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THE EFFECT OF MEDIATED IMMEDIACY UPON STATE MOTIVATION AND COGNITIVE LEARNING IN AN ONLINE LESSON

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THE EFFECT OF MEDIATED IMMEDIACY UPON STATE MOTIVATION AND COGNITIVE LEARNING IN AN ONLINE LESSON

DISSERTATION

A dissertation submitted in partial fulfillment of the Requirements for the degree of Doctor of Philosophy in the College of Communication and Information At the University of Kentucky

By

Gary K. Hughes

Lexington, Kentucky

Director: Dr. Donald O. Case, Professor of Library and Information Science

Lexington, Kentucky

2014

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THE EFFECT OF MEDIATED IMMEDIACY UPON STATE MOTIVATION AND COGNITIVE LEARNING IN AN ONLINE LESSON

The role of teacher immediacy and its impact upon student learning within the traditional classroom has been established within the instructional communication discipline in the past 30 years. In recent years, with the advent of computer-mediated distance education (i.e. online courses), some researchers have attempted to apply the same theories and measures of concepts without making the distinction between actual teacher behavioral indicants of immediacy and student perceptions of immediacy, nor recognizing that there may be a different number of variables involved between a single lesson presented online and an entire course presented over a period of time. Building upon previous models, the Short-Term Motivational Model of Learning was proposed and tested, using survey results from 229 undergraduate students who completed an online lesson presented in six different formats, and who were tested for learning outcomes. In comparison to a direct measure of learning outcomes (number of correct test answers), it was found that the Perceived Cognitive Learning Scale correlated highly with the direct measure, while the Learning Loss Scale did not. Three of the three study hypotheses were supported. Hypothesis one proposed that higher student perception of immediacy would correlate with higher student state motivation and was supported. Hypothesis two proposed that higher student trait motivation would correlate with higher student state motivation and was supported. Hypothesis three proposed that higher student state motivation would correlate with higher student cognitive learning. Student cognitive learning determined through three measures: the Perceived Cognitive Learning Scale, pretest-posttest scores differences, and the Learning Loss Scale. Using the Perceived Cognitive Learning Scale, hypothesis three was supported. Using the pretest-posttest scores differences, hypothesis three was supported weakly. Using the Learning Loss Scale, hypothesis three was also supported weakly. In testing whether teacher behavioral indicants of immediacy, student perception of immediacy and student trait motivation would explain significant variance in student state motivation in a single lesson presented online, trait motivation failed to be a predictor. Subsequently, in testing whether all of these variables would explain significant variance in student cognitive learning (and using each of the three measures of student cognitive learning), trait motivation again failed to be a predictor.
In general the results support the idea that perceived learning is affected by the degree of motivation as affected by immediacy. While an attempt to vary degrees of immediacy was not fully successful, results also suggest that adding audio to online lessons may not produce significant gains in learning when compared to text-only presentations.

KEYWORDS: mediated immediacy, student motivation, cognitive learning, learning model, student perception

Gary K. Hughes

April 24, 2014
THE EFFECT OF MEDIATED IMMEDIACY UPON STATE MOTIVATION AND COGNITIVE LEARNING IN AN ONLINE LESSON

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To my loving wife Karen who has been patient and supportive in this endeavor and to my sons Andrew and Nathan for their confidence and belief in me.
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Chapter One: Introduction

Education has been changing. Prior to the last century the methods used in teaching were slow to change, lasting for centuries and even millennia. Even in the twentieth century much instruction was done using the Socratic method of dialogue, a method that is more than two thousand years old. With the advent of mandatory public education in the United States and other developed countries came a challenge to the old ideas concerning how to teach and how to help students to learn. Changes had to be made to accommodate the student who did not have the advantages of material wealth and/or educated parents that others might have. Motivational levels of students varied, creating a challenge for teachers and parents to motivate these students. Even the science of how students learn was not understood, and continues to evolve today. As a result of these issues, research began that was to identify those factors that lead to learning. The question has been and is “what can teachers do to increase student learning?”

One of the avenues of study that has been productive in helping the educational establishment to improve has been in the area of teacher behaviors and messages (Andersen, 1979; Christophel, 1990; Frymier, 1993, 1994; Gorham, 1988; Kearney, Plax, & Wendt-Wasco, 1985; Ni & Aust, 2008; Plax, Kearney, McCroskey, & Richmond, 1986; Richmond, Gorham, & McCroskey, 1987; VanHorn, Pearson, & Child, 2008; Waldeck, Kearney, & Plax, 2001; Zhang, Oetzel, Gao, Wilcox, & Takai, 2007b). In particular, with regard to the communication of the teacher to students, the study of the concept of immediacy has demonstrated a link between teacher behaviors that are either immediate or non-immediate and student learning behaviors, characteristics, and outcomes (C. Baker, 2008, 2010a, 2010b; J. D. Baker, 2001, 2003, 2004; Christophel,
The current study explores students’ perception of immediacy, its effect upon student state motivation, and subsequent student cognitive learning as measured through pre-test/post-test assessments and perceived cognitive learning scales. In this dissertation the following are presented: first, a review of literature with the background history of the study of teacher immediacy, brief explanation of the theory of approach and avoidance that serves as the basis for the construct of immediacy, details of the immediacy construct, the co-constructs of trait and state motivation, and student cognitive learning construct; second, a discussion of past models that have sought to elucidate the connection between immediacy and learning, the proposal for two new models of immediacy and learning based upon short-term and long-term perspectives, a brief description of the prevalence of the type of lesson presentation to be used in the study, and a description of the cognitive theory of multimedia learning that serves to direct the format of the lesson presentation; third, a brief description of the pilot study and method used for the main dissertation study, including what was learned from the pilot student and greater details concerning the measures that were used; and fourth, a discussion section that includes interpretation of the results, limitations of the study, implications for future research and conclusions.

In this dissertation a new model of immediacy and learning in episodic situations called the Short-Term Motivational Model of Learning was tested. This model is derived
from a new postulated model for learning over time called the Long-Term Affective Learning/Motivational Model of Learning. The unique nature of these new models is that they make the heretofore seldom made distinction between teacher behaviors and students’ perception of immediacy as well as that between affective learning and motivation with student learning behaviors that extend over time and that proceed from motivation. Past studies and the literature have tended to gloss over these differences in their conceptions of immediacy and motivation. Thus, the question raised was should there be different models of learning for long-term and short-term learning settings, and if so, how might they differ and how might they be similar? The following narrative will lead the reader to understand why this author believes that there should be separate models and how the short-term model as applied to a computer-mediated lesson was tested.
Chapter Two: Review of Literature

Background

Beginning over four decades ago, Albert Mehrabian and Morton Wiener identified and began studying the construct of immediacy (Mehrabian, 1967, 1971; Wiener & Mehrabian, 1968). Their work applied the construct of immediacy to settings that were not specifically seeking to measure educational impact. Their intent was to explore information that might be applied to society as a whole. In addition, these scholars used a third party observation scoring method primarily of non-immediacy proxemic actions and resultant attitudes as the basis of their studies.

The application of the construct of immediacy to the instructional setting began in earnest with the work Janis Andersen (1979). Andersen conceptualized immediacy as “nonverbal behaviors that reduce the physical and/or psychological distance between teachers and students” (Andersen, 1979, p. 543). Andersen also connected immediacy to teaching effectiveness which was defined as the “ability to produce affective, behavioral and cognitive student learning” (Andersen, 1979, p. 543), corresponding to Bloom’s (1956) “Taxonomy of Learning Domains.” For the next few years the bulk of research on immediacy focused primarily on nonverbal immediacy since Andersen’s “Behavioral Indicants of Immediacy Scale” (or BII) became the basis for survey scales to follow (Andersen, 1979, p. 547).

Where the construct of immediacy had been narrowed in the 1970s to refer primarily to nonverbal behaviors, Gorham (1988) helped to reinvigorate the study of the verbal aspect of immediacy that existed twenty years earlier (Wiener & Mehrabian, 1968) with her introduction of the verbal immediacy scale (Gorham, 1988). Although the scale

The construct of teacher immediacy and the effect upon learning has been studied in various instructional settings. Beyond the typical university classroom setting, Plax, Kearney, McCroskey and Richmond (1986) studied the connection of nonverbal immediacy, verbal control strategies, and affective learning in the junior high school and high school settings. In the university setting Kearney, Plax and Wendt-Wasco (1985) considered the effect of teacher immediacy upon affective learning and the differences in that effect between people-oriented courses (e.g. management), also called P-Type courses, and task-oriented courses (e.g. accounting), also called T-Type courses. Zhang, Oetzel, Gao, Wilcox and Takai (2007b) found that immediacy still has an impact in cultures as divergent from one another as China, Germany, Japan, and the United States. In addition to traditional classroom settings, online and web-based courses have also served as the setting of immediacy studies (C. Baker, 2010a; J. D. Baker, 2001; Fall et al., 2011; Farwell, 2011; Lawless-Reljic, 2010; Ni & Aust, 2008; O'Sullivan, Hunt, & Lippert, 2004; VanHorn et al., 2008).

Several scholars have taken the study of immediacy and learning a step further by proposing models that account for possible intervening variables. One line of research follows the logic that higher teacher immediacy behaviors impact student motivation which in turn impacts learning. Using the approach/avoidance theory as the basis,
Christophel (1990) stated that “it was believed that students would be motivated to move towards (approach) classes they like and unmotivated or move away from (avoid) classes they dislike” (Christophel, 1990, p. 325). Christophel (1990) sought to measure the impact of trait motivation, state motivation, verbal immediacy, nonverbal immediacy and affective learning. Her findings indicated that a student’s state motivation is affected by immediacy which in turn impacts student affective learning. Frymier (1993) also studied the impact of immediacy upon motivation and found that state motivation appears to be impacted by nonverbal immediacy more than verbal immediacy. The next year Frymier (1994) further refined her motivational model of learning which included trait motivation, nonverbal immediacy and verbal immediacy. The model demonstrated that immediacy had an indirect impact on affective learning through state motivation. Whether such a model is pertinent only to the traditional classroom setting or is also applicable to the online, web-based course setting requires further study.

In 2004, Witt, Wheeless and Allen conducted a meta-analysis over the literature dealing with the effectiveness of instructor immediacy that cast some doubt upon its impact upon the student learning outcome of cognitive learning as opposed to students’ perception of their cognitive learning (Witt, Wheeless, & Allen, 2004). Two years later, these same scholars reconsidered the impact of immediacy by proposing a model composed of immediacy impacting affective learning and student motivation which subsequently impact student cognitive learning (Allen, Witt, & Wheeless, 2006). Through the use of meta-analysis, these scholars discovered that there was considerable evidence that their model was an accurate description of the process involved.
Finally, it should be noted that the study of immediacy has been widespread in previous decades but continues to be of importance today with the movement toward computer mediated learning. In their survey of instructional and developmental communication research from the 1990s, Waldeck, Kearney and Plax (2001) found that out of eighty five articles concerning teacher communication published in major communication journals (primarily composed of *Communication Education*, *Communication Research Reports*, *Communication Quarterly*) that twenty eight (one third) concerned teacher immediacy related behaviors. As recent as 2011, Farwell (2011) compared teacher immediacy, student motivation, and student learning between the traditional and online settings. There are several other recent investigations into the impact of immediacy in online instruction as well. Fall, Kelly and Christen (2011) sought to discover whether or not there was a difference in the impact of immediacy upon the motivation and outcomes between military and civilian students. Lawless-Reljic (2010) investigated the effects of instructor immediacy mediated through an avatar within the synchronous online 3D virtual world of Second Life. In 2010, Bodie studied the impact of instructor immediacy within the Wimba synchronous virtual classroom (Bodie, 2009). More closely related to this current study, Baker (2010a) studied the impact of instructor immediacy and presence upon student affective learning, cognition and motivation in both synchronous and asynchronous settings. Thus, as instructional methods, delivery methods, and instructional contexts change, the construct of teacher immediacy persists as one to be measured and requires revalidation as a factor influencing learning either directly or indirectly in various settings, including the online/web-based course setting. This history leads one to the theoretical underpinnings:
approach/avoidance theory, the construct of verbal immediacy, the construct of mediated immediacy, the construct of student motivation, and the construct of student cognitive learning.

One question that is not fully addressed in this thesis is how immediacy differs from other relevant concepts in computer-mediated communication, such as “social presence,” which has been investigated for many years in regards to communication media (Short, Williams, & Christie, 1976) and in recent years also characterized as “instructor presence” in studies of online learning (C. Baker, 2008, 2010a, 2010b; Bozkaya & Erdem Aydin, 2007; Frisby, Limperos, Record, Downs, & Kercsmar, 2014; Sheridan & Kelly, 2010; VanHorn et al., 2008). Social presence, as has generally been defined in terms of “awareness of others in an interaction” (Rice, 1993; Walther, 1992), is closely tied to the notion of interactivity in media. Some investigations (Tu & McIssac, 2002) suggest social presence is composed of three dimensions, one of which is interactivity, with the other two being social context and online communication. Of these it seems to be aspects of interactivity (e.g., timely response, formality of messages, communication strategies) that matter most in shorter relationships such as academic classes, while social context variables (like whether the instructor offers a personal website or video, or engages in chat) are rated less important by online students (Sheridan & Kelly, 2010). In any event, it seems like instructor presence is less well-defined than instructor immediacy, and also more difficult to develop in the context of very-short term intervention, such as a single online lesson.
Approach/Avoidance Theory

The basic theory behind the construct of immediacy is that of approach/avoidance. As stated by Mehrabian (1971), “people are drawn toward persons and things they like, evaluate highly, and prefer, and they avoid or move away from things they dislike, evaluate negatively, or do not prefer” (p. 1). The tendency to approach the things we like and avoid the things we dislike includes doing so physically and psychologically. As a positive construct, Mehrabian claimed that “liking encourages greater immediacy and immediacy produces more liking” (Mehrabian, 1971, p. 7)

Approach/avoidance theory is the basis for several “instructional concerns, including immediacy, communication apprehension, extraclass [sic] communication, student motivation, receiver apprehension, willingness to communicate in the classroom, and use of communication technologies for instructional purposes” (Waldeck et al., 2001, p. 211). Of these concerns, the concept of immediacy focuses more than the other concerns on the specific actions by a source (teacher) which are likely to produce approach or avoidance on the part of the receiver (student). Mehrabian’s greater emphasis was on the physical nature of approach/avoidance through the use of the approach metaphor (Mehrabian, 1981, p. 13). On the other hand, this is not to imply that Mehrabian completely avoided dealing with the verbal/speech aspect of approach/avoidance. When dealing with approach/avoidance within certain contexts, Mehrabian provides a list of various approach/avoidance speech situations and the corresponding approach/avoidance replies (Mehrabian, 1981, pp. 143-145).

Mehrabian (1967, 1971, 1981) laid the foundation for the study of immediacy in the instructional setting whether that was his intent or not. Immediacy was eventually
divided into two types out of the one concept: nonverbal and verbal. The current study concerning mediated immediacy deals with some aspects of both nonverbal and verbal immediacy as it has developed since Mehrabian but extends the construct to include visual presentation in the online environment.

**Immediacy**

Immediacy as conceptualized by Mehrabian (1971) in the face-to-face setting includes all communication behaviors, verbal and nonverbal, that enhance the perception of physical or psychological closeness between the communicator (e.g. teacher) and the receiver (e.g. student). Nonverbally, immediacy has been operationalized in scales as including such actions as eye contact, relaxed body position, greater use of gestures, positioning the body toward students, increased use of smiles, the variety in vocal expressions, more bodily movement when speaking, and literally decreasing the physical distance to the student (Andersen, 1979; Christophel, 1990; Frymier, 1993, 1994; Frymier, Shulman, & Houser, 1996; Gorham, 1988; Kearney, 2009; Kearney et al., 1985; Richmond, Gorham, et al., 1987; Zhang et al., 2007b). Verbally, immediacy was originally conceived by Mehrabian (1981) as stylistic differences in the verbal communication acts from which liking or disliking was inferred.

Since 1988 verbal immediacy has been largely operationalized through Gorham’s verbal immediacy scale (Gorham, 1988). This scale includes on the part of the source (teacher) such verbal elements as the use of personal examples, the use of humor, references to “our” and “we,” praising student actions and comments, addressing students by name, and encouraging students to talk (Gorham, 1988, p. 44). Since that time many
have used the same or slightly altered verbal immediacy scale (Christophel, 1990; Freitas et al., 1998; Frymier, 1994; Frymier et al., 1996; Ni & Aust, 2008).

In 1995, Robinson and Richmond called into question the validity of Gorham’s verbal immediacy scale by claiming that the scale measured verbally “effective” teacher behaviors and not verbally “immediate” behaviors (Robinson & Richmond, 1995). Using previously collected data sets, Robinson and Richmond sought to find a correlation between verbal immediacy scale scores and the scores for nonverbal immediacy and affect toward an instructor. According to their findings there was only one item on the scale that had correlations consistently above .50, two with correlations in the .40 range, and three with correlations in the .30 range. Since the majority of the items on the scale did not have strong correlations in the data that they analyzed, Robinson and Richmond drew the drastic conclusion that the immediacy construct may be a purely nonverbal phenomenon and that “verbal factors are more related to other constructs” (Robinson & Richmond, 1995, p. 84). It was their conclusion that “Until this issue is resolved, advancement of theory and research related to immediacy should focus on its nonverbal components” (Robinson & Richmond, 1995, p. 84). Their conclusion seems harsh in light of coefficient alphas for the verbal immediacy scale that have ranged from .65 to as high as .94, not too unlike those for nonverbal immediacy which have ranged from .76 to .82 (Freitas et al., 1998).

Two years later, Richmond relaxed the previous conclusion slightly in a work coauthored with Mottet claiming that “verbal immediacy’s utility appears to be limited to a linguistic-situated context” (Mottet & Richmond, 1997, pp. 5-6). These authors left open the possibility that verbal immediacy may be a legitimate construct but had doubts
that it is consciously employed in the face-to-face setting. Still, their study allowed for
the application of the theory of approach and avoidance in the verbal realm as they
designed a new scale to measure approach and avoidance strategies (Mottet & Richmond,

Subsequent to Robinson’s and Richmond’s (1995) critique of Gorham’s verbal
immediacy scale and Mottet’s and Richmond’s (1997) attempt at developing a new scale,
O’Sullivan, Hunt and Lippert (2004) designed a new scale for the computer mediated
setting based in part upon the work of Watzlawick, Bavelas and Jackson (1967) as well as
the previous literature on immediacy. Due to the spread of online, web-based instruction,
they proposed a new form of immediacy, namely, mediated immediacy. They defined
mediated immediacy “as communicative cues in mediated channels that can shape
perceptions of psychological closeness between interactants” (O’Sullivan et al., 2004).
Their mediated immediacy was subdivided into nine dimensions (self-disclosure,
expressiveness, accessibility, informality, similarity, familiarity, humor, attractiveness,
and expertise). These dimensions are similar to several of the dimensions identified by
Witt and Wheeless (2001) for verbal and nonverbal immediacy which had been used in
the face to face setting (distance, time, duration, probability, communicator participation,
object participation, mutuality, activity, inclusivity, concern, self-disclosure, detail,
proximity, eye gaze, gestures, body position, movement, facial expressions, and
vocalics). According to O’Sullivan, et al. (2004), their newly developed dimensions of
mediated immediacy represented two macro categories of instructor behaviors or
indicators: regard for the other, and approachability. Basically, within the approach-
avoidance framework, those behaviors or indicators that encompassed “regard for other”
were those that signal to the other that “I am approaching you” while behaviors or indicators that encompassed “approachability” were those that signaled to the other that “You can approach me” (O'Sullivan et al., 2004, p. 472). From the micro dimensions (mentioned above) that were developed from these two macro categories, these scholars developed a new immediacy scale for mediated immediacy with a strong reported reliability for the scale \( \alpha = .83, N = 170 \). This new scale appeared to perform well in their study as they utilized linguistic immediacy cues and presentation (visual) immediacy cues on static web pages. Using this scale, these two types of immediacy were found to produce higher evaluations of immediacy, motivation, and perceptions of the instructor associated with the web pages. Thus, this new immediacy scale seems well suited for measuring the construct in the mediated setting, especially those situations that are asynchronous in nature.

More recently, Kelly (2012) made a distinction in the literature largely not made since Andersen (1979), namely, that there is a difference between behaviors that are intended to indicate immediacy and the perception of immediacy. This observation calls into question the means by which the immediacy concept has been typically measured since Andersen (1979). The point made by Kelly is that the nonverbal and verbal immediacy measures that were developed and have been used almost exclusively since Anderson have focused upon the student observation of specific actions on the part of the teacher and not the perception by the student of whether or not those actions produced immediacy with the instructor. In addition, as investigators of the effect of immediacy in other cultures already know, the actions that might be perceived as producing immediacy in one culture do not necessarily do so in another, and may in fact be perceived as non-
immediate in a different culture (Kelly, 2012; Zhang, 2009, 2011; Zhang & Huang, 2008; Zhang & Oetzel, 2006; Zhang, Oetzel, Gao, Wilcox, & Takai, 2007a; Zhang et al., 2007b; Zhang & Zhang, 2006). As a result, Kelly (2012) developed a new 18-item 7-point semantic differential perceived immediacy scale based off of the previous work of Andersen (1979). Interestingly, this scale is similar to the 10-item 7-point semantic differential mediated immediacy scale developed by O'Sullivan et al. (2004), including three identical items (“cold/warm,” “friendly/unfriendly,” and “close/distant”). As a result, even though O'Sullivan et al. (2004) were not making the distinction between behavior indicants of immediacy and the subject’s perception of immediacy, due to the process that was used to arrive at their measure (based upon subject perceptions), and given the fact that they were seeking to establish an immediacy measure for the computer mediated context (especially the online context, including static webpages), the mediated immediacy scale already accounts for the difference between behaviors and perception.

Given the long history of the study of teacher immediacy, the casual observer might be tempted to ask “Hasn’t teacher immediacy been studied enough? Is there not enough known about it already?” It is true that there have been many studies over the last forty years dealing with teacher immediacy, but much of this has focused on the face-to-face setting, especially nonverbal immediacy. Even Witt, Wheeless, and Allen (2006) saw the value in exploring the impact of immediacy in the online environment as they wrote “The impact of teacher immediacy may not appear initially relevant to the distance learning environment but research indicates that communication features may play as important a role in that environment as well” (p. 151). In addition, when scholars have attempted to conduct meta-analytical studies just of the impact of immediacy in the face-
to-face setting (Allen et al., 2006; Witt et al., 2004) they have found the effects studies upon which they can base their work to be insufficient in number. If it is true that verbal immediacy may be more pertinent to a linguistic text-based form of learning as indicated by Mottet and Richmond (1997) then the explanation as to why verbal immediacy has not been studied as much is found in the fact that until the last few years the overwhelming majority of instruction was done in the classroom setting. That is changing. In fact, through the years verbal immediacy may have been a factor in correspondence studies without anyone recognizing it. Now that computer-mediated and web-based courses have become mainstream with some regionally accredited degrees being offered entirely online, the importance of teacher immediacy in student learning has risen to be a topic of importance. In addition to courses that are part of the offerings of accredited universities and colleges, there is a growing trend for corporate training that utilizes asynchronous forms in their instructional design and that tend to de-personalize the perceived instructor to some extent. With the recent advent of massive online open courses (MOOCs hereafter) the asynchronous mode of instruction appears to be on a steep increase, assuming that the issues of accreditation and the business model are worked out. Nonverbal immediacy as traditionally conceptualized does not typically apply in these settings, although some aspects will be applicable when either audio or video are also used in online instruction. In the place of traditionally conceived verbal and nonverbal immediacy is the new concept of mediated immediacy which measures the perception of immediacy and not immediacy indicating behaviors. The common factor in all educational settings is largely the verbal component whether it be spoken or in text, but in the online setting mediated immediacy incorporates the verbal component, the nonverbal
components that may be present when audio and/or video modes of instruction are used, plus those visual aspects that are related to webpage presentation.

**Student Motivation (Trait and State)**

Much of the study of student motivation that has occurred in the communication discipline in the last 25 years has been based in part upon the work of Jere Brophy (1983, 1987) in the education discipline. Brophy claimed that the definition of “motivation to learn” could be conceived as “both a general trait and a situation-specific state” (Brophy, 1983, p. 200). In further delineating the differences between the two types of motivation, Brophy conceived trait motivation as “an enduring disposition to value learning for its own sake” and that situation-specific motivation was “when students engage themselves purposefully in classroom tasks by trying to master the concepts or skills involved” (Brophy, 1983, p. 200). Although Brophy did not test or measure the construct of student motivation in the two main works that are often cited, she did make a connection between developing a student’s motivation to learn and socialization within the classroom between the teacher and the student (Brophy, 1983, 1987). This observation served as a link between the developing understanding of student motivation to learn and the impact that communication factors might have upon such motivation.

As a construct within the educational communication discipline, motivation as conceptualized by Christophel (1990) has been commonly used by many of those studying the construct (Allen et al., 2006; C. Baker, 2010a, 2010b; Beatty, 2009; Fall et al., 2011; Farwell, 2011; Fisher & Katt, 2007; Frymier, 1993, 1994; Frymier et al., 1996; Mazer, Murphy, & Simonds, 2007; McCroskey, Richmond, & Bennett, 2006). Christophel (1990) accepted Brophy’s definition and concept of student motivation, as
well as the division of motivation into the two types: trait motivation and state motivation. On the other hand, Christophel claimed that there were five beliefs concerning motivation held by some (Wlodkowski, 1978) that led to wrong conclusions. First, she stated that the belief that students who were not willing to complete assignments were *unmotivated* was incorrect and that students were always motivated to do something, even if it was inappropriate and disruptive (Christophel, 1990, p. 324). Second, she claimed that the belief that teachers motivated students claimed too much for the teacher’s direct impact upon the student. Teachers could make learning attractive and provide opportunities and incentives for students to participate in activities and learn, but motivation came from how these matched the students’ interests and intrinsic motivators (Christophel, 1990). Third, according to Christophel the belief that since learning was necessary for survival and that it was therefore more important for students to learn than to be motivated would create students who may learn today but would no longer care to learn once they were outside of any situation that forced them to learn (Christophel, 1990). Fourth, she claimed that the belief that threats could motivate students to learn was counter-productive and would only lead the student to avoid the subject matter in the future (Christophel, 1990). Fifth and finally, she stated that the claim that learning would automatically improve with an increase in student motivation was to make the creation of motivation within the student a panacea and made claims for motivation that were not sustainable (Christophel, 1990). It is entirely possible for a student to be very motivated to learn about a particular subject while that student’s learning would still be impacted by other factors (including lack of nutrition, social problems at home, and possible learning disabilities). Therefore, motivation to learn on the part of the student is important and
should be pursued for sustainable learning when the student is no longer under the
direction of an instructor, but the claim that motivation would automatically result in
learning cannot be substantiated.

Given the importance of understanding how motivation is affected by other
constructs such as immediacy, and given the theoretical proposals that motivation
impacts learning, it was important for there to be an operationalization of the construct.

Using the three item measure previously developed by Beatty, Forst, and Stewart (1986),
Christophel added nine (9) more bipolar adjective semantic differential items to produce
the 12 item scale to measure more accurately both trait and state motivation (Christophel,
1990, p. 327). The Beatty et al. (1986) measurement included the bipolar pairs of

Christophel extended the measure by including the following pairs: “not stimulated:
stimulated,” “don’t want to study:want to study,” “inspired:uninspired,”
“unchallenged:challenged,” “uninvigorated:invigorated,” “unenthused:enthused,”
“excited:not excited,” “aroused:not aroused,” and “not fascinated:fascinated”
(Christophel, 1990, p. 327). The same instrument was used to measure both trait
motivation and state motivation with differences in the directions for the student to
complete the survey items in light of either their general attitude toward learning and/or
taking classes or their attitudes toward the specific class that they had taken. It should
also be noted that the same year that Christophel published the 12 item student
motivation scale that Richmond (1990) also published a 5 item scale using the same three
items from the scale produced by Beatty et al. (1986) and two items very similar or the
same as used by Christophel (bored:excited and inspired:uninspired). Although a 16 item
scale is available (Beatty, 2009), and the shorter scale developed by Richmond (1990) is occasionally used (Fisher & Katt, 2007; Frymier et al., 1996), the 12 item scale developed by Christophel (1990) tends to be the preferred scale for measuring student motivation (C. Baker, 2010a; Farwell, 2011; Mazer et al., 2007; McCroskey et al., 2006).

The importance of studying motivation in the context of immediacy is one that was substantiated through the use of meta-analysis by Allen et al. (2006). In an earlier meta-analytical study, Witt et al. (2004) had found that the cumulative research demonstrated strong correlations between nonverbal immediacy and students’ perceptions of learning ($r = .51$) and affective learning ($r = .49$), while measures of cognitive learning were weakly/negligibly correlated. In similar fashion, verbal immediacy correlated with students’ perceived learning ($r = .49$) and affective learning ($r = .49$), but measures of cognitive learning correlated even less ($r = .06$) than did nonverbal immediacy. At this point it appeared that immediacy may have little to do with the acquisition of knowledge and much more to do with students’ evaluations of teachers. Two years later (Allen et al., 2006), the same authors published a follow up meta-analysis using eight studies ranging from 1979 to 2001 in which they tested a motivational model with affective learning as a mediating factor between immediacy and cognitive learning. They found a strong correlation between teacher immediacy and affective learning ($r = .51, p < .05$) and a slight correlation between affective learning and cognitive learning ($r = .08, p < .05$).

Although the correlation was small, these authors made a very important observation that such a small correlation should not be discounted. Their point was that “the effects should be viewed not in isolation but rather cumulatively” (Allen et al., 2006,
The point that they make is that small effects in specific circumstances can have greater effect when repeated over time. In addition, they point out that there is another aspect to the educational endeavor that is just as important as the amount of cognitive learning in a single lesson or even a course, which is the long-term retention of students until the completion of their educational programs. As they state, “An educational practice that is effective at creating ‘learning’ but increases the long-term dropout rate provides only a short-term questionable benefit that may or may not really be in the best interests of the system” (Allen et al., 2006, p. 29), nor of the student. If the point made by Dennen and Bonk (2007) that there is a deficiency in the motivational climate of online instruction is true, and few designers of online learning are giving attention to the motivational principles that may unknowingly undergird effective learning (Dennen & Bonk, 2007, p. 66), then studying the impact of student motivation as a part of any model of learning in the online setting is important.

**Student Cognitive Learning**

As stated by Gorham (1988), “The product in an instructional process-product model is learning: cognitive, affective, and behavioral” (p. 41). These three domains of learning are those originally proposed by Bloom (1956) and have been the same basic domains studied in instructional research ever since. The cognitive domain deals with knowledge and other mental skills and according to Bloom (1956) the domain can be divided into six categories: knowledge (recall of information), comprehension (understands the meaning and can provide an interpretation), application (applies learned concepts in new situations), analysis (divides more complex concepts into its parts and can provide organization), synthesis (can draw from various concepts and knowledge to
create new thought structures and ideas), and evaluation (can make judgments about the
good and value of ideas and materials). Learning occurs when any of these six are
evidenced, but moving from the earlier categories to the latter ones is perceived as
moving from the simpler to the more complex and deeper learning.

Although the eventual goal in all educational settings is for students to accomplish
cognitive learning, a large problem in determining whether this learning has occurred is
the difficulty in finding a measure that can determine the amount of learning that has
occurred and that is generalizable to other situations, subject matter, and pedagogical
styles. At the time of their writing, Kearney and Beatty (2009) were very blunt in this
matter as they state “The fact remains that no completely valid means of measuring
cognitive learning exists” (Kearney & Beatty, 2009, p. 8). They went on to point out that
traditional measures, such as examination scores, course grades, and grade point
averages, only provide a limited measure of how much learning has occurred (Kearney &
Beatty, 2009). There are too many other factors that can impact those measures causing
the resulting outcome to be invalid in actually determining how much learning occurred.

In the field of instructional communication, there are two types of cognitive
learning measures that have been most commonly used to get around the validity issues
related to more traditional indicators of learning: recall tests and the learning loss scale
(Kearney & Beatty, 2009). As of the revision of their original 2004 work, Kearney and
Beatty (2009) indicated that the most recent use of the recall test method in the
instructional communication discipline was in a study by Kelley and Gorham (1988),
Pelowski et al. (2005) notwithstanding. The obvious problem with this method is the
inability to generalize the results across different disciplines, skills, and topics. The
second method to measure learning, the learning loss scale, was developed by Richmond, McCroskey, Kearney, and Plax (1987). This scale relies upon student self-reporting of their perceptions of learning on a 0-9 scale by first asking how much the student learned and then a second question of how much they think they would have learned if they had the ideal teacher. The advantages of this method allow for measurement of learning that goes beyond the simple acquisition of knowledge and recall of facts, includes the student’s perception of what they have learned in addition to what they already knew, and allows for application and comparison across instructors, courses, classes, schools, and subject areas (Kearney & Beatty, 2009). Because of these advantages, there have been many studies and scholars in the field of instructional communication who have utilized the learning loss scale (C. Baker, 2010a; J. D. Baker, 2004; Chesbro & McCroskey, 2000; Christophel, 1990; Fall et al., 2011; Gorham, 1988; Kearney et al., 1985; Plax et al., 1986; Witt & Wheeless, 2001). Unfortunately, the drawbacks of using self-report methodology include a lack of objectivity and standardization (Kearney & Beatty, 2009). In addition, there have been some who have questioned whether cognitive learning should be operationalized with one- and two-item measures (Ellis, 2004; Frisby & Martin, 2010; Rodriguez, Plax, & Kearney, 1996). In attempts to overcome these deficiencies, other approaches have been used. Pelowski et al. (2005) used a pretest/posttest design and Frisby and Martin (2010) created a 10-item “Perceived Cognitive Learning Measure” scale, both of which appear to be designed to measure learning over the course of a class term. Generalizability of the measures used by Pelowski et al. (2005) is highly questionable since the exams/tests were subject specific, but the new scale Frisby and Martin (2010) developed may be useful as it is tested and
compared to other methods. More recently, Frisby et al. (2014) altered the 10-item “Perceived Cognitive Learning Measure” for an experimental condition by simply substituting the word “presentation” for each instance that the word “class” appeared in the original scale items. Still, the learning loss scale persists, as is noted above. What is needed at this point is a comparison of the “Learning Loss Scale” to the “Perceived Cognitive Learning Measure” and both of these to a recall test/quiz results to determine the accuracy of each of these two self-report measures, as was done in the main dissertation study.

**Past Models Linking Immediacy and Learning**

Even though the link between immediacy and affective and cognitive learning has been established (more so with affective learning and to a lesser degree with cognitive learning), it is evident that “there is little agreement about how immediacy works to enhance learning” (Witt et al., 2006, p. 152). This can readily be seen through two studies and the models proposed by Frymier (1994) and Rodriguez et al. (1996).

Early research into the impact of immediacy upon learning was based upon an assumed model that has since been named the Learning Model (Frymier, 1994). Based upon the belief that it is logical that the teacher behavior of immediacy impacted student learning instead of student learning creating teacher immediacy, this model proposed that teacher nonverbal immediacy and, to a lesser extent, verbal immediacy worked directly to bring about learning in the student. The Learning Model served as the basis for work by such scholars as Andersen (1979), Kelley and Gorham (1988), Gorham (1988), Richmond, Gorham, et al. (1987), and other researchers in the 1980s who sought to demonstrate a causal link between immediacy and learning (Frymier, 1994). If other
phenomena such as motivation were involved, then that phenomenon, whether it was motivation or some other phenomenon, was a separate independent variable related to learning (see Figure 2.1 below).
Figure 2.1 The Learning Model (Frymier, 1994)
Primarily beginning with the work of Christophel (1990) and Richmond (1990), the thinking about the causal chain between immediacy and learning began to shift. Building off of the work by Brophy (1983, 1987) and Wlodkowski (1978), Christophel (1990) hypothesized that the impact of teacher immediacy behaviors upon student learning would be mediated by student motivation to study. She found that teacher immediacy was positively related to student motivation to study, and specifically that state motivation was more highly correlated to teacher immediacy than with trait motivation. Thus, she concluded that immediacy must impact the student motivation to study in order to impact learning (Christophel, 1990). In a separate but related study, the work of Richmond (1990) supported the conclusions of Christophel (1990) as she found teacher nonverbal immediacy behaviors to be positively related to state motivation to study, affective learning, and perceived cognitive learning.
Figure 2.2  The Motivation Model (Frymier, 1994)
Frymier (1994) helped to advance the Motivation Model of learning that links teacher immediacy to learning through state motivation as the mediating variable (see Figure 2.2 above). In her study, Frymier (1994) tested four models: the Motivation Model and the Learning Model each with affective learning and cognitive learning as the criterion variable. Using correlation and chi-squared analysis, she determined that the Motivational Model proved to be a better fit than the Learning Model with affective and cognitive learning finding that the Motivational Model was a good fit and the Learning Model was a poor fit (Frymier, 1994). Thus, it appeared that a good model to explain the link between teacher immediacy and learning had been found that would settle the debate.

It should also be noted that Frymier (1993, 1994) brings up the issue of the ARCS Motivational Model of instructional design by Keller (1983, 1987) as a possible explanation for the connection between teacher behaviors associated with immediacy and student motivation that leads to learning. The ARCS Model focuses more on instructional design and specifically how the information is organized and presented through teacher strategies (Frymier, 1993, p. 456) than upon interpersonal communicative aspects of the teacher behaviors. On the other hand, Frymier (1994) suggests that the ARCS Model may be “useful in explaining why immediacy contributes directly to motivation and not learning” (Frymier, 1994, p. 141). The four components in the ARCS model are attention, relevance, confidence and satisfaction (Frymier, 1994; Keller, 1983, 1987, 1999). The observation has been made that many of the teacher behaviors portrayed in the literature as being immediacy producing are also attention getting (Frymier, 1994). Indeed, a causal path presented by Kelley and Gorham (1988)
proposed that immediacy created arousal which captured the attention of the student
which in turn was connected to learning. Frymier (1994) interpreted the results of her
study as demonstrating that the path went from immediate behaviors which created
arousal which captured the attention of the student which enhanced motivation which
increased learning.

Frymier (1994) not only viewed attention as playing a part in the connection
between immediacy and motivation, but also confidence and satisfaction. The
connection to the confidence category in the ARCS model had to do with the building of
positive expectation in students. There have been a moderate correlations between
nonverbal and verbal immediacy with those portions of the affective learning scale
having to do with willingness to take another course in the same content area. In
addition, she viewed satisfaction as being connected to immediacy as a she speculated
that those students with more immediate teachers would likely be more satisfied. This
too may be seen in the connections between teacher immediacy and affective learning.
Unfortunately, Frymier (1994) misses the fact that the ARCS Model is based upon a
different theory than the concept of immediacy. As has already been stated above, the
concept of immediacy is rooted in approach/avoidance theory whereas the ARCS Model
is founded upon expectancy/value theory (Keller, 1987). To use the words of Keller
(1987), “Expectancy-value theory assumes that people are motivated to engage in an
activity if it is perceived to be linked to the satisfaction of personal needs (the value
aspect), and if there is a positive expectancy for success (the expectancy aspect)” (pp. 2-
3). It should be noted here that there is crossover with the approach/avoidance theory on
which immediacy is founded. The whole concept concerning immediacy is one that is
relationally based: perceived immediate behaviors influence the student to be attracted to the teacher which reduces perceived psychological distance between the student and the teacher. In the case that expectancy-value theory views people as motivated to satisfy personal needs, and the need is considered to be the need for affiliation, then there is similarity between what immediacy does and expectancy-value theory. On the other hand, with expectancy-value theory being goal oriented, its principles entail much more than relationships and includes the needs for power and achievement (Keller, 1983), neither of which are directly linked with immediacy. Thus, suffice it to say that immediacy certainly does involve gaining attention. Its impact upon affective learning is also bound to affect satisfaction in an indirect way, which may also impact confidence, but to equate the means by which immediacy works to eventually impact learning with the ARCS Model misses an important distinction.

The distinction that is missed in the discussion concerning the connection between Keller’s ARCS model is the difference between the perception of immediacy by students and the measurement of teacher behaviors that are thought to produce immediacy. Some of the same behaviors that may be perceived as immediate by students may also be behaviors that are related to certain aspects of the ARCS Model. Unfortunately, the confusion comes into play due to how immediacy was measured in the past. Older scales that were thought to be measuring immediacy, such as those used by Frymier (1993, 1994); Frymier and Thompson (1995), were actually measuring student recall of teacher behaviors, whereas new measures of immediacy measure the subjects’ perception of immediacy (decreased psychological distance) (Kelly, 2012; O'Sullivan et al., 2004). As a result, there is a need for more research on immediacy to be conducted
that makes this distinction as the newer measures of perceived immediacy actually get at the concept of approach/avoidance and psychological distance more directly than older measures typically did.

Two years subsequent to Frymier’s work, Rodríguez et al. (1996) challenged the Motivation Model by proposing the Affective Learning Model. According to the Affective Learning Model, the mediating variable between teacher immediacy and cognitive learning is affective learning instead of student state motivation. Rodríguez et al. (1996) reasoned that student state motivation, “because of its conceptual and operational properties, produces virtually the same type of data as a measure of students’ affective learning,” and as such, is likely to serve in a mediating function. In their analyses, Rodríguez et al. (1996) used the data produced by their own survey and the data produced by Frymier (1994). Using correlational and chi-squared analysis, they found that the data from both research efforts proved to be a good fit with either the Motivational Model or the Affective Learning Model with the difference being that the Affective Learning Model appeared to be a slightly better fit. Therefore, the Affective Learning Model was proposed to be the model that should be used.

It is important here to note that the methods used in each of the studies from which these models were produced have a common feature: each study relied upon student self-report measures for each construct concerning courses that were on-going at the time of each study. Christophel (1990) administered her survey at the mid-semester point, Frymier (1994) administered three surveys (first day of the semester, seven or eight weeks into the semester, and the week before final examinations), and Rodríguez et al. (1996) did not stipulate at what point in the semester the survey was administered, but in
each case, it becomes obvious from the text of each of these studies that the students had already had time to develop a long-term relationship with the instructor of the course for which they were to use as a reference point in their answers to the survey items. Given that set of circumstances, the assumptions drawn by Rodríguez et al. (1996) miss a very important point: affective learning represents an attitude toward a teacher, a course, and course topic that requires time to develop while student state motivation can be understood as an attitudinal desire to be engaged in learning behaviors at a given point in time. When the measures that are typically used to measure student motivation (Christophel, 1990) and affective learning (McCroskey, 1994) are examined, it becomes obvious that the student motivation scale can be used for either a long-term course or a single lesson by simply changing the instructions whereas the affective learning measure asks questions that presume that the student has been in a course for some measure of time. The nature of the measures is also reflected in the method used by Frymier (1994) in collecting data as she only measured student trait and state motivation on the first day of class while measuring motivation, verbal immediacy, nonverbal immediacy, affective learning and cognitive learning at mid-semester and the last week of classes. This begs the question: Should there be different models of learning for long-term and short-term learning settings, and if so, how might they differ and how might they be similar?

As can be seen, there has been some disagreement about what type of model best reflects the connection made between teacher immediacy behaviors and student learning. Witt et al. (2006) summarize the past research concerning the link between immediacy and cognitive learning in particular by stating that there are five basic explanations for how immediacy works to impact learning: 1) immediacy attracts or arouses a students’
attention which is related to cognitive learning, 2) immediacy increases students’ state motivation to learn which leads to learning, 3) immediacy enhances students’ affect toward the teacher and/or the content which leads to increased cognitive learning, 4) immediacy directly increases students’ learning, and 5) immediacy elicits positive emotional responses which increase learning. It is important to note as Witt et al. (2006) do, that “Essentially, all the theoretical models provide an account that assumes the behaviors by the instructor increase the motivation of the student to learn. The disagreement is whether the motivation is episodic (for the particular session or class) or provides a longer term change in motivation toward the entire class (or even the entire process of college education in general)” (p. 153). How does this impact learning in the setting of online learning, especially as might be measured in a single lesson?

Considering the first explanation listed by Witt et al. (2006) there is no doubt that for any learning to occur on the part of a student that the student must attend to the lesson that is being presented. The explanation that immediacy attracts or arouses a students’ attention which is associated with cognitive learning seems obvious on face value (Kelley & Gorham, 1988). It is obvious to the most casual observer that failure to pay attention to any communication that is directed toward that individual is a failure to receive that communication. But, Frymier (1993, 1994) goes further in suggesting that the ARCS Model of instructional design by Keller (1983, 1987, 1999) may serve as an explanation for the impact not only of “attention” (also referred to as “interest”) but also student “confidence” and “satisfaction” (Frymier, 1994). According to Frymier (1994), “…an immediate teacher gains students’ attention” (p. 141), and, in reference to the work of Kelley and Gorham (1988), the mechanism by which this occurs is that “…immediacy
arouses students, gets their attention, which enhances motivation, which in turn increases learning” (p. 141). Unfortunately, this equating of the concept of “attention” as used in the ARCS Model and the concept of “attention” as used by Kelley and Gorham (1988) fails to see the difference in the concepts as conceived by the authors. For Kelley and Gorham (1988) conceptualized immediacy as serving as “arousal stimuli” while failing to actually define “attention,” but it becomes obvious from their study that “attention” is perceived as primarily the momentary function of mental focus to the stimuli. On the other hand, Keller (1987) gives a definition for “attention” that includes the mental reaction to a momentary stimulus as well as a sustained “interest” by the student in the content over a period of time. As stated by Keller (1987), “it is necessary to respond to the sensation-seeking needs of students…and arouse their knowledge-seeking curiosity…, but without overstimulating them” (p. 3). Thus, for Keller (1983, 1987, 1999), “attention” is far more than what Frymier (1993, 1994) portrays as Keller’s concept of “attention.” If anything, the concept of attention as described by Keller (1987) appears to include the concepts of attention and motivation.

As to the first (attention) explanation of how immediacy produces cognitive learning, the only problem with this explanation is that it simply does not go far enough in explaining a causal link; it only purports that the student’s attention is “related” to cognitive learning. This explanation begs the question “How is a student’s attention related to cognitive learning?” Even Frymier (1994) admits that once the teacher gets the students’ attention that it enhances motivation which in turn increases learning. So, this explanation is simply inadequate in producing any theory of learning since the only causal link in this statement is between immediacy and attention followed by a
relationship between attention and learning, a relationship that could be causal, could be
correlational, or could be coincidental.

As to the third (immediacy enhances students’ affect toward the teacher or
content) and fifth (immediacy elicits positive emotional responses) explanations listed by
Witt et al. (2006), although these might be valid for long-term, on-going courses in the
online instructional setting, they do not explain the process that takes place in short-term,
single lesson/class settings since there is little potential for student affect towards the
teacher or for other positive emotional responses to be elicited. It is more likely that a
negative emotion might be elicited by hard to understand questions, or instructions that
are confusing and thereby cause frustration. Thus, for either of these explanations to be
valid explanations of the process connecting immediacy to cognitive learning requires a
longer-term exposure of the student to the instructor and the content designed and
delivered by the instructor.

With regard to the fourth explanation (immediacy directly increases student
learning) listed by Witt et al. (2006), the previous discussion above regarding the
Learning Model has pointed out the inadequacies of this explanation. Given the work by
Frymier (1994) and Rodríguez et al. (1996) that have demonstrated with reasonable
decisiveness that either the Motivation Model or the Affective Learning Model are much
better fits for the process than the Learning Model, this explanation can be ruled out.

Based upon the elimination of the other four explanations, this leaves us with the
second explanation (immediacy increases students’ state motivation to learn which leads
to learning) listed by Witt et al. (2006). As has already been stated above, the Affective
Learning Model assumes that there is some passage of time that a relationship might be
capable of developing. It is with that passage of time and the repeated exposure that it affords the student to observe and interpret enough teacher behaviors (including immediacy) that a student can develop affect toward an instructor, a course, or the topic of instruction in a course. In a single class or instructional session, the explanation that immediacy increases students’ state motivation to learn which leads to cognitive learning is the most logical for that setting. This assumes that state motivation is understood as an attitude that exists at any given point in time. As will be seen in the section below regarding new models of immediacy and learning and later in “Chapter Three” of this study, the design of the study teases out the difference between explanation two and four and leads us to a model of learning for episodic lessons/class sessions.

**New Models of Immediacy and Learning**

As stated by Witt et al. (2006), much of the disagreement over explanations of the causal path between immediacy and cognitive learning may be attributable to whether the investigator defines motivation as episodic (for a particular class period) or if the student motivation is changed over time (over the term of a course or over the course of receiving an education and/or degree). If this is the case, then can there be a theoretical model that encompasses both situations? The answer may be found in what might be called the general, or long-term, affective learning/motivational model of learning from which an episodic, or short-term, motivational model of learning is derived.

The general affective learning/motivational model of learning that explains the connection between immediacy and cognitive learning accounts for multiple mediating factors that would be involved over a period of time. There are two dependent variables that account for what the teacher contributes to the process and what the student brings to
the process, namely, teacher behaviors that serve as behavioral indicants of immediacy and student trait motivation to learn. As can be seen in Figure 2.3, teacher behavioral indicants of immediacy are perceived as immediate by the student which then impacts student affective learning and student state motivation, which is also impacted by affective learning and student trait motivation. Student state motivation and affective learning both impact student learning behaviors, which together with student state motivation impacts cognitive learning.
Figure 2.3  Long-Term Affective Learning/Motivational Model

Long-Term Affective Learning/Motivational Model of Learning

TBII – Teacher Behavioral Indicators of Immediacy (IV)
STM – Student Trait Motivation (IV)
SPoI – Student Perception of Immediacy (MV)
SAL – Student Affective Learning (MV)
SSM – Student State Motivation (MV)
SLB – Student Learning Behaviors (MV)
SCL – Student Cognitive Learning (DV)
In the Long-Term Affective Learning/Motivational Model of Learning there are several important distinctions made between constructs that have heretofore been conflated into single constructs and which have often confused the theories that have previously been proposed. First, it should be noted that in keeping with the distinction made by Kelly (2012), the teacher behaviors do not serve as the basis for defining immediacy. Teacher behaviors that may be perceived by students as being immediate in one setting or culture may not have the same effect in another setting or culture. Therefore, teacher behavioral indicants of immediacy no longer serve as the basis for a measure of immediacy, but the student’s perception of immediacy does. Second, this model allows for how affective learning (defined as affect toward the teacher and affect toward the content) is more typically developed over time and has more of a long-term effect whereas state motivation is reflective of a student attitude to learning at any given point of time. Third, this model makes a distinction between student state motivation as being an attitude or a drive that leads to direct learning and to additional student learning behaviors that take place over a period of time. These student behaviors include not only attending to the lesson at hand, but also to spending more time on task when available, searching out additional information, collaborating with other students, and completing tasks and assessments more thoroughly, all of which have been connected with learning in the educational literature (Means, Toyama, Murphy, Bakia, & Jones, 2010).

The Short-Term Motivational Model of Learning for immediacy (as found in Figure 2.4) is derived from the general affective learning/motivational model of learning. This model makes similar distinctions in that behavioral indicants of immediacy are still separated from the students’ perception of immediacy, and the true measure of
immediacy is the students’ perception of it. Again, this allows for cultural and situational differences. The difference between these two models is in the deletion of the concepts of affective learning and student learning behaviors, both of which require the passage of time. Therefore, the short-term motivational model of learning proposes that teacher behavioral indicants of immediacy create student perception of immediacy which together with student trait motivation impacts student state motivation and in turn impacts cognitive learning. The short-term motivational model is seen as a snapshot model that represents the process of immediacy’s impact upon student cognitive learning in a single class or lesson, especially in the computer-mediated setting.
Figure 2.4 Short-Term Motivational Model of Learning

Short-Term Motivational Model of Learning

TBII → SPoI → SSM → SCL

TBII – Teacher Behavioral Indicators of Immediacy (IV)
STM – Student Trait Motivation (IV)
SPoI – Student Perception of Immediacy (MV)
SSM – Student State Motivation (MV)
SCL – Student Cognitive Learning (DV)
As Witt et al. (2004) note, there has been a lack of sufficient studies regarding the
effect of immediacy upon cognitive learning for truly adequate meta-analyses to be
conducted. Typically, prior studies have measured impact of immediacy and cognitive
learning with measures that span a full course and which are not reliable as true measures
of actual learning. In addition, prior studies that are available for such meta-analysis
typically measure immediacy based upon students’ observation of teacher behaviors that
may not necessarily be indicants of immediacy instead of the students’ perception of
immediacy. The short-term motivational model of immediacy’s effect upon cognitive
learning accounts for the unique nature of a study designed to measure immediate impact
of immediacy and the change in how the immediacy construct is conceived and
measured. Therefore, the short-term motivational model of learning served as the
theoretical underpinning of the current study conducted to test the new model.

Obviously, studies require a design, and the design of a self-directed lesson to test
the above model requires a medium by which the lesson might be presented. In the
following section the use of desktop presentation programs (DPPs) as an instructional
medium in computer-mediated contexts will be reviewed, including the widespread use
of DPPs in computer-mediated lessons (including online classes) and the apparently most
effective format for material to be presented via DPPs for learning.

**Pedagogical Use of Desktop Presentation Programs**

Prior to the development of the World Wide Web, distance education that was
conducted through the Internet would have been very similar in design to traditional
correspondence courses as email was the mode of communication for those fortunate
enough to have access to an account. As the World Wide Web introduced web pages
which had text that was formatted and began including photos and other graphical materials, the development of “online learning” became possible as a student could be logged onto the Internet for a period of time and be presented with lessons without a break in the connection. Simultaneous to this development was the adoption of the use of desktop presentation programs (DPPs) by some instructors as a visual aid and note taking aid for students during face-to-face lectures. Because of the widespread acceptance of Microsoft Office over other office computer software application suites, the name PowerPoint become nearly synonymous with all desktop presentation programs much like some individuals may refer to any facial tissue by one particular brand name. As noted by Kangas (2012), “The adoption of PowerPoint in the 1990s quickly replaced other presentation mediums, including overhead transparencies, slide projectors, and chalkboards” (Kangas, 2012, p. 421). Kangas also made the point that with this widespread adoption of the use of desktop presentation programs that there has been little subsequent study or critique of presentation software as a pedagogical tool (Kangas, 2012).

It is curious how presentation software technology has become so ubiquitous in educational contexts without a sufficient background of rigorous research to support its effectiveness in the face of the additional costs that are involved in its implementation and continued use. Still, as the educational endeavor has moved beyond the face-to-face classroom to include online courses, desktop presentation programs have made the transition as well. This is evidenced in some textbooks and guides related to online teaching similar to that written by Ko and Rossen (2008) as the authors appear to assume that DPPs like PowerPoint will be used as a method of presenting curriculum material
online. Recently, this assumption has been supported in the research of Frisby et al. (2014). In their study, these researchers sought to test social presence theory by operationalizing three conditions: low social presence, moderate social presence, and high social presence. These conditions were similar to a slide only based course, slides with audio based course, and slides with audio and video. As a check to make sure that their operationalized conditions were realistic, the investigators asked the subjects to indicate if they had taken a class using their assigned instructional format. Their findings were surprising as 31.8% of the subjects had previously taken an online course with a slides only presentation, while 65.5% had taken a course with slide and audio and 71.6% had taken a course that use slides, audio, and video. Thus, it is reasonable for a student in an online course to expect that some of the material to be presented to him/her might be through the use of desktop presentation programs, especially given the ability for the course instructor/designer to include animation, graphics, audio, and video in a single package.

While some instructional designers have questioned the appropriateness of using desktop presentation programs as an instructional delivery method, there have been some interesting findings in some of the studies that have been done of the effectiveness of DPPs and their formats. Shapiro, Kerssen-Griep, Gayle, and Allen (2006) conducted a meta-analysis of studies that investigated the effectiveness of DPPs as an instructional tool. Unfortunately, they only discovered 12 publications covering 16 studies that met their criteria to be included in their meta-analysis since most studies of the use of DPPs and student learning depend upon student self-report in place of an empirical measure of learning. From their meta-analysis they found that their studies provided “limited
support for the role of DPPs in improving students’ comprehension and learning” (Shapiro et al., 2006, p. 70). Most of the studies found no statistically significant difference, but out of those that did find a statistical significance, all but one found a positive effect (Shapiro et al., 2006, p. 70) and the overall increase in learning or comprehension success was from 44% to 56% when DPPs were used.

Further support for the use of DPPs as a means of presenting material to be learned by a student, one can turn to the meta-analysis of comparisons between computer-assisted formats and traditional instructional formats for learning by Timmerman and Kruepke (2006). Using Media Richness Theory, Timmerman and Kruepke (2006) hypothesized that learning would be higher with the use of video, followed by audio, followed by text with graphics and finally text alone. To their surprise, they discovered that learning was higher in the text alone format, followed by audio, followed next by text with graphics, and finally video. In fact, based upon their results, use of the video channel in computer-assisted instruction was found to decrease student performance in comparison to more traditional instructional formats (Timmerman & Kruepke, 2006, p. 87). The investigators speculated that reason behind the finding concerning the use of video may be due to information overload. The one caveat to these findings is that in their tests of homogeneity for each condition that three out of the four conditions were found to be heterogeneous and thus indicating either possible outliers or possible mediating factors.

When this investigator conducted a pilot study for this research, it utilized desktop presentation software as a medium to present the lessons used in the study. This allowed the investigator to attempt to manipulate immediacy through the choice of words in the
text on slides and also through the inflection or lack thereof in the voice recordings used in the narration of two conditions. With regard to the instructional format, only two types of conditions were used: text only, and text with audio narration. Some may question why only text alone and text + audio formats were used, but given the findings of Timmerman and Kruepke (2006) with regard to computer-assisted learning formats, and given the suggestion by Shapiro et al. (2006) that dual coding may be an explanation for the role of DPPs in improving comprehension and learning, it makes logical sense to limit the instructional formats to these two conditions alone and not include video. If dual coding is a factor in the effectiveness of the lesson, then how does that affect the results of previous studies? Is there a point of diminishing returns? The answer to these questions may be found in the cognitive theory of multimedia learning as it concerns the presentation of learning content in the computer- or online-mediated environment.

**Cognitive Theory of Multimedia Learning**

Since the introduction of online learning, text based presentation of learning material has been the baseline with regard to methods of delivering content. This method was used in correspondence courses that allowed for materials to be delivered between the student and the instructor via electronic mail. As previously mentioned, since that time other methods of delivering content have become possible through the use of graphics that became a staple of the World Wide Web, followed by streaming audio and video, then interactive text, audio and video, and finally collaborative tools such as text-based chat, wikis, and videoconferencing. With the recent development of MOOCs that utilize many modes of presentation of learning content and interaction between students and instructors, it begs the question concerning what are the most effective pedagogical
and content delivery methods, specifically, what is the best way to present learning content (Glance, Forsey, & Riley, 2013). MOOCs in particular “are defined by characteristics that include the following: lectures often formatted as short videos combined with formative quizzes; automated assessment and/or peer and self-assessment; and an online forum for peer support and discussion” (Glance et al., 2013).

Glance et al. (2013) reviewed research literature related to the various characteristics that are typically used in MOOCs, including the online mode of delivery, online quizzes and assessments, short videos and quizzes, peer and self-assessment, stand-alone short videos, and online forums. Pedagogical bases for each of these characteristics included the use of retrieval learning, mastery learning, learning through assessment, enhanced attention and focus, peer assistance, and out-of-band learning (Glance et al., 2013). In essence, they claimed that the various methods that are brought together in the MOOC format have all been substantiated to one degree or another by prior research, but their review did not provide any theoretical bases for any of the methods and modes covered since much of the literature they covered included newsletters, newspapers, and trade journals. Unfortunately, the effectiveness of the various presentation methods in comparison to one another was not established through research. In addition, their review did not deal with the use of these formats in combination nor the order in which these formats may be combined. In fact, when discussing the use of videos specifically, they admit that “There is unfortunately no formally published evidence for the effectiveness of the Khan Academy, or the use of short videos in enhancing student learning” (Glance et al., 2013). It would seem then that
due to the exuberance of those who have rushed to form MOOCs that theoretical bases and research that address the use of multimedia learning were not considered.

Beginning in 1998, Mayer and Moreno proposed what they term as “a cognitive theory of multimedia learning” in which they sought to explain how multimedia instruction works (Mayer & Moreno, 1998a, 1998b). Mayer (2011) has stated that the theory begins “with three principles from cognitive science concerning how learning works—dual channels, limited capacity, and active processing” (Mayer, 2011, p. 434). The first principle of dual channels claims that there is a *verbal channel* (what is received in sensory memory through the ears) and a *pictorial channel* (what is received in the sensory memory through the eyes). In a multimedia presentation words and pictures (images) are put before the learner. Words may be received through either channel depending upon whether they are spoken or written, whereas pictures or images (still and animated) may only be received through the *pictorial channel* (Mayer, 2011, p. 434). The second principle of limited capacity is that there is a finite amount of information that can be processed per channel. The third principle of active processing is that meaningful learning occurs as in each channel the individual cognitively perceives words and/or images, selects what is relevant, organizes what is received into coherent mental representations, and integrates these representations with each other and knowledge retrieved from long-term memory (Mayer, 2011, p. 434). Over the course of the last decade and more, Mayer and others have tested the cognitive theory of multimedia learning with relatively consistent results (Bentrancourt, 2005; Clark & Mayer, 2011; Mayer, 2003, 2005, 2011; Mayer & Moreno, 1998a, 1998b, 2003; Moreno & Mayer, 2002).
The point to be taken and applied to the current study from the cognitive theory of multimedia learning is that neither of the dual channels should be overloaded or else the cognitive load will interfere with learning. For instance, when printed words are on a screen at the same time as animation, the visual channel with its limited capacity and the active mental processing in short-term memory can become overloaded (Moreno & Mayer, 2002). On the other hand, the use of both the verbal and pictorial/visual channels will allow for more learning to occur than merely the use of the verbal alone (Mayer, 2003; Mayer & Moreno, 2003; Moreno & Mayer, 2002; Xie, 2011). For instance, if the multimedia presentation has text only in the visual channel that is accompanied by audio narration of the text, or the visual channel is composed of animation without text but with audio narration, or animation is presented in visual channel followed by text alone with audio narration, then there is more learning than when text and animation appear in the visual channel simultaneously (Moreno & Mayer, 2002). This phenomenon compares favorably to the findings mentioned above by Timmerman and Kruepke (2006). To recount, in their meta-analysis of the impact of various instructional modes in computer-assisted learning, Timmerman and Kruepke (2006) discovered that greater learning was found in the test alone mode, followed by audio, text with graphics, and finally video (the combination of text with narration was not included in their study). Speculation on the part of the authors concerning the finding of less learning in the video mode was that it was possible that video provided more information than students need and therefore resulted in some type of information overload (Timmerman & Kruepke, 2006, p. 89). The implication of their results is that any research using any of the multitude of modes found in online learning today (especially those in MOOCs with little or no direct contact
with the instructor whose lecture is included as a video) should seek to account for
cognitive load as a background variable. Using the cognitive theory of multimedia
learning provides one theoretical basis upon which to design instructional modes in a way
that helps to avoid cognitive overload. But, regardless of the design, the research should
contain some measurement of cognitive load, especially since a widely used single item
scale is available (Paas, 1992; Paas, Tuovinen, Tabbers, & Van Gerven, 2003).

Based upon the findings of Timmerman and Kruepke (2006) and Mayer’s
cognitive theory of multimedia learning (Clark & Mayer, 2011; Mayer, 2003, 2005,
2011; Mayer & Moreno, 1998a, 1998b, 2003; Moreno & Mayer, 2002), in the pilot study
a lesson was presented using desktop presentation software (DPP) using text with static
photographs in all four conditions which were presented with two of the conditions
accompanied by audio narration. The use of video and/or animation was excluded in
order that the principles of the cognitive theory of multimedia learning might be observed
at their simplest level in an attempt to avoid possible cognitive overload by
overwhelming short-term memory processing or overloading one of the channels in use
and thus producing a confounding variable in the study background. Cognitive load was
not measured in the pilot study, but was in the current study.

Based upon the previous review of literature, the following hypotheses were
proposed for this study:

H₁: Higher Student Perception of Immediacy (SPoI) will correlate with higher
  Student State Motivation (SSM).

H₂: Higher Student Trait Motivation (STM) will correlate with higher Student
  State Motivation (SSM).
H₃: Higher Student State Motivation (SSM) will correlate with higher Student Cognitive Learning (SCL).

Additionally, in an effort to test the new Short-Term Motivational Model of Learning the following research questions were proposed:

RQ₁: Will Teacher Behavioral Indicants of Immediacy (TBII), Student Perception of Immediacy (SPoI) and Student Trait Motivation (STM) explain significant variance in Student State Motivation (SSM) in a single lesson presented online?

RQ₂: Will Teacher Behavioral Indicants of Immediacy (TBII), Student Perception of Immediacy (SPoI), Student Trait Motivation (STM), and Student State Motivation (SSM) explain significant variance in Student Cognitive Learning (SCL) in a single lesson presented online?

Finally, in an effort to determine for future research the best self-report measure for student cognitive learning the following research question was proposed:

RQ₃: Between the Perceived Cognitive Learning Scale and the Learning Loss Scale, which self-report measure is a more accurate indicator of cognitive learning?
Chapter Three: Methods

This study explored a new model of mediated immediacy and motivation in a single lesson presented in a computer-based learning environment. Regression analysis was used to test the model and to determine how these variables may have related to the two criterion variables of student cognitive learning and student perceived cognitive learning. To devise an effective study, a pilot was conducted in 2012 with participants ($N = 153$) drawn from courses taught by the Department of Communication at Western Kentucky University. A fuller description of the pilot study is found in “Appendix A: Pilot Study Description.” A brief summary follows below with lessons learned delineated.

Pilot Study

The pilot study used a two condition (low vs. high immediacy) by two condition (text and photos only vs. text and photos with audio narration) design to test a modified version of the Motivation Model of Learning (Frymier, 1994). The modified model had cognitive learning as the criterion variable with student state motivation as the mediating variable between four independent variables: mediated immediacy, student trait motivation, student interest in the general topic area, and student knowledge of the general topic area. Measures used included a pretest and posttest specially constructed for the pilot, the Trait and State Motivation Scales (Christophel, 1990) with 12 semantic differential items, the Mediated Immediacy Scale (O'Sullivan et al., 2004), and the Learning Loss Scale (Richmond, McCroskey, et al., 1987). Other factors explored for possible confounding effect included subjects’ sex, university classification, prior experience with online courses, and length of time that subjects took to complete the
survey and lesson. The study lessons were presented through PowerPoint slide shows (.pps files) which automatically ran and advanced using embedded timings, each of which was downloaded from a BlackBoard course management site and which ran on identical computers in a lab setting.

Several lessons learned from conducting the pilot study were used to improve the main study design, measures, and implementation of the main dissertation study. First, reports from lab assistants in the pilot study included accounts that some students were manually advancing slides faster than the programmed timings for those slides. This led to a number of cases in which so little time was spent on task that the subject had not met the minimum requirements of the study. Given that subjects were running through the study protocol without close supervision, the timing needed to be controlled. In the final dissertation study this was improved through the use of video versions of the lesson that could not be manipulated by the subjects with regard to speed. An embedded YouTube video format with user controls disabled and presented from within the interface of the Qualtrics online survey software prevented this from happening in the main dissertation study.

Second, the lack of sufficient subjects in the pilot to provide enough power for significance between the criterion variable of cognitive learning and the predictor variables was improved through a significant increase of the number of subjects by the distribution of an email invitation to a panel of students of the Department of Communication. This distribution method reached 3,578 students, of which ten to fifteen percent (10-15%) were expected to participate in the study. The actual number of participants who at least “started” the survey by following the unique survey link to the
informed consent page was 494. This constituted an initial participation rate of 13.8 percent, although those completing the full survey/study were much lower due to attrition.

Third, the main dissertation study tested a new model of learning that applies to the episodic nature of a single class or learning session built upon the findings of previous models.

Fourth, through the use of a “field study” format, as subjects in the dissertation study completed the survey and lesson in the location of their choosing. This allowed the setting for the study to more closely resemble the setting in which a student might typically choose to work on lessons for an online course.

Fifth, the results of the pretest and posttest that were used in the pilot were unusual. ANOVA analysis revealed that the scores differences between the groups was only significant for the immediate text – no audio condition. In retrospect, the number of items between the two quiz measures and the type of questions asked should have been equal in number and uniform in type. This was corrected in the main dissertation research by using an equal number of questions between the pretest and the posttest, using all multiple choice items for each measure, expanding the lesson content, and better judging between the distribution of difficult questions more evenly between the two quizzes.

Sixth, since cognitive load may have been a factor that confounded the results of the pilot, the mental effort scale (Paas, 1992) was included as a measure of cognitive load.
Seventh, to better test for cognitive learning and the scales which are meant to represent that construct, the perceived cognitive learning scale (Frisby & Martin, 2010) was added for comparison to the pretest-posttest scores differences and the learning loss scale.

Finally, because patterns among the conditions were not clear, the inclusion of a medium/intermediate immediacy condition was used to help distinguish between the patterns of the operationalization of immediacy more completely.

The Present Study

Research Participants

Participants (N = 229) for this study were recruited from students enrolled in undergraduate courses taught by the Department of Communication of Western Kentucky University during the last two weeks of the Fall semester, 2013, the Winter term, 2014, and the first two weeks of the Spring semester, 2014. Upon completion of the survey, the subjects were invited to participate in a drawing for one of three $50 Visa gift cards by providing an email address by which they could be contacted. From a total population of 3,580 (non-duplicating), 494 students accessed the link to the informed consent page, 439 began the survey (433 answering that they were 18 years of age or older, or 98.6%), and 238 completed the entire survey. The breakdown of respondents who completed the survey by university classification was 125 freshmen (52.7%), 38 sophomores (16.0%), 31 juniors (13.1%), 41 seniors (17.3%), and 2 graduate students (0.01%). Following the reduction of cases due to data cleaning 229 cases were analyzed. Of these 229 cases there were 120 freshmen (52.4%), 36 sophomores (15.7%), 31 juniors (13.5%), 40 seniors (17.5%), 1 graduate student (0.4%), and 1 with missing data (0.4%).
compares to university-wide class distribution of 4,615 freshmen (22.5%), 3,084 sophomores (15.1%), 3,238 juniors (15.8%), 4,508 seniors (22.0%), 2,939 graduate students (14.4%), and 2,072 other (10%). As a result, freshmen were overrepresented in the sample compared to the overall undergraduate student population of the university. This overrepresentation was expected due to the basic public speaking and communication course taught in the Department of Communication being a general education requirement of all four year degree students and therefore accounted for approximately 2/3 of the course sections from which participants were recruited.

In addition to university classification, the demographic breakdown based upon sex of the original 238 completing the study was 159 females (67.4%), 77 males (32.6%), and one missing (0.4%), and of those remaining after the cleaning of the data there were 153 females (67.1%) and 75 males (32.9%). This compares to university-wide distribution of 11,894 females (58.1%) and 8,562 males (41.9%). As a result, females were over represented in the sample. Although the general education course classes would be expected to contain proportions of females to males similar to the university, courses within the two majors of the Department of Communication may have a larger ratio of females to males than the university-wide distribution. The ages of those completing the survey is unknown since the only question asked related to age was the initial question asking whether or not the participant was 18 years of age or older which was used to screen out minors. Participants who answered “no” were not allowed to participate.

Of the 238 participants who completed the entire survey, nine were deleted. Visual inspection of the dataset responses, while paying particular attention to reverse
coded items in the trait motivation scale, the state motivation scale, and the mediated immediacy scale, revealed that four cases appeared to suffer from response set bias (e.g. all responses for one or more of these scales had the same item response toward one end of the semantic differential spectrum or the other even when there were items that were reverse coded). Based upon standardized z-scores greater than an absolute value of three (3.0) for the total time spent by the participants in the survey, there were four additional cases that were deleted as outliers (i.e. the time spans for all four were greater than 2 hours and ranged as high as 4.4 hours). Finally, one case was deleted due to the time spent on the survey being too short to be reasonable (duration was 7.98 minutes even though the lesson videos were all approximately 7 minutes in length). Based upon these deletions as a part of the data cleaning process, 229 cases were left for analysis.

**Research Design/Procedure**

The study utilized a computer-based, online field study requiring the subjects to complete an initial survey and pretest followed by a brief online lesson after which each subject then completed a posttest and additional survey items. A link to a Qualtrics survey was included in the email message body in order for a subject to begin the study process. Upon the subject’s navigating to the web page connected to the link in the email message, the Qualtrics instrument presented the consent document which, upon the subject’s approval, took the subject to the rest of the instrument. Upon entering the instrument each subject was presented with the various measurement scales, survey questions, and lesson in the following order: brief initial instructions, questions concerning previous online learning experience, questions concerning knowledge and interest in environmental issues, the trait motivation measurement scale items, the pretest
of the lesson material, the lesson (the condition assigned by the Qualtrics software), the posttest of the lesson material, the mental effort rating scale, the state motivation measurement scale, the mediated immediacy scale, the learning loss scale, the perceived cognitive learning scale, and demographic questions. The online lesson featured a topic expected to be interesting yet unfamiliar to the study subjects, namely, the north Pacific Ocean gyre and the pollution associated with it. The lessons in each of six conditions included the same content presented to all subjects, but each lesson represented one of the six conditions based upon the design of the study.

The basic design of the study was a between groups three condition (low/medium/high immediacy) by two condition (text with photos vs. text/photos + audio narration) design (see Figure 3.1). The limitation of instructional modes to only the text with photos and text/photos + audio methods was based upon the Cognitive Theory of Multimedia Learning and suggestions by Clark and Mayer (2011) as discussed in “Chapter Two” and the findings of the meta-analysis by Timmerman and Kruepke (2006) that learning in computer-assisted instruction was higher (from highest to lowest) in text, audio, and text with graphics modes of presentation than the traditional classroom presentation, and that video produced less learning than the traditional classroom presentation. Therefore, the six conditions consisted of low immediacy through text and photos only, medium immediacy through text and photos only, high immediacy through text and photos only, low immediacy through text/photos + audio, medium immediacy through text/photos + audio, and high immediacy through text/photos + audio. A manipulation check conducted using post hoc analysis of variance (ANOVA) to determine the levels of immediacy perceived by the subjects in each of the six conditions.
appeared to demonstrate that the manipulation was successful (see Figure 3.2 and Table 3.1). In other words, the means scores of mediated immediacy sloped upward from what was operationalized to be the condition with the least amount of immediacy present to the condition which was operationalized to be the greatest amount of immediacy present. However, despite the appearance of Figure 3.2 based upon a magnified scale (range of 24-28 versus a possible range of 0-42), the manipulation did not really work as the differences between groups did not reach statistical significance at the $p < .05$ level for any of the conditions [$F(5, 223) = 1.05, p = .39$]. Therefore the conditions essentially collapsed and were not fully analyzed. Nevertheless, it should be noted that the manipulation of the conditions was not the main focus of this study and that these manipulations are all student perceptions.
Figure 3.1 Matrix of Manipulated Variables/Study Conditions

<table>
<thead>
<tr>
<th>Audio Narration</th>
<th>Mediated Immediacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>Low Textual Immediacy &amp; Low Immediacy Audio Narration</td>
</tr>
<tr>
<td></td>
<td>Medium Textual Immediacy &amp; Medium Immediacy Audio Narration</td>
</tr>
<tr>
<td></td>
<td>High Textual Immediacy &amp; High Immediacy Audio Narration</td>
</tr>
<tr>
<td>Absent</td>
<td>Low Textual Immediacy &amp; No Audio</td>
</tr>
<tr>
<td></td>
<td>Medium Textual Immediacy &amp; No Audio</td>
</tr>
<tr>
<td></td>
<td>High Textual Immediacy &amp; No Audio</td>
</tr>
</tbody>
</table>
Figure 3.2 ANOVA Distribution of Immediacy Means across Conditions
<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonimmediate text/photo</td>
<td>37</td>
<td>24.3243</td>
<td>9.06475</td>
<td>1.49024</td>
</tr>
<tr>
<td>Nonimmediate text/photo w/audio</td>
<td>38</td>
<td>24.3947</td>
<td>7.99506</td>
<td>1.29697</td>
</tr>
<tr>
<td>Medium text/photo</td>
<td>38</td>
<td>25.3684</td>
<td>9.21051</td>
<td>1.49414</td>
</tr>
<tr>
<td>Medium text/photo w/audio</td>
<td>36</td>
<td>25.6667</td>
<td>7.37176</td>
<td>1.22863</td>
</tr>
<tr>
<td>Immediate text/photo</td>
<td>41</td>
<td>26.4634</td>
<td>6.49268</td>
<td>1.01399</td>
</tr>
<tr>
<td>Immediate text/photo w/audio</td>
<td>39</td>
<td>27.8462</td>
<td>8.12254</td>
<td>1.30065</td>
</tr>
<tr>
<td>Total</td>
<td>229</td>
<td>25.7031</td>
<td>8.08394</td>
<td>.53420</td>
</tr>
</tbody>
</table>
Subjects were assigned to one of the six conditions by the Qualtrics survey software. A post hoc check of the cognitive load was conducted to insure that none of the conditions created a cognitive overload (see Figure 3.3). The scale used was a 9-point symmetrical category scale that ranges from very, very low mental effort (1) to very, very high mental effort (9). It has been reported that this scale is “the most widespread measure of working memory load within CLT research” (Paas et al., 2003). Clearly the lowest condition (low immediacy, no audio) had the least cognitive load while the highest cognitive load was found in the highest condition (high immediacy with audio) yet with mixed results between these conditions including the medium immediacy without audio condition being nearly the same at the high immediacy with audio condition. In two of the three pairs of conditions (no audio vs. with audio) there appears to be greater cognitive load with the condition with audio. Further investigation using analysis of variance (ANOVA) of the Mental Effort Rating Scale across the six conditions found that there was no significant difference in the means between the six conditions at the \( p < .05 \) level [\( F(5, 223) = .740, \ p = .594 \)].
Figure 3.3 ANOVA Analysis of Mental Effort Rating Scale
Table 3.2  Means, Standard Deviations, and Standard Error of Mental Effort across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Immediacy - no audio</td>
<td>37</td>
<td>3.30</td>
<td>2.120</td>
<td>.348</td>
</tr>
<tr>
<td>Low Immediacy - w/audio</td>
<td>38</td>
<td>3.87</td>
<td>1.818</td>
<td>.295</td>
</tr>
<tr>
<td>Intermediate Immediacy - no audio</td>
<td>38</td>
<td>4.05</td>
<td>1.888</td>
<td>.306</td>
</tr>
<tr>
<td>Intermediate Immediacy - w/audio</td>
<td>36</td>
<td>3.86</td>
<td>2.045</td>
<td>.341</td>
</tr>
<tr>
<td>High Immediacy - no audio</td>
<td>41</td>
<td>3.68</td>
<td>2.173</td>
<td>.339</td>
</tr>
<tr>
<td>High Immediacy - w/audio</td>
<td>39</td>
<td>4.05</td>
<td>2.051</td>
<td>.328</td>
</tr>
<tr>
<td>Total</td>
<td>229</td>
<td>3.80</td>
<td>2.015</td>
<td>.133</td>
</tr>
</tbody>
</table>
Stimulus Materials

The participants were presented with one of six lessons on a subject unrelated to the concepts being measured and unrelated to the classes from which the subjects were recruited. The subject of the lesson was the pollution in the Great Pacific Ocean Gyre (Goldstein, Rosenberg, & Cheng, 2012; Gross, 2010; Hoshaw, 2009; Lai, Tsai, & Yu, 2011). Many topics are appropriate for such a design, and several were considered. This particular topic was chosen because it was thought to have the following strengths: 1. Vividness — it lends itself to imagery, and indeed there were numerous pictures of the Gyre and related items on the Internet; 2. Compelling — oceanic pollution is an important environmental problem, while remaining hidden to most of the world’s population due to the remoteness of the Gyre; and, 3. Unfamiliarity — many undergraduates are unlikely to be familiar with the details and history of the Gyre, even if they have heard of it and/or seen images of it. It is a unique problem that is in a remote and uninhabited part of the world. As a crosscheck, respondents answered two questions prior to beginning the pretest that were related to their interest and knowledge level concerning general environmental issues.

The attempt at operationalization of immediacy in text was made through language that sought to demonstrate inclusivity (Witt & Wheeless, 2001, p. 332), informality (O'Sullivan et al., 2004, p. 473), humor (O'Sullivan et al., 2004, p. 473), and mutuality (Witt & Wheeless, 2001, p. 332). Immediacy in the audio narration was operationalized through all of those means used in the printed text plus the use of expressiveness (O'Sullivan et al., 2004, p. 473) and attractiveness of the voice (O'Sullivan et al., 2004, p. 473). Lack of or low immediacy was operationalized through the absence
of the qualities used for immediacy. Fisher and Katt (2007) offer 12 contrasting examples of high and low verbal immediacy, which served as one basis for operationalizing the low, medium and high conditions. The examples given by Fisher and Katt (2007) demonstrated categories used by Witt and Wheeless (2001) including distance, duration, communicator participation, object participation, probability, activity, self-disclosure, inclusivity, concern, and mutuality. The manipulation of verbal immediacy component was accomplished through the use of personal pronouns, active verbs, and future tense. Medium or intermediate immediacy was achieved by using alternating between slides used in the low and high immediacy conditions.

The lesson presentation used streaming of a Youtube.com video from within the Qualtrics survey which utilized Youtube.com viewer and Qualtrics parameters that together prevented the video from being bypassed or being increased in playback speed. Each video presented the stimulus content so that it simulated a desktop presentation program presentation running in automatic mode. As a result, this method controlled for equivalent time-on-task between all six conditions.

**Measures**

*Trait and State Motivation*

Trait and state motivation were each operationalized using the 12 item Trait and State Motivation Scales by Christophel (1990). The only difference between the version used for trait motivation and the version for state motivation was the wording of the instructions as trait motivation asked how the subject felt “*in general about learning*” (see Appendix B) whereas the state motivation scale asked how the subject felt “*about the lesson you have just completed*” (see Appendix C). Each item consisted of a 7-point
semantic differential. Past use of the scale has produced Cronbach’s alpha reliabilities from .91 to .96 (Christophel, 1990; Farwell, 2011; McCroskey et al., 2006). In the current study, the trait motivation scale consisted of a Cronbach’s coefficient alpha reliability of .90 \([M = 37.52, SD = 9.69]\) following reduction of the scale using principle components analysis using the 60-40 split (McCroskey & Young, 1979), and the state motivation scale had a Cronbach coefficient alpha reliability of .94 \([M = 41.33, SD = 15.02]\) while retaining all 12 items.

**Mediated Immediacy**

Mediated immediacy was operationalized using the 10 item Mediated Immediacy Scale (see Appendix D) by O'Sullivan et al. (2004). Each item consisted of a 7-point semantic differential. O'Sullivan et al. (2004) reported an alpha reliability of .82. In the current study, following scale reduction using principle components analysis, the resulting 7 item mediated immediacy scale consisted of a Cronbach coefficient alpha reliability of .89 \([M = 25.70, SD = 8.08]\).

**Perceived Cognitive Learning Scale**

One of the three methods by which cognitive learning was operationalized was the 10 item Perceived Cognitive Learning Scale (see Appendix E) by Frisby and Martin (2010). Each item consisted of a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Previous alpha reliabilities of .88 and .89 have been reported for the scale (Frisby et al., 2014; Frisby & Martin, 2010). Following scale reduction using principle components analysis, the resulting 4 item perceived cognitive learning scale had a Cronbach’s coefficient alpha reliability of .85 \([M = 10.93, SD = 2.91]\).
Pretest-Posttest Differences

The second of three methods by which cognitive learning was operationalized was the score difference between a pretest and a posttest over the material presented to the subjects in each of the six versions of the lesson. Twenty questions were used in the pretest and posttest each. Ten of the questions were used in both the pretest and posttest. Attention was given to the difficulty of the remaining questions to insure that the difficulty level was distributed equally between the pretest and posttest.

Learning Loss Scale

The third of three methods by which cognitive learning was operationalized was the 2 item Learning Loss Scale which (see Appendix F) was first introduced by Richmond and other scholars in two separate studies published in 1987 (Richmond, Gorham, et al., 1987; Richmond, McCroskey, et al., 1987) and was used for comparison purposes. Many other scholars have used the scale since (C. Baker, 2010a; J. D. Baker, 2001; Christophel, 1990; Frymier, 1994; Rodríguez et al., 1996).

Mental-Effort (Cognitive Load) Rating Scale

As a check of the subjects’ cognitive load as a possible confounding factor, the single item mental effort rating scale developed by Paas (1992) was used (see Appendix G).

Background Questions

Several additional questions were included as manipulation checks and to test for confounding factors. First, questions were included that asked the participants how seriously they took the quizzes and the lesson and how hard they tried learning the lesson. Second, questions concerning the subjects’ prior knowledge and/or interest in
environmental issues in general were asked. Third, questions regarding past experience with online learning, including number of courses and length of time since the last online class experience, were asked. Finally, basic demographic question concerning student classification (Freshmen, Sophomore, etc.) and sex were asked.
Chapter Four: Results

The purpose of the study was to test the proposed Short-Term Motivational Model of Learning. In order to test this model, a series of regression analyses were conducted. Below is a descriptive table of the six variables used in the regression analyses (see Table 4.1), the last three which serve as duplicate means of measuring the same phenomenon (student cognitive learning). A seventh variable which was included in the Short-Term Motivational Model of Learning, Teacher Behavioral Indicants of Immediacy, was not directly measurable, but was inferred to have occurred due to the attempts at operationalization across the six conditions.
<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait Motivation</td>
<td>229</td>
<td>0</td>
<td>54</td>
<td>37.52</td>
<td>9.69</td>
</tr>
<tr>
<td>Mediated Immediacy</td>
<td>229</td>
<td>0</td>
<td>42</td>
<td>25.70</td>
<td>8.08</td>
</tr>
<tr>
<td>State Motivation</td>
<td>229</td>
<td>0</td>
<td>72</td>
<td>41.33</td>
<td>15.02</td>
</tr>
<tr>
<td>Perceived Cognitive</td>
<td>229</td>
<td>0</td>
<td>16</td>
<td>10.93</td>
<td>2.91</td>
</tr>
<tr>
<td>Learning Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest-Posttest</td>
<td>229</td>
<td>-5</td>
<td>14</td>
<td>6.05</td>
<td>3.78</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Loss Scale</td>
<td>229</td>
<td>-7</td>
<td>5</td>
<td>-1.06</td>
<td>1.75</td>
</tr>
</tbody>
</table>
In addition, a matrix of Pearson correlations (see Table 4.2) was also examined for the six variables included in the tested model.
Table 4.2 Correlation Matrix for Short-Term Motivational Model Variables

<table>
<thead>
<tr>
<th>Trait Motivation</th>
<th>Mediated Immediacy</th>
<th>State Motivation</th>
<th>Cognitive Learning Scale</th>
<th>Pretest-Posttest Difference</th>
<th>Learning Loss Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait Motivation</td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>229</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mediated Immediacy</td>
<td>Pearson Correlation</td>
<td>.220**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>229</td>
<td>229</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Motivation</td>
<td>Pearson Correlation</td>
<td>.232**</td>
<td>.701**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>229</td>
<td>229</td>
<td>229</td>
<td></td>
</tr>
<tr>
<td>Cognitive Learning Scale</td>
<td>Pearson Correlation</td>
<td>.195**</td>
<td>.503**</td>
<td>.588**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.003</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>229</td>
<td>229</td>
<td>229</td>
<td>229</td>
</tr>
<tr>
<td>Pretest-Posttest Difference</td>
<td>Pearson Correlation</td>
<td>.079</td>
<td>.055</td>
<td>.132*</td>
<td>.383**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.232</td>
<td>.409</td>
<td>.047</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>229</td>
<td>229</td>
<td>229</td>
<td>229</td>
</tr>
<tr>
<td>Learning Loss Scale</td>
<td>Pearson Correlation</td>
<td>.040</td>
<td>.229**</td>
<td>.285**</td>
<td>.229**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.547</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>229</td>
<td>229</td>
<td>229</td>
<td>229</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).
Hypotheses 1 and 2

According to hypotheses 1 and 2 respectively, higher student perception of immediacy (SPoI) and higher student trait motivation (STM) would each correlate with higher student state motivation (SSM). Analysis of each of these pairs was conducted through two-tailed Pearson product-moment correlation coefficients. Between the variables of student perception of immediacy (SPoI) and student state motivation (SSM) a very strong positive correlation \( r = .70, n = 229, p < .001 \) was discovered. Higher levels of student perception of immediacy (SPoI) were associated with higher levels of student state motivation (SSM). Hypothesis 1 was strongly supported. The relationship between student trait motivation (STM) and student state motivation (SSM) was found to have a weak positive correlation \( r = .23, n = 229, p < .001 \). Therefore, hypothesis 2 was supported.

As a check between student perception of immediacy (SPoI) and student trait motivation (STM), a weak positive correlation was also found between these two variables \( r = .22, n = 229, p < .01 \). No hypothesis was proposed concerning this relationship since the two variables were thought to be unrelated theoretically given that the student perception of immediacy (SPoI) focuses on some action on the part of the teacher or lesson designer while trait motivation (STM) focuses on the student’s enduring desire to learn. Considering the relationship that was found, and since trait motivation (STM) is a variable brought to a lesson by the student, it is plausible to conceive of this relationship as one in which trait motivation (STM) may predispose a student to be more responsive to teacher behavioral indicants of immediacy (TBII) and thus have higher perceptions of immediacy (SPoI).
Hypothesis 3

According to hypothesis 3, higher student state motivation (SSM) will correlate with higher student cognitive learning (SCL). As has been noted above, student cognitive learning (SCL) was measured using three different means by which to do so: the Perceived Cognitive Learning Scale, the difference between pretest and posttest quiz scores over the study lesson material, and the Learning Loss Scale.

Using the Perceived Cognitive Learning Scale as the indicator of student cognitive learning (SCL-Cognitive Learning Scale), a test for Pearson product-moment correlation coefficient was performed. A strong positive correlation between student state motivation (SSM) and the Perceived Cognitive Learning Scale was found \[ r = .59, n = 229, p < .001 \]. In addition, a stepwise multiple regression analysis was conducted with the Perceived Cognitive Learning Scale as the criterion variable and student trait motivation (STM), mediated immediacy (SPoI), and student state motivation (SSM) as the predictor variables. Using these variables predicted student cognitive learning (SCL-Cognitive Learning Scale) \[ F(2, 226) = 64.038, p < .001; Adjusted R^2 = .356 \]. Mediated immediacy \[ t = 2.388, p < .05; \beta = .178 \] and student state motivation \[ t = 6.211, p < .001; \beta = .463 \] were statistically significant, while student trait motivation did not remain in the regression model (see Table 4.3 and Figure 4.1). Thus, using the Perceived Cognitive Learning Scale as the representation of student cognitive learning (SCL-Cognitive Learning Scale), hypothesis 3 is supported.
Table 4.3  Regression Model Using Perceived Cognitive Learning Scale as Student Cognitive Learning

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>5.564</td>
<td>.528</td>
</tr>
<tr>
<td>State Motivation</td>
<td>.090</td>
<td>.014</td>
</tr>
<tr>
<td>Mediated Immediacy</td>
<td>.064</td>
<td>.027</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Cognitive Learning Scale

Note: Adjusted $R^2 = .356$
Figure 4.1 Model Using Mediated Immediacy and State Motivation as Predictors

![Image of the model](image-url)

- Mediated Immediacy
- Student State Motivation (SSM)
- Student Cognitive Learning (Cognitive Learning Scale)

$\beta = .178^*$

$\beta = .453^*$

$Adjusted R^2 = .356$

$**p < .001, *p < .05$
Using the Pretest-Posttest Differences as the indicator of student cognitive learning, a test for Pearson product-moment correlation coefficient was performed. A negligible positive correlation between student state motivation (SSM) and the pretest-posttest scores difference was found \([r = .132, n = 229, p < .05]\). In addition, a stepwise multiple regression analysis was conducted with the Pretest-Posttest Scores Difference as the criterion variable and student trait motivation (STM), mediated immediacy (SPoI), and student state motivation (SSM) as the predictor variables. The resulting model of student state motivation (SSM) \([t = 1.999, p < .05, \beta = .132]\) as a predictor of pretest-posttest scores differences was statistically significant \([F(1, 227) = 3.996, p < .05; Adjusted R^2 = .013]\) while both mediated immediacy (SPoI) and student trait motivation (STM) were excluded (see Table 4.4 below).
Table 4.4  Regression Model Using Pretest-Posttest Score Differences as Student Cognitive Learning

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>4.681</td>
<td>.727</td>
<td>6.437</td>
<td>.000</td>
</tr>
<tr>
<td>State Motivation</td>
<td>.033</td>
<td>.017</td>
<td>.132</td>
<td>1.999</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Pretest-Posttest Differences

Note: Adjusted $R^2 = .013$
Thus, using the pretest-posttest scores differences as the representation of student cognitive learning (SCL-Pretest/Posttest Differences), hypothesis 3 was only negligibly supported (see Figure 4.2 below).
Figure 4.2 Model Using Student State Motivation as Pretest-Posttest Scores Differences

Student State Motivation (SSM) $\beta = .132^*$ \rightarrow$ Student Cognitive Learning (Pretest-Posttest Differences)

$Adjusted R^2 = .013$

* $p < .05$
Using the Learning Loss Scale as the indicator of student cognitive learning, a test for Pearson product-moment correlation coefficient was performed. A weak positive correlation between student state motivation (SSM) and the Learning Loss Scale was found \( r = .29, n = 229, p < .001 \). In addition, a stepwise multiple regression analysis was conducted with the Learning Loss Scale as the criterion variable and student trait motivation (STM), mediated immediacy (SPoI), and student state motivation (SSM) as the predictor variables. Using these variables, only student state motivation remained (SSM) \( t = .4.486, p < .001, \beta = .285 \) in the model as a predictor of learning loss at a very low level \( F(1, 227) = 20.125, p < .001; \text{Adjusted } R^2 = .077 \) (see Table 4.5 below).
Table 4.5 Regression Model of Learning Loss Scale excluding Trait Motivation and Immediacy

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>-2.432</td>
<td>.325</td>
</tr>
<tr>
<td>State Motivation</td>
<td>.033</td>
<td>.007</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Learning Loss Scale

Note: Adjusted $R^2 = .077$
Thus, using the Learning Loss Scale as the representation of student cognitive learning (SCL-Learning Loss Scale), hypothesis 3 is very weakly supported (see Figure 4.3 below).
Figure 4.3 Model Using Student State Motivation as Predictor of Learning Loss

\[ \beta = 0.285^* \]

\[ \text{Student Cognitive Learning (Learning Loss Scale)} \]

\[ \text{Adjusted } R^2 = 0.077 \]

\[ *p < 0.001 \]
Taken individually and as a whole, for all three measures of student cognitive learning (SCL), student state motivation (SSM) did have some predictive value for student cognitive learning (SCL) however slight it might be. It is also interesting to note that using Pearson product-moment correlation coefficient that relationships were found between the three measures (see Table 4.2 above). A moderate positive correlation between the Perceived Cognitive Learning Scale and the pretest-posttest scores differences was found $[r = .383, n = 229, p < .001]$, a weak positive correlation between the Learning Loss Scale and the Cognitive Learning Scale was found $[r = .229, n = 229, p < .001]$, but no significant correlation between the Learning Loss Scale and the pretest-posttest scores differences was found $[r = .074, n = 229, p = .263]$. Thus, hypothesis 3 was supported at different levels with each of the three measures of student cognitive learning (SCL). This leads to the larger research questions and the larger models based upon these results.

**Research Question 1**

Research Question 1 asked “Will Teacher Behavioral Indicants of Immediacy (TBII), Student Perception of Immediacy (SPoI) and Student Trait Motivation (STM) explain significant variance in Student State Motivation (SSM) in a single lesson presented online?” As has already been discussed above, Teacher Behavioral Indicants of Immediacy (TBII) is being inferred from the Student Perception of Immediacy (SPoI) that was observed through scale measurement. In addition, as a result of the Pearson product-moment correlation coefficients that demonstrated a very strong positive correlation $[r = .70, n = 229, p < .001]$ between mediated immediacy (representing Student Perception of Immediacy) and Student State Motivation (SSM) and a weak
positive correlation \( r = .23, n = 229, p < .001 \) between Student Trait Motivation (STM) and Student State Motivation (SSM), one might think that both Student Perception of Immediacy (SPoI) and Student Trait Motivation (STM) could be predictors of Student State Motivation (SSM).

To test the model representing research question 1, a stepwise multiple regression analysis was conducted with student state motivation (SSM) as the criterion variable and student trait motivation (STM) and mediated immediacy (SPoI) as the predictor variables. Using these variables predicted student state motivation (SSM) \( F(1, 227) = 219.637, p < .001; \text{Adjusted } R^2 = .492 \). Only mediated immediacy \( t = 14.820, p < .001; \beta = .701 \) was retained in the model while student trait motivation \( t = 1.683, p = .094 \) was dropped from the model (see Table 4.6).
### Table 4.6 Regression Model of Research Question 1

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>7.835 2.369</td>
<td>3.308 .001</td>
</tr>
<tr>
<td>Mediated Immediacy</td>
<td>1.303 .088</td>
<td>.701 14.145 .000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: State Motivation

*Adjusted $R^2 = .492$*
The answer to the question “Will Teacher Behavioral Indicants of Immediacy (TBII), Student Perception of Immediacy (SPoI) and Student Trait Motivation (STM) explain significant variance in Student State Motivation (SSM) in a single lesson presented online?” is a qualified “no” if Student Trait Motivation is included, but once Student Trait Motivation is dropped from the model, the answer is a significant “yes” since the resulting model does illustrate that 49.2 percent of variance can be explained by the variables included in the model, i.e. Mediated Immediacy (see Figure 4.4 below).
Figure 4.4 Model of Research Question 1

![Diagram showing the model of research question 1](image)

Teacher Behavioral Indicators of Immediacy (TBII) → Mediated Immediacy (SPoI) → Student State Motivation (SSM)

\[ \beta = .701^{**} \]

Adjusted $R^2 = .492$

**$p < .001$**
Research Question 2

Research Question 2 logically progresses from the simpler model of RQ1 to include the outcome that is desired, namely, student cognitive learning, as it asks “Will Teacher Behavioral Indicants of Immediacy (TBII), Student Perception of Immediacy (SPoI), Student Trait Motivation (STM), and Student State Motivation (SSM) explain significant variance in Student Cognitive Learning (SCL) in a single lesson presented online?” When using the Perceived Cognitive Learning Scale as the measure of student cognitive learning (SCL), 35.6 percent of the variance of student cognitive learning is explained by the model with the student state motivation accounting for the greatest amount of the variance with a beta weight of $\beta = .463$, $p < .001$ (see Figure 4.5 below).
Figure 4.5 Model of Research Question 2 using Cognitive Learning Scale

**p < .001, *p < .05**
When using the Pretest-Posttest scores differences as the measure of student cognitive learning (SCL), the model changes with mediated immediacy having an indirect impact upon student cognitive learning and student state motivation having a negligible impact upon learning, with only 1.3 percent of the variance accounted for in the model (see Figure 4.6).
Figure 4.6 Model of Research Question 2 using Pretest-Posttest Scores Differences

Teacher Behavioral Indicators of Immediacy (TBII) → Mediated Immediacy (SPoI) → Student State Motivation (SSM) → Student Cognitive Learning – Pretest–Posttest Scores Differences (SCL)

$\beta = 0.701^{* *}$

$\beta = 0.132^{*}$

Adj. $R^2 = 0.492$

Adj. $R^2 = 0.013$

$p < 0.05$
Using the Learning Loss Scale as the measure of student cognitive learning (SCL) finds some increase in the amount of variance explained by the model at 7.7 percent total variance accounted for (see Figure 4.7 below).
Figure 4.7  Model of Research Question 2 using the Learning Loss Scale

Teacher Behavioral Indicators of Immediacy (TBII) → Mediated Immediacy (SPoI) → Student State Motivation (SSM)

β = .701**

Adj. R² = .492

β = .285**

Adj. R² = .077

**p < .001
Although the amount of variance explained in each model is impacted by which measure for student cognitive learning (SCL) is chosen, the answer to RQ₂ is a qualified “yes” when considering statistical significance and dropping Student Trait Motivation from the model, although the effect sizes vary from moderate to negligible among the various means of measuring cognitive learning. Thus, the overall model which best fits includes teacher behavioral indicants of immediacy, which leads to student perception of immediacy, which leads to student state motivation, which in turn leads to student cognitive learning. With the one modification made by dropping Student Trait Motivation, this provides some confirmation for the Short-Term Motivational Model of Learning in the online setting as seen in Figure 4.8 below.
Figure 4.8  Concluding Short-Term Motivational Model of Learning based upon Study Results
Research Question 3

Research Question 3 asked “Between the Perceived Cognitive Learning Scale and the Learning Loss Scale, which self-report measure is a more accurate indicator of cognitive learning?” As has been previously discussed in “Chapter Two,” the Learning Loss Scale has been used for over two decades with mixed results when compared to empirical measures of cognitive learning (C. Baker, 2010b; J. D. Baker, 2004; Chesebro & McCroskey, 2000; Christophel, 1990; Fall et al., 2011; Gorham, 1988; Richmond, Gorham, et al., 1987; Richmond, McCroskey, et al., 1987; Witt & Wheeless, 2001). Also, as previously noted, questions have been raised concerning the measure, including the critique that as a self-report measure that the scale lacks objectivity and standardization (Kearney & Beatty, 2009) as well as the question of whether cognitive learning should be operationalized with one- and two-item measures (Ellis, 2004; Frisby & Martin, 2010; Rodríguez et al., 1996). Still, the problem of how to measure cognitive learning objectively remains. Due to the subject specific nature of nearly all objective measures of cognitive learning, self-report survey items seem to provide the best means of measuring that cognitive learning and making comparisons and generalizations across various subject matter and pedagogies.

With that word in mind, one of the secondary purposes of this study was to determine if there was a better self-report measure of cognitive learning than the learning loss scale when compared to an objective measure of learning, specifically subject recall. Thus, both the Perceived Cognitive Learning Scale and the Learning Loss Scale were compared to the pretest-posttest scores differences. An interesting finding in this study was that the Perceived Cognitive Learning Scale moderately positively correlated with
the empirical measure of learning, namely, the pretest-posttest scores differences \( r = .383, n = 229, p < .001 \), whereas, the more tradition perceived learning measure, the Learning Loss Scale, did not correlate with the pretest-posttest scores differences at all \( r = .074, n = 229, p = .263 \). Therefore, the Perceived Cognitive Learning Scale appears to be a valid measure, as has been demonstrated in previous research (Frisby & Martin, 2010), and is more accurate in representing actual cognitive learning as measured by tests of subject recall than the Learning Loss Scale.
Chapter Five: Discussion

Since Andersen’s (1979) study of immediacy, many advances have occurred in the study of instructional communication. Over the last thirty-five years many studies of teaching and learning have appeared, some including measures of teacher verbal and nonverbal immediacy. As was observed in “Chapter Two,” the variable of teacher immediacy was subject to debate with regard to teacher verbal immediacy and whether immediacy impacted learning either directly or through an intervening variable. Unfortunately, as was also observed in “Chapter Two,” most past studies of immediacy with other teacher and student variables tended to muddle the concept. Most measurements of immediacy depended upon student recall of teacher behaviors without regard to whether or not those behaviors actually reduced the psychological distance between the teacher and the student. Not until recently did researchers make a distinction between teacher actions and student psychological perceptions that produced either approach or avoidance. Therefore, previous models concerning the means by which immediacy affected learning were proposed based upon the assumption that immediacy measures were measuring student psychological perceptions of teacher actions. Yet, in fact, what was measured was whether or not students remembered teachers committing certain actions which were assumed to produce student perceptions of immediacy. It should come as no surprise that such models and studies have varied in their results. In addition to the problems with what was being measured as opposed to what was being claimed to be measured has been the additional conundrum concerning how to accurately measure actual cognitive learning.
This study contributes to the body of instructional communication literature in several ways. First, the mediated immediacy scale that was used more accurately reflects student perception of immediacy instead of testing the student’s memory of actions committed by or word choices made by a teacher/lesson designer. Second, the Short-Term Motivational Model of Learning that was used as the basis of the dissertation study recognizes that there may be a need for different ways of conceptualizing the causal link between variables such as immediacy and student cognitive learning given the different contexts presented by a single lesson versus a course that endures over a period of time. Third, by using a pretest-posttest recall of information, an empirical measure of learning provided the opportunity in an study setting for comparison to measures of student perception of learning (i.e. Learning Loss Scale and Perceived Cognitive Learning Scale) to determine the usefulness of each in future research. The remainder of this chapter includes interpretation of the results, limitations of this study, implications for future research, and final conclusions.

**Interpretation of Results**

The primary goal of this study was to test the new Short-Term Motivation Model of Learning as proposed in “Chapter Two.” A secondary goal of this research was to test the recently developed Perceived Cognitive Learning Scale (Frisby & Martin, 2010) and the Learning Loss Scale (Richmond, McCroskey, et al., 1987) as measures of cognitive learning against an actual recall of information using a pretest and posttest of the lesson subject matter. To this end, three hypotheses and three research questions were proposed, all of which are addressed in turn below.
Hypotheses 1 and 2

Hypothesis one stated that higher student perception of immediacy would correlate with higher student state motivation, and hypothesis two stated that higher student trait motivation would also correlate with higher student state motivation. The results of the present study are supported by previous studies that have been done in both the face-to-face and online settings with regard to immediacy and student motivation. In keeping with the suggestions by Allen, Witt and Wheeless (Allen et al., 2006; Beatty, 2009, p. 343), mediated immediacy appears to be a significant and strongly related positive factor influencing student state motivation. A surprising finding about the relationship between immediacy and state motivation in the present study was that the relationship was as strong as it was \( r = .70, p < .001 \) and \( r = .65, p < .001 \) in the pilot study and accounted for a significant portion of the influence upon state motivation \( (\beta = .701, p < .001; \text{Adjusted } R^2 = .492) \) while trait motivation was excluded from the model in the current study, failing to meet the criterion for inclusion of \( p < .05 \) \( (p = .094) \).

Second, given the degree to which mediated immediacy influenced student state motivation, which is higher than is often associated between the two constructs, student trait motivation may have amplified the effect of immediacy. Perhaps higher student trait motivation predisposes a student to respond more to immediacy when it is present. A follow up stepwise multiple regression analysis was conducted using mediated immediacy as the criterion variable and including the following as possible independent variables: student trait motivation, subject sex, subject classification, subject interest in the larger lesson topic, subject knowledge level of the larger lesson topic, and whether the subject had previously taken an online course. The results of this multiple regression
indicated three variables that predicted mediated immediacy at a very low level of variance \[ F(3, 224) = 8.373, p < .001; \text{Adjusted } R^2 = .089 \]. Student trait motivation \[ t = 3.161, p < .01; \beta = .207 \], subject interest in the general lesson topic \[ t = 3.614, p < .001; \beta = .285 \] and subject prior knowledge of the general lesson topic \[ t = -2.058, p < .05; \beta = -.164 \] were all statistically significant.

The findings of this follow up multiple regression analysis indicate that student trait motivation has effect upon mediated immediacy when it does not have effect directly on student state motivation. All three variables that were retained in the follow up regression are variables that are brought by the student to the learning episode and that might predispose a student to learn in that setting. Given the discussion about attention and the ARCS model in “Chapter Two,” it could be postulated that attention/interest serves as a predictor of student perception of immediacy. In other words, a student who is already generally interested in learning, and who is already interested in the subject matter to be taught/learned, is more inclined to receive and/or notice the tone in which the learning material is presented, namely, with immediacy. On the other hand, this must not be over interpreted since these three variables only accounted for 8.9 percent of the variance in mediated immediacy, leaving open the probability that Teacher Behavioral Indicants of Immediacy would explain more variance in Mediated Immediacy if it were measured. Further study is required to determine how much of the student’s perception of immediacy is intrinsic and how much of it is extrinsic.

**Hypothesis 3**

Hypothesis three stated that higher student state motivation (SSM) would correlate with higher student cognitive learning (SCL). For the purposes of this study,
three different measures of student cognitive learning were used for comparison purposes. The first of the three measures of student cognitive learning was the Perceived Cognitive Learning Scale by Frisby and Martin (2010). As was reported in “Chapter Four,” 35.6 percent of the variance in the Perceived Cognitive Learning Scale was predicted by mediated immediacy and student state motivation. This was as expected. Given the past work on immediacy and motivation in the classroom setting which led to the Motivational Model by Frymier (1994) and the prior Learning Model used by many researchers (Andersen, 1979; Gorham, 1988; Kelley & Gorham, 1988; Richmond, Gorham, et al., 1987) which was graphically illustrated by Frymier (1994), a direct relationship between immediacy and student learning and an indirect relationship between these two variables with state motivation as an intervening variable have both been observed. Thus, for the Perceived Student Cognitive Learning Scale, the relationship between cognitive learning and mediated immediacy appears to be partially mediated by student state motivation.

Although the results concerning the relationship between mediated immediacy and the Perceived Cognitive Learning Scale were promising, a caveat should be noted. As the name of the scale implies, the scale measures the student’s perception of learning and is not an empirical measure of actual learning. The scale is a self-report measure. As such, students’ perceptions are subject to attitudinal influences that may not necessarily translate into an accurate representation of the underlying action or change that is implied.

The second measure of cognitive learning, the pretest-posttest quiz scores differences, served as an empirical measure of cognitive learning. The advantage of this
method was that it did test information recall, one of the six categories of cognitive learning delineated in Bloom’s taxonomy (Bloom, 1956), those being knowledge (recall of information), comprehension (understands the meaning and can provide an interpretation), application (applies learned concepts in new situations), analysis (divides more complex concepts into its parts and can provide organization), synthesis (can draw from various concepts and knowledge to create new thought structures and ideas), and evaluation (can make judgments about the quality and value of ideas and materials).

One of the weaknesses in the pretest-posttest testing method is that it only tests one of the six categories of cognitive learning, namely, knowledge, which is considered to represent the least in-depth learning. As stated in “Chapter Two,” learning is considered to have occurred when any of the six are evidenced, but moving from the earlier categories to the latter ones is perceived as moving from the simpler to the more complex, and with that progression is the assumption of deeper learning. Typically, it is assumed that if a student can exercise synthesis and evaluation then the student has already exercised and mastered the less complex forms of learning in the process, especially knowledge.

While the pretest-posttest method is limited in the type of learning that is measured, it is significant that learning was measured and that student state motivation did weakly correlate with the test scores differences \( r = .132, n = 229, p < .05 \). In similar fashion, the regression analysis using trait motivation, mediated immediacy, and student state motivation dropped trait motivation and mediated immediacy from the model predicting the pretest-posttest scores difference. The amount of variance was also very small with an Adjusted \( R^2 = .013 \). This is similar to meta-analysis results of Witt et
al. (2004) with regard to immediacy and cognitive learning in face-to-face settings and
Allen et al. (2006) with regard to immediacy, affective and cognitive learning. Initial
reaction is to dismiss the model on the basis of the small effect sizes, but to do so may be
tantamount to discarding a variable that may have greater impact with time and in other
important areas of learning. As mentioned in “Chapter Two,” in referencing the work by
Abelson (1985), Allen et al. (2006) made the point that the apparent negligible effects of
variables such as immediacy and state motivation upon empirical measures of cognitive
learning may actually be cumulative (p. 26). In this present study, the exposure to lesson
content was only for approximately seven minutes, whereas, in the typical educational
setting the exposure will be longer for a single lesson with repeated exposure over a
period of months to years whether the setting be in elementary, secondary, or post-
secondary formal educational settings. Even occupational educational settings provide
much more exposure time by the student to the instruction of a teacher or course
designer.

In addition to this, the total number of elements involved in predicting cognitive
learning outcomes may be so numerous that no single variable would have a large effect
size. Whether it is student physical or emotional health, previous exposure to the subject
area (scaffolding), relationships with other students, various stress factors, learning
disabilities, etc., the effect of any one variable would become diluted for any given lesson
but possibly have a cumulative effect over time. Thus, as stated by Allen et al. (2006),
“…the small effect observed for a moment in time in an individual class, particularly
concerning issues of motivation, probably are far more influential when viewed over the
whole course” (p. 26).
The third measure of cognitive learning, the Learning Loss Scale, was included in the study to discover if the scale could accurately determine if cognitive learning had or had not occurred in an asynchronous single lesson setting such as the one in the study. To make this determination, a comparison was made between the learning loss scale score and the pretest-posttest scores difference. It was also expected that in keeping with previous research that the learning loss scale would correlate with immediacy and state motivation to some extent. As expected, the learning loss scale did weakly positively correlate with mediated immediacy \( r = .229, n = 229, p < .001 \), state motivation \( r = .285, n = 229, p < .001 \), and the Perceived Cognitive Learning Scale \( r = .229, n = 229, p < .001 \), but no correlation was found with the pretest-posttest scores differences \( r = .074, n = 229, p = .263 \). Being that the Learning Loss Scale is a self-report of the subject’s perception, it should be expected that it might correlate more strongly with perceptions of immediacy, state motivation, and the Perceived Cognitive Learning Scale, but that was not true. If the Learning Loss Scale is an accurate measure of actual cognitive learning then the measure would correlate with a more objective measure of cognitive learning such as the pretest-posttest scores differences, but the lack of a significant correlation between the two makes the learning loss measure questionable unless the pretest-posttest scores difference were impacted by some other confounding variable not observed. Thus, the results of this study cast additional doubt on the utility and reliability of the learning loss measure.

In summary, the following was concluded regarding the three hypotheses:

Hypothesis 1 (SPoI positively correlates with higher SSM): Supported.

Hypothesis 2 (STM positively correlates with higher SSM): Supported.
Hypothesis 3 (SSM positively correlates with higher SCL): Supported

**Research Question 1**

Research question one asked if teacher behavioral indicants of immediacy (TBII), student perception of immediacy (SPoI), and student trait motivation (STM) explain significant variance in student state motivation (SSM) in a single lesson presented online. This study provides a qualified “yes” once student trait motivation (STM) is dropped from the model. As previously discussed in “Chapter Four,” the presence of teacher behavioral indicants of immediacy (TBII) has been inferred from the attempts to operationalize mediated immediacy. The remaining variables of mediated immediacy (SPoI) and student trait motivation (STM) were measured, and as has been noted in “Chapter Four,” stepwise multiple regression analysis found that mediated immediacy alone accounted for a significant percentage of the variance in student state motivation (SSM) with an $Adjusted R^2 = .492$ or 49.2 percent. If student state motivation is a significant variable in the teaching and learning process, then this finding is important for the format and design of online learning modules and courses. As noted in “Chapter Two,” the motivational climate in online instruction has been deficient, with few instructors/designers giving attention to motivational principles that may be an underpinning of effective learning. Therefore, the answer to research question one is a qualified affirmative one.

**Research Question 2**

Research question two asked if teacher behavioral indicants of immediacy (TBII), student perception of immediacy (SPoI), student trait motivation (STM), and student state motivation (SSM) explain significant variance in student cognitive learning (SCL) in a
single lesson presented online. Unlike RQ1, the answer to this question is more complicated depending upon how student cognitive learning is measured. When stepwise multiple regression analyses were conducted individually with the Perceived Cognitive Learning Scale, the pretest-posttest scores differences, and the Learning Loss Scale as the criterion variable, results differed. As has already been noted, using the Perceived Cognitive Learning Scale found that student trait motivation (STM) was deleted from the model while student state motivation (SSM), and mediated immediacy (SPoI) (and teacher behavioral indicants of immediacy by inference) were retained and accounted for 35.6 percent of the variance in the measure with an Adjusted $R^2 = .356$. When using the pretest-posttest scores differences as the criterion variable, only student state motivation (SSM) was retained and only accounted for 1.3 percent of the variance with an Adjusted $R^2 = .013$. When using the Learning Loss Scale as the criterion variable, 7.7 percent of the variance was explained by student state motivation only as a predicting variable with an Adjusted $R^2 = .077$.

At first glance, it would appear that neither the Perceived Cognitive Learning Scale nor the Learning Loss Scale had much in common with the pretest-posttest scores difference, an actual measurement in the change in knowledge. Upon inspection of the correlation matrix (see Table 4.2), no significance correlation was found between the Learning Loss Scale and the pretest-posttest scores differences [$r = .074, n = 229, p = .263$]. On the other hand, there was a highly significant moderate correlation between the Perceived Cognitive Learning Scale and the pretest-posttest scores differences [$r = .383, n = 229, p < .001$]. This seems odd since the Adjusted $R^2$ of the Learning Loss Scale was more similar in the model to the pretest-posttest scores differences than the Perceived
Cognitive Learning Scale was to the pretest-posttest scores differences. Notwithstanding, the Pearson correlation coefficients imply that, compared to an actual measure of knowledge gained, the Perceived Cognitive Learning Scale is more likely to represent actual knowledge gained than does the Learning Loss Scale.

But research question two asked whether teacher behavioral indicants of immediacy (TBII), student perception of immediacy (SPoI), student trait motivation (STM) and student state motivation (SSM) would explain significant variance in student cognitive learning in a single lesson presented online. After making the adjustment of deleting student trait motivation (STM) from the model implied by the research question, and based upon the criterion that statistical significance is met, the answer for all three possible criterion variables is affirmative, if student state motivation (SSM) is seen as an intervening variable in each representation of the Short-Term Motivational Model of Learning for online instruction. Based upon the strength of the effect, the answer would be a qualified affirmative. Viewing student state motivation (SSM) as an intervening variable, teacher behavioral indicants of immediacy (TBII), and student perception of immediacy (SPoI) predict a significant portion of the variance in student state motivation (SSM) which in turn predicts a varying yet statistically significant portion of the variance in student cognitive learning (SCL).

As an additional check of the model, follow up analysis was performed in IBM® SPSS® Amos software to check for model fit. For the model using the independent variables of mediated immediacy and student trait motivation with student state motivation as an intervening variable and the dependent variable of student cognitive learning as measure through the Perceived Cognitive Learning Scale, statistics for NFI
and CFI (.944) were in the acceptable range (.90 to .95) while RMSEA was questionable (.148) but with a PCLOSE value (.006) well within the acceptable range of .05. For the same model using the pretest-posttest scores differences as the measure of student cognitive learning, NFI (.927) and CFI (.942) were again in the acceptable range, while RMSEA was again questionable (.119) yet also with a PCLOSE value (.037) within the acceptable range. For the model using the Perceived Cognitive Learning Scale, the NFI and CFI statistics were well within the range for good fit (NFI = .978 and CFI = .982) while the RMSEA remained essentially unchanged (.143). Although the RMSEA values were above what would be desired in each of these analyses, but Hu and Bentler (1999) call into question the usual cutoffs for RMSEA when N<=250 (in the present student N=229). In addition, Kenny (2014) claims that RMSEA can be artificially high when the degrees of freedom or the number of cases are low. In analyses for both Perceived Cognitive Learning Scale and the pretest-posttest scores differences the degrees of freedom were very low (Df = 3). Kenny (2014) also states that increasing the number of variables in the model can improve the RMSEA value. All of this suggests that the model is receiving some initial support from these measures of fit, but these measures could be improved by adding other variables in future research.

**Research Question 3**

Research question 3 sought to make a determination of whether the Perceived Cognitive Learning Scale or the older Learning Loss Scale was a more accurate indicator of cognitive learning. Based upon the findings of this study as noted in the previous chapter, the Perceived Cognitive Learning Scale has support as a valid measure of student cognitive learning in comparison to an actual measure in the change in knowledge in light
of the moderate correlation the scale had with the pretest-posttest scores differences ($r = .383, p < .001$). On the other hand, the fact that the Learning Loss Scale failed to correlate to the pretest-posttest scores differences with statistical significance is another demonstration of the lack of ability for the scale to accurately represent actual learning that takes place on the part of the student. Given the results of this study, the Learning Loss Scale should not be considered as a valid measure of student cognitive learning and should be abandoned in favor of the Perceived Cognitive Learning Scale in research on educational communication.

**Limitations**

This study provided several interesting findings, but like all other studies this one also has its limitations. Some of the limitations of this study center on the pool of participants. First, the sample of participants was limited in scope on several fronts. Although many of the potential subjects in the pool represented various majors and departments across the university with the largest portion of students receiving the email invitation to participate being enrolled in a general education course, there were several course sections included in the sample in which those enrolled would more likely than not be students majoring within the communication discipline. Approximately one third of the students in the pool were registered in courses that were required or select major electives within the Department of Communication. Whether or not there would be a systematic difference in the response of these students from a more representative sample is difficult to determine. In addition, the subjects represented only one university, Western Kentucky University, a comprehensive state-supported regional university situated in a small city (approximately 55,000 in population) surrounded by rural counties.
and being at least a one hour drive from the nearest standard metropolitan statistical area (SMSA). Although there are students on the campus from numerous states and countries, the overwhelming majority of students are from the state of Kentucky and the greatest concentration of those are from the city and county within which the university is located and the surrounding area. Also, since the subjects were drawn from an institution of higher education with programs ranging from associates degrees to professional doctorates (nursing practice, physical therapy, and educational leadership), applicability of the results to a population of adults who have no experience in the collegiate setting would require the implementation of the study with subjects who do not have a college education, a population that is more the rule than the exception. There can also be some question regarding whether comparable results would be obtaining in a secondary, intermediate, or primary school setting with age appropriate wording and subject matter. Thus, generalizability of the results of this study to any larger population in society is unknown.

A second area of concern is with the composition of the participants who completed the survey. The generalizability of the results to a university population is questionable. The largest group in the study consisted of freshmen, being 60.9 percent of those participating. Although the student body on college campuses in a similar institution might be expected to have a greater number of freshmen due to different retention rates from the first year through graduate school, the number of freshmen in this study was inordinately greater than what would be typical. Due to the general education course sections from which the majority of participants were recruited being a required course of all four-year degree students, this statistic is not surprising. Additionally, the
student body and culture of the institution in which the study was conducted would undoubtedly be different from those of a Research I institution or a community college.

Third, it is possible that the results of the study may be subject matter specific. As was noted earlier in this chapter, when a follow up multiple regression analysis was performed with mediated immediacy as a criterion variable and several additional variables included as possible predictors of immediacy, there were three of those variables that predicted mediated immediacy at a very low level of only 8.9 percent of the variance \[F(3, 224) = 8.375, p < .001; Adjusted R^2 = .089\]. Those variables left in the regression included student trait motivation \[t = 3.161, p < .01; \beta = .207\], subject interest in the general lesson topic \[t = 3.614, p < .001; \beta = .285\] and subject prior knowledge of the general lesson topic \[t = -2.066, p < .05; \beta = -.165\] which were all statistically significant. It is unclear how the results may have been different if the topic had been different (e.g. a mathematics concept) or if the subject matter had been of greater or lesser interest to the participants. Although the design of the study was meant to be such that any subject matter could be substituted for that which was used with different pretest-posttest items, without replication of the study using different lesson subject material, there is no guarantee that similar results would be obtained.

The fourth area of concern is that of the research design. As is always the case, a limitation of the study design is that it does not always thoroughly simulate real world circumstances even though this study was conducted as a field study. The participants knew that they were not receiving a grade for their performance like they would in an actual course being taught for credit. This may be reflected in the lackluster results of the Mental Effort Rating Scale (Paas, 1992) with a mean below the pure mid-point of the
scale \( M = 3.80, SD = 2.015, \text{Min} = 0, \text{Max} = 8, N = 229 \). Many students are motivated to do better work when there is some tangible individual benefit to be derived from the outcome of their participation. The incentive for participation was only a chance of no worse than one in 125 that the participant might be selected in a random drawing for one of three $50 Visa gift cards to be given, but such an incentive is not available in the typical learning setting and under normal circumstances. In addition, voluntary participation in a contrived setting as exists in many studies simply does not duplicate the motivational aspect to perform well that is found in the actual course setting.

The fifth area of limitations is related to the means used to measure variables in survey research. Nearly all of the variables were measured using self-report survey items in scales. Trait motivation, mediated immediacy, student state motivation, and perceived cognitive learning were all measured using self-report. Such items can be affected by the participant’s psychological state and impacts the measurement of the variables being studied.

In addition to the shortcomings of self-report measures, there are limitations to the method used to measure the change in knowledge. In this particular study/lesson the pretest-posttest measures only presented and measured subject matter for prior knowledge and factual recall. To measure other types of cognitive learning listed by Bloom (1956), including comprehension, application, analysis, synthesis and evaluation, would require a different design. Also, use of the pretest-posttest design may have predisposed each subject to the material that was presented in the lesson. In fact, the use of the same ten questions out of twenty for both the pretest and the posttest may have added to the predisposition of the subjects to the material. On the other hand, what was
being measured was the change in knowledge level concerning the lesson subject matter. In addition to the above, the single lesson design, though it is less likely to suffer from the history effect, fails to make compensation for those whose learning happened to be at a slower pace or who find that they learn best over time. Since the typical setting of learning is over a period of time regardless of the venue, the study design of this dissertation simply does not capture that type of information.

**Implications for Future Research**

No research is done in a vacuum, and this study was no exception to that. Just as this study has relied upon previous research to establish the theoretical foundation for the principles investigated, this research has provided several findings upon which to build additional study in the future. In “Chapter Two,” previous models of learning using the variables of teacher immediacy, trait motivation, state motivation, and cognitive learning were found to be insufficient to accurately explain the process in both a single lesson as well as over the course of a more extended period of time. As a result, two new models were proposed: the Long-Term Affective Learning/Motivational Model of Learning and the Short-Term Motivation Model of Learning. The Short-Term model was tested through the study upon which this dissertation was built, but additional research is needed to further test the Short-Term model. First, future testing should include other forms of learning besides simple acquisition of knowledge. Higher forms of learning in Bloom’s taxonomy (1956) need to be investigated to determine if the model operates in the same way and with at least the same strength for more than simple recall of information.

Second, additional research of this model is needed using other subject matter. This study sought to use as subject matter a topic that was perceived as being of interest
to university students, most of whom are of the traditional college age (18-25 years of age). Different subject matter might include a more obscure subject or more difficult or abstract material.

Third, as was indicated by the measures of fit analyses conducted through IBM® SPSS® Amos software, the RMSEA statistic needs improvement to reach an agreed upon cutoff level in addition to the RFI and CFI statistics. According to Hu and Bentler (1999) and Kenny (2014) this statistic for model fit can be improved by making sure that the subject N>250, and the higher the number of cases the better. In addition, according to Kenny (2014) an increase in the degrees of freedom will also improve the RMSEA statistic. The primary means to do this is to increase the number of variables in the model. Other statistics (NFI and CFI) indicated model fit, especially after deleting the variable of student trait motivation, but additional variables that will fit within the model will increase the degrees of freedom.

Fourth, additional research could utilize other methods for measuring actual learning that are not dependent upon subject self-report/perception. These measures could then be used as more of a “gold standard” against which to have additional comparisons to the Perceived Cognitive Learning Scale (Frisby & Martin, 2010).

Just as the Short-Term Model needs additional testing, so too the Long-Term Affective Learning/Motivational Model of Learning should be tested by possibly using a longitudinal method employing panels of participants. Measures of actual learning may be similar to or different from those used in the test of the Short-Term Motivational Model of Learning. Also, comparative studies between the Short-Term Motivation Model of Learning and the Long-Term Affective Learning/Motivational Model of
Learning could help to determine if there is a different or cumulative effect upon learning that constitutes the need and empirical support for both models of learning. This will also afford the opportunity to measure the construct of affective learning within the Long-Term model in order to determine if there is an effect upon cognitive learning separate from the construct of student state motivation.

In addition to the testing of both of the models proposed in this dissertation, work needs to be done on the construction of better measures for two specific variables: Teacher Behavioral Indicants of Immediacy and Student Cognitive Learning. For Teacher Behavioral Indicants of Immediacy measures might involve the use of teacher self-report of intent with regard to immediacy and the actions intentionally committed to convey immediacy. On the other hand, the use of third party recording and reporting of observed actions that are believed to be immediacy producing could prove to be a useful means for measuring teacher behavioral indicants of immediacy. If care is taken to insure that the actions expected to be observed are matched well with the norms for the culture of the subject, then the method of measuring teacher behavioral indicants of immediacy would be useful regardless of the differences between cultures.

With regard to cognitive learning, additional testing of the Perceived Cognitive Learning Scale in conjunction with other formats of measuring learning will provide more insight into the usefulness of that scale.

The concept of social presence and its related construct of teacher presence also need to be explored as to whether there is a difference between these and immediacy, or if immediacy is actually a sub category of social presence and/or teacher presence. Questions remain in this realm which need to be addressed further.
Future research should also consider the role of attention and other elements of the ARCS Model of Instructional Design even though the theoretical basis of the model is different from that of “approach/avoidance.” For instance, how should “attention” be conceptualized, if at all, in the context of either the Short-Term Motivational Model of Learning or the Long-Term Affective Learning/Motivational Model of Learning? As conceptualized by Keller (1983, 1987, 1999), is there overlap between “attention” and immediacy, or is attention a student learning behavior (SLB) that occurs either simultaneous with or as a result of motivation and/or affective learning? In addition, are the concepts of confidence and satisfaction possibly student factor inputs in the model that are part of a feedback loop?

Finally, in order for meta-analyses to be conducted there must be multiple studies concerning the same constructs and utilizing similar measures. As the point has been made by Witt, Wheeless and Allen (2004) and Allen, et al (2006), there is a need for more effects studies for meta-analyses to be useful.

Conclusions

This dissertation was built upon two theories, the one which was central to the study and the unit of analysis and the other which served to guide the design of the study. The first theory of “approach/avoidance” serves as the basis for the concept of immediacy and the belief that humans physically and/or psychologically draw closer to those things that produce liking, and that humans physically and/or psychologically draw away from or avoid those things which produce disliking (Mehrabian, 1971). As stated in “Chapter Two,” approach/avoidance theory has served as the basis for several concepts studied with the educational communication discipline in addition to that of immediacy
Thus, approach/avoidance theory is well established in educational communication research, and the study of the effect of immediacy as mediated through computer technology (i.e. mediated immediacy) is an open and valid area for such study given the obvious differences in the computer-mediated context and the face-to-face setting, and given recent developments in the understanding of the concept of immediacy.

One of the key points made in “Chapter Two” was that the methods by which the construct of immediacy has been measured in the past and the conceptualization of immediacy have not coincided with one another in research. The nonverbal and verbal immediacy scales measured the recollection by the students of certain teacher behaviors that were thought by researchers to be immediacy inducing, but no one had noticed that the presuppositions concerning those scales were inaccurate. We now know that students’ perceptions of immediacy and the actions taken by those who sought to decrease the psychological distance between teacher and student are not one and the same concept. Previous research demonstrated that immediacy appears to be a concept that crosses cultural boundaries, but what actions, words, phrases and types of verbal expressions are perceived as signaling immediacy will be different in different cultures. This fact lends further evidence to the conclusion that previous assumptions about the perception of immediacy and the immediacy measures which were used were incorrect.

Using immediacy as a central construct, there were two new models of learning proposed in this study based upon whether or not the duration of learning is a matter of a single lesson or multiple lessons presented over time. The Short-Term Motivational Model of Learning was presented and tested in the context of a single online lesson.
Results of the field study found sufficient evidence that the model, after modified by the deletion of student trait motivation, is a valid partial conceptualization of the larger process of learning. It was found that in the short-term context that greater student perception of immediacy leads in part to greater student state motivation, and that greater student state motivation leads to greater student perception of cognitive learning, as well as slightly higher student cognitive learning (knowledge) as measured by pretest-posttest scores differences. Although the actual measurement of knowledge was not large in the effect in the single lesson, previous evidence suggests that the effects may be cumulative and would demonstrate a stronger total effect in a test of the Long-Term Affective Learning/Motivational Model of Learning.

A question that might be raised regarding the immediacy construct in the computer-mediated context and especially related to learning in episodic learning is what type of immediacy is being presented? Traditionally, the immediacy construct has been conceptualized as “teacher/instructor immediacy,” but in a single episode of learning, if there is no longer term exposure to the teacher or lesson designer that allows for the development of a relationship, is the perception of immediacy on the part of the student to be considered “teacher/instructor/instructional designer” immediacy, or is it something else? Could the perception of immediacy in a single lesson not be “teacher” immediacy but instead be “content” immediacy? Obviously, in the online setting, the development of immediacy must be done through the manner in which content is delivered to the student. In some online learning contexts, the student has no chance to develop a relationship with an “instructor” because the lesson was designed by the instructional designer to be presented as a stand-alone lesson without personal knowledge of the lesson.
designer able to be acquired. Thus, it becomes difficult for the student to psychologically
“draw near” to the nebulous, unnamed, unknowable lesson designer, but the student
might actually be “drawing near” to the content. In most learning settings, there are three
types of interaction possible: student to instructor, student to student, and student to
content. In longer term online courses, all three of these interaction types would be
available, but in episodic learning there would often only be one type, student to content.
Thus, we are left to conclude that in the Short Term Motivational Model of Learning that
the immediacy that is perceived by the student is a form of “content immediacy” instead
of “teacher/instructor immediacy,” whereas, in the Long Term Motivational/Affective
Learning Model of Learning that either type is possible, but in most settings there would
be a conscious effort on the part of the instructor to build a relationship, making the
student perception of immediacy be of instructor immediacy.

The Long-Term Affective Learning/Motivational Model of Learning was also
proposed in “Chapter 2,” a model that additionally includes the constructs of student
affective learning and student learning behaviors along with those found in the Short-
Term Motivational Model of Learning, and which also has immediacy as a key
independent variable in the model. Given the support found for the Short-Term
Motivational Model of Learning, four of the six constructs of the Long-Term Affective
Learning/Motivational Model appear to have valid support, all of which lend credence to
the possibility of longitudinal research that will provide more direct evidence of the
Long-Term model as a whole.

A word of caution should also be remembered before claiming too much about
the impact of the models on learning, especially concerning student state motivation. As
Christophel (1990) pointed out, the claim that learning would automatically improve with an increase in student motivation is to make the creation of motivation within the student a panacea and is making claims for motivation that were not sustainable. Just as the point was made in “Chapter Two,” it is entirely possible for a student to be very motivated to learn about a particular subject while that student’s learning may still be susceptible to being impacted by other factors not necessarily in the teacher’s or the student’s control (including lack of nutrition, social problems at home, possible learning disabilities, etc.).

The second theory used in this study which guided the design of this study was the Cognitive Theory of Multimedia Learning by Mayer (Clark & Mayer, 2011; Mayer, 2003, 2005, 2011; Mayer & Moreno, 1998a, 1998b, 2003; Moreno & Mayer, 2002). Based upon this theory the study presented the material in two modes: text with static photos without narration and text with static photos with narration. According to the Cognitive Theory of Multimedia Learning, there are two channels for learning, the visual and the audible. If either of these becomes overloaded with multiple stimuli then the learner will experience cognitive overload, but if they both used without either having multiple stimuli then learning can be optimized. In other words, printed words, although verbal in nature, are still received through the visual channel. To include an animation of any type along with text on screen has been shown to overload the visual channel and thus negatively impact learning (Clark & Mayer, 2011). Likewise, the same would be true if the audio had two streams of stimuli of the same type (i.e. two narrations) or if the narration were different in wording from the text presented on screen, but text presented with audio narration using the same wording does not overload memory and therefore does not create cognitive overload.
In this dissertation study, the lesson presentations were designed to avoid creating excessive cognitive load by overloading either channel. ANOVA analysis did not find any significant differences between the conditions \((p = .594)\) based upon the results of the Mental Effort Rating Scale (Paas, 1992). Therefore, the goal based upon the Cognitive Theory of Multimedia Learning was achieved: To avoid cognitive overload for the study participants. But the use of narration or the lack thereof raises another question: Is there a difference between those conditions without narration and those with narration? Independent-samples t-tests show no statistical significance between those two groups on several variables (mediated immediacy, \(p = .432\); student state motivation, \(p = .956\); Perceived Cognitive Learning Scale, \(p = .950\); pretest-posttest scores differences, \(p = .362\)). Therefore, it should be concluded that for the purposes of this study, that the use of narration or the lack thereof in a single online lesson has no significant effect upon cognitive learning, the perception of cognitive learning, the perception of immediacy, or student state motivation.

As has been discussed previously, this study also tested two perceived cognitive learning measures against an actual measure of knowledge gain (pretest-posttest scores differences) in order to determine which one would more accurately represent actual cognitive learning as measured through pretest-posttest scores differences. It was found that the Learning Loss Scale did not correlate with the measure of knowledge gain and only negligibly was affected by student state motivation. On the other hand, the Perceived Cognitive Learning Scale did moderately correlate positively with the actual measure of knowledge gain. Although the Learning Loss Scale has appeared to be used successfully in the past, this present study provides evidence that the scale is unreliable.
and that there is a better alternative for a self-report measure of cognitive learning that more accurately reflects actual learning. It should be concluded then that the Learning Loss Scale should be abandoned as a self-report measure of student cognitive learning in favor of the Perceived Cognitive Learning Scale.

Given all of the above, what are the implications for online course designers and students? What could an instructor do to improve online learning? How might all of this impact other types of episodic learning? First, in learning settings involving a single lesson in which no future instruction is involved, and if actual cognitive learning is what is most important, then mediated immediacy and student state motivation may not be of much importance. Given the small size of the effect of the model on the pretest-posttest scores differences, the actual knowledge gain with immediacy present over immediacy not being present is so small as to be unnoticeable. On the other hand, if there are other variables that are important, then the presence of immediacy in the lesson and the expected resulting student state motivation may be very important. For instance, it is reasonable to expect that if affective learning is important, especially if the single learning episode is part of a longer term learning plan, then it serves to reason that immediacy and motivation are important to include in the lesson design. In addition, if behavioral learning is important, then higher student state motivation would be greatly desired given the connections between attitudes/emotions and motivation to act. In fact, in the Long-Term Motivational/Affective Model of Learning, the variable of student learning behaviors (SBL) may very well partially represent the concept of behavioral learning.
Second, lesson and course designers of online instruction must consider the impact of a short-term lesson on long-term outcomes. The Short-Term Motivational Model of Learning is derived from the Long-Term Motivational/Affective Learning Model of Learning. It can be viewed as representing what happens in a single lesson online while also understanding that long-term learning is the goal. In other words, the single lesson is not divorced from a workshop of several days or a single course that spans months to a year or a course of study that spans several years. In such circumstances, persistence is key to finishing the greater task, and immediacy and student state motivation may provide the key to a student being willing to persist to the end of the course of study. So, just because the difference in learning in a single lesson may be negligible, it is not a reason to not be concerning with these variables. Even other types of episodic learning (e.g. a short safety film or sensitivity training session) may be impacted with greater long term memory of the lesson content when immediacy is present than a measure of short-term learning (e.g. pretest-posttest scores differences) can represent.

Thus, regardless of the mode of delivery of instruction (face-to-face or online), evidence suggests that there is more to immediacy and motivation than simply helping a student to “feel good” about learning. As perceptions are affected, so are attitudes. As attitudes are impacted, so are actions. As actions are affected, so eventually is learning. For online instructors and course designers, whether the lesson is delivered through a standalone website, a course management system shell, or a massive online open course (MOOC), student motivation still matters, and when student motivation matters then so does the perception of immediacy.

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Appendices

Appendix A: Pilot Study Description

A pilot study was conducted in November/December 2012 that used a two by two (2 x 2) design to a modified version of the Motivation Model of the connection between immediacy and cognitive learning in a single online lesson. The basic model had cognitive learning for the criterion variable with student state motivation as the mediating variable between four independent variables: mediated immediacy, student trait motivation, student interest in the general topic area, and student knowledge of the general topic area. Other factors also examined for possible confounding effect included subjects’ sex, university classification, prior experience with online courses, and length of time that subjects took to complete the survey and lesson. Cognitive learning was measured through a pretest-posttest administration and the learning loss scale.

Participants (N = 153) were drawn from courses taught by the Department of Communication at Western Kentucky University.

Participants

These courses included those offered for credit by the department toward a major or minor, those offered for graduate credit, and two general education courses of which all four-year degree students are required to have taken one of the two as a part of their degree program. Two surveys were not completed by the subjects and therefore thrown out, leaving an N of 151. Prior to data analysis, an additional 13 cases were also thrown out due to response bias that was discovered by visual inspection of scale items that were reverse coded from the rest of the items in the scale.
Classifications of subjects who completed the study included freshman (60.9 percent or 92 out of 151), sophomore (13.9 percent or 21 out of 151), junior (13.2 percent or 20 out of 151), and senior (18 percent or 11.9 out of 151). No graduate students chose to participate even though the invitation was extended to them. By classification, the number of participants per student classification was not representative of the larger student population since freshmen outnumbered all other classifications combined.

With regard to the sex of the respondents, females composed sixty four percent (97 out of 151) and males thirty six percent (54 out of 151). This compares to the general distribution of students at the university of sixty percent (12,538) female to forty percent (8,510) male (Office of Institutional Research, 2012).

**Procedure**

When each participant presenting himself/herself to a peer tutor in the Communication Success Center located in the Department of Communication, the peer tutor would assign the student to one of the four treatment conditions. A log was kept to insure that subjects were assigned to a treatment group in the order in which the subjects presented themselves. The first subject was assigned to treatment group 1, the second to treatment group 2, the third to treatment group 3, the fourth to treatment group 4, the fifth to treatment group 1, and so forth while keeping the number of subjects assigned to each treatment group as close as possible to equal of the other groups. Once the peer tutor assigned the subject to a treatment group, the peer tutor handed an instruction sheet to the subject that contained the uniform resource locator (URL) address for the BlackBoard learning management system shell into which the student would self-enroll.
Upon self-enrolling in the BlackBoard shell, each subject was taken by the BlackBoard course management system to the “Start Here” page which contained the informed consent document. Following the informed consent document and near the bottom of the same page further directions were given concerning leaving the browser window open as well as the new browser window that would appear upon clicking the hyperlink to the Qualtrics survey. Once the subject clicked on the hyperlink to the Qualtrics survey, the subject was requested to use a password which was also given on the “Start Here” page in order to proceed with the survey. Once the password was input, the subject was presented with the pre-test portion of the survey. The pre-test portion of the survey included questions concerning previous experience with online courses, the trait motivation scale with 12 semantic differential items, one question each concerning interest in and previous knowledge of environmental matters, the ten item pre-test over the subject matter of the PowerPoint lesson to be presented (including six multiple fixed-choice questions and three “True-False” questions), followed by directions to the subject to pause the survey and leave the browser window or tab of the survey open while he/she returned to the “Start Here” browser window or tab to proceed to the lesson that would be presented through PowerPoint.

Once the participant completed the pre-test portion of the survey and returned to the browser window containing the “Start Here” page, each participant was instructed to click on the link to the PowerPoint lesson as indicted by the label “Click here to open the lesson”. Subjects were also given contingency instructions in case the browser used did not automatically open the PowerPoint. Subjects were also instructed to not advance the PowerPoint presentation manually since the PowerPoint file had been saved as a slide.
show (.pps file type) that would automatically run and advance from slide to slide according to the timings that were included for each file. The PowerPoint lesson presented was determined by the BlackBoard shell to which the participant had self-enrolled at the beginning of this process.

Following completion of the lesson, the final slide of the PowerPoint instructed the participant to return to the browser window or tab that still had the survey open and remaining to be completed. The remainder of the survey included an item measuring the participant’s satisfaction with the lesson presented, followed by the nineteen item post-test (including twelve multiple fixed-choice items and seven “True-False” items), the state motivation scale, the mediated-immediacy scale, the learning loss scale, two demographic questions, and a question requesting feedback concerning how hard the participant tried to learn the lesson. At this point, each participant was thanked and informed that his or her responses had been recorded.
Appendix B: Trait Motivation Scale

Trait Motivation Scale (Christophel, 1990)

Directions: These items are concerned with how you feel in general about learning. Please select the number toward either word which best describes your feelings. Note that in some cases the most positive score is “1” while in other cases it is a “7”.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motivated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Interested</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Involved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Not stimulated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Don’t want to study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Inspired</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Unchallenged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Uninvigorated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Unenthused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Excited</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Aroused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Not fascinated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: State Motivation Scale

State Motivation Scale with modified directions (Christophel, 1990)

Directions: These items are concerned with how you feel about the lesson you have just completed. Please select the number toward either word which best describes your feelings. Note that in some cases the most positive score is “1” while in other cases it is a “7”.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motivated</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>Interested</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>Involved</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>Not stimulated</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>5</td>
<td>Don’t want to study</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>6</td>
<td>Inspired</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>7</td>
<td>Unchallenged</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>8</td>
<td>Uninvigorated</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>9</td>
<td>Unenthused</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>10</td>
<td>Excited</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>11</td>
<td>Aroused</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>12</td>
<td>Not fascinated</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
Appendix D: Mediated Immediacy Scale

Mediated Immediacy Scale (O'Sullivan, Hunt & Lippert, 2004)

Directions: These items are concerned with how you feel about the lesson you have just completed. Please select the number toward either word which best describes your feelings. Note that in some cases the most positive score is “1” while in other cases it is a “7”.

1. Inviting 1 2 3 4 5 6 7 Uninviting
2. Disclosing 1 2 3 4 5 6 7 Nondisclosing
3. Open 1 2 3 4 5 6 7 Closed
4. Kind 1 2 3 4 5 6 7 Unkind
5. Distant 1 2 3 4 5 6 7 Close
6. Engaging 1 2 3 4 5 6 7 Detached
7. Inaccessible 1 2 3 4 5 6 7 Accessible
8. Expressive 1 2 3 4 5 6 7 Nonexpressive
9. Friendly 1 2 3 4 5 6 7 Unfriendly
10. Warm 1 2 3 4 5 6 7 Cold
**Appendix E: Perceived Cognitive Learning Measure**

**Perceived Cognitive Learning Scale – modified (Frisby & Martin, 2010)**

The Perceived Cognitive Learning Scale by McCroskey et al. (2006) uses 10 items on a Likert-type scale ranging from *strongly disagree* (1) to *strongly disagree* (5). For purposes of the study, the word “class” was changed to “lesson” in keeping with the practice of Frisby and Martin (2010). Those items marked with an asterisk (*) are reverse coded.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I have learned a great deal from this lesson.</td>
</tr>
<tr>
<td>2.</td>
<td>I have learned more in other presentations than in this lesson.*</td>
</tr>
<tr>
<td>3.</td>
<td>My knowledge on this lesson topic has increase since the beginning of the</td>
</tr>
<tr>
<td>4.</td>
<td>I can clearly recall information from this lesson.</td>
</tr>
<tr>
<td>5.</td>
<td>I would be unable to use the information from this lesson.*</td>
</tr>
<tr>
<td>6.</td>
<td>I have learned nothing in this lesson.*</td>
</tr>
<tr>
<td>7.</td>
<td>I can see clear changes in my understanding of this topic.</td>
</tr>
<tr>
<td>8.</td>
<td>I am unable to recall what I have learned in this lesson.*</td>
</tr>
<tr>
<td>9.</td>
<td>I have learned information that I can apply.</td>
</tr>
<tr>
<td>10.</td>
<td>I did not understand what I learned in this lesson.*</td>
</tr>
</tbody>
</table>
Appendix F: Learning Loss Scale

Cognitive Learning Scale (“Learning Loss”) – modified (Christophel, 1990)

On a scaled of 0-9, how much did you learn from the previous lesson on the subject, with 0 meaning you learned nothing and 9 meaning you learned as much as you possibly could have?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

How much do you think you could have learned in the previous lesson had you had the ideal lesson, with 0 meaning you would have learned nothing and 9 meaning you would have learned as much as you possibly could have?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
Appendix G: Mental Effort Rating Scale

Mental Effort Rating Scale – (Paas, 1992)

The Mental Effort Rating Scale by Frisby et al. (2014) uses 1 item on a symmetrical scale ranging from very, very low mental effort (1) to very, very high mental effort (9).

How much mental effort did you find yourself putting into learning this lesson?

<table>
<thead>
<tr>
<th>Very, very low mental effort</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very, very high mental effort</th>
</tr>
</thead>
</table>
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The Southern Baptist Theological Seminary  
December - 1983

Bachelor of Arts - Speech Communication (Summa cum Laude)  
Western Kentucky University  
August – 1980

**Administrative Experience**

Western Kentucky University  
Department of Communication  
Bowling Green, KY  
7/13 – present  
Co-Director of the Basic Course

Western Kentucky University  
Department of Communication  
Bowling Green, KY  
8/05 – present  
Classroom Technology Coordinator

**Instructional Experience**

Western Kentucky University  
Department of Communication  
Bowling Green, KY  
8/02 – present  
Instructor

Logan-Todd Baptist Association  
Seminary Extension Center  
8/98 – 12/98  
Instructor
Professional Experience

Auburn Baptist Church
Auburn, KY
3/93 – 8/02
Senior Pastor

First Baptist Church
Maysville, KY
5/87 – 3/93
Pastor

Cove Hill Baptist Church
Carrollton, KY
8/82 – 5/87
Pastor

Grants

- $38,374. WKU Internal Classroom Technology Grant. As Department of Communication Classroom Technology Coordinator. To provide additional computer workstations with network connections in the rear of the classroom for instructor use in recording student speeches as well replacement computers for existing units in the front of the classroom. 2006-2007.

- Approximately $130,000. WKU Internal Classroom Improvement Grant. As Chairperson of the Department of Communication Technology Committee. To provide mounted cameras with controller system, wireless microphones, video capture server, video file and evaluation software server, presentation computers, interactive whiteboards, wireless presentation remotes, software, and necessary cabling for video capture of student speeches and delivery of student speeches for student self-assessment and basic course performance assessment. 2005-2006.

Conference Presentations and Panels

- Hughes, G. K. (April, 2013). Implementing a multi-room speech recording system without breaking the bank. In H. Sterk (Chair), Layers of technology within the basic course: What are the choices? What are the consequences? Panel conducted at the meeting of the Southern States Communication Association, Louisville, KY.

• Hughes, G. K. (October, 2007). Implementing and using an IP based recording system for student self-evaluation in communication courses. Demonstration/presentation at the Kentucky Public Speaking Conference, Bowling Green, KY.

• Hughes, G. K. (September, 2007). Implementing internet protocol based audio/video recording as a tool for student learning. Paper presented at the meeting of the Kentucky Communication Association, Carrollton, KY.

• Kell, C. & Hughes, G. K. (September, 2005). Self-reported content by student cell phone users. Paper presented at the meetings of the Kentucky Communication Association, Slade, KY.


**Honors and Awards**

• President’s List, Western Kentucky University, Spring - 1977, Fall - 1977, Spring - 1978, Fall - 1978, Fall – 1979.

• Dean’s List, Western Kentucky University, Spring – 1979.

• Outstanding Scholar (Undergraduate), Department of Communication, Western Kentucky University, 1979.

• Outstanding Graduate Student, Department of Communication, Western Kentucky University, 2002.

• Member, The Honor Society of Phi Kappa Phi, Western Kentucky University, 2002.

• Member, Golden Key International Honour Society, University of Kentucky, 2009.

• Member, Delta Epsilon Iota Academic Honor Society, University of Kentucky, 2012.

**Professional Affiliations**

• Southern States Communication Association

• Kentucky Communication Association