The Effects of Online Time Management Practices on Self-Regulated Learning and

Academic Self-Efficacy

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ABSTRACT

The following study investigates the use of a web-based mechanism that was
designed to attempt to influence levels of self-efficacy by engaging participants in an
experimental procedure. The process encouraged participants to monitor their time
management behaviors and engage in a self-regulated learning process. The study
utilized a web-based tool in order to attempt to evoke these changes using current and
emerging instructional technologies and tools. This mechanism provided participants
with feedback on their time management behaviors as they progressed through a two-
week process of setting goals, monitoring their time management practices, and receiving
feedback. Although no significant findings were discovered via the statistical analyses,
many implications regarding the development and implementation of future interventions
can be inferred.

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INTRODUCTION

Problem Presentation

On many college campuses today, new students have the option to participate in freshman seminar courses or programs designed to facilitate the acclimation to the college environment by teaching such things as study skills, time management, and various other components of living and learning on campus. One such course, entitled *Learning to Learn* (Hofer, Yu, & Pintrich, 1998), located and taught at the University of Michigan, based its strategies on the notion that self-regulated learning is an important aspect of student academic performance and achievement in classroom settings. The specific components of the course included instruction and activities on information processing, note taking, test taking and preparation, goal setting, and time management.

Research related to the effects of this course cites such outcomes as increased grade point average, decreased level of test anxiety, increased self-efficacy, and an increase in mastery learning orientation (Hofer et al., 1998). The researchers, however, cite many different areas needed for future research including a general need for the development of more interventions that would provide the empirical and theoretical knowledge needed to develop more appropriate pedagogies. Schunk and Ertmer (2000), in their overview of research that has been conducted to enhance self-efficacy by enhancing students' self-regulation and academic learning, also call for the development of more interventions that address the dual purpose of enhancing students' self-efficacy for learning and the facilitation of self-regulatory strategies.

Although only one study cited in their overview utilized computing technologies (Schunk & Ertmer, 1998), additional researchers advocate the investigation of the use of

appropriate technologies to develop more effective interventions (Khine, 1996; P. H. Winne & Stockley, 1989). The present study will attempt to address the need of furthering the pedagogical implications related to developing interventions designed to enhance students' use of self-regulatory processes and thus influence levels of efficacy beliefs. By leveraging the attributes of multimedia development, the study will investigate how technologies can provide additional enhancements to the development of self-regulation strategies.

Overview

The current study will attempt to add to the literature that links the use of various learning and self-regulatory strategies to increased levels of self-efficacy. The study will be situated in social cognitive theories and models of learning and will utilize an intervention based on self-reported time management practices to engage students in self-regulated learning processes.

The conceptual paradigm and theoretical bases of the study are illustrated in Figure 1. The study will draw on a wide base of research on self-efficacy and self-regulated learning and will develop an intervention that will leverage different attributes of technology and different feedback schedules to engage students in a process of self-regulated learning. In addition to being based on a large amount of theoretical and psychological literature, the study will draw heavily from already existing models of self-regulation and models of interventions.

Therefore, the wide range of literature that will be reviewed includes the literature related to self-efficacy beliefs as they are situated within social cognitive theories and theories of human agency and causality, as well as the research regarding self-regulated

learning, most specifically the components of goal setting, time management and

feedback. Last but not least, literature regarding multimedia learning will be reviewed in

an attempt to provide a sound basis from which to develop the intervention.
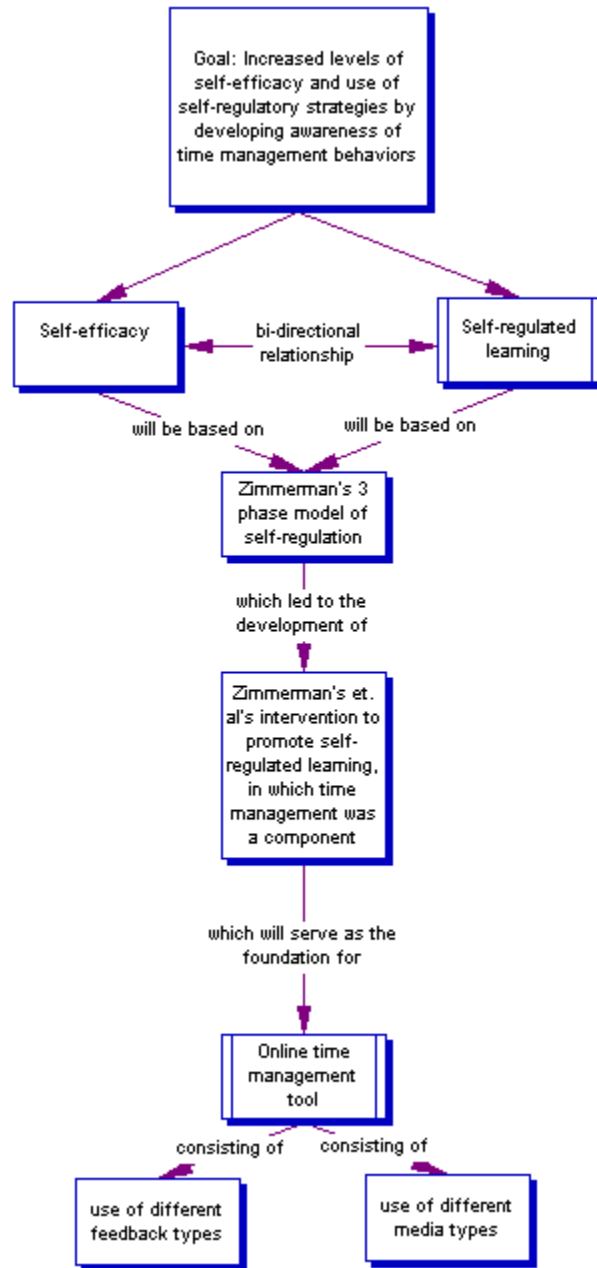
Figure 1. Concept map of theoretical model of study

Definitions

For the purpose of this study, a number of psychological and theoretical terms will be supplied in order to provide for greater understanding of concepts and relationships of concepts within the literature review.

Self-efficacy: the most quoted definition of self-efficacy has been cited in many works by Bandura (1977, 1995, 1997) and refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments.

Human agency: endowments, belief systems, self-regulatory capabilities and distributed structures and functions through which personal influence is exercised. In relation to social cognitive theory, agents are conceived as having potential to influence environmental and behavioral events, not merely act as recipients of such factors.

Triadic reciprocal causation: related specifically to Bandura's model of social cognitive theory, it speaks to the reciprocal relationships between all three components of the "self-system" (i.e., personal, environmental and behavioral). In other words, triadic reciprocal causation states that personal behavior can be affected by environmental cues and behavioral changes, as the environment can exert change and influences over behaviors and personal characteristics, etc. All three components are integrally related.

Mediational processes: within the context of theories of self-efficacy, the cognitive, affective, motivational and selective subprocesses have a reciprocal relationship with efficacy outcomes as, for instance, increased levels of cognitive engagement lead to higher levels of self-efficacy and higher levels of self-efficacy lead to increased use of cognitive strategies.

REVIEW OF LITERATURE

The Exercise of Control: Self-Efficacy Defined

People have always striven to control the events that affect their lives. By exerting

influence in spheres over which they can command some control, they are better

able to realize desired futures and to forestall undesired ones. (Bandura, 1997)

According to Gardner (1963, p. 21), "the ultimate goal of the educational system

is to shift to the individual the burden of pursuing his [sic] own education". The

construct of self-efficacy is one that can, and has been, studied in order to determine

some of the issues related to how students learn and how they may, or may not accept the

shift of taking more responsibility for their learning. Albert Bandura (1997), prominent

theorist and psychologist, proposes that the ability of people to bring about significant

outcomes assists them with being able to predict such outcomes, which, in turn fosters

adaptive preparedness. Bandura (1997) has defined self-efficacy as referring to "beliefs

in one's capabilities to organize and execute the courses of action required to produce

given attainments" (p. 3). Bandura situates the construct of self-efficacy within the

context of social cognitive theory, which is, in turn, based on the notions of *human

agency* and *triadic reciprocal causation*.

Bandura's social cognitive theory represents a paradigm shift in psychological

theorizing as the notion of human causality is situated within the context of psychological

theories of the self. These 'self' theories stand in contrast to other theories such as

behaviorism (Skinner, 1953; Watson, 1919) that place the stimulus or the environment as

being the impetus for behavioral change.

Instead, Bandura's notion of triadic reciprocity posits that personal factors, behaviors, and environmental events all operate as interacting determinants that influence one another bidirectionally (Bandura, 1986, 1997). Bandura situates human beliefs within a context in which they are of equal importance as environmental influences and behavioral outcomes. Behavior, therefore, becomes a result of the dynamics that occur between self-beliefs (personal factors such as cognitive, affective and biological events) and environmental events. Self-efficacy becomes an important component of social cognitive theory, specifically the notion of triadic reciprocity as beliefs about one's capabilities are likely to inform and impact the interplay between the elements of the triad. Bandura refers to the control one has over influencing environmental and behavioral outcomes as human agency.
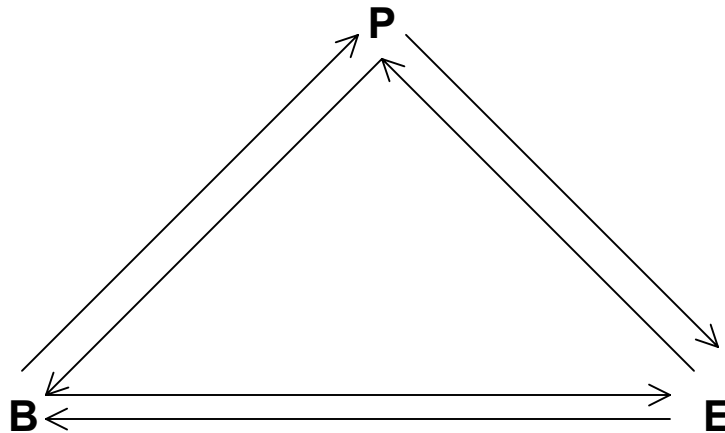
Figure 2. Bandura's representation of the triadic reciprocal relationship between behavioral (B), personal (P) and environmental (E) factors in human functioning. This notion serves as the foundation of social cognitive theory (Bandura 1986, 1977)

Agency, according to Bandura (2001), can be seen as the "endowments, belief systems, self-regulatory capabilities and distributed structures and functions through which personal influence is exercised" (p. 2). Therefore, the notion of human agency, as it relates to self-efficacy, posits that the individual is the "agent" that causes particular events to occur. Bandura (2001) articulates core features of personal agency that address the theoretical basis of the dimensions of agency that influence self-efficacy and the role of self in interacting with behavioral and environmental factors. According to Bandura, the following are the core features of human agency:

Intentionality refers to the self-regulatory aspects of planning, motivation, and choices necessary for events to occur, whether individual or joint activities. Bandura distinguishes intentionality from accidental behavioral occurrences when discussing the notion of agency.

Forethought refers to one's ability cognitively representing foreseeable future events in the present. Forethought, within the construct of human agency, serves as a motivator and regulator of actions. Forethought, which serves to create outcome expectancies, serves as a motivator that facilitates the adoption of courses of action that are likely to produce positive outcomes.

Self-Reactiveness speaks to the role of self-regulation and motivation in human agency. According to Bandura (2001), "actions give rise to self-reactive influence through performance comparison with personal goals and standards" (p.8). Therefore, self-reactiveness is seen as being closely tied with the self-regulatory subfunctions and elements of goal setting in that it facilitates the self-directedness of human agency.

Self-Reflectiveness refers to the self-reflective component of human agency is most closely tied with self-efficacy as it is the metacognitive activity of self-reflection that facilitates the evaluation actions and the assessment of capabilities in regard to specific outcomes. Bandura cites people's beliefs in their capabilities as being the most central or pervasive aspect of human agency (1997, 2001).

According to social cognitive theory, therefore, human agency operates as a key force within an interdependent causal structure of triadic reciprocal causation as how individuals interpret and act on their self-beliefs creates the interplay between all elements of the triad (Bandura, 1986, 1997). Social cognitive theory suggests that personal agency operates within sociostructural influences where people are both producers and products of social systems. The reciprocal relationships between personal, behavioral and environmental processes are not proposed to be of equal strength but their relative influence instead varies under different circumstances. For instance, when individuals have a high level of self-efficacy they are more likely to exert control over their environment and behavioral outcomes than when the reverse is true.

Social cognitive theory, therefore, rejects bi-directional relationships between individual and society and instead proposes a more dynamic interplay of human agency noting again the multiple aspects of person, behavior and environment that exert influences and affect change in many different ways. Self-efficacy, which consists of the self-reflective mechanisms in which individuals evaluate their actions and assess their capabilities, has developed into being a key component of the social cognitive theory of thought.

Although self-efficacy and social cognitive theories have a relatively brief history as psychological constructs, they have evolved from a long history involving many different notions of the role of self in psychology and education.

A Brief History of Social Cognitive Theory and Self-Efficacy

The development of social cognitive theory and the construct of self-efficacy began with Bandura's development of social cognitive theory in 1977. Self-efficacy as a construct was first introduced by Bandura (1977) with his publication of *Self-Efficacy: Toward a Unifying Theory of Behavioral Change*. The roots of self-efficacy, however, can be traced to the beginnings of research on the self (Pajares & Schunk, 2002). Although Pajares and Schunk trace the beginnings of thoughts of self to Descartes' *Principles of Philosophy*, they cite William James' (1896) *Principles of Psychology* as being the beginning of interest in the self in American psychology. Other turning points, or historical landmarks leading to the development of Bandura's construct of self-efficacy are cited as being James' (1896/1958) use of the concept of self-esteem, which he described as a self-feeling that "in this world depends entirely on what we back ourselves to be and do" (p. 54). Other developments include Charles Horton Cooley's (1902) introduction of the metaphor of the looking-glass self and, most notably Sigmund Freud's (1923) development of the concepts of the id, ego, and superego which served as constructs that helped frame the self as the regulating center of an individual's personality (Pajares & Schunk, 2002).

Although psychologists and theorists such as Freud, James and Cooley were making significant advances in considering the role of self in psychological functioning, they were contending with other psychological movements such as the behaviorist

movement of Pavlov (1927) and Thorndike (1903) in which the role of self played was not an integral component. The humanistic revolt of the 1950s, spearheaded by Abraham Maslow (1954), however, argued for an individual's need to achieve self-actualization, self-fulfillment, inner peace and contentment. The 1960s and 1970s, therefore, began a "renaissance of interest in internal and intrinsic motivating forces and affective process, particularly with reference to the dynamic importance of the self" (Pajares & Schunk, 2002). However, the mixed, insignificant, or absent results of research that attempted to create ties between self-esteem and adaptive functioning induced a backlash against the humanistic movement and reduced interest in self-research.

The humanistic movement of the 1970s, therefore, gave way to the cognitive revolution of the 1980s. Technological advances, which provided the metaphor of the computer, fueled cognitive theories that focused on the internal structures and mental events of individuals. During the past two decades, however, prominent voices, most namely that of Albert Bandura, in psychology and in education have shifted back to focusing on the role of the self. The concepts that have fueled this renewed interest are the concepts of self-efficacy and self-concept (Pajares & Schunk, 2002). Self-efficacy, which was introduced by Bandura in 1977 and further expanded upon in 1986 when Bandura proposed his social cognitive theory and the notion of triadic reciprocity, serves as a focus of research in many different areas today. Although the specific attributes of self-efficacy, self-esteem and self-concept are sometimes misrepresented or confused, all form constructs that have been researched and applied in psychology and education, and Bandura (1997) clearly delineates the differences.

Definitions of Self-Efficacy

Bandura begins to delineate some of the differences between self-concepts by articulating that not all concepts are concerned with beliefs of efficacy, or beliefs in abilities. According to Bandura (1997), although self-conceptions are all self-referential, not all facets are concerned with personal efficacy. Theories of the self frequently differ in conceptual orientation and comprehensiveness and rarely encompass all important aspects of efficacy beliefs. Bandura (1997) states that

> a full understanding of personal causation requires a comprehensive theory that
> explains, within a unified conceptual framework, the origins of efficacy beliefs,
> their structure and function, the processes through which they produce diverse
> effects, and their modifiability. Self-efficacy theory addresses all these
> subprocesses at both the individual level and the collective level. (p. 10)

Bandura's definition of self-efficacy, which again refers to an individual's ability to bring about specific courses of actions very specifically aligns itself to beliefs in ones capabilities and can be seen in contrast to other related theories such as *self-concept, self-esteem, perceived control,* and other motivational theories.

Bandura differentiates self-efficacy from *self-concept* by defining self-concept as being measured by having people rate how well descriptive statements of different attributes apply to themselves. Instead of assessing beliefs in their capabilities to perform certain actions, individuals are merely assessing more generic attributes of self. When these various aspects, or judgments of self, are combined into a whole concept, measuring a global effect of self-image does not provide a reliable index of measurement (Bandura, 1997). Although these features may contribute to an understanding of the

individual self, Bandura cites research (Pajares & Kranzler, 1995; Pajares & Miller, 1994) that describes the effects of self-concept as being weak and equivocal in comparison to studies involving self-efficacy.

Self-efficacy also differs from *self-esteem,* according to Bandura, as self-efficacy is concerned with judgments of personal capability, and self-esteem comprises general judgments of self-worth (Bandura, 1997). Bandura differentiates between these two constructs by stating that judgments of self-worth and personal efficacy represent different phenomena. Judgments of self-worth, which is what he equates with self-esteem, he defines as "self-liking". This construct does not necessarily lead people to engage in activities that are relative to their beliefs in their capabilities. Self-esteem is seen as being as multi-dimensional as self-efficacy and can stem from many sources; however, it does not necessarily correlate with individual capabilities as self-efficacy does. As Bandura (1997) states, "people need much more than high self-esteem to do well in given pursuits" (p.11).

The notion of *perceived control* is also different than self-efficacy, as perceived control tends to be a more generic construct, and is only one aspect of self-efficacy. Perceived control encompasses people's beliefs over how they can control what they learn and how they will perform. Being able to control outcomes is important and is a critical element of self-efficacy theories, however, Schunk and Pajares (2002) cite other factors that influence self-efficacy such as: perceptions of ability, social comparison, attributions, time available and perceived importance. Therefore, perceptions of control can differ from self-efficacy due to affective components, or the value they put on what

they can or can't control. Other constructs also influence self-efficacy and serve to provide additional structure to the definition of self-efficacy.

Effectance motivation and *outcome expectations*, both of which are motivational constructs that encompass properties similar to self-efficacy, tend to be more general motivational constructs which lack the specificity inherent in self-efficacy (Bandura, 1997; Schunk & Pajares, 2002). More specifically, therefore, self-efficacy, which is concerned with human capabilities, influences many aspects of human functioning. Self-efficacy, and how it influences behavior, can be seen through the individual's:

Choice of activities – how one's efficacy can influence what activities they choose to undertake. Individuals tend to choose tasks and activities in which they feel competent and confident and avoid those in which they do not.

Effort and persistence – how one's sense of efficacy determines the amount of effort exerted to accomplish a task, how long they will persevere when confronted with obstacles, and how resilient they will be in the face of adversity. The higher the efficacy, the more likely individuals will approach difficult tasks and will more likely exert more effort and persevere in the face of adversity (Ormrod, 1999; Pajares, 2001).

Learning and achievement – how one's efficacy determines the level of success in learning. Students who believe in their capabilities therefore become more likely to accomplish their tasks (Ormrod, 1999).

Thought patterns and emotional reactions – the affective reactions to challenging tasks are also determined by the individual's level of efficacy beliefs. While those with high levels of efficacy tend to approach challenges with feelings of serenity, those with

low self-efficacy may encounter feelings of anxiety, stress and depression (Pajares, 2001).

In contrast to other self-theories and theories of motivation which posit more general conceptions of self and ability, self-efficacy influences choice of activities and motivational level, which make important contributions to the acquisition of the knowledge structures on which skills are founded (Bandura, 1997). Efficacy beliefs, therefore, are concerned primarily with judgments of beliefs in one's capabilities to perform given courses of action.

Bandura also cites efficacy beliefs as being generative in nature by stating that "efficacy is a generative capability in which cognitive, social, emotional, and behavioral subskills must be organized and effectively orchestrated to serve innumerable purposes (Bandura, 1997, p.37). In other words, self-efficacy can be generated – or developed – according by means of many different developmental sources. The development and generation of such beliefs are again multi-dimensional in nature and can be learned or developed from a variety of sources.

Development of Self-Efficacy

Schunk and Pajares (2002) cite a number of developmental sources, ranging from familial and peer influences to schooling and transitional influences that impact the development of self-efficacy. Additionally, Bandura (1997) has articulated a number of sources from which self-efficacy can be constructed or learned. Bandura's work has focused on articulating four particular sources from which self-efficacy can be constructed. They are: *enactive mastery experiences*, *vicarious experiences*, *verbal persuasion*, and *physiological and affective states*.

Enactive Mastery Experiences

Enactive mastery experiences, which are experiences that are intended for the learner to encounter success and therefore incur a heightened sense of efficacy beliefs, are very critical to the development of higher levels of self-efficacy. Higher levels of self-efficacy, therefore, create higher levels of effort and persistence, which leads to higher levels of engagement and opportunities for success. Bandura cites enactive mastery experiences as being the most influential sources of self-efficacy information because they "provide the most authentic evidence of whether one can master whatever it takes to succeed" (1997, p. 80). Mastery experiences influence efficacy beliefs in that when students engage in tasks or activities and interpret their results as being successful, their efficacy beliefs are enhanced. If they interpret their experiences as failures, however, their efficacy beliefs are lowered. Bandura (1997) cites several types of mastery experiences that research has shown to be beneficial in elevating self-efficacy. The development of experiences that create the cognitive and self-regulative facilities for effective performance are the most reliable sources of building self-efficacy. As will be discussed in further detail when reviewing the literature and research regarding self-regulated learning, those experiences that facilitate the processes in which learners can better self-regulate their behavior are effective when attempting to build levels of efficacy. In other words, whether the task is considered a complex performance or not, Bandura encourages facilitating tasks that will encourage the learning of cognitive and metacognitive skills, and discouraging "ready-made" behavior. Again, Bandura (1986) stresses the generative nature of developing self-efficacy.

Additionally, Bandura cites the development of self-knowledge structures as being critical to developing appropriate mastery experiences. According to Bandura (1997), building self-knowledge in individuals influences "what people look for, how they interpret and organize the efficacy information generated in dealing with their environment, and what they retrieve from their memory in making their efficacy judgments" (81). One important criterion for constructing appropriate tasks from which individuals can discern efficacy information, or beliefs about their abilities, is to consider task difficulty and contextual factors.

According to Bandura, mastering difficult tasks conveys new efficacy information for raising belief in capabilities. Succeeding at easy tasks that are redundant does little to raise efficacy beliefs. Depending on the difficulty and the context of the task, appropriate tasks have the ability to change previously held efficacy beliefs. The context of the task, in which Bandura (1997) cites factors such as situational impediments, assistance provided by others, adequacy of resources, and circumstances under which the activity is performed also effects the efficacy information gained. Therefore, not only must tasks be appropriately challenging and not oversimplified, they must also be performed within a context that will convey to the learner that they have achieved on primarily on their own merits.

Effort expenditure as well is an important variable to consider when constructing appropriate mastery experiences. Because ability and effort are seen as interdependent determinants of performance, effort expended during accomplishment of a task also has the capability of influencing efficacy beliefs. For example, research has found that tasks completed by expending a tremendous amount of effort can lower efficacy beliefs

because of their lack of belief in being able to replicate the task (Bandura & Cervone, 1986). However, challenging tasks provided within a context that does not convey to the learner that they would be able to replicate the task based on the merit of their own abilities, provide for positive efficacy building experiences.

Vicarious experiences

Vicarious experiences are the experiences that influence efficacy beliefs through the effects of actions produced by others. This type of learning has also been termed social modeling or observational learning, as learning occurs through modeled attainments (Bandura, 1977), or by observing appropriate role models. Vicarious learning is also a particularly powerful source of efficacy beliefs, as it has been cited to influence attitude change as well as efficacy beliefs (Bandura, 1977). There are several processes that govern the impact of modeling on self-efficacy, which are attentional, retention, reproduction and motivational processes.

Attentional processes. The first process necessary for observational learning to occur is the attentional process. Since observers cannot learn by observation until they attend to appropriate cues and behaviors, it is important to draw attention to the relevant cues and traits exhibited by the model. In order to do so, Bandura (1977) suggests components such as associational patterns, functional value, and salience and complexity that must be present in order for models to be deemed credible or effective. Various combinations of these components create different effects. For instance, while patterns of association create familiar patterns of behavior for the observer, the functional value of the models is also important in drawing attention to certain characteristics. Functionality is also enhanced by interpersonal attraction. Characteristics of effective models can be

articulated as consisting of qualities of competence, perceived similarity, credibility, and enthusiasm (Pintrich & Schunk, 1996). Models who possess engaging qualities are sought out, while those who are not deemed as attractive are disregarded. In addition to attractiveness, the salience and complexity of the actions of the model are said to influence the attentional processes of the observer by increasing the level of credibility of the model. Therefore, in order to begin the process of observational learning, it is important to create a model with whom the targeted observers will associate, find attractive, and who will demonstrate relevant and salient behaviors.

Retention processes. The next most necessary process that needs to occur in observational learning after attending to a behavior is being able to remember it. Retention processes focus on the ability of the observer to remember the modeled activities. Bandura (1977) proposes that strategies of symbolic coding, cognitive organization, symbolic rehearsal and motor rehearsal are integral to the development of appropriate retention processes. The retention process begins with observers coding symbolic cues in imaginal or verbal systems. Some behaviors are retained in imagery, in which sensory stimulation activates sensations that, over time, produces retrievable images, while others are retained as verbal cues. These verbal cues or imaginal representations are then coded by labeling, or through imagery techniques, and then rehearsed. The importance of these processes is underscored as research studies (Bandura & Jeffery, 1973; Michael & Maccoby, 1961, cited in Bandura, 1977) indicate that mental rehearsal, including visualization of observers themselves performing the appropriate behavior, increases the proficiency and retention of observed behaviors.

Motor reproduction processes. The third component of modeling deals with converting the symbolic representations into appropriate actions. The subprocesses within the motor reproduction phase of observational learning consist of physical capabilities, availability of component responses, self-observation of reproductions and accuracy of feedback (Bandura, 1977). The motor reproduction process being deemed the "production" phase consists of translating all cues and observed behaviors into actual behavior. In order to do so, however, observers must possess the appropriate abilities. When deficits exist, the basic skills must first be acquired. When learning complex skills especially, learners must also have access to self-observation and corrective feedback. Bandura (1977) notes that skills are not perfected through observation alone, nor through trial and error, but through processes of self-observation and corrective feedback.

Motivational processes. Motivational processes involve elements of external reinforcement, vicarious reinforcement, and self-reinforcement. These motivational processes all describe the fact that the behaviors the observers of these processes are able to perform depart from the ones that they choose to perform (Rosenthal & Zimmerman, 1978). In other words, by observing models, observers are motivated to perform behaviors other than the ones they typically choose to perform. It is through the processes of external reinforcement, vicarious reinforcement, and self-reinforcement that observers of behaviors learn to how to modify their cognitive and motor production responses in order to be able to perform the behaviors they have observed. Observers are, therefore, more likely to adopt behaviors that result in outcomes they value than if the result of the behavior performed has unrewarding or punishing effects.

Therefore, when using vicarious experiences to increase efficacy levels, it is important to keep in mind the processes governing modeling. Additionally, issues such as model competence and credibility must be considered. Model competence is cited as being one of the most critical aspects of models when attempting to influence efficacy beliefs (Bandura, 1997). Regardless of age, gender or other personal attributes, competence is cited as being one of the most influential attributes. When a highly regarded teacher models excellence, students are likely to develop an "I can do that" belief (Pajares, 2002).

Verbal Persuasion

While not considered to be as effective of a source of efficacy information, verbal persuasion does carry the ability to influence efficacy beliefs. Bandura (1997) cites verbal persuasion as being particularly significant in being able to sustain a sense of efficacy, especially while struggling with difficulties. However, with authentic and appropriate feedback, verbal persuasion does have the potential to positively influence efficacy levels.

Bandura (1997) cites studies by Schunk (1983b, 1984; Schunk & Cox, 1986) in which students received prearranged attributional feedback (i.e., feedback specifically related to effort or ability) on their performance. These studies found that evaluative feedback highlighting personal capabilities raises efficacy beliefs; feedback that capabilities were improved through effort also enhanced perceived efficacy, and ability feedback in the early stages of skill development also raised levels of efficacy in students. Bandura also cites the need for knowledgeable and credible sources when providing feedback. Because self-appraisals are not always effective and/or possible, and because

persuasory efficacy appraisals are often met with mixed results, Bandura cautions that the impact of persuasory opinions on efficacy beliefs is apt to be only as strong as the recipient's confidence in the person who issues them. Persuasory efficacy appraisals, according to Bandura, are likely to be most believable when they are only moderately beyond what individuals can do at the time.

Physiological and Affective States

Physiological feedback that influences efficacy beliefs can be said to stem from people "reading" themselves – their emotions including levels of anxiety, stress and fatigue. From this reading, individuals come to realize the thoughts and emotional states that they have created (Pajares, 2002). For example, since high arousal can debilitate performance, people are more likely to expect success when their levels of stress, fatigue, or anxiety are not high to the point of being debilitating. According to Bandura "stress reactions to inefficacious control generate further stress through anticipatory self-arousal" (1997, p.106). When mastery experiences are successful in eliminating emotional reactions to threats, beliefs in coping efficacy will correspond with improvements in performance (Bandura, 1988).

Because activities are often performed in situations that contain potentially varied evocative events, it is difficult to discern what causes physiological reactions. "The efficacy impact of physiological arousal on self-efficacy, therefore, will vary depending on the situational factors singled out and the meaning given to them" (Bandura, 1997, p. 107). Activation of physiological states leads to discussions of the development of efficacy beliefs as questions such as how children learn to tell what emotions they are experiencing and what arousal cues signify particular emotions are considered. In other

words, just as individuals are able to learn efficacy beliefs through such means as mastery experiences and observational learning so too do they develop beliefs through more subtle forces such as familial and peer influences.

Schunk and Pajares (2002) cite the following influences as being part of the development of efficacy beliefs:

Familial influences. The home environment created by parents is said to have significant affects on self-efficacy; however, Pajaras and Schunk note that the influence is bi-directional. "Parents who provide an environment that stimulates youngsters' curiosity and allows for mastery experiences help to build children's self-efficacy. In turn, children who display more curiosity and exploratory activities promote parental responsiveness" (Pajares & Schunk, 2002, p. 4). Additionally, parents who provide opportunities for mastery experiences and who teach children ways to cope with difficulties and model persistence and effort strengthen children's self-efficacy.

Peer influences. Peers influence children's self-efficacy in many ways, most notably through model similarly. Directly parallel to the constructs and processes discussed regarding social learning or modeling, children's levels of efficacy are raised when they observe similar others succeed and lowered when they observe similar others fail. Peer groups, or peer networks, also have the ability to influence levels of efficacy through modeling, as students in networks tend to be similar to one another (Cairns, Cairns, & Neckerman, 1989).

Schooling. Research has indicated that self-efficacy beliefs tend to decline as students advance through school (Pintrich & Schunk, 1996). Factors such as greater competition, more norm-referenced grading, less teacher attention and stresses associated

with school transitions have all been cited as making contributions to decreases in efficacy beliefs (Schunk & Pajares, 2002). Schunk and Pajares (2002) additionally cite classrooms that allow for too much social comparison as contributing to lower self-efficacy, but state that school environments that encourage involvement and participation and contribute to perceptions of autonomy and relatedness influence self-efficacy and academic achievement.

Transitional influences. Transitions in schooling, especially those that occur when moving from elementary to middle school, bring about changes in social structure, peer networks and evaluation standards that causes students to reassess their academic abilities and consequently perceptions of confidence typically begin to decline during middle school (Harter, 1996).

Schunk and Pajares (2002) cite additional developmental changes in self-appraisal skill by stating that children most typically feel highly efficacious about accomplishing a difficult task, yet may also have faulty knowledge about their performance capabilities. Therefore, when considering the development of efficacy beliefs, it is important to consider how efficacy beliefs are learned as well as the factors surrounding development of efficacy in children. As previously discussed, issues of context and task difficulty are important factors to consider when assessing efficacy beliefs. Also, when considering discussions of self-efficacy, it is important to consider the mediational processes that influence self-efficacy and also serve as regulators of human functioning.

Mediating Processes of Self-Efficacy

When discussing how efficacy beliefs produce their effects, Bandura posits that there are four major processes that regulate human functioning. The regulation of human

functioning is a critical aspect of self-efficacy theory due to the theory's roots in social cognitive theory that underscores the importance of determining how individuals act and interact with their environment. These functions are referred to as cognitive, motivational, affective, and selective processes. Bandura (1997) states that these processes usually operate in concert rather than in isolation when regulating human functioning.

Cognitive Processes

Cognitive processes serve a major role in the formation of beliefs, as most courses of action are initially organized in thought. Cognitive constructions, therefore, serve as guides for action in the development of proficiencies as people's beliefs in their efficacy influence how they construe situations (Bandura, 1986). Inferential thinking is a major component of cognitive processes that guide efficacy beliefs as it "enables people to predict the likely outcomes of different courses of action and create the means for exercising control over those that affect their lives" (Bandura, 1997, p. 117).

Cognitive processes also involve personal goal setting, which is influenced by self-appraisal of capabilities (Bandura, 1995). The difference between level of skill and level of self-belief, as described by Bandura, consists of analyzing cognitive processes involving academic goal setting and their effects on self-efficacy. High self-efficacy and skill become factors for academic success – skill without self-belief does not necessarily result in high personal accomplishment (Bandura, 1993). Other factors such as conception of ability, social comparison influences, feedback, perceived controllability, and casual structure are critical components of the cognitive processes as these factors

influence the cognitive the level of control individuals have over the processes that create

positive experiences, which in turn facilitate higher levels of efficacy beliefs.

Motivational Processes

Motivational processes, according to Bandura, are cognitively generated and involve

the processes of forethought and self-regulation and cause purposeful action (Bandura,

1997). Although cognitively rooted, motivational processes employ strategies such as

goal setting in order to provide individuals with the locus of control needed to develop

high efficacy beliefs. The three different forms of cognitive motivators that are described

by Bandura (1993) are causal attributions, outcome expectancies, and cognized goals,

which correspond to attribution theory, expectancy-value theory, and goal theory,

respectively.

Causal attributions (Weiner, 1986), which can generally be defined as the reasons

people give for their successes or failures, and their beliefs about what causes those

failures, are considered to assume a bidirectional relationship with efficacy beliefs

(Bandura, 1990). While attributional factors can have an impact on individual's

assessments of ability, effort, and task related achievement, efficacy beliefs, in turn, can

bias causal attributions. It is important to note that Bandura (1990) found that although

attributions are theorized to affect motivation, the evidence shows that causal attributions

on their own generally have weak or no independent effect on achievement motivation.

Outcome expectancy theories, which at their most basic level can be characterized as

theories that attempt to tie task choice to expectations of success, are also intertwined

with efficacy beliefs and motivational theories. Generally speaking, it can be said that

outcome expectancy theory predicts that motivation to perform a behavior is greatest

when the highest value is placed on the outcome of the chosen behavior. "The concept of expectancy represents the key idea that most individuals will not choose to do a task or continue to engage in a task when they expect to fail" (Pintrich & Schunk, 1996).

Cognized goals, which are goals that are achieved through cognitive processes such as forethought and incentive motivations, comprise the third motivational process cited by Bandura (1997) have been the subject of many research studies in academic settings. One study related to cognized goals, focuses on how classroom goal orientation facilitates motivational patterns when students adopt mastery goals (Ames & Archer, 1988). The study begins by differentiating between mastery goals and performance goals. Mastery goals are defined as those goals that attach importance to developing new skills, and performance goals reflect a valuing of ability and normatively high outcomes. The study investigated how specific motivation patterns were related to the salience of mastery and performance goals in classroom settings and found significant differences in how students perceived the classroom learning environment related to such distinctions. The study found that "students' perceptions of mastery and performance goals showed different patterns of relation with learning strategies, preference for challenging tasks, attitude toward the class, and beliefs about the causes of success and failure" (Ames & Archer, 1988). They also found that students in classrooms with a mastery goal emphasis were more likely to report using effective learning strategies, prefer tasks that offer challenge, like their class more, and believe that effort positively affects success. Implications for the findings of this study suggest that classroom structures that appropriate mastery goal structures provide a context that fosters long-term use of learning strategies and a belief that success is related to effort.

Affective Processes

Affective processes, according to Bandura, are the processes in which self-efficacy mechanisms play roles in self-regulation of different affective states: thought, action and affect (1997). These processes control an individual's ability to regulate emotional states, alleviate negative emotional states and influence cognitive representation of life events. Affective efficacy beliefs affect vigilance toward the perception and processing of potential threats; the control over ruminative, disturbing thoughts; and supporting effective modes of behavior that change threatening environments into safe ones (Bandura, 1995). All of these processes affect stress and anxiety arousal. Affect, as with motivation, is of central importance to the discussions of efficacy beliefs of students.

Selection Processes

Selection processes refer to the shaping of destinies by the selection of environments known to cultivate certain potentialities and life-styles (Bandura, 1995). These processes utilize the individuals' efficacy beliefs in order for them to choose the activities and environments that will cultivate their chosen competencies and interests. People tend to avoid activities and environments that they believe exceed their coping abilities, while the choice of environments is known to cultivate certain potentialities and life-styles. Bandura (1995) states that people who have a low sense of efficacy in given domains shy away from difficult tasks, which they view as personal threats.

These mediational processes, when applied to academic environments illustrate how learning and instruction can have a dramatic impact on students' perceived efficacy beliefs. Not only must students be able to differentiate between skill level and efficacy beliefs, but they must also be aware of affective processes and must possess high enough

efficacy beliefs to exert control over their environment. Cognitive, affective, motivational and selection processes, therefore, all have the potential of influencing efficacy beliefs while efficacy beliefs reciprocally influence these mediational processes. Before investigating the structure and functions of efficacy beliefs, however, it is important to articulate the dimensions of measuring efficacy beliefs.

Assessment of Self-Efficacy

"Perceived self-efficacy is not a measure of the skills one has but a belief about what one can do under different sets of conditions with whatever skills one possesses" (Bandura, 1997). When defining the constructs and various aspects of self-efficacy, Bandura has been careful when proposing guidelines for constructing self-efficacy scales (Bandura, 2001). These scales, which include scales on exercise self-efficacy, driving efficacy, problem-solving efficacy, self-efficacy for academic achievement and self-efficacy for self-regulated learning and others, are based on many of the theoretical constructs surrounding efficacy beliefs. Other researchers as well have developed recommendations regarding the assessment of efficacy beliefs (Pajares, 1996a; Rule & Grisemer, 1996).

Pajares (1996) cautions against general and broad measures of self-efficacy, which he states, "create problems of predictive relevance and are obscure about just what is being assessed" (p.1). Based on Bandura's (1986) work, Pajares advocates for precise judgments of capability that are matched to specific outcomes. The scales should be "consistent with and tailored to the domain of functioning and/or task under investigation" (Pajares, 1996, p.2). Therefore, as part of Bandura's (1986) microanalytic procedure to assess the level, generality and strength of perceived self-efficacy, which

was achieved by examining the attributions of self-efficacy in several different domains of functioning, Bandura developed scales of measurement pertaining to the unique features of academic self-efficacy.

In terms of measuring efficacy beliefs in a manner such that they are distinguished from other related constructs, in addition to recommending that scales of efficacy beliefs be tailored to the particular domains of functioning that are of interest (Bandura, 2001), Bandura also suggested that efficacy beliefs be measured according to the dimensions of *level*, *generality*, and *strength* (Bandura, 2001).

Level refers to the variations of one's beliefs across different levels of tasks – for instance, the numbers of activities individuals judge themselves as being capable of performing above a certain level. According to Bandura (1997), "the range of perceived capability for a given person is measured against levels of task demands that present varying degrees of challenge or impediment to successful performance" (p.42). For example, Bandura encourages researchers to consider the cut-off levels of specific task demands so that no artificial discrepancies between perceived self-efficacy and performance are produced. The level of task demands within the writing discipline can range from judging students efficacy levels when constructing simple sentences to judging their efficacy to write a thesis or dissertation.

Generality, according to Bandura (2001), refers to the fact that efficacy beliefs can vary across types of activities, the modalities in which capabilities are expressed, situational variations, and the types of individuals toward whom the behavior is directed. People may judge themselves as being efficacious across a wide variety of activities or only in specific situations. For instance, Pajares (1996) encourages researchers to pay

particular attention to correspondence between belief and outcome as an important criterion of self-efficacy research. In other words, researchers should provide a task that corresponds to the task that confidence levels were based on.

Strength of perceived efficacy describes the dimension that describes the tenacity of an individual's efficacy beliefs. Disconfirming experiences can easily negate beliefs that are weak whereas stronger beliefs will tend to persevere despite obstacles. Bandura (1977) also cautions that strength of perceived efficacy beliefs are not necessarily linearly related to choice of behavior. In other words, certain levels of self-efficacy are required to attempt an activity. Whether the individual possesses higher efficacy levels than what is needed for the baseline attempt is not relevant. Additionally, most self-efficacy instruments are based on likert-scales in which students are asked to rate the strength of their efficacy beliefs ranging from 1 (weak self-efficacy) to 10 (strong self-efficacy).

In all discussions of self-efficacy, multi-dimensionality is stressed and is linked to different content areas and different skills. Learners having a high strength of perceived efficacy with mathematical skills may not necessarily possess the same efficacy beliefs with language skills. This can also be defined in terms of being context-dependent (Zimmerman, 1995a). Efficacy beliefs are dependent on the context, or the domain associated with previous successes or failures, or messages conveyed from others.

Additionally, Multon, Brown, and Lent's (1991) meta-analysis of self-efficacy studies confirmed that in order to correlate efficacy beliefs to specific outcome measures, it is imperative to clearly articulate the specific characteristics of the context, notably the types of efficacy and performance levels used. Pajares (1996a) states "to be both practically useful and predictive, the level of specificity of an efficacy assessment should

depend on the complexity of the performance criteria with which it is compared" (p.3). Based on these guidelines, develop self-efficacy measurement scales to measure a variety of tasks within a variety of contexts. Whether the researcher is attempting to measure health-related behaviors by measuring levels of efficacy to regulate diet and exercise or academic behaviors by measuring ability to self-regulate time and tasks, beliefs are generally measured on a likert scale that allows subjects to articulate the strength of their beliefs. Being that measures of efficacy beliefs are context dependent, it now becomes necessary to investigate the different structures and functions of efficacy beliefs within the academic context, which serves as the foundation of the current study.

Structure and Function of Academic Efficacy Beliefs

Research on self-efficacy has spanned many disciplines and many aspects of human functioning including organizational behavior (Bandura & Cervone, 1986; Wood & Bandura, 1989), health-related behaviors (Marlatt, Baer, & Quigley, 1995; Schwarzer & Fuchs, 1995), transitional life experiences (Jerusalem & Mittag, 1995), and academic achievement and motivation (Lane & Lane, 2001; Lent, Brown, & Larking, 1996; Multon et al., 1991; Pajares, 1996a, 1996b, 2000; Schunk, 1989a, 1994; Schunk & Pajares, 2002; Zimmerman, 1995a; Zimmerman, Bandura, & Martinez-Pons, 1992).

Zimmerman's (1995) work on self-efficacy and educational development identifies many of the areas within the academic environment that researchers have attempted to measure efficacy beliefs and determine behavioral outcomes. More specifically, Zimmerman cites the need for developing students' self-beliefs and self-regulatory capabilities in order to foster learning that creates students that are capable of self-education and the pursuit of lifetime learning goals.

Within the synthesis of the research studies previously cited, self-efficacy is seen as having a causal or mediational role on students' educational development. Additionally, self-efficacy is cited as being a context dependent and multi-dimensional belief, rather than being characterized as being of a single disposition as with other self-beliefs. As such, there are many processes and structures related to academic achievement and the role of self-efficacy that can be examined. The synthesis of various empirical studies provides a rich context for discussing the many different functions of efficacy beliefs, particularly how beliefs influence academic motivation, achievement and affect.

Self-efficacy and academic motivation

As previously stated, the effects of self-efficacy have been demonstrated to manifest themselves in such behavioral outcomes as level of effort, persistence, and choice of activities (Bandura, 1977, 1997). In terms of empirical studies that have focused on academic motivation, which can be measured according to rate of performance and expenditure of energy (Zimmerman, 1995a), considerable support has been found regarding the effects of perceived self-efficacy on levels of motivation, including persistence. Additionally, studies have cited various task engagement variables and mediating processes that can influence levels of academic motivation by increasing levels of effort and persistence.

For instance, Pintrich and Schunk (1996) cite task engagement variables such as strategy instruction, performance feedback, models and goals as being instrumental in increasing students' self-efficacy for learning. While Pintrich and Schunk state that an initial sense of self-efficacy motivates students, they also acknowledge that self-efficacy is not completely determined by aptitudes and prior experiences and cite these task

engagement variables as being critical in influencing the process of raising efficacy beliefs.

Additionally, as previously discussed, the motivational processes that are seen as mediating processes within the construct of self-efficacy, as cited by Bandura, are goal theory, outcome expectancy theories and causal attributions, (Bandura, 1990). Some of the empirical findings from research that has been conducted examining these variables are as follows.

Goal theory has accounted for a wide variety of research as it relates to self-efficacy and self-regulated learning. Studies such as Zimmerman, Bandura and Martinez-Pons (1992), Bandura and Cervone (1983), Bandura and Schunk (1981) and Schunk (1984) have all investigated different goal properties and feedback mechanisms as they have related to motivation and efficacy beliefs. Bandura and Cervone (1983), for instance, found that goals that combined performance information and a standard had a strong motivational impact. Bandura and Schunk (1981) found that proximal subgoals facilitated rapid progression in self-directed learning, substantial mastery of mathematical operations, a developed sense of personal efficacy and intrinsic interest in arithmetic activities.

Research on self-efficacy and academic motivation has also been studied in relation to students' persistence and academic success in pursuing a major in college (Lent et al., 1996). The findings of this study indicated that self-efficacy beliefs are related to academic performance behavior and vocational interests and career options. In this study, self-efficacy was linked with prediction of grades, as well as persistence and range of perceived career options.

Another measure of students' motivation that has been studied, in addition to effort and persistence, is their choice of activities (Zimmerman, 1995a). Bandura and Schunk's (1981) study on goal setting and arithmetic found that the higher the children's sense of efficacy, the greater their interest in the activity, and the more likely they were to choose to do subtraction problems instead of engaging in different activities.

Schunk's (1991) study on self-efficacy and academic motivation cites related constructs of perceived control, expectations and values, attributions and self-concept as each encompasses unique features that positively impact academic motivation by increasing levels of effort and persistence. Perceived control, which is closely related to the concept of locus of control, posits that people differ in whether they believe that outcomes occur independently of how they act or are highly contingent on their actions. Although perceived control over outcomes is an important motivational construct, students also have to believe in their capabilities of producing such an outcome (self-efficacy).

Expectancy-value theories, theorize that behavior is a joint function of people's expectations of obtaining a particular outcome and the extent that they value those outcomes (Atkinson, 1957). Although this construct is similar to efficacy beliefs and does influence motivation, according to Schunk (1991), "self-efficacy theory differs from expectancy-value formulations in its emphasis on students' beliefs concerning their capabilities to learn and effectively employ the skills and knowledge necessary to attain the valued outcomes" (p. 211).

Attributions are perceived causes of outcomes, and allow students to attribute their successes and failures to factors such as ability, effort, task difficulty and luck

(Weiner, 1986). Attributions contribute to and are one type of cue that students use to appraise efficacy. For instance, students successfully completing an easy task will less likely encounter raised efficacy beliefs than students who successfully complete a more difficult or complex task since students that complete easy tasks will be less likely to attribute their success to effort than those who complete a more challenging task. Attributional beliefs, therefore, contribute to efficacy beliefs, but are not comprised solely of beliefs in one's capabilities.

Schunk (1991) additionally cites constructs such as goal setting, information processing activities, the impact of models, attributional feedback, and rewards as different areas of research within self-efficacy and motivation. It is not within the scope of this document to examine all variables that relate to academic motivation, however it is important to note that within Zimmerman's (1995) the motivational variables of effort, persistence and choice of activities are instrumental in researching academic motivation. The outcome, therefore, is postulated to result in behaviors that create successful learning experiences. The link between efficacy beliefs and levels of academic achievement is yet another area that has been investigated within the academic environment.

Self-efficacy and academic achievement

According to Zimmerman (1995), academic achievement becomes another subset of research and another distinct function of self-efficacy to be considered due to the fact that perceived self-efficacy fosters engagement in learning activities that promote the development of educational competencies, and such beliefs affect level of achievement as well as motivation.

There has been much research conducted that creates a link between self-directed learning and efficacy beliefs. Schunk, in particular, engaged in a series of experiments (1981, 1984, 1985, 1989a, 1991) in which children with academic deficiencies engaged in self-directed learning of mathematic and language skills. The researchers facilitated the use of such strategies as: modeling of cognitive strategies, self-verbalization of cognitive operations and strategies, goal setting, self-monitoring, social comparison, and attributional feedback. Some of the findings that emerged included social and evaluative feedback accompanying formal instruction that positively influenced self-efficacy beliefs, which in turn enhanced development of academic competencies. Adoption of learning goals resulted in an increase in efficacy for attaining their goals, and encouraging students to set their own goals improved not only their efficacy beliefs but their commitment to attaining them.

More current research (Lane & Lane, 2001; Vancouver, Thompson, & Williams, 2001) has additionally substantiated the link between efficacy beliefs and academic achievement. Lane and Lane (2001) found that stable self-efficacy measures were associated with 11.5% of performance variance with "confidence to cope with the intellectual demands of the program" as the only significant predictor (p. 692). Overall, they state that their findings of the relationship between efficacy beliefs and academic performance compares favorably with pervious research.

While Vancouver, et al (2001) decided to take an "against the tide" research approach by questioning the positive correlation among self-efficacy, personal goals, and performance, they too found positive correlations between performance, self-efficacy, and goals. Additionally, Bouffard-Bouchard (1990), while cautioning that judgments of

self-efficacy on cognitive tasks are difficult measures and prone to assessment error, found that perceived self-efficacy was related both to task persistence and ability to evaluate the correctness of responses. On a slightly different note, Lent, Brown and Larkin (1986) undertook a study that was designed to assess the extent to which self-efficacy beliefs predict academic grades and retention. They too found that self-efficacy expectations are related to academic performance behavior as well as vocational interests and range of perceived career options. Therefore, there seems to be empirical evidence to support the effectiveness of efficacy beliefs as predictors of academic performance. One other area that warrants investigation, however, is the relationship between efficacy beliefs and academic affect.

Self-efficacy and academic affect

Bandura (1969) cites affect-oriented approaches of behavior change that consist of modifying evaluations of and behavior toward particular attitude objects by altering affective properties. Additionally, in more current writing, Bandura (1997) cites affect and affective states as being critical to the construct of self-efficacy. Bandura (1993) affirms this notion by stating that student's beliefs about their efficacy to manage academic task demands influence emotional states as well as academic motivation and achievement.

Although there is little empirical evidence that focuses on the affective domain and efficacy beliefs, there is a conceptual framework that may support such studies. When discussing the affective domain from within the context of education, many new theories and strategies emerge. More current definitions of affective development, the affective domain, and affect in education are as follows. The *affective domain* refers to

"components of affective development focusing on internal changes or processes, or to categories of behavior within affective education as a process or end-product" (Martin & Reigeluth, 1999). *Affective education,* which is generally used to describe programs dealing with personal and social development (Ackerson, 1991/1992), also refer to education for personal-social development, feelings, emotions, more, and ethics (Beane, 1985, Ackerson, 1991, 1992).

Most current discussions related to definitions and issues related to affect and the affective domain in education are influenced by the work of Krathwohl, Bloom & Masia (1964) and their taxonomy of educational objectives of the affective domain. The concept of internalization, which is considered to be an important dimension of the affective domain (Martin & Reigeluth, 1999), was derived from their taxonomy. Internalization is considered to be a description of the process "by which the phenomenon or value successively and pervasively becomes a part of the individual" (Krathwohl, Bloom, & Masia, 1956). The concept of internalization is of particular importance as the "phenomenon" or "value" can be expressed as the value of higher education, and, hence, attitudes toward learning. Similar to concepts of modeling and observational learning, the process of internalization begins when some phenomenon, characteristic, or value captures attention of the student.

An empirical study that attempts to address the issue of anxiety as it relates to efficacy beliefs follows. Meece, Wigfield, and Eccles (1990) studied math anxiety and efficacy beliefs as they related to students' math performance. They hypothesized that perceived math ability would affect math performance expectancies; performance expectancies would then directly influence performance, and both efficacy beliefs and

performance would affect math anxiety directly. The path analyses supported these hypotheses as both perceived ability and performance expectations were predictive of math anxiety. In light of these and other related studies, Bandura (1993) recommends that educators should focus on fostering a sense of personal efficacy. One of the ways in which educators can foster, or help facilitate increased levels of self-efficacy beliefs, is by teaching students strategies such as how to self-regulated their learning. The following section will investigate some of the mechanisms and strategies related to self-regulated learning.

<div align="center">Self-Efficacy and Educational Self-Regulation</div>

[Self-regulated learners are] aware of what they know, what they

believe, and what the differences between these kinds of information

imply for approaching tasks. They have a grasp of their motivation, are

aware of their affect, and plan how to manage the interplay between

these as they engage with a task. (Winne, 1995)

Given Winne's definition of the attributes or characteristics of self-regulated learners and Bandura's (1997) definition of self-efficacy which refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3), it stands to reason that in order for students to organize and execute the appropriate courses of action in an academic sense, they should be taught the strategies necessary to create an awareness of the choices available when approaching academic tasks. The relationship between self-regulated learning and self-efficacy can be characterized as being bi-directional. For instance, research states that effective self-regulation depends on students developing a high level of academic self-efficacy

(Schunk, 1994). According to Schunk (1994) and Zimmerman and Martinez-Pons (1990), students with higher levels of self-efficacy are more likely to engage in self-regulated learning. However, students' levels of engagement in self-regulated learning also correlate with their levels of self-efficacy. Zimmerman, Bandura, and Martinez-Pons (1992) reported results of a study in which self-efficacy for self-regulated learning was linked to self-efficacy for academic achievement. Therefore, students who believed in their ability to self-regulate also believed in their ability to achieve. This relationship has led to a body of research that has attempted to influence levels of self-efficacy by designing studies targeted at developing self-regulation strategies in learners (Schunk & Ertmer, 2000; Winne & Stockley, 1989; Zimmerman, 1998a, 1998b). Before delving into some of the specific research regarding interventions and strategies for developing self-regulated learners, however, the definitions and concepts of self-regulation will be examined in more detail.

The construct of self-regulation refers to the degree that individuals are metacognitively, motivationally, and behaviorally active participants in their own learning process (Zimmerman, 1994). Again, in order to expect students to engage in metacognitive and motivational courses of action, learners must be taught to engage in the strategies and cycles of learning that promote appropriate strategy use and lead to gains in efficacy beliefs. Zimmerman (1998b) proposes the self-regulated learning cycle, which leads to creating the awareness of appropriate strategy use. The phases of the self-regulated learning cycle are described as the forethought phase, the performance or volitional control phase, and the self-reflection phase (Zimmerman, 1998b).

The *forethought* phase is described as the phase in which beliefs that precede efforts to learn set the stage for learning to occur. Processes that occur during learning efforts that affect concentration and performance are referred to in the *performance or volitional control phase*. The *self-reflection* phase involves the processes that occur after learning which influence learner's reactions to that experience. Because mastery learning involves repeated attempts at mastering a cognitive task, Zimmerman emphasizes the cyclical nature of the three phases self-regulated learning.

Zimmerman also elaborates on sub-processes within each of the three self-regulation processes that have been studied in research on academic self-regulation to date. The research Zimmerman cites can be described in more detail as follows. The five types of forethought processes and beliefs that have been studied are *goal setting*, which refers to deciding on specific outcomes of learning; *strategic planning*, which refers to the selection of learning strategies or methods desired to attain the desired goals; *self-efficacy*, which focuses on beliefs of capabilities; *goal orientation*, which focuses on learning progress rather than competitive outcomes and *intrinsic interest*, which continues interest in a task even in the absence of tangible rewards.

Within the performance or volitional control phase, the Zimmerman synthesizes the research resulting in *attention focusing*, which emphasizes the need for learners to protection their intention to learn from distractions; *self-instruction*, which involves telling oneself how to proceed during a task; and *self-monitoring,* which informs learners of their progress on a task.

The third phase, the self-reflection phase, involves the documented processes of *self-evaluation*, which involves comparison of self-monitored information with a goal;

attributions, which provide information regarding the causal meanings of the results of performance; *self-reactions*, which are the results of the attributional assessments; and *adaptivity,* which can involve many outcomes including enhancing forethought or goal orientation.

While Zimmerman's analysis of the cycles of academic regulation have provided information regarding his conceived model and its related processes and subprocesses, there are other models and components of self-regulated learning that can be considered as well. Other characteristics of self-regulated learning include dimensions such as students' observable behavior, their motivation and affect, and their cognition (Pintrich, 1995). The components that function in relation to these dimensions are control, goal structures, and self-directedness. The control component functions to assist learners with developing control of their cognitions, behaviors and motivations. The goal structures provide the standards by which students can monitor and judge their performance, while the component of self-directedness ensures that the learner is taking responsibility for his/her own actions. This cyclical process and relative components of self-regulation serve as foundational concepts for many of the models of self-regulated learning and self-regulation processes that can provide students with strategies needed to become successful self-regulated learners.

Models of Self-Regulation

Social cognitive model of self-regulated learning

The social cognitive theory of self-regulation, in which Zimmerman's (1989b, 1998) cyclical model of self-regulated learning is situated, goes beyond metacognitive knowledge and skill and instead focuses on involving a sense of personal agency in order

to regulate sources of personal influence, affect, behavioral and social-environmental sources of influence (Zimmerman, 1995b). This theory posits that in order to qualify as being self-regulated learners, students' must utilize self-regulated learning strategies, demonstrate self-efficacy perceptions of performance skill, and show a commitment to setting academic goals (Zimmerman, 1989b). Bandura's (1986) notion of triadic reciprocity is also central to the social cognitive theorists' conception of self-regulation. Therefore, self-regulated learning is not determined merely by personal processes, but is assumed to be influenced by behavioral and environmental events, and, in its reciprocal nature, assumes that self-regulative responses can influence environment and personal processes. Additionally, the social cognitive theory of self-regulated learning is portrayed by illustrating a reciprocal relationship between student beliefs (i.e., learning goals and self-efficacy) and self-regulatory processes (Schunk, 1989b). The self-regulatory processes of social cognitive theory are self-observation, self-judgment, and self-reaction (Bandura, 1986).

Self-observation. Self-observation, which can be defined as deliberate attention to aspects of one's behavior (Schunk, 1996), is merely one component of the three-pronged theoretical make-up of self-regulation. Schunk (1994) further describes self-observation as being a behavioral assessment tool and a motivating factor for students. He describes that through the process of self-recording, students are able to assess their behavior on dimensions such as quantity, quality, rate and originality, and are better able to gauge goal progress. The self-observation criteria (Bandura, 1986) are *regularity*, which refers to needing to observe behavior frequently instead of sporadically, and *proximity*, which refers to behavior that is recorded close in time to its occurrence. Therefore, one step in

the development of self-regulative strategies is self-observation – providing learners with the strategy that will help them observe and record their own behaviors.

Self-judgment. Self-judgment, the second process necessary for self-regulation involves the students' ability to compare their present performance with their goal. Self-judgments, according to Schunk (1994), are affected by the goal standards, goal properties, and importance of goal attainment. Goal properties, which will be discussed in more detail later in the document, are integral components of developing self-regulative strategies. Schunk (1994) discusses the standards by which students judge themselves, including social comparison, to be a motivating and informational factor. Standards, to the extent that students compare themselves to them, convey the belief that one is making progress, which serves to enhance self-efficacy.

Self-reaction. The third and final process that is necessary for self-regulation is self-reaction, which is the individuals' reaction to their goal progress (Schunk, 1994). According to Schunk (1994), evaluative reactions involve students' beliefs about their progress. The belief that one is making progress, along with the anticipated satisfaction of goal accomplishment, enhances self-efficacy and sustains motivation. One aspect of this process includes the typical reward scenario – the student reacts favorably to his/her progress, and therefore rewards him or herself with an evening free of studying or a purchase of something new. The reward system is a factor in enhancing self-efficacy when the rewards are tied to students' accomplishments such as mastery of skills.

Other Models of Self-Regulated Learning

Although the social cognitive model of self-regulated learning and Zimmerman's cyclical approach to the development of academic regulation serve as the theoretical

foundation for this document, there are other models, based on other conceptual

paradigms that have been developed. Briefly, they are as follows.

The metacognitive model. Although the metacognitive model involves similar

processes as the social cognitive model, its focus is strictly on the "cognitive and

affective processes that focus on the 'higher order' process of metacognition. By

definition, metacognition refers to the understanding of knowledge that can be reflected

in either effective use or over description of the knowledge in question," (Brown, 1987).

In contrast to the social cognitive theory of self-regulation, metacognitive theories of self-

regulation do not include any elements of human agency.

Volitional theories. Volitional strategies, which encompass aspects of

metacognitive control, can be defined as "goal-oriented control" of information

processing, affective responses and the immediate environment (Corno, 1989).

Volitional theories involve processes that attempt to add to the individual an ability to

protect their psychological states through covert and overt self-processes. Again, these

strategies are based on information-processing theories and do not involve any

components of "self" theories or human agency.

Constructivist theories. The construct of self-regulation, as viewed through the

constructivist paradigm proposes that students construct their own theories of academic

competence, effort, tasks, and strategies (Paris & Byrnes, 1989). Constructivist theories

describe how people transform and organize reality according to common intellectual

principles as a result of interactions with the environment. Paris and Byrnes (1989)

describe a knowledge component, which consists of developmental competence and an

action component, which can be thought of in terms of the student's acquisition of procedures for cognitive strategies, as being foundational to constructivist theories.

Vygotskyian theories. Theorists who are interested in Vygotsky's views on self-regulated learning are interested in his concepts regarding the role of speech during self-regulation. Vygotsky's concept of inner speech or, as it is also termed, the internalization of higher psychological functions, occurs when (a) an operation that initially represents an external activity is reconstructed and begins to occur internally, (b) an interpersonal process is transformed into an intrapersonal one, and (c) the transformation from interpersonal to intrapersonal is the result of a long series of developmental events (Vygotsky, 1978). Inner speech is, therefore, applied as a construct of self-regulated learning when it becomes a source of knowledge and self-control and when the social interactions between adults and children are seen as a vehicle for conveying and internalizing linguistic skill (Zimmerman, 1989a).

Throughout these different theories an element or strategy that is common to most and has been researched widely is the construct of goal setting. Whether researched from social cognitive or constructivist paradigms, goal setting is a critical element that becomes foundational in the development of self-regulated learning. The specific researching regarding goal setting will be reviewed in the following section.

Goal setting

As has been alluded to when discussing the models and research related to self-regulation, goal setting also becomes a central and important strategy to be used when developing self-regulated learners. Schunk (1990) uses goal setting and perceived self-efficacy as two self-regulative strategies that are discussed in the context of the processes

of self-observation, self-judgment, and self-reaction. As the terms are defined a *goal* is what an individual is consciously trying to accomplish, and *goal setting* involves establishing a goal and modifying it as necessary (Schunk, 1990).

Schunk (1990) identifies goals that incorporate specific performance standards as being more likely to enhance learning and activate self-evaluations. These specific goals promote self-efficacy because their progress is easy to gauge. Proximity, another important goal characteristic, results in increased motivation since learners are better able to gauge their progress toward achieving their goal. The effect of goals as motivating factors is further substantiated in research documented by (Bandura & Cervone, 1983), which supports the theory that goal systems gain motivating power through self-evaluation and self-efficacy mechanisms activated by cognitive comparison. The study utilized college students who used an ergometer and were engaged in different goal setting and feedback variations and completed self-evaluation and perceived self-efficacy questionnaires. The findings were that goals, combined with performance feedback, enhanced performance. Schunk (1990) further extrapolates on some of the goal properties that maximize their use as self-regulative strategies. The characteristics that are important to the development and utilization of goals as self-regulative strategies, as outlined by Schunk, are goal specificity, goal proximity, goal difficulty and self-set goals.

Goal specificity

Schunk's various studies with children and mathematics skills (Schunk, 1983b, 1984) reveal that providing children with attainable, specific goals may increase self-efficacy for learning, which, in turn can raise skill acquisition and performance.

Goal proximity

Research by Bandura and Shunk (1981), again dealing with children and mathematics skills, revealed that children who were given proximal goals showed an increase in self-regulated learning that resulted in the highest subtraction skill, self-efficacy and intrinsic interest. Their findings also revealed that distant, as opposed to proximal, goals resulted in no benefits as compared with the general goal.

Goal difficulty

More research by Schunk (1983) with children and mathematics skills revealed that children who received difficult goals achieved greater self-regulated learning and children who received difficult goals combined with direct-goal attainment information displayed the highest self-efficacy and skill.

Self-set goals

Schunk (1985) study was designed to assess the effects of self-set goals. In this study, learning-disabled sixth graders received subtraction instruction and practice, and were given the opportunity to set their own goals or receive pre-assigned goals. The results indicated that self-set goals led to the highest self-efficacy and subtraction performance.

These goal characteristics, when combined with the aforementioned self-regulative strategies and process feedback become powerful tools for teaching students to become self-regulated learners. Just as there are different models that address the processes surrounding self-regulated learning, these models also address the issues surrounding the development of self-regulated learning and the implementation of specific interventions or programs.

Developing Self-Regulated Learners

Engaging students in self-regulated learning, or, in the self-regulatory cycle is "designed to enhance not only the students' learning but also their perception of self-efficacy or control over the learning process" (Zimmerman, Bonner, & Kovach, 1996). The development of self-regulation can be discussed from different perspectives. It can be considered a process that develops from childhood, which can be viewed in constructivist terms – students construct theories of academic competence, effort, tasks, and strategies (Paris & Byrnes, 1989). It can also be viewed from the social-cognitive perspective of triadic reciprocity and through the cycles of self-observation, self-judgement, and self-reaction. Metacognitively speaking, children who are immersed in the classroom environment gradually acquire strategies that will enable them to become highly efficacious, successful learners. Volitional theories, which focus on willpower and the ability for students to protect their own emotional states, coupled with Vygotskian theories which focus on the role of speech in the interplay of environmental and behavioral constructs, all provide powerful theoretical positions from which to build an integrated, applied model of self-regulated learning. There are, however, particular strategy and design concerns to consider.

When dealing with the college student population in general, issues to consider, which have been articulated by (Hofer et al., 1998) are (a) the components and design of an intervention, (b) integrated versus adjunct course design, (c) the issue of transfer, and (d) characteristics of college students. Issues related to the components of design include needing to consider the scope, content and timeframe of the program. Hofer, et

al. (1996) suggest the need for multi-strategy programs, but also suggest placing limits on programmatic scope in order to avoid too much dilution of the intervention.

Integrated versus adjunct course design deals with concerns of whether cognitive and motivational strategies should be taught as their own course or whether strategies learning should be integrated with domain specific courses. Implicit in this discussion is also a concern regarding the transfer of information. Whereas it is assumed that a learning strategies course as a standalone course would teach students to transfer appropriate strategies to different domains and content areas, integrated courses may have a more difficult time dealing with the transfer issue as strategies would only be learned within the context of a specific domain or content area. Characteristics of college student learners generally are such that while they have more exposure to metacognitive and strategy related learning information and, hence, have more of an awareness of how to use strategic and self-regulated learning, they are also more attached to their own strategies and less likely to want to learn others which may be more relevant to different academic demands within the higher education environment (Hofer et al., 1998).

Regardless of the type of program chosen, a conceptual framework must be established. A current model (Garcia & Pintrich, 1994) proposes that the constructs of knowledge/beliefs and strategies used for regulation, along with two general domains, cognitive and motivational, be included. The Garcia and Pintrich (1994) model suggests that declarative knowledge about what various strategies are, procedural knowledge about how to use them, and conditional knowledge of when and why to use strategies be included.

One strategy program that has been investigated in many programs related to college student success and achievement involves teaching time management skills and strategies. The effective management of time has been linked to student achievement in different studies (Britton & Tesser, 1991; Woolfolk & Woolfolk, 1986). Additionally, Zimmerman, Greenberg and Weinstein (Zimmerman, Greenberg, & Weinstein, 1994) outline a theoretical and practical approach to facilitating time management strategies with students.

Time Management

According to Zimmerman, Greenberg and Weinstein (1994), time management can be viewed as an anticipatory strategy that can prompt students to use other self-regulatory processes and can also be viewed as a performance outcome that students can use to self-regulate their current and future learning and academic performance. The following section will overview the theoretical constructs that govern the process of time management as it relates to self-regulated learning and will review empirical studies that tie use of time management strategies to outcomes such as academic achievement, lowered stress levels, and heightened efficacy beliefs.

There are many theoretical views of time management that help provide a foundation from which to develop strategy programs. The management of academic study time can be viewed through aptitude-trait, operant, information processing, metacognitive and social cognitive paradigms.

In the aptitude-trait view of self-regulated learning, in Carroll's (1963) model of time management, time was not conceived as a source of self-regulation. Instead, it was viewed as a manifestation of personal factors such as aptitudes or motivational traits. In

Carroll's model of student learning, time management was viewed as developing from three learning elements. These elements were *aptitude*, the amount of time needed to learn the task under optimal instructional conditions; *perseverance*, which was defined as the amount of time the learner was willing to engage actively in learning; and *opportunity to learn*, which was seen as the time allowed for learning. From this theoretical paradigm researchers such as Gettinger and White (1979) found that students' learning time was a better predictor of their achievement on standardized tests than IQ.

The operant theorists of the 1960s and 1970s pioneered the use of time series graphs to describe and explain time on task performances. These graphs plotted (a) the *frequency* of key behaviors and (b) the *time* or date of the corresponding behavior. Theorists were therefore able to plot changes in time related behavior over a variety of tasks and related to different intervention programs. Operant theorists viewed time as an important dimension of behavior that was subject to self-control. Their intervention programs reflected beliefs that as subjects' progress of completion of programs was assessed, they were assessed according to criterion referenced tests and according to how quickly they were able to complete units of instruction.

Specific research interventions (see Britton & Glynn, 1989), conceived of from the information processing view of academic study time, have developed interventions that are comprised of three distinct processes or phases. These phases can be described as the *goal manager* phase in which a list of goals is constructed, a *planner* phase that produces a list of tasks and subtasks, and a *scheduler* phase that then converts the tasks into timed events. These phases comprise the information processing model of time

management in which the essential feature is a negative feedback loop where performance is compared and adjusted to meet goals or standards.

The essential elements that comprise the metacognitive model of academic study time consists of *procedural knowledge*, which can be seen as how time can be used to guide acquisition of information. *declarative knowledge*, which is information already known about a topic, and *conditional knowledge*, which can be conceptualized as knowing when managing study time can be a problem. The major concern of the metacognitive theorists center around the issue of cognitive monitoring. It is up to the students, therefore, to know when to appropriately apply a strategy and to know when that strategy is failing and adjustments should be made. Empirical evidence shows that students who fail to monitor their learning also fail to self-regulate their use of time (see (Gettinger, 1985).

The social cognitive theorists rely on Bandura's (1986) notion of triadic reciprocity as they design interventions related to academic study time. They conceive of time management as involving a combination of *behavioral, environmental* and *personal influences.* Behavioral influences include efforts to self-observe, self-evaluate, and self-react to academic performance outcomes (Zimmerman et al, 1994). Environmental influences include the use of planning aides such as calendars, computers, and palm pilots that help to manage time optimally. Personal influences include learning strategy influences such as goal setting, attributions, and perceptions of self-efficacy (Bandura, 1989; Schunk, 1989b; Zimmerman, 1989b). Social cognitive theorists recognize these personal processes, in addition to the behavioral and environmental influences, as being critical to the development of effective time management. Therefore, according to

Zimmerman and Martinez-Pons (1992), in order to manage time effectively, students should set specific goals, attribute outcomes to strategy use, and must feel efficacious to learn a task within the allotted time. Poor time management, conversely, may reflect deficiencies in behavioral, environmental or personal self-regulatory processes.

A Social Cognitive Model of Time Management Strategy Instruction

Based on social cognitive theory, the notion of triadic reciprocity, and Zimmerman's cyclical model of self-regulation, Zimmerman, Bonner and Kovach (1996) developed an intervention program designed to assist students with developing time management strategies and increasing perceptions of self-efficacy. Time planning and management is seen as an integral part of their learning strategies instruction and is listed as a primary goal in a program designed to increase levels of self-efficacy in learners through facilitating the use of various self-regulated learning strategies,.

Zimmerman et al.'s intervention begins with a *self-evaluation and monitoring* phase. During this phase, students are asked to record specific features of their academic study time in order to be able to evaluate the time use. On a study time self-monitoring form, students record the assignment, the time started and time spent, the study context, which includes where they studied, who they studied with and whether distractions were present or not. They are also asked to rate and record their level of self-efficacy for the task. In order to help facilitate this phase, instructors are encouraged to develop assignments that will be roughly equivalent in scope in order to help the students establish an objective measure of their time. Additionally, instructors are also encouraged to provide students with an objective way to monitor their self-efficacy for attaining specific learning outcomes. The goal of monitoring self-efficacy was to assist

students with being able to more accurately predict their learning and also to influence motivation. Students should therefore be able to more accurately monitor their time usage as well as their levels of confidence in their capabilities to complete a task.

The second phase of the program is the *goal setting and strategic planning* phase. In this phase, which begins at the start of the second week of monitoring, the instructor initiates a phase of self-regulatory skill development by guiding students through the process of evaluating their time management behaviors and setting process goals for developing their skills. Zimmerman, et al recommend that instructors model an analytical framework in which students think about three dimensions of study – regularity, context, and quality. *Regularity* refers to the amount and consistency of studying; *context* refers to where and with whom one studies and to the presence of distractions and quality can be judged by self-efficacy ratings. The purpose of this phase of the program is for students to begin to discover their areas of deficiency and then set goals to overcome them.

The third and final phase, *strategy implementation and monitoring*, is the phase in which students attempt to develop and implement strategies to develop their time management skills. During this phase, the instructor provides assistance by helping students find concrete ways to adjust their time and opportunities to see the impact of their time management choices. Throughout this process, students are given opportunities to try different approaches as long as they monitor how they implement their new strategies. This type of strategic outcome monitoring allows students to learn from their efforts and try varied approaches. This process also deals with self-efficacy perceptions as students learn to fine-tune and more accurately predict their levels of

capabilities as they compare their efficacy perceptions with their scores on tasks and the time invested. Therefore, "students are more apt to take responsibility for their learning when they realize that they are capable of achieving on their own" (Zimmerman, et al., p. 43)

Zimmerman et al's approach offers a great deal of guidance to instructors who wish to facilitate great levels of self-regulation in their students. According to Zimmerman et al, time management falls under the self-regulatory domain as students who have participated in the program cite behavioral changes that have led to higher levels of time management, academic achievement and efficacy beliefs.

Although Zimmerman et al.'s approach is geared more toward instructors working with students in a K-12 classroom setting, Hofer et al. (1998) developed an intervention geared specifically to college students. Hofer et al. draw from the self-regulation literature to develop strategies and recommendations particular to teaching college students to be self-regulated learners. Their intervention, entitled *learning to learn*, encompasses different self-regulatory phases such as information processing, note taking, test taking and preparation, goal setting and time management.

Within the time management phase of their *learning to learn* program, Hofer et al. (1998) required that students keep time logs of their daily activities for a 2 day period during the course. Students are asked to log their various activities in one hour blocks for two days. They then bring the logs to class and share them with partners. These partners, who have participated in a lecture about time management, serve as consultants to one another by assessing current patterns of time use and helping strategize alternatives. The outcome of this activity is then for students to develop guides for their weekly study time

that, with their knowledge of effective strategy use, would be able to be adapted according to different time demands from their courses. This activity, according to Hofer, et al "enables students to reflect on current time use practices, to asses their effectiveness, to develop better regulatory strategies, and to regain a sense of personal control over their own schedule with tools for future monitoring and revision" (p. 76 - 77).

Other than being documented as a self-regulatory strategy, time management has also been integrated as a component of many college study skills strategy programs. Most notable is David B. Ellis' *Becoming a Master Student* (Ellis, 2000), which is a textbook that has been widely used in many freshman seminar/orientation courses. Additional programs (e.g. Judd, McCombs, & Dobrovolny, 1979; Kelly, 1999; M. Smith, Teske, & Gossmeyer, 2000) also deal with time management as a study skill or learning strategy. There is evidence; however, that time management is more than just an incidental study skill. Although the research is limited, there are empirical studies that link time management to grades, academic performance, and stress.

Empirical Research Related to Time Management

Although the effects of time management practices have been linked to increased efficacy beliefs in one study in particular (Britton & Tesser, 1991), there are other studies that have linked time management to other significant outcomes. For example, Macan et al, (Macan, Shahani, Dipboye, & Peek Phillips, 1990) conducted a study with college students who completed a questionnaire assessing their time management behaviors and attitudes, stress, and self-perceptions of performance and grade point average. Using the Time Management Behavior scale in their study, the researchers were able to discern two

significant findings. The first finding was that self-reported time management is multidimensional. The independent findings revealed four different factors. Factor 1, setting goals and priorities, and Factor 2, mechanics – scheduling, planning represented what is commonly considered to be specific time management behaviors taught in training seminars. Factor 3 represented a person's perception of control of time and Factor 4 was indicated as preference for disorganization. These findings indicate that it is important to distinguish among the different facets of time management.

The second major finding of the study was that the various time management behaviors are related to important outcome variables including stress and performance (Macan et al., 1990). While the findings for Factors 1 and 2 supported some of the conventional notions of time management such as those who practice time management behaviors are clearer about their role and perceive that they perform better, the findings for factor 3 indicated that the performance measures and affective measures of stress were significantly related to perceived control of time. The findings, as cited by the authors, were consistent with stress research that shows that feeling in control of a situation leads to lower levels of stress.

Another study (Woolfolk & Woolfolk, 1986), which dealt with the effects of time management training on the performance preservice teachers, examined treatments of time management procedures (written planning and self-monitoring) against basic training. The purpose of the study was to "determine whether preservice teachers will manage their time more effectively after they receive brief training in setting specific goals, making written plans, and self-monitoring time use" (p. 268). Whereas one experimental group received only direct instruction on effective time management

practices, the other group received the same direct instruction, and was then was provided with supervised practice in daily planning and self-monitoring. They were then asked to complete written plans and time use monitoring logs each day for two weeks.   To assess the effectiveness of the training, participants' performance was assessed on a variety of tasks. The results indicated that although short-term effects in performance of time management behaviors were detected for both groups, the group that was subject to additional training and practice demonstrated superiority over the control group until the end of the semester. The implications made by this study, therefore, are that learning strategies at a deeper level (e.g., with goal setting, self-monitoring and practice) will lead to more long-term effects in regard to study skills and time management.

The importance of these effects, however, is indicated by yet another study (Britton & Tesser, 1991). These researchers tested the effects of time management practices on academic achievement during the college years. Their study tested the hypothesis that college grade point average would be predicted by time-management practices. The study was based on the theoretical model of time-management practices developed by Britton and Glynn (1989), which specified time-management components such as: choosing goals and subgoals, prioritizing goals, generating tasks and subtasks, prioritizing task, scheduling task, and carrying out tasks. Britton and Tesser (1991) subsequently developed a time management questionnaire with the goal of being able to assess time-management practices and compare those practices to college grades.

Britton and Tesser's study was longitudinal in nature, and was based on empirical studies of self-regulated learning in which researchers measured time-management variables in the context of other variables such as self-monitoring and self-judgment

(Zimmerman, 1990; Zimmerman & Schunk, 1989). Subjects for this study completed a time management questionnaire when they were enrolled as freshmen in an introductory psychology course. The researchers also obtained the SAT scores for the individuals in the study. Four years later, the GPAs for all subjects were obtained and the SAT scores, scores of the time management questionnaire and GPAs were all analyzed. The results of the data analysis indicated that self-reports of time management were positively related to academic achievement and the effects of time management were independent of SAT score and even stronger than the effects of SAT scores. Although the researchers acknowledge possible flaws with using self-reported measures as a basis for their study, they believe that students are describing with some accuracy their actual behaviors. A significant finding of their experiment is their perception of the Time Attitudes factor of their questionnaire as being similar to the construct of self-efficacy. According to the researchers, "subjects report feelings of being in charge of their own time – they are able to say 'no' to people, and are able to stop unprofitable routines or activities" (p. 408). They further state that such feelings of self-efficacy allow for more efficient cognitive processing, more positive affective responses and more persevering behavior.

In addition to the studies by Macan et al. and Britton and Tesser, a study was also conducted in Britain that was based on the previous studies by Macan et al. and Britton and Tesser (Trueman & Hartley, 1996). The study utilized a time management instrument that was based on Britton and Tesser's (1991) scale. The scale (see Appendix C) was adapted from Britton and Tesser's 18-item scale to its current version as a 14-item Likert-type Time Management scale. The scale was used to assess the time management

practices of three different age groups of students (i.e., young students, mature student, and older mature students) enrolled in a British university.

The data from the time management scale was assessed and correlated with academic achievement measures for all three populations. The results indicated that there were significant differences found between the time management scores of the three age groups, most notably the older mature students reported making the greatest use of time-management strategies and the borderline mature students reported making the least use of them. Additionally, the results of these studies found positive correlations between student age and daily planning scores, and between student age and examination performance. The confidence in long-term planning scores also correlated significantly with performance in course work, examination scores, and overall academic performance. Additionally, the total time management scores correlated significantly with performance in course-work, examinations, and overall academic performance.

The results of this study, therefore, not only provide substantial ties to the construct of time-management with academic achievement and efficacious behaviors, but also situate the time-management behaviors within theories of self-regulated learning and self-efficacy. As the researchers stated, this study was based on prior empirical and theoretical research by Zimmerman and Schunk, and other constructs such as self-monitoring and self-judgment were considered. One issue that has been studied as an element that leads to self-regulatory behaviors such as self-monitoring and self-judgment is that of feedback.

Feedback

The effects of feedback have been studied within a variety of perspectives ranging from the effects of attributional feedback on self-regulation (Schunk, 1981, 1983a; Schunk & Cox, 1986; Schunk & Swartz, 1993b), to its relationship to self-efficacy (Gorrell & Capron, 1988; Renn & Fedor, 2001; Schunk & Swartz, 1993b; Yan Lan & Gill, 1984), and to its effect on time management interventions (Smith & Steffen, 1994). A variety of different issues have been studied in relationship to feedback as well including different models of feedback, (Bangert-Drowns, Kulik, Kulik, & Morgan, 1991; Kulhavy & Stock, 1989) timing of feedback (Dempsey, Driscoll, & Swindell, 1993; Schmidt, Young, Sinnen, & Shapiro, 1989) and its relation to different learning outcomes. Before reviewing the empirical research, however, it is important to situate the process of feedback within the context of some of the current models and conceptual theories that relate to self-regulated learning and the use of various instructional strategies.

Models of Feedback

Within the context of examining feedback as an integral component of the learning process, there are two models that emerge as being the prevalent models within the theoretical and conceptual literature. These models are referred to as the certitude model of feedback (Kulhavy & Stock, 1989) and the five-stage model of mindfulness (Bangert-Drowns et al., 1991).

A Certitude Model of Feedback

Kulhavy and Stock's certitude model of feedback "is cited as being the most comprehensive treatment of feedback in facilitating learning from written instruction,

since it integrates the factors of learner confidence, feedback complexity, and error correction, and has been investigated under different modes of presentation and timing"(Mory, 1996). Kulhavy and Stock's (1989) model is based on the assertions that most research on feedback is conceptually flawed because it is based on the fact that researchers treat most responses as being absolutely right or wrong and ignored the origins or reasons for such answers. Based on that assertion, Kulhavy and Stock (1989) developed a model of feedback that included three cycles. Within the first cycle, learners are presented with a task to which he or she needs to respond. In the second cycle, feedback is presented to the learner, and in the third cycle the original task is presented again as a test item. Within each cycle, the learner inputs information, which is compared to a standard, which hence results in an output that describes the level of discrepancy. The model, therefore, focuses on the level of discrepancy between the practice question, cycle I, and the feedback, cycle II, and how much effort the learner will expend in error correction. Research based on this model (Kulhavy & Stock, 1989) verifies the contention that high-confidence (high-certitude) errors indicate that students have little need for elaborative feedback, while students that enter low-confidence (low-certitude) responses, have greater need for elaborative feedback. Therefore, the model contends that the level of certitude of student responses should in fact dictate the type of content and feedback that should be present. Although this model has been studied and validated through empirical research, it is cited as having some problematic aspects, most notably that response certitude is a self-reported measure and identification of certitude judgments can therefore be problematic (Mory, 1996). The findings of this model were

therefore organized to create another model of feedback based on the learner's cognitive state.

A Five-Stage Model of Mindfulness

The Bangert-Drowns model (Bangert-Drowns et al., 1991) is based on the findings of Kulhavy and Stock's (1989) investigations and emphasizes the construction of mindfulness, which is described as "a reflective process in which the learner explores situational cues and underlying meanings relevant to the task involved" (Dempsey et al., 1993). The five-stages of this model, which emphasizes the learner's cognitive and behavioral processes during learning include (a) the learner's initial state, (b) what search and retrieval strategies are activated, (c) the learner's response, (d) the learner's evaluation of the response, and (e) adjustments the learner makes (Mory, 1996). Within each stage of the process, Bangert-Drowns (1991) consider such elements as prior knowledge, interests, goals, self-efficacy, expectancy and others as being a part of the learners "mindful state" that affects learning.

These researchers (Bangert-Drowns, 1991) contend that the construct of mindfulness impacts whether feedback will promote learning. If feedback is received mindfully, it can promote learning, while feedback that encourages mindlessness (i.e., too easy or redundant feedback) can inhibit learning. Dempsey et al. (1993) additionally affirm the need for focusing on mindfulness as an important framework for constructing future research on text-based feedback, and should also guide future studies that examine feedback in more complex learning environments that involve higher learning outcomes. In addition to studying feedback as it relates to different learning outcomes and

processes, other issues such as whether delayed or immediate feedback is most effective, have also been studied.

Timing of Feedback

The research of Kulhavy and Wager (1993) has attempted to deal with the issue of whether immediate or delayed feedback is more effective. Kulhavy and Wager reference Skinner's programmed instruction as the basis for using immediate feedback as Skinner proposes that the reinforcement must follow the instructional response as closely in time as possible.

However, Kulhavy and Wager (1993) also reference studies that have investigated the effects of delayed feedback when using different types of instruction (eg., Sturges, 1972; Surber & Anderson, 1975). Additionally, Brackbill and colleagues (Brackbill & Kappy, 1962; Brackbill, Wagner, & Wilson, 1964) provide empirical evidence that substantiates the effectiveness of delayed feedback and their naming of the phenomenon as the "delayed retention effect" (DRE) as supporting the notion that providing delayed feedback can enhance retention.

Although Kulhavy and Wager find no plausible explanation for the effectiveness of delayed feedback within the operant conditioning paradigm, Kulhavy and Anderson (1972) provide a theoretical paradigm called the "interference-preservation" hypothesis that states that "when feedback is delayed, initial errors are less well remembered, and the likelihood of substituting the correct response increases because errors are less interfering" (Kulhavy & Wager, 1993, p. 14). Kulhavy and Wager additionally cite research that has continued to affirm that the interference-preservation hypothesis has held up over the years.

The implications of timing of feedback research, therefore, show that although principles such as DRE and the interference-preservation hypothesis can provide guidelines for instructional design, additional issues such as the type of program and type of learning outcomes should be considered.

Feedback and Learning Outcomes

Whereas Kulhavy and Wager (1993) consider feedback primarily within the context of programmed instruction and Skinnerian behaviorism, Smith and Ragan (1993) consider feedback as it applies to a variety of learning outcomes. While Smith and Ragan cite the importance of feedback within the learning cycle since it constitutes one-half of the interaction loop of interactive technologies, they also caution that there are many issues that must be considered when designing effective feedback scenarios. Among the issues to take into consideration, or some of the issues that confound the development of effective feedback, are as follows:

a. Content of feedback and theoretical rationale for that content

b. Instructional even which feedback follows – pretest, practice, post-test

c. Amount and nature of information available to learners prior to requiring response of learner

d. Characteristics of learners

e. Second try on same or similar question available

f. Learning task

In their discussion on different types of learning outcomes, Smith and Ragan deal with types of learning such as declarative knowledge learning, concept learning, rule learning, problem-solving learning, cognitive strategy learning, psychomotor learning, and attitude

learning. In order to relate their discussion more succinctly to self-regulated learning, Smith and Ragan's strategies for cognitive strategy learning and attitude learning will be discussed.

In terms of general advice related to cognitive strategy learning and feedback, Smith and Ragan (1993), who define cognitive strategies as "those techniques that learners use to control and monitor their own cognitive processes" (p. 94), recommend the following.

In instructional scenarios where modeling is used, Smith and Ragan recommend that "feedback should explain why the modeled performance is judged so by focusing on the simulated learner's capabilities, the task characteristics, the efficacy and the application of a particular strategy" (p. 96). For open-ended instructional scenarios, when learners practice actually applying the strategy to a task, feedback must "generally be presented through a modeled application of the strategy in which attention is directed to specific aspects of the strategy with which attention is directed to specific aspects of the strategy with which learners frequently evidence difficulties" (p. 94).

As far as recommendations for feedback in an attitude learning situation, Smith and Ragan (1993) recommend that learners be presented with feedback as to whether they have successfully employed the skill required by the attitude, and should also be informed as to whether their responses are congruent with the desired attitude. Additionally, Smith and Ragan state that "in addition to such informational feedback, the designer may, after some soul searching, decide to employ positive reinforcement through affirming and personalized statements to learners who evidence the desired behavior" (p. 99).

Although the recommendations for feedback in cognitive strategy and attitude learning are pertinent to discussions at hand, it is also important to investigate the construct of feedback more specifically as it relates to self-regulated learning. The research of Schunk and Zimmerman provide the basis and context for such discussion.

Feedback and Self-Regulated Learning

One of the most prominent voices that have examined the process of feedback as it relates to theories of self-regulated learning is that of Dale Schunk. Schunk, who has published widely as a theorist and researcher of self-regulation and its different constructs, has focused the majority of his feedback research on the effects of varying types of attributional responses to learners (Schunk, 1981, 1983a; Schunk & Swartz, 1993b). According to Schunk (1994), "as students work on a task they compare their performances and their goals. Self-evaluations of progress enhance self-efficacy and keep students motivated to improve" (p. 81). Schunk bases much of his work on Weiner's (1986) model of attributions in order to promote effective self-regulation and increased levels of self-efficacy. Attributions, according to Schunk (1994), enter into self-judgment and self-reaction phases, based on the social cognitive model of self-regulation, when students are searching for attributes to explain their goal progress.

From a slightly different theoretical perspective, Schunk (2001) situates feedback within Zimmerman's three-phase model of self-regulation (see Table 1). Attributional feedback is listed as a component of the performance control stage, and progress feedback and self-evaluation are listed as components of the self-reflection stage. Schunk (2001) cites attributional feedback as being an important component of the performance control stage. For instance, being told that one can achieve through harder work can be

motivational, and providing effort feedback for successes can support students' perceptions of their progress, which could in turn sustain motivation and increase self-efficacy for learning. Ability related feedback can also sustain self-efficacy and self-regulation as students learn to acquire skills.

Progress feedback and self-evaluation, which according to Schunk (2001) differ from attributional feedback, are essential components of the self-reflection stage. During the self-reflection stage, in which self-monitoring and reward contingencies are also component processes, progress feedback and self-evaluation are seen as critical processes as they provide information to learners regarding their goal progress. This process becomes important especially when goal criteria or progress is not clear. Progress feedback provides learners with information regarding their goal progress. This, in turn, can substantiate self-efficacy and motivation. Zimmerman (2001) defines this process as a self-oriented feedback loop of learning. Within this loop, "students engage in a cyclical process in which [they] monitor the effectiveness of their learning methods or strategies and respond to this feedback in a variety of ways ranging from covert changes in self-perception to overt changes in behavior" (Zimmerman, 2001, p. 5)

In addition to Schunk and Zimmerman's views of feedback as a part of the social cognitive method of self-regulated learning, Hoska (1993) provides a set of instructional strategies relating to motivating learners and enhancing self-efficacy through computer based instruction (CBI) feedback.

Hoska (1993) cites providing positive learning experiences and changing the causes learners attribute to their successes and failures as being critical to improving their levels of effort, which will in turn increase their goal achievement and levels of self-

efficacy. In terms of methods related to changing the causes learners attribute to success

and failure in order to increase levels of self-efficacy, Hoska also relies on Weiner's

(1986) definitions of attributions. Of the attributional dimensions of ability, effort, luck,

task difficulty or strategy use, Hoska cites effort and ability as being the most critical in

determining learner perspective. According to Hoska (1993), students with learning-goal

orientations usually attribute their track record at gaining knowledge and developing

skills to both ability and effort whereas learners with performance-goal orientations cite

only ability as the key to obtaining their goals and maintaining a self-image of high

ability. In order to engage in changing attributions with the intent of maximizing

expectancy and self-efficacy beliefs, Hoska recommends attribution training in the form

of feedback. Hoska proposes the following guidelines in order to help learners make

effort attributions:

- Provide effort encouragement after a success or failure, not before it.

- Use direct attributions, learners telling themselves they need to try harder,
  rather than indirect attributions.

- Use attribution training only in noncompetitive, task-focused, learning
  environments.

- Use attribution training with learning tasks of intermediate difficulty.

- Train in the use of strategies that can help learners develop a sense that they
  have control over their successes and failures.

In addition to being situated within a variety of psychological and pedagogical

contexts, the effects of feedback have been studied from within a variety of different

content domains and have been tested for a variety of different outcomes. The following

section will outline some related studies that link feedback to achievement outcomes, efficacy belief outcomes, and time management outcomes.

Empirical research related to feedback

The research published by Schunk, as previously stated, has provided much insight into the processes of feedback and goal setting as they relate to the development of self-regulation strategies and self-efficacy. Coupled with Schunk's prior research on goal setting the effects of feedback have also provided perspectives on interventions that can influence the development of higher levels of self-efficacy. Earlier research by Schunk (Schunk, 1983a; Schunk & Cox, 1986) focused on the effects of attributional feedback on children and mathematical skills. Later research, however, (Schunk & Swartz, 1993a, 1993b) focused instead on the effects of process feedback as related to goal type. These studies (Schunk & Swartz, 1993b) investigated the effects of different types of goals (i.e., product, process, or general) and progress feedback on achievement in writing. The progress feedback was hypothesized to have conveyed to the students that the strategy was effective; students were making progress, and were capable of improving.

Students in the study were (a) assigned to experimental conditions based on goal type, (b) were administered a self-efficacy for skill improvement measure, and (c) participated in a modeled demonstration of writing strategies, followed by guided practice and independent practice. The results indicated that providing students with a goal of learning a writing strategy, coupled with feedback on their progress, raises achievement outcomes. The results, as interpreted by the authors, indicate that a strategy goal highlights strategy use as a way to improve writing and the progress feedback

conveys that the strategy is effective and students are therefore capable of improving their skills. The strategy instruction plus progress feedback group also judged their self-efficacy higher, which demonstrates that self-efficacy is related to skill.

In addition to Schunk's research, additional studies have been performed that also attempt to correlate feedback with self-efficacy. One such study (Gorrell & Capron, 1988), which was based on an earlier study (Gorrell & Partridge, 1985), found that undergraduate students, when presented with effort attributions exhibited greater levels of persistence and improved their writing significantly in contrast to a control group that did not receive attributions.

Gorrell & Capron, (1988) assessed the effects of instructional type and feedback on prospective teachers' efficacy beliefs. According to the authors, the study was "initiated in order to explore the conditions that would pertain in training education students in specific skills needed to teach children effectively" (p. 121). Therefore, the experimental intervention focused on the presentation of material in a direct instruction versus a cognitive modeling format and the effects of watching a demonstration of skills with task-oriented or self-efficacy statements. Subjects, therefore viewed video tapes that taught a skill using one of the two instructional strategies and then viewed tapes in which the preservice teacher expressed either high levels of positive self-efficacy related to her ability to teach, or task oriented statement related to what she was doing in the video.

The results of the study indicated that the cognitive modeling method of instruction raised estimates of success and persistence among students entering a teacher education program. In addition to the cognitive modeling finding, however, it was found that the task-oriented feedback statements were more effective than self-efficacy

statements in determining the willingness of the preservice teacher to continue teaching a difficult skill. The author attributes these findings to the lack of low efficacy beliefs in their population before the intervention. Similarly, another study on the effects of feedback on the management of time of student teachers (Smith & Steffen, 1994) found similar results.

The study by Smith and Steffen (1994) investigated the effects of data-based feedback on teaching behaviors of student teachers. More specifically, the study addressed the effects of different schedules of feedback on the management time of student teachers. The types of data-based feedback that were utilized in this study were (a) knowledge of results (KR) feedback, which included graphed rates of targeted behaviors, and verbal reports of levels of targeted behaviors; and (b) knowledge of performance (KP), which included explanations of why certain levels of behavior were high or low; and finally (c) advice on how to improve future teaching performance. Although these feedback types do not correlate identically with those of the previous study, based on similar definitions, the KR condition can be seen as being similar to the task-oriented condition previously studied.

The purposes of Smith and Steffen's (1994) study, therefore, were to determine whether the provision of data-based KR for student teachers on management time would lead to less time being spent on management during teaching and whether the provision of different schedules of KR would produce different levels of reduced management time. The subjects in this study were live-coded by the researchers on their time spent on various management tasks while teaching their class. The coders then provided the

teachers with KR feedback on time schedules of every day, every other day, every four days, or, in the case of the control, no feedback was provided.

The results of this study substantiated prior research (see Metzler, 1989; Sidentop, 1981) that claimed that more frequent schedules of feedback lead to greater improvement in student teacher performance. The results of the Smith and Steffen's study, therefore, found that students receiving KR every day produced a greater decrease in time spent in all five managerial behaviors that were coded. The researchers found that a schedule of KR every day enhanced a student teacher's ability to decrease management time.

A study by Khine (1996) also investigated the effects of KR feedback, this time, however, the effects of KR feedback were assessed in opposition to elaborative feedback (EF), which is a higher order response that provides reasons why the response was (a) correct, (b) incorrect, or (c) participants received no feedback. These feedback types were investigated as they interacted between students who were field dependent versus field independent. The instructional treatment was a commercially produced multimedia program consisting of verbal information as presented in text, graphic and sound formats.

The subjects were assigned to one of the three treatment groups (NF, KR or EL), were administered a post-test after completing a practice session and were assessed for field dependence-independence based on the Group Embedded Figure Test (Witkin, Oltman, Raskin, & Karp, 1971). The subjects then spent about an hour on the stimulus material and completed an on-line post-test. The results of the post-test indicated no significant difference between the KR or EL groups in terms of achievement scores, but found significant differences between either KR or EL groups and the NF group indicating that either feedback condition was preferable to no feedback. When cognitive

styles were assessed against feedback types, the results indicated that while the raw scores of field dependent students in the KR group were higher than those in the EF group, the scores of the field independent students were lower in the KR group than were those in the EF group. These results, therefore, led the researchers to conclude that knowledge of results seems to be the most effective mode of feedback for field dependent and independent students (Khine, 1996).

Another important dimension of this study, as cited by the author, lies in the extension of this study from previous studies to more sensory channels through the use of multimedia. When considering future directions, the author suggests investigating more sophisticated uses of technology, especially those that relate to multimedia applications, to enhance the effectiveness of feedback. Additional researchers as well (Mory, 1996) suggest that as newer technologies offer more instructional delivery options and a wider variety of modalities through which to deliver feedback, the issues surrounding the content of feedback and how to deliver feedback will become even more complex".

Study Overview

The current study, therefore, intends to assimilate the literature reviewed by engaging participants in an experimental process that will encourage the development of self-efficacy beliefs through participation in a self-regulatory process based on Zimmerman's social cognitive model of time management. By doing so, participants will be engaged in an enactive mastery experience which, according to Bandura (1997), is one of the primary sources of developing efficacy beliefs. The study will attempt to build on the feedback literature by incorporating different types of feedback content with different feedback timing schedules. A "rich" feedback condition will contain (a) knowledge of

results, (b) strategy information, and (c) encouragement. This rich feedback condition is based on Bandura's notion of vicarious experience where a model engages the participants in learning based on the model's experiences. The knowledge of results portion of the rich feedback condition will consist of goal discrepancy information. The strategy information will continue to engage participants in an enactive mastery experience as they are given tips on how to continue to master the ability to manage their time. Verbal persuasion will also be utilized in the form of encouragement. Within the rich feedback condition, therefore, three out of four of Bandura's noted forms of the development of efficacy beliefs will be utilized as participants will be engaged in a mastery learning experience while participating in a vicarious experience and receiving verbal persuasion for their efforts.

In contrast, the "lean" feedback condition will challenge the literature regarding the effectiveness of knowledge of results feedback by utilizing (a) knowledge of results and (b) encouragement type of feedback. The knowledge of results feedback again will consist of goal discrepancy information and the encouragement feedback will be considered to be the equivalent of Bandura's definition of verbal persuasion.

All participants, therefore, will be engaged in a mastery learning experience in which time management behaviors and self-regulatory strategies will be used to attempt to influence levels of self-efficacy.

<div align="center">Need for the Study</div>

According to Lane and Lane (2001), "if self-efficacy research is to impact on real-world settings that typically involve complex tasks, there is a need for well-designed research to investigate self-efficacy and performance relationships in ecologically valid

settings" (p. 688). They additionally state that self-efficacy research should involve thorough examinations of the competences that underpin performance.

Since time management has been tied to increased levels of efficacy and academic achievement (Britton & Tesser, 1991; Macan et al., 1990; Trueman & Hartley, 1996), and since engagement in self-regulated learning has been linked to academic achievement and increased self-efficacy (Zimmerman, 1990, 1998b; Zimmerman & Schunk, 1989), this study will attempt to engage students in a time management mastery learning experience in which they will engage in the self-regulation processes as outlined by Zimmerman's three phase cyclical model of academic regulation.

Based on Zimmerman's model of self-regulation and his subsequent model of time management interventions, this study will address the gap in the literature that fails to utilize multimedia in an online learning environment. The research will additionally supplement the lack of research geared specifically toward the college student population.

<div align="center">Hypotheses</div>

The proposed study seeks to explore the impact that different schedules of feedback – daily versus weekly – and different delivery types of such feedback – rich feedback versus lean feedback– will have on self-reported time management behaviors, use of self-regulation strategies, and general perceived self-efficacy.

<div align="center">*Research Questions*</div>

H1) Does feedback presented in a rich format as opposed to a lean format result in changes in self-reported time management behaviors and levels of general and self-regulatory self-efficacy beliefs?

H2) Does feedback provided on a daily basis as opposed to feedback provided on a weekly basis result in changes in levels of self-reported time management behaviors and levels of general and self-regulatory self-efficacy beliefs?

H3) Do changes in levels of self-reported time management behaviors relate to changes in levels of self-regulation?

H4) Do changes in levels of self-regulation relate to changes in levels of perceived self-efficacy?

METHOD

Research Design

The current study employed a 2-between/1-within, 2 (daily vs. weekly feedback) X 2 (rich vs. lean feedback) X 2 (pre-test vs. post-test) repeated measures design (see Table 2). The study assessed the effects of different schedules of feedback and different types of feedback on general self-efficacy, self-efficacy for self-regulated learning and self-reported time management behaviors.

Table 2. *Representation of Research Design*

	Type of feedback	
Schedule of feedback	**Lean feedback**	**Rich feedback**
Weekly	Group 1	Group 2
Daily	Group 3	Group 4

This research design was developed and implemented as an online intervention in which students participated at a distance. The use of technology and various media attributes were leveraged in order to provide the participants with various types and schedules of feedback according to group designation. The participants were randomly assigned to one of the four groups as they initially logged into the online intervention program.

The study utilized a web-based tool that consisted of different feedback treatments across four groups. All groups engaged in monitoring their time management practices and were asked to set goals regarding how they planned to spend their time on a

daily basis. Finally, participants were asked to monitor how they actually spent their time.

Participants were asked to enter their time spent in four different categories. They were asked to monitor how much time during each 24 hour day they spent on academics and studying (including time in class), how much time they spent sleeping or napping, how much time they spent on personal or social matters such as house cleaning, child care and entertainment and how much time they spent on their job. Participants were asked to set goals and monitor their time usage in the four areas in order to record their totals into the web-based program and receive the appropriate feedback. The appropriate feedback was provided to the participants under the following conditions.

Participants in Group 1 received feedback on a weekly basis, which occurred on day 8 and day 16 of their participation in the study, which marked the end of their first and second full week of participation in the program. Their feedback was presented in a lean format, which consisted of text-based knowledge of results plus encouragement. For the purposes of this study, knowledge of results was interpreted on the basis of participants being within one hour of having met their goal. Participants that recorded actual times that fell within an hour, above or below, of their goal received feedback that they met their goal. In other words, participants that recorded that they had spent in excess of one hour more than they had planned or more than an hour less than they had planned in an area than their goal indicated received feedback that they either exceeded their goal did not meet their goal. Participants in Group 1 received the appropriate lean feedback on a weekly basis, which evaluated their efforts to meet their time management goals.

Participants in Group 2 also received feedback on a weekly basis (i.e., day 8 and day 16), but received their feedback in a rich format. The rich feedback condition consisted of knowledge of results, strategy information, and encouragement. The knowledge of results feedback was presented in a visual bar graph format that compared their goals with their actual times on a daily basis. The strategy feedback information was presented in a format that showed bulleted strategies on a PowerPoint slide with accompanying audio that articulated their feedback, which played in the background. Therefore, on day 8 and day 16 of the study, participants received feedback in this rich format utilizing multiple media attributes to deliver the feedback.

Participants in Group 3 received feedback on a daily basis, and received their feedback in a lean format. Their feedback consisted of the lean content format (i.e., knowledge of results plus encouragement), which was presented in a text-based format. Group 4 participants received daily feedback that was presented in the rich feedback content format utilizing the same media formats that were described for Group 2. All participants, in addition to entering daily goals and actual times also completed additional tasks on day 1 and day 16.

All participants were asked to fill in the appropriate demographic information as well as the assessments that measured their levels of generalized self-efficacy, self-efficacy for self-regulated learning and time management behaviors when they initially logged into the program (i.e., day 1). This process served to address the within-subjects component of the study as participants also completed the survey information after their last day of participation in the program (i.e., day 16). The pre and post-survey process was utilized in an attempt to measure any changes in attitude or behavior over time. All

participants, therefore, completed the general perceived self-efficacy survey, the self-efficacy for self-regulated learning survey and the time management behavior survey at the beginning and at the end of the two week experimentation period.

Participants

A total of 79 participants were recruited to participate in the online time management program. Of these participants, 15 were removed from the study due to not having completed the required two weeks of treatment. This resulted in a total number of 64 participants. The attrition rate for participation in the two week program, therefore, was 19%.

Participants were primarily online learners who were enrolled in a graduate level educational psychology course. The participants were majoring in a variety of different program areas that were predominantly located in the College of Education and Human Resources at a large land-grant institution in the southeast.

Eighty-five percent (n=55) of the participants that completed the program were enrolled as graduate students – 68% (n=44) being master's level students and 17% (n=11) being doctoral students. The remaining 15% of participants (n=9) were undergraduate students listed primarily as junior or senior level students.

Of the participants that completed the program, 67% (n=43) were female and 33% (n=21) were male. All but 6 participants indicated that their nationality was white/Caucasian. The remaining 6 participants were of African American or Asian descent. The average birth year of all participants was 1970, making the average age of participants 32.

Before beginning the two-week treatment, informed consent was obtained in accordance with the university's Internal Review Board. Information regarding details of the university's informed consent process, an overview of the program, the url and technical support information was provided to the students by the researcher prior to the first day of the experiment.

Feedback

The independent variables, which include type of feedback and schedule of feedback, in addition to the pre- and post-test conditions, have been defined in the following terms.

Type of feedback

The feedback type varied according to a *rich* or *lean* condition. Feedback was given in each time management area (i.e., academic, sleep, personal and work-related time) in each condition. Rich feedback, however, was defined as including (a) knowledge of results, (b) strategy information, and (c) encouragement. Lean feedback was defined as including (a) knowledge of results, and (b) encouragement. Rich feedback was presented in a multi-media based format which utilized graphics and audio. The rich knowledge of results feedback was presented as a bar graph in which each participants' daily goals were compared with their daily actual totals. The bar graph was sequential as each day stacked up next to the others as participants progressed through the program. The strategy information was presented in a graphical and audio based format as well. The strategy information for each daily outcome contained a short slide presentation that contained bulleted strategy information with an accompanying audio clip that conveyed the appropriate strategy information.

The lean feedback, on the other hand, was presented in a text-based format. Lean feedback was given in each time management area (i.e., academic, sleep, personal and work-related time) as with the rich feedback condition. The feedback, however, only contained knowledge of results based on the +/- 1 hour threshold criteria established plus an encouragement statement.

If the participants' actual times spent matched within an hour of their goal, for each condition, they received feedback that they had met their goal. If their times were mismatched for +/- one hour, the participant received feedback that they had not met their goal or they had exceeded the goal. The knowledge of results feedback and the encouragement feedback that was present in all conditions represented goal discrepancy feedback and verbal persuasion that attempted to influence participants levels of self-efficacy.

Schedule of feedback

The schedule of feedback was also manipulated, as subjects were presented with either a daily or a weekly schedule of feedback. All participants, however, received feedback in all four time management areas (academic, work-related, sleep, and personal) according to the schedule indicated by the group designation (daily or weekly). All participants were instructed to monitor their time on a daily basis for a two week period of time. They were additionally instructed to log into the program on a daily basis in order to set their goals for the upcoming day and record their actual times for the prior day. Participants in Groups 1 and 3 who received weekly feedback received two sets of feedback – one set on day 8 and one set on day 16. Participants in Groups 2 and 4 who were in the daily feedback conditions received feedback each day they logged in after

they entered their goals and actual times. All feedback in all conditions was based on a comparison of their daily goals in all four areas with their actual times spent in academic, work-related, personal and sleep.

Materials

The materials used in this web-based experiment consisted of three pre and post-test scales that measured participants on all indicated dependent variables and the mechanism in which participants set goals, recorded their times and received the appropriate feedback. Participants were assessed on their levels of general perceived self-efficacy according to the Schwarzer and Jerusalem (2000) scale (Appendix A), self-efficacy for self-regulated learning according to Bandura's (2001) scale (Appendix B), and time management behaviors according to Britton and Tesser's (1991) scale (Appendix C).

General perceived self-efficacy

Participants were assessed on their general perceived self-efficacy prior to and following participation in the intervention (see Appendix A). Although self-efficacy is commonly understood as being very specific, some researchers have also conceptualized a generalized sense of self-efficacy (Schwarzer & Jerusalem, 2000). Therefore, the general perceived self-efficacy scale, which aims at a "broad and stable sense of personal competence to deal efficiently with a variety of stressful situations," (Schwarzer & Jerusalem, 2000, p. 1) will be utilized in order to attempt to measure participants general levels of self-efficacy before their participation in the experiment and assess any effects of the experiment at the end of their participation.

The scale was originally developed by Jerusalem and Schwarzer in a German version in 1981, but has since been adapted to English and revised. It has been used in numerous studies (see Schwarzer, 1994; Schwarzer, 1997; Zhang, 1995). The instrument as used in the 1992 study yielded an internal consistency of alpha = .82. It has been used in other research projects (Schwarzer, 1994, Schwarzer & Born, 1997, Zhang & Schwarzer, 1995) where it yielded internal consistencies between Cronbach's alpha = .75 and .90 (Jerusalem & Schwarzer, 1992).

The general perceived self-efficacy scale is comprised of 10 questions that are measured on a 4-item likert scale in which the response format ranges from *not at all true*, to *barely true*, *moderately true* and *exactly true*. Participants are asked to assess how well they feel they can solve problems and confront challenges and obstacles.

Self-efficacy for self-regulated learning

Participants were also assessed on their self-efficacy for self-regulated learning prior to and following their participation in an attempt to measure any changes in self-regulated learning behaviors over time (see Appendix B). This scale was developed as a subscale of Bandura's children's self-efficacy scale (Bandura, 2001). Although Bandura's scales remain unpublished, a study that utilized an earlier version of his scales collected statistical data on the validity of the instrument (Rule & Grisemer, 1996).

Within Rule and Grisemer's (1996) analysis of the self-efficacy for self-regulated learning scale, inter-item correlations were conducted. A coefficient alpha for the 11 item scaled was computed at the alpha = .81 level.

The self-efficacy for self-regulated learning scale is comprised of 11 questions that ask participants to record their level of confidence in being able to regulate their

academic behaviors including focusing on material, organizing and planning school work and motivating oneself to complete academic work. Participants are asked to answer how they can perform the various self-regulatory behaviors on a 4-item likert scale including *not well at all,* to *not too well*, *pretty well* and *very well*.

Time Management Behaviors

The third dependent variable that was measured in the experiment was time management behaviors. This variable was measured in order to assess any changes in time management behaviors over time. The time management scale was developed by (Trueman & Hartley, 1996) as an adaptation from Britton and Tesser's (1991) original 18-item scale. The Trueman and Hartley scale is comprised of two subscales: a 5-item *Daily Planning* subscale and a 9-item *Confidence in Long-Term Planning* subscale.

The alpha values for the internal reliability coefficients of the scale were found to be .85 for the daily planning subscale, .71 for the confidence in long-term planning subscale, and .79 overall for the entire scale.

The time management behavior scale is a 14-item survey that asks participants to assess their levels of engagement in time management behaviors such as creating "to do" lists, setting and keeping priorities and making constructive use of their time. Participants were asked to answer according to a five-item likert-type response that ranged from stating that they *never* engaged in the activity, the engaged in the activity *infrequently, sometimes, frequently*, or they *always* engaged in the activity.

Web-based Intervention

The entire intervention was web-based and consisted of pre-test and post-test instruments, demographic data entry forms, a daily goal-setting mechanism, a daily actual

time recording form, and the appropriate feedback screen, (see figures 4-7). The entire

module was database driven and was developed in using Microsoft Access, Macromedia

ColdFusion, Microsoft RealPresenter and the RealOne Player. A streaming server was

also be utilized in order to efficiently and effectively deliver the multimedia feedback via

the Internet.

Figure 4. The login screen for the Online Time Planner. This screen began the process

for participants on each day of their participation in the program.

Questions? Contact Krista Smi

The online Time Planner

Today's Tasks.

Hello, **Krista Terry**. This is your **1st** time logging in. **16** logins are required to complete the study.

There are five tasks that you must complete before ending today's session.

- Enter general demographics information.
- Complete three short surveys addressing time management and self-regulation.
- Enter your time management goals, for studying, working, socializing/relaxing, and sleeping, for tomorrow.(3)

[Continue]

Figure 5. The introductory screen that participants viewed after logging in to the program. This screen includes a "to do" list for each participant to follow and an indication of what day in the program they were logging in on.

Questions? Contact Krista Smith

The online Time Planner

Goal Setting.

Please enter your goals for **tomorrow**, . Please plan your time goals to the nearest 15 minute segment (i.e., 5.00 = 5 hours, 5.25 = 5 hrs & 15 mins, 5.50 = 5 hrs & 30 mins, 5.75 = 5 hrs & 45 mins)

1 Tomorrows hourly goal for academic/study time
2 Tomorrows hourly goal for personal/social time
3 Tomorrows hourly goal for job/work-related time
4 Tomorrows hourly goal sleep/rest time

[SUBMIT] [RESET]

Figure 6. The goal setting reporting screen including instructions. Participants were asked to input their daily goals in all four areas on this screen. The actual reporting screen consisted of the same design, but asked participants to record their actual time spent in all four areas.
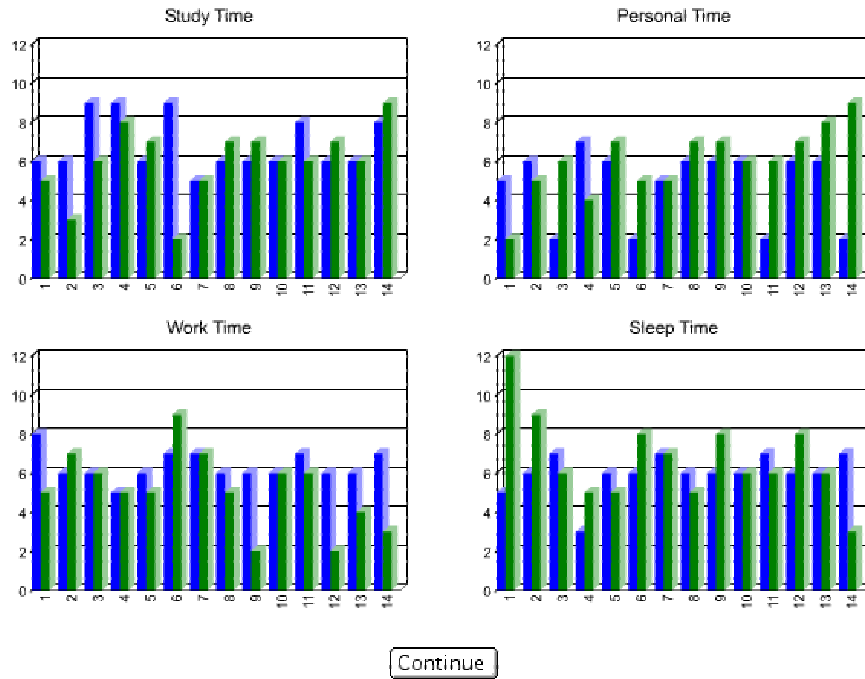
Figure 7. A sample of the bar graphs that were compiled in rich feedback groups (groups

2 and four). The blue bars indicate the participants goals set while the green bars indicate

the actual time they spent in each area.
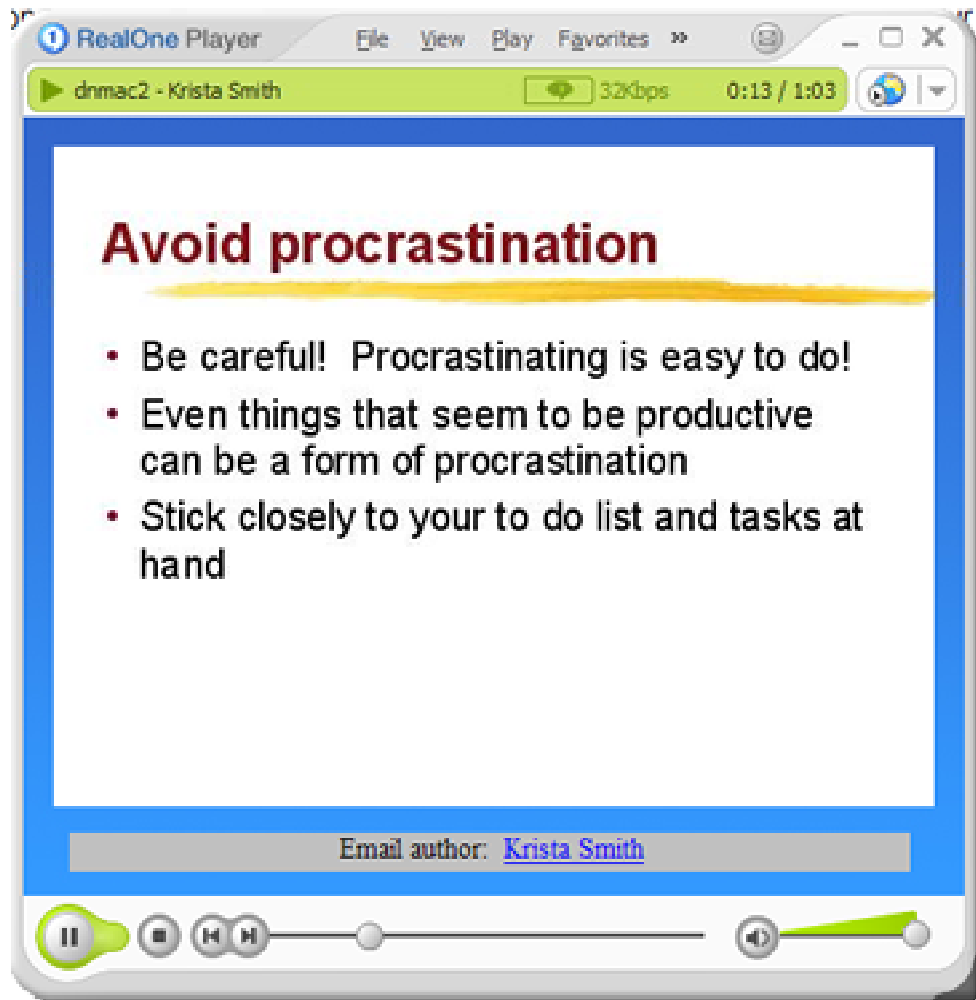
Figure 8. Sample of a feedback screen provided for participants in rich feedback groups. This particular screen indicates strategy information for a participant who did not meet their academic goal. The accompanying audio clip included articulation of knowledge of results, strategy information and encouragement.

Procedures

The experiment, which was conducted exclusively through participation in an online program on time management, was based on Zimmerman's three-phase cyclical model of self-regulation (see Figure 3 and Table 1) and was based on his model of developing time planning and management skills (Zimmerman et al., 1996). Participants

were asked to engage in forethought, performance/volitional control and self-reflection processes by interacting with an online time management tool that required them to set goals, self-monitor their progress, and self-evaluate and reflect their strategy use according to feedback provided to them.

Each participant was asked to log in to the program every day for 16 days to follow the process as described in Figure 9. More specifically, the daily process for the two week participation period was as follows.
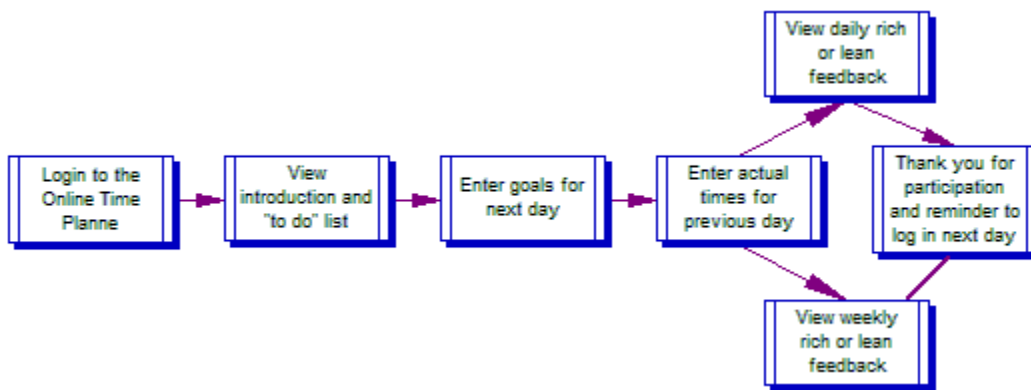
Figure 9. Flow of procedure participants followed on a daily basis.

Day 1

Participants were given the url to the informed consent form to complete and were given the url to the introduction screen for the online time management program. On the introductory screen, participants were informed of the basics of the process, the areas in which they would be asked to set goals and monitor their times and were asked to establish a login and password. After their login and password was established, they logged into the program for the first day, completed the demographic data, all three pre-tests and were asked to set their goals for day 2.

Day 2

Upon logging in on day 2, participants were welcomed to the program and given their tasks for the day, which included only setting their goals for day 3. They were then directed to the data entry screen to enter their goals and were thanked for their participation and reminded to log in the next day.

Days 3 – 14

During the next 12 days of the program, when participants logged in to the online time management program, they were instructed to (a) enter their goals for the next day, (b) enter their actual times for the previous day, and (c) view any appropriate feedback (see Figure 8). Upon completion of the data entry of actual times spent in all four areas, Groups 1 and 4 were forwarded to their feedback screens in which they viewed either rich or lean feedback depending on their condition. Groups 2 and 3 received feedback only on day 8 and day 16 of their participation. All participants were thanked for their participation and reminded to log in the following day.

Day 15

On day 15, when participants logged in, they were only asked to record their actual times for the prior day, were directed to the appropriate feedback screen, if appropriate, and were reminded to log in on day 16, the final day of the experiment.

Day 16

On the final day of the experiment, participants were instructed to enter their actual times from the previous day, view any appropriate feedback and complete the post-tests on generalized self-efficacy, self-efficacy for self-regulated learning and time management behaviors.. Participants were therefore given their final set of feedback,

were asked to complete all final assessments and were thanked for their participation in the study.

RESULTS

Introduction

The current study employed a 2-between/1-within, 2 (daily vs. weekly feedback) X 2 (rich vs. lean feedback) X 2 (pre-test vs. post-test) repeated measures design (see Table 2). The study assessed the effects of different schedules of feedback and different types of feedback on general self-efficacy, self-efficacy for self-regulated learning, and self-reported time management behaviors.

The purpose of the study was to engage participants in a time management enactive mastery experience in order to influence levels of self-efficacy by engaging them in a self-regulated learning activity that asked them to set goals and monitor their time management behaviors. The study employed pre and post-tests that measured participants' levels of self-reported time management behaviors, self-efficacy for self-regulated learning, and generalized self-efficacy beliefs. The study attempted to measure any changes in variables over time as well as any specific effects resulting from variation in feedback timing and feedback type.

Research Questions

By using the research design indicated, the study explored the impact that different schedules of feedback, daily versus weekly, and different delivery types of feedback, rich feedback versus lean feedback, had on self-reported time management behaviors, use of self-regulation strategies, and general perceived self-efficacy. In doing so, the study sought to answer the following questions.

H1) Does feedback presented in a rich format as opposed to a lean format result in changes in self-reported time management behaviors and levels of general self-efficacy and self-efficacy for self-regulated learning?

H2) Does feedback provided on a daily basis as opposed to feedback provided on a weekly basis result in changes in levels of self-reported time management behaviors and levels of general and self-regulatory self-efficacy beliefs?

H3) Do changes in levels of self-reported time management behaviors relate to changes in levels of self-efficacy for self-regulated learning?

H4) Do changes in levels of self-efficacy for self-regulated learning relate to changes in levels of generalized self-efficacy?

The first two hypotheses were analyzed by conducting an analysis of variance on each dependent variable. The third and fourth hypotheses were measured by conducting correlational analyses.

<div align="center">Descriptive Analysis</div>

Changes were measured and assessed according to four different group designations according to the collection of pre and post-test data that measured participants' levels of generalized self-efficacy, self-efficacy for self-regulated learning and self-reported time management behaviors. Group 1 received lean feedback on a weekly basis (twice during the time of the experiment), while Group 2 received the same lean feedback, but received it on a daily basis (every time they logged in and recorded their actual times). Group 3 received the rich feedback content on a weekly basis (twice during the experiment), while Group 4 received the same rich feedback, but on a daily basis (each time they logged in and recorded their actual times).

The data collected included pre and post-test scores on a 10-item generalized self-efficacy scale, an 11-item self-efficacy for self-regulated learning scale, and a 15-item time management behavior scale. Each item on the first scale was scored from 1(low) to 4 (high), giving the potential of a total score ranging from 10 to 40. The second scale was also from 1 (low) to 4 (high), giving the potential of a total score ranging from 11 to 44. Each item on the third scale was scored from 1 (low) to 5 (high), which presented the potential for each participant to score between 15 and 75 points.

All data was stored in a database until the conclusion of the experiment at which time it was extracted, downloaded and imported into SPSS for analysis and reporting. Among the type of analyses that were performed, a general descriptive analysis that reported the means and standard deviations for each group condition was reported (see Table 3).

Table 3. *General descriptive statistics reported by dependent variable and group size.*

	General Self-Efficacy[a]		Self-Efficacy for Self-Regulated Learning[b]		Time Management Behaviors[c]	
	Pre	Post	Pre	Post	Pre	Post
Group 1						
(Weekly; Lean; n=15)						
M	31.00	32.20	33.80	34.13	43.67	44.87
SD	4.95	4.72	3.91	3.44	7.24	6.91
Group 2						
(Weekly; Rich; n=16)						
M	30.81	31.19	32.19	33.63	45.44	47.38
SD	3.97	4.62	5.38	5.34	5.50	5.27
Group 3						
(Daily; Lean; n=18)						
M	33.33	33.06	35.67	36.50	45.72	49.00
SD	3.61	3.68	4.66	4.55	5.78	5.47
Group 4						
(Daily; Rich; n=15)						
M	32.13	32.93	35.80	35.27	48.07	47.13
SD	3.11	3.61	3.25	4.28	4.80	4.50

[a] The range of potential scores is from 10 (min) to 40 (max); Cronbach's alpha: .85
[b] The range of potential scores if from 11 (min) to 55 (max); Cronbach's alpha: .87
[c] The range of potential scores is from 15 (min) to 75 (max); Cronbach's alpha: .73

Hypotheses 1 and 2

The first two hypotheses, which measured any changes in self-efficacy, self-efficacy for self-regulated learning and self-reported time management behaviors, were analyzed using a repeated measures analysis of variance with a Greenhouse-Geiser adjustment to account for any potential violation of sphericity. All p-values, therefore, have been adjusted according to the Greenhouse-Geiser protocol. The findings for each dependent variable are elaborated on in the following paragraphs.

Generalized Self-efficacy Beliefs

The potential effects of the experiment on participants' levels of generalized self-efficacy beliefs were analyzed by using a repeated measures analysis of variance to account for any variations in mean scores. The ANOVA for generalized self-efficacy beliefs did not find any significant main effects for either feedback type or feedback frequency (see Table 4).

The ANOVA did not find significance in the between subjects main effects analysis for feedback frequency, $F(1, 60) = 2.695$, $p = .106$, feedback type, $F(1, 60) = .438$, $p = .511$, or the interaction between feedback frequency and type, $F(1, 60) = .001$, $p = .975$. The within subjects analysis of main effects also did not reveal any significant main effect differences for levels of efficacy, $F(1, 60) = 2.082$, $p=.154$, nor the interaction between levels of efficacy and feedback frequency, $F(1, 60) = .525$, $p = .472$, the interaction between levels of efficacy and feedback type, $F(1, 60) = .030$, $p = .863$, and the interaction between self-efficacy, feedback frequency, and feedback type, $F(1, 60) = 1.714$, $p = .195$.

The analyses of variance, therefore, indicate that the treatment had no significant effect on participants levels of generalized self-efficacy in the between subjects or within subjects approach.

The analyses of variance additionally indicated extremely small effect sizes and extremely low power analyses (see η^2 and *power*, Table 4). The *post hoc* analysis on power and effect size provided insight into the analyses as the low statistics indicate a reduced likelihood of finding any significant differences in the data. According to Cohen (1988), in order to find small effects, such as are illustrated in the following analysis, the current experimental design would require a sample size of 160 participants per cell. However, in order to find a medium effect, 28 participants per cell would be needed, while a large effect would require only 12 participants per cell.

Table 4. *Analysis of Variance for Generalized Self-Efficacy by Frequency and Type of Feedback*

Source	df	F	p	η^2	power
Between Subjects					
Feedback Frequency	1	2.695	.106	.043	.365
Feedback Type	1	.438	.511	.007	.100
Frequency x Type	1	.001	.975	.000	.050
Error	60	(28.80)			
Within Subjects					
Efficacy	1	2.082	.154	.034	.295
Efficacy x Frequency	1	.525	.472	.009	.110
Efficacy x Type	1	.030	.863	.001	.053
Efficacy x Frequency x Type	1	1.714	.195	.028	.251
Error (Efficacy)	60	(4.201)			

Note. Values in parentheses represent mean square errors.

*p<.05, **p<.01

Self-Efficacy for Self-Regulated Learning

The potential effects of the treatment on participants' levels of self-efficacy for self-regulated learning were analyzed by using a repeated measures analysis of variance to account for any variations in mean scores. The ANOVA for self-efficacy for self-regulated learning yielded one significant difference for the frequency main effect, $F(1, 60)$, $p < .05$. This finding indicates that participants who were in the daily feedback condition groups ($M = 35.84$, $SD = 4.21$) reported greater self-efficacy for self-regulated learning than participants in the weekly feedback group ($M = 33.45$, $SD = 4.58$), (see Table 5).

The ANOVA did not find significance in the between subjects main effects analysis for feedback type, $F(1, 60) = .589$, $p = .446$, or the interaction of feedback type and feedback frequency, $F(1, 60) = .059$, $p = .809$. The within subjects analysis of main effects also did not reveal any significant differences for levels of self-efficacy for self-regulated learning, $F(1, 60) = 1.904$, $p=.173$, nor the interaction between levels of self-efficacy for self-regulated learning and feedback frequency, $F(1, 60) = .961$, $p = .331$, the interaction between levels of efficacy and feedback type, $F(1, 60) = .031$, $p = .862$, or the interaction between levels of efficacy, feedback type, and feedback frequency, $F(1, 60) = 2.711$, $p = .105$.

The analyses of variance, therefore, indicate that while participants that received daily feedback scored significantly higher than participants that received weekly feedback for self-efficacy for self-regulated learning, there were no other significant differences found on any of the main effects or interactions for either between or within

subjects analyses. As previously noted, the lack of significance may be at least partially due to small effect sizes and low statistical power.

Table 5. *Analysis of Variance for Self-Efficacy for Self-Regulated Learning by Frequency and Type of Feedback*

Source	df	F	p	η^2	power
Between Subjects					
Feedback Frequency	1	5.112	.027*	.079	.604
Feedback Type	1	.589	.446	.010	.117
Frequency x Type	1	.059	.809	.001	.057
Error	60	(35.02)			
Within Subjects					
Self-Regulated Learning (SRL)	1	1.904	.173	.031	.274
SRL x Frequency	1	.961	.331	.016	.161
SRL x Type	1	.031	.862	.001	.053
SRL x Frequency x Type	1	2.711	.105	.043	.367
Error (SRL)	60	(4.47)			

Note. Values in parentheses represent mean square errors.

*p<.05, **p<.01

Time Management Behaviors

A repeated measures analysis of variance was again conducted to analyze potential treatment effects on the dependent variable of time management. This analysis attempted to answer questions related to how the treatment affected participants' levels of time management behaviors during the treatment period. The ANOVA for time management behaviors found significance at the time management main effect level in the within subjects analysis, $F(1, 60) = 4.347$, $p < .05$. This finding indicates that the treatment did, in fact, influence participants levels of self-reported time management behaviors from pre-test ($M = 45.72$, $SD = 5.98$) to post-test ($M = 47.19$, $SD = 5.66$); (see Table 6).

The ANOVA did not, however, find any significance in the between subjects analysis for feedback frequency, $F(1, 60) = 2.797$, $p = .100$, feedback type, $F(1, 60) = .861$, $p = .357$, or the interaction between feedback frequency and type, $F(1, 60) = .550$, $p = .461$. The within subjects analysis of main effects, other than revealing significance for time management in general (see above), did not reveal any significant differences for the interaction between levels of time management behaviors and feedback frequency, $F(1, 60) = .091$, $p = .764$, the interaction between levels of time management behaviors and feedback type, $F(1, 60) = 1.745$, $p = .191$, or the interaction between time management behaviors, feedback type, and feedback frequency, $F(1, 60) = 3.543$, $p = .065$.

The analysis of variance, therefore, indicates that while the variance in pre and post-test indicated a significant difference, there were no other significant differences found on main effects or interactions. Again, as previously noted, this lack of significance may be at least partially due to small effect sizes and low statistical power.

Table 6. *Analysis of Variance for Time Management Behaviors by Frequency and Type of*

Feedback

Source	df	F	p	η^2	power
		Between Subjects			
Feedback Frequency	1	2.797	.100	.045	.377
Feedback Type	1	.861	.357	.014	.150
Frequency x Type	1	.550	.461	.009	.113
Error	60	(52.30)			
		Within Subjects			
Time Mgmt Behaviors (TMB)	1	4.347	.041*	.068	.537
TMB x Frequency	1	.091	.764	.002	.060
TMB x Type	1	1.745	.191	.028	.255
TMB x Frequency x Type	1	3.543	.065	.056	.457
Error (TMB)	60	(13.74)			

Note. Values in parentheses represent mean square errors.

*p<.05, **p<.01

Based on the analyses of variance conducted to address Hypotheses 1 and 2 of the

research study, and the results represented in Tables 4, 5 and 6, the null hypotheses

cannot be rejected at this time. The statistical analyses did not indicate any significant

differences regarding rich or lean feedback, or daily or weekly feedback as related to

participants' levels of generalized self-efficacy, self-efficacy for self-regulated learning and self-reported time management behaviors.

<div align="center">Hypotheses 3 and 4</div>

Hypotheses 3 and 4, which attempted to answer questions regarding how changes in dependent variables were related to changes in other dependent variables, were analyzed by correlating difference scores between dependant variables (see Table 7). The difference in pre and post scores was computed for each dependent variable and a Pearson Product-Moment correlational analysis was performed to attempt to answer the research questions posed in Hypotheses 3 and 4.

Hypothesis 3 and 4

The correlational analysis indicated that significance was found at the alpha = .05 level for the correlation between time management behaviors and self-efficacy for self-regulated learning, $r(64) = .260$, $p < .05$. Additionally, significance for the correlation between generalized self-efficacy and self-efficacy for self-regulated learning was also detected, $r(64) = .328$, $p < .05$. However, there was no significance found between the correlation of time management behaviors and generalized self efficacy, $r(64) = .135$, $p = .268$.

The results of this analysis indicate that changes in time management behaviors do, in fact, correspond to changes in one's levels of self-efficacy for self-regulated learning and that changes in self-regulated learning do correspond to changes in one's level of generalized self-efficacy beliefs. While these findings are significant in terms of answering the research questions posed in this study, they also add to current literature as they corroborate results that have been found by previous researchers who have

attempted to investigate the links between self-regulated learning and self-efficacy

(Zimmerman, 1990, 1995a & 2001) and the few researchers who have attempted to

investigate the links between time management and self-regulated learning (Britton &

Tesser, 1991 and Zimmerman, et al., 1994). Each of these significant findings results in

the rejection of the null hypothesis for Hypotheses 3 and 4 and the acceptance of the

alternative hypotheses that there *is* a relationship between changes in time management

behaviors and self-efficacy for self-regulated learning and changes in generalized self-

efficacy and self-efficacy for self-regulated learning. The final correlational analysis

between time management behaviors and self-efficacy was not a component of any

hypothesis and was included only for analytical completeness.

Table 7. *Correlational analysis of self-reported time management behaviors and self-efficacy for self-regulated learning.*

	Time Management Behaviors	Self-Efficacy for Self-Regulated Learning	Generalized Self-Efficacy Beliefs
Time Management Behaviors	------	.266*	.135
Self-Efficacy for Self-Regulated Learning		-----	.328*
Generalized Self-Efficacy Beliefs			-----

*p<.05, **p<.01

Summary

The findings of the study, therefore, indicate that there level of significance as reported by the analyses of variances for Hypotheses 1 and 2 did not indicate any reason to reject the null hypotheses. This, therefore, indicates that neither the rich or lean feedback condition nor the daily or weekly feedback condition had any significant effect

on participants' levels of generalized self-efficacy, self-efficacy for self-regulated learning or time management behaviors.

The correlational analyses, however, did indicate a positive relationship between time management behaviors and self-regulated learning and between generalized self-efficacy beliefs and self-efficacy for self-regulated learning. These positive findings provide reason for rejecting the null Hypotheses 3 and 4.

DISCUSSION

Background

The overall goal of the study was to add to the literature on self-efficacy and self-regulated learning by designing an intervention utilizing web-based technologies that would attempt to influence participants' levels of self-efficacy and self-regulated learning. The study utilized the construct of time management, which has been shown to impact students' levels of self-regulated learning, self-efficacy, and academic success (see Britton & Tesser, 1991, Zimmerman, et al., 1994). The study took as its foundation for development Hofer, Yu and Pintrich's (1998) study on teaching college students to be self-regulated learners, Zimmerman et al's (1994) model of influencing self-regulated learning in a classroom setting and Bandura's (1997) notions for the development of self-efficacy which include engaging students in enactive mastery experiences, vicarious experiences, and verbal persuasion.

In doing so, the intervention engaged participants in a self-regulatory process that encouraged them to set goals and monitor their time management behaviors. The independent variables of *type of feedback* and *timing of feedback* were manipulated in order to provide participants' with feedback. The effect of this feedback on the development of self-efficacy was then assessed.

The discussion of the findings will be based on results from statistical analyses, while the discussion on extending the findings will be based on several questions posed within the literature, specifically as the study pertains to Hofer, Yu and Pintrich's (1998) study on how to teach college students to be self-regulated learners. Hofer, Yu and Pintrich asked questions regarding (a) the components and design of interventions, (b)

integrated versus adjunct course designs, (c) the issue of transfer and (d) the characteristics of college students. The results of this study, limitations of the study, and implications for future research will be discussed in the context of the aforementioned concerns.

Discussion of Results

All four hypotheses posed by the research study were analyzed statistically to attempt to isolate the possible significance of any of the treatment conditions on influencing levels of self-efficacy. The first two hypotheses, which attempted to analyze any changes in behaviors over time, were analyzed by performing an analysis of variance on all three dependent variables of generalized self-efficacy, self-efficacy for self-regulated learning and time management behaviors.

The analysis performed on the dependent variable of generalized self-efficacy revealed no significant differences. This finding indicates that none of the treatment conditions, timing of feedback or content of feedback, had any effect on participants' levels of generalized self-efficacy from pre test to post-test.

The analysis performed on the dependent variable of self-efficacy for self-regulated learning indicated a level of significance for the feedback frequency independent variable. This finding indicated that participants who received daily feedback as opposed to those who received weekly feedback scored higher when pre and post-tests were combined. The analysis did not, however, reveal any other significance indicating that overall the treatment conditions did not affect participants' levels of self-efficacy for self-regulated learning.

The analysis performed on the third dependent variable, time management behaviors, indicated that there was a significant change in participants' levels of time management behaviors from pre-test to post-test. Since significance was not found in any of the other main effects or interactions, inferences can not be drawn relative to the impact of frequency of feedback or feedback type relative to time management behaviors.

Overall, the analyses reveal that although significance was found for the main effect of time management behaviors and the interaction of self-regulated learning and feedback frequency, the results could not be attributed to the treatment conditions.

The third and fourth hypotheses posed by the study attempted to determine the relationships between the dependent variables used in the study. The correlational analyses that were performed on the differences in pre and post-test scores did reveal a positive relationship between self-reported time management behaviors and self-efficacy for self-regulated learning and between self-regulated learning and generalized self-efficacy. The significance of these findings indicate that designing interventions that lead to changes in time management behaviors will result in changes in self-regulated learning behaviors. Additionally, the findings indicate that changes in self-regulated learning are related to changes levels of self-efficacy. The implications of these findings, therefore, indicate that engagement in positive time management goal setting practices and self-regulated learning processes may relate positively to changes in levels of self-efficacy.

Therefore, although the statistical analyses performed on Hypotheses 1 and 2 did not reveal any significant differences that could add specific to the literature regarding feedback type or feedback frequency, there are implications that can be inferred from the

results of the correlational analyses and through the process of developing, delivering and assessing the intervention.

Extending the Results

Within their discussion on the specific components and designs of interventions, Hofer, Yu and Pintrich (1998) asked what the target of an intervention would be in terms of the potential cognitive, metacognitive, or motivational components that would comprise the intervention. The current study utilized the research on feedback as its basis and attempted to manipulate types of feedback and frequency of feedback to incorporate motivational and affective components to the design of the intervention. The analyses revealed significance only at the level that frequency of feedback provided for affecting participants levels of self-efficacy for self-regulated learning and at the time management main effect. Although the intervention was designed to incorporate motivational elements by utilizing goal discrepancy feedback, and encouragement, both of which have been cited to influence levels of motivation and affective states (see Schunk 1984 & 1985; Bandura, 1997), and utilized media attributes to attempt to further enhance motivation and increased affect (see Khine, 1996) the research did not reveal a level of significance that corroborated the use of the specific design.

Related to discussion on the design of the intervention, Hofer et al. (1998) additionally asked questions regarding the issue of "adjunct or integrated" course design. Evidence inferred by the attrition rate of participants (19%) and the difficulty in soliciting participation in a program that required a two week commitment indicated that perhaps a design that integrates an intervention with existing curricula and academic goals would further intrinsic interest and commitment to the learning experience. The majority of

participants who participated and completed the two-week treatment period received course credit from their instructor. The participants, therefore, who completed the experiment had a high level of extrinisic motivation. Investigating opportunities to incorporate mechanisms to integrate the learning goals of the intervention into already existing learning goals in an existing curricula or course design raise the question of the effectiveness of the design as an "adjunct" experience.

Regarding the issue of transfer, Hofer, Yu and Pintrich's (1998) contention that integrated course design "may increase the probability of transfer because the students have the opportunity to learn the various strategies in a number of different course context" (p. 63) again raises questions as to the effectiveness of the design based on participants' abilities to transfer skills and strategies learned to other useful contexts during their participation in the treatment program.

Anecdotal feedback from participants in the program which included "this program would have been helpful if I didn't already know how to manage my time" or "I once again learned that I know how to manage my time, and realized again that there isn't enough time in the day", combined with high mean pre-test scores, indicate before the treatment, participants already exhibited average to above average levels of generalized self-efficacy, self-efficacy for self-regulated learning and time management behaviors. Knowing that the majority of participants were graduate students (68%) opens the avenue for investigating the effects of such an intervention on other populations such as entering freshmen or other undergraduate populations.

Therefore, although the design of the intervention did not yield significant differences in main effects or interactions, both the power analysis, analysis of effect

sizes, and issues pertaining to participant characteristics, capabilities of transferring skills between contexts and implementing the intervention as an additional requirement as opposed to providing an integrated approach reveal potential for further development and integration.

<div align="center">Limitations of Study</div>

Although significance was found in Hypotheses 3 and 4, the lack of significance found when attempting to isolate the effectiveness of specific treatment conditions, Hypotheses 1 and 2, leads to discussions of limitations of the design and avenues for design and implementation of future interventions. The limitations of the current research can be discussed by investigating (a) statistical power and effect sizes and (b) noted problems with the web-based tool.

<div align="center">*Power and effect*</div>

As previously mentioned, the statistical analysis revealed low power and a small effect size. The analyses of variance indicated extremely small effect sizes and low power analyses (see η^2 and *power*, Tables 4, 5 and 6). The *post hoc* analyses of power and effect size provided insight into the ANOVA analyses as the low statistics indicate a reduced likelihood of finding any significant differences in the data. According to Cohen (1988), in order to find small effects, such as are illustrated in the present analysis, the current experimental design would have required a sample size of 160 participants per cell. However, in order to have found a medium effect, 28 participants per cell would have been needed, while a large effect would have required only 12 participants per cell.

The limitations in terms of power and effect, therefore, can be interpreted by not having had enough participants to account for the small effect and not having a design

that could have produced a larger effect. Further studies that either (a) elicit a larger population or (b) incorporate a design that would yield a larger effect might result in significance in the future. Further analyses on effect size should be conducted *a priori* to determine what effect sizes could be anticipated. Design considerations such as the incorporation of more powerful media attributes could also be incorporated.

Media Delivery Implications

As with any process that requires further development and refinement, the actual web-based instrument which encountered errors during utilization that blocked participants for entering data or receiving feedback, could account for levels of disregard or apathy in participant experiences. The errors encountered during the treatment involved (a) participants being blocked from either of the daily input processes and/or receiving their feedback and (b) participants not being able to access the post-test information.

During the implementation process, several participants emailed the researcher noting that they had received a computer-generated error message that had blocked them from one of the daily processes. This error prohibited them from being able to complete all or parts of the daily processes and in some cases could have caused participants to question whether their data was "synched". Although final examination of the data indicated that no participant was blocked from more than 2 days' worth of data, feedback from the participants indicated a level of frustration and could have lead to a decreased level of motivation and/or affective engagement. Participants also noted an occasional lack of access to the feedback, which could have undermined the potential impact of the feedback on the process.

Another error encountered by participants, but that was unable to be replicated by the developers, prevented participants from being able to access the post-test information. The error, which impacted a large number of participants, caused the researchers to develop an alternative website to provide access to the post-test only. Additionally, the task of discerning which participants had been provided access to the post-test and which had not, and subsequently soliciting participants who had not completed the original post-test required a substantial amount of time and effort. That being the case, several participants experienced a time lapse between the time they completed the process and when they completed the post-test.

Areas of Future Research

Based on the findings of the study and the already existing body of research on self-efficacy, self-regulated learning and time management, there exists much potential for the continued development and deployment of similar interventions and strategies. The positive results of the correlational analysis, which substantiates previous findings in the literature (Britton & Tesser, 1991), indicates that attempting to change levels of self-efficacy by engaging participants in an enactive mastery experience related to time management practice is a viable path of research.

Based on issues raised by questions asked by Hofer, Yu and Pintrich (1998), additional research could be conducted to answer the aforementioned questions in regard to teaching college students to be self-regulated learners. Bandura's self-efficacy theories and notions of triadic reciprocity (1997), Zimmerman's work with the phases of self-regulated learning and interventions in the K – 12 classroom and the preliminary research on time management (Britton & Tesser, 1991), couched in the literature of feedback and

the use of current and emerging technologies all provide a firm foundation from which to continue to develop interventions targeted at influencing college students levels of self-efficacy.

Specific design considerations for continuing research could involve leveraging different media attributes to enhance the vicarious learning/social modeling experience when receiving feedback. Discussions on instructional designers for attitudinal objectives frequently turn to Bandura's concept of social modeling (Bandura, 1977) and cite the use of video as being the media of choice when attempting to utilize such instructional strategies (see Smith & Ragan, 1993). Investigating the use of video to use as a tool to enhance the rich feedback conditions could possibly yield more significant results as it would, therefore, incorporate a more affective component into the enactive mastery experience.

Additionally, the issue of adjunct versus integrated course design provides many viable options for continued research. Using an online learning mechanism with the current use of technologies in the classroom provides a wealth of opportunities in regard to integrating such a mechanism into an already existing course design. Whether it be a course such as Hofer, Yu and Pintrich's (1998) *Learning to Learn* course, or whether it is a course in any other discipline, a mechanism that encourages participants to engage in a forethought, volitional control, and reflective process has the potential of impacting levels of self-efficacy and self-regulated learning.

Summary

In conclusion, although the current study did not provide the statistical significance that would lend credibility to the literature on feedback in an online learning

environment, or the development of self-efficacy beliefs, the implications of the findings

of the research, do provide several viable areas for future research.

The instructional implications for the research and its related findings, therefore,

provide many implications for utilizing web-based delivery modes and varying media

attributes to affect levels of academic success in learners. With the increase in use of

digital technologies to address many learning objectives, the current research adds to the

body of literature that considers design strategies and implications for doing so.

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APPENDIX A

General Perceived Self-Efficacy Scale

(Schwarzer & Jerusalem, 2000)

1. I can always manage to solve difficult problems if I try hard enough.

2. If someone opposes me, I can find the ways and means to get what I want.

3. I am certain that I can accomplish my goals.

4. I am confident that I could deal efficiently with unexpected events.

5. Thanks to my resourcefulness, I can handle unforeseen situations.

6. I can solve most problems if I invest the necessary effort.

7. I can remain calm when facing difficulties because I can rely on my coping abilities.

8. When I am confronted with a problem, I can find several solutions.

9. If I am in trouble, I can think of a good solution.

10. I can handle whatever comes my way

Response format:

(1) not at all true, (2) barely true, (3) moderately true, (4) exactly true

APPENDIX B

Self-Efficacy for Self-Regulated Learning

(Bandura, 2001)

1. How well can you finish your homework assignments by deadlines?

2. How well can you study when there are other interesting things to do?

3. How well can you concentrate on school subjects?

4. How well can you take class notes of class instruction?

5. How well can you use the library to get information for class assignments?

6. How well can you plan your school work?

7. How well can you organize your school work?

8. How well can you remember information presented in class and textbooks?

9. How well can you arrange a place to study without distractions?

10. How well can you motivate yourself to do school work?

11. How well can you participate in class discussions?

Response Format

(1) Not well at all, (2) Not too well, (3) Pretty well, (4) Very well

APPENDIX C

Time Management Behavior Scale

(Trueman & Hartley, 1996)

Daily planning subscale

1. Do you make a list of the things you have to do each day?

2. Do you plan your day before you start it?

3. Do you make a schedule of the activities you have to do on work days?

4. Do you write a set of goals for yourself each day?

5. Do you spend time each day planning?

Confidence in long-term planning subscale

6. Do you have a clear idea of what you want to accomplish during the next week?

7. Do you set and keep priorities?

8. Do you often find yourself doing things which interfere with your studying simply because you hate to say "no" to people?

9. Do you believe that there is room for improvement in the way you manage your time?

10. Do you make constructive use of your time?

11. Do you continue to carry out unprofitable routines or activities?

12. Do you have a set of goals for the entire term?

13. Are you still working on a major assignment the night before it is due?

14. Do you regularly review your lecture notes, even when a test is not imminent?

Response format

(5) always, (4) frequently, (3) sometimes, (2) infrequently, (1) never

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Education

Ph.D. Curriculum and Instruction, *(Instructional Technology)*
    Virginia Polytechnic Institute and State University, Blacksburg, VA, Nov. 2002

M.A. English
    Radford University, Radford, VA, May 1995

B.A.   English
    Lyndon State College, Lyndonville, VT, May 1992

B.A.   Communication Arts & Sciences, *concentration: graphic design*
    Lyndon State College, Lyndonville, VT, May 1992

Professional Experience

2002 - Director, Instructional Design and Technology and Assistant Professor
    College of Education, Troy State University, 8/02 – present

- Teach online and traditional graduate level educational technology courses
- Design, develop and manage online and traditional instructional technology courses
- Coordinate faculty development technology training
- Manage computer labs, technology acquisitions, and technical support concerns
- Collaborate with the Distance Learning Center regarding online course design, Blackboard system administration and instructional design and development issues.
- Serve as webmaster for College of Education
- Consult with faculty regarding instructional design and development of online courses

2001- Manager, Educational Technology Lab, Department of Teaching and Learning
    Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

- Supervise staff of eight graduate assistants who maintain labs and provide technical support to the College of Human Resources and Education
- Supervise coordination and maintenance of Windows 2000, Snap and Assimilator Servers
- Coordinate, develop, and deliver training to graduate assistant staff
- Develop and deliver training to College of Human Resources and Education faculty and staff

2001   Instructional Designer, Department of Teaching and Learning, Instructional Technology Program, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

- Collaborated with team members to create, develop and evaluate course content for the online Instructional Technology master's degree program.
- Collaboratively designed and developed courses on Instructional Design, Portfolio Evaluation and Presentation Graphics.
- Served as a team member when making decisions regarding delivery issues, development concerns, and assessment issues.

2000   Project Manager, Interactive Design and Development, Blacksburg, VA 24060

- Managed the development of a four-CD set of multi-media instructional CDs for commercial production and distribution
- Supervised programmers, graphic designers, and audio/video producers.
- Communicated with client and subject matter experts
- Managed content databases, audio editing process, and beta testing process.

2000   Lab Assistant, Educational Technology Lab, Department of Teaching and Learning, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

- Served as a member of a team of graduate assistants to maintain the educational technology lab and provide technical support to the College of Human Resources and Education.
- Served as server administrator and manager of Macintosh lab/classroom.

1996-99   Assistant Director, New Student Programs
Radford University, Radford, VA 24141

- Responsible for coordination of all aspects of new student orientation program including: staff selection, training and supervision; program evaluation and implementation; production of all related publications and facilitation of campus-wide facilities reservations and management.
- Served as primary database manager for a 4,000+ record Microsoft Access database.
- Served as network administrator for NT office network.
- Supervised professional staff, graduate assistants, and work-study workers.
- Served as ropes course facilitator and training for various student leadership training activities.
- Worked collaboratively with Academic Advising staff in order to train faculty and staff, produce advising publications, and coordinate the advising/registration process for all incoming new students.
- Created and developed EDCS450, Instructing the First Year Student

1995-96   Orientation and Special Projects Coordinator, New Student Programs
Radford University, Radford, VA 24141

- Assisted with overall production of orientation program including staff selection, Training and supervision; program coordination; facilities reservations and management, and publication management.
- Developed 4,000 record database and implemented complete reservation process including tracking of all reservations, monies, and reports; generation of daily and session-specific reports; and supervision of office staff.
- Implemented and coordinated Freshman Advocate program including selecting, training, and corresponding with 120-130 faculty and staff volunteers; tracking all student contacts; generating and organizing all College Student Inventory reports and maintaining contact with Noel Levitz Center.

University Teaching Experience

Troy State University (to be taught during 2002-2003 academic year)
EDU 6605 Computer-Based Instructional Technologies
EDU 6606 Current and Emerging Instructional Technologies
EDU 6607 Curriculum Integration of Technology

EDU 6617 Graphic Design in Multimedia Instruction (online)
EDU 6618 Advanced Multimedia Production (online)

Virginia Tech
EDCI5534, Applied Theories of Instructional Design (co-instructor)
ATSC2984, Athletic Transitions

Radford University

EDCS450, Instructing the First Year Student
- Created, developed, and taught a three-credit course for upper class student leaders who were peer mentors for UNIV100. Topics taught included student development theory, mentoring techniques, problem-solving, and leadership.

UNIV100, Introduction to Higher Education
- Taught several sections of a one-credit student transition course entitled "Introduction to Higher Education." Areas of focus included development of community, orientation to the collegiate environment, time management, study skills, and learning styles.

SORTS/UNIV100, Introduction to Higher Education
- Taught a section of UNIV100 specifically adapted for students enrolled in a spring semester retention program. Specific focus areas included personal development and exploration, goal setting, and management skills.

Co-facilitator, LESE421, Ropes Course Programming

- Co-facilitated three credit course which served as the equivalent of Project Adventure's Adventure Programming and Adventure Based Counseling workshop. Content areas included team and group skills, personal goal setting and counseling techniques.

Guest presenter, THEA 480, Film Theory &Criticism (Spring '97 & Fall '98)
Guest presenter, LESE 417, "Using Microsoft Access"
Panelist, EDCS564, Student Affairs Administration

Conference Presentations

Terry, K. (2002, November). *Multimedia and self-efficacy: The effects of a multimedia-based intervention on self-efficacy and self-regulated learning.* Presented at 2002 Association for Educational Communications and Technology national conference. Dallas, TX.

Doolittle, P. & Terry, K. (2002, November). *Constructing Multimedia.* Presented at 2002 Association for Educational Communications and Technology national conference. Dallas, TX.

Scheer, S., Doolittle, P., & Terry, K. (2002, November). *Design and Development of Online Learning: Field-Tested Principles of Practice.* Paper presented at the 2002 Teaching Online in Higher Education Online Conference.

Doolittle, P., Smith Terry, K., Scheer, S. (2002, October). *Online Teaching: Field-Tested Principles of Pedagogy and Practice.* Paper presented at the Innovations for Learning Enhancement conference, Ashland, KY.

Perkins, R. & Smith, K.P. (2002, March). *One for all: The single computer and your classroom.* Workshop presented at the 2002 VSTE state technology conference, Roanoke, VA.

Smith, K.P. (2001, November). *A Learner-Centered Model of Distance Education.* Paper presented at the 2001 Teaching Online in Higher Education Online Conference.

Smith, K.P. (2001, October). *Introduction to Dreamweaver* Hands-on workshop presented at the Appalachian College Association Tech Summit IV, Johnson City, Tennessee.

Smith, K.P. (2000, April). *Self-Efficacy and Learning Strategies: Perspectives on Success in the College Environment: A work in progress.* Paper presented at College of Human Resources and Education Graduate Student Research Day, Virginia Tech, Blacksburg, VA.

Smith, K.P, Wilson, A., & Garretson, A. (1999, March). *The Other Side of Orientation: Developing Effective Parents' Programs.* Workshop presented at 1999 Regional National Orientation Directors Association conference, Philadelphia, PA.

Smith, K.P., & Henton, M. (1998, October). *Developing a 'Take Charge' Experiential Leadership Training Program.* Pre-conference workshop presented at 1998 National Orientation Directors Association national conference, Austin, TX.

Smith, K.P., Wilson, A., Myers, T., & Adams, B. (1998, March*). Teambuilding: The Core of the Orientation Leader Training Program*. Workshop presented at National Orientation Directors Association, Region VIII Conference, Pittsburgh, PA.

Smith, K.P., (1997, March). *`ACCESSing' a New Orientation Management System*. Workshop presented at National Orientation Directors Association, Region VIII Conference, Washington D.C.

Smith, K.P., (1997, February). *Building Community: A Comprehensive Network of Support for New Students*. Workshop presented at National Conference on Student Retention, Washington D.C.

Publications

Henton, M. & Smith, K. (1998) "Joining Team Building and Experiential Learning in an Orientation Leader Training Program: The Quest Model", The Journal of College Orientation and Transition, spring 1998, Vol. 5 No. 2

Smith, K, (1996) "Creating a Network of Support for New Students", Strategies newsletter, USAGroup Noel-Levitz, Fall 1996.

Works In Progress

Smith, K.P. (2002). *New designs of educational multi-media.* Unpublished manuscript.

Terry, K.P & Doolittle, P.E. (2002). *Constructing multimedia: Synthesizing Philosophy, Psychology and Pedagogy.* Unpublished manuscript.

Smith, K.P. (2001). *Developing learner-centered distance education*. Unpublished manuscript.

Smith, K.P. (2000). *Aesthetics and functionality: Graphic design vs. Instructional Message design in electronic instructional media.* Unpublished manuscript.

Association Memberships

President and founding member, Instructional Technology Student Association, Department of Instructional Technology, Virginia Tech, 2001-2002

Association for Educational Communications and Technology, 2001-present

International Visual Literacy Association, 2000 – present

American Educational Research Association, 2001 – 2002

Eastern Educational Research Association, 2001 – 2002

Technology Skills

Web Development: Macromedia Dreamweaver and Microsoft Frontpage

Programming and Authoring: Macromedia Director, Macromedia Authorware &

Toolbook

Graphics: Adobe Photoshop, Macromedia Fireworks and Macromedia Freehand

Video: Avid Cinema, Media Cleaner

Audio: SoundForge

Miscellaneous: Microsoft Office desktop system, including Microsoft Access

Operating Systems: Macintosh, Windows, 9x, 2000, NT

Server software: Windows NT, 2000, Snap, and Assimilator