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By

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ABSTRACT

USING GOAL ORIENTATION TO DEVELOP CUSTOMIZED LEARNING ENVIRONMENTS: AN INTERACTIONIST APPROACH

By

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The purpose of this study was to investigate goal orientation theory as a means of developing customized computer based learning environments designed to support the learner's needs and create a good fit between the learner and the environment. Specifically, avoid and mastery learning environments were created to allow us to capitalize on the strengths and tendencies associated with each goal orientation, while minimizing the weaknesses. The first conceptual model proposed that goal orientation would interact with the training environment to influence training outcomes. The second model extended the first model to include self-regulatory processes. Specifically, this model proposed that the training environment and its interaction with goal orientation would influence the cognitive, affective, and behavioral components of self regulation which would in turn influence the training outcomes. A 2 (mastery orientation, avoid orientation) X 2 (mastery training environment, avoid training environment) between subjects design was employed. The interaction between goal orientation and the training environment and the interaction between goal orientation and self-regulatory processes failed. However, the results indicate that there were some main effects for the training environment, the self-regulatory processes influenced training outcomes, satisfaction, and anxiety, and all goal orientation relationships were consistent with extant research. Implications for future research and practice are discussed.

Dedication

This dissertation is dedicated to my father, George Scheu

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CHAPTER 1: INTRODUCTION

In recent years we have all been made aware of the changing nature of work and the workplace through a number of outlets including the popular press, academic and practitioner journals, and our own experience. It has become common knowledge that the technical and cognitive complexity of work is increasing (Ford & Fisher, 1997; Turnage, 1990; Thayer, 1997) at a time when the number of skilled workers available is decreasing (Carnevale, 1995; Ford & Fisher, 1997; Goldstein & Gilliam, 1990; Johnston & Packer, 1987). The workplace itself has become a fast paced environment reflecting the organizational needs of flexibility and just in time knowledge; key elements for remaining competitive in a global economy (Coovert, 1990; Garger, 1999). Furthermore, we have all witnessed the influence of computers and other technological advances in both work and our daily lives. These changes themselves are no longer new and surprising, however, many of their implications and effects have yet to be demonstrated or evaluated.

One area where researchers and practitioners have begun to consider the impact of the above-mentioned changes is training. It is estimated that U.S. organizations with 100 or more employees spent 60 billion dollars on training in 1998, a 26 percent increase since 1993 (Garger, 1999). This spending reflects organizations' increased reliance on training for coping with changes in the world of work (Ford & Fisher, 1997). More specifically, some organizations are relying on training because they cannot hire employees who already possess the necessary skills, while others depend on training to prevent their workforces from becoming obsolete or to remain competitive in today's

rapidly changing global market (Coovert, 1990; Davis, 1990; Garger, 1999; Thayer, 1997).

In addition to the new reliance on training, there has been a dramatic shift in methods of training delivery. It is not surprising that technology has revolutionized training such that it is no longer restricted to the classroom. Organizations now offer training opportunities through virtual corporate universities, computer-based training via the web or CD ROM, and teleconferencing to name just a few of the new delivery mechanisms (Coovert, 1990; Garger, 1999; Spiegel, 1990; Toney, 2000). These new delivery mechanisms have generated a host of training related opportunities and challenges, many of which have yet to be addressed.

One opportunity that has been continually recognized is the potential for customizing computer-based training to meet an individual's needs as opposed to generic training aimed at the group level (e.g., Brown, 2001; Filipczak, 1996; Garger, 1999; Snow, 1986). Essentially, computer technology offers us the capability to create learning environments that capitalize on an individual's strengths and tendencies in an effort to improve learning, transfer, motivation, and satisfaction. Despite the numerous references to this capability in both the academic and popular literatures (e.g., Brown, 2001; Filipczak, 1996; Garger, 1999; Snow, 1986), this opportunity has yet to be realized. Instead the primary focus to date has been on understanding learner choices and manipulating the learner's mental state to fit a generic learning environment. The goal of the current study is to more directly address the potential for customizing computer-based training by creating multiple learning environments.

Specifically, the current study will investigate the potential of the motivation-based theory of goal orientation to guide the development of customized learning environments. It is expected that customizing the learning environment will allow us to capitalize on an individual's strengths and tendencies, while, minimizing their weaknesses; ultimately improving learning, transfer, motivation, self-efficacy, and satisfaction. The following pages will highlight what we know about motivation, goal orientation, person-environment fit, and computer-based training, in an effort to lay the foundation for the current study.

Motivation

Motivation permeates many aspects of the work environment and training is no exception. Past research has consistently demonstrated that motivation is related to various aspects of training effectiveness including performance, affective reactions, and transfer (Goldstein, 1993; Mathieu & Martineau, 1997; Tannenbaum & Yukl, 1992). As technological changes allow organizations to shift the burden for training from the administration to the employee, and employees become increasingly responsible for their own development (Drucker, 1994; Garger, 1999), the role played by an individuals' motivation is likely to increase. Recent data suggests that computer based courses have a dropout rate 10-20% higher than traditional instructor led courses and it is believed that motivation or a lack thereof, is partly responsible for this difference (Frankola, 2001). The critical questions for applied training research become, what do we know about motivation and how it drives the individual? And more importantly, how can we use this knowledge to improve the effectiveness of computer-based training?

To address these questions one can look at decades of research on motivation, which can be classified into two broad categories. Research that focuses on individual traits or characteristics, and research that focuses on the situation or specific environments (Kanfer & Heggestad, 1997). Over the years these two types of research have frequently remained mutually exclusive even though many motivation researchers believe we need to integrate information on the person and the environment to make real progress in understanding motivation in the workplace (Kanfer & Heggestad, 1997; Weiss & Adler, 1984). This suggests that the ultimate goal for motivation research is to develop an interactionist approach to motivation. To achieve this however, researchers caution that we need to develop a more cohesive framework for understanding individual differences in motivation (Kanfer & Heggestad, 1997).

For decades, theory and research have acknowledged the importance of stable individual differences. The study of stable individual differences should allow us to determine how a given individual will typically respond to a host of environmental stimuli such as feedback, rules and regulations, supervision, and other employees to name just a few. In terms of motivation, researchers have identified individual differences in needs (e.g., achievement, growth, self-actualization, and belongingness), individual differences in motives (e.g., mastery, competence, challenge), and individual differences in values (e.g., rewards, feedback, and evaluation; Kanfer, 1990). Despite it's recognized importance, the theory and research on motivational individual differences remains fragmented, disorganized, and chaotic (Kanfer & Heggestad, 1997). This is largely due to the vast number of individual differences we have identified and relatively few efforts to look for patterns and similarities across these differences. Thus as previously

mentioned, the lack of a recognized cohesive framework has made it difficult for us to apply what we know to any given environment and to truly achieve an interactionist approach to motivation (Kanfer & Heggestad, 1997). More recently, however, researchers have begun to recognize the value of organizing frameworks such as self-regulation in working towards an interactionist approach. The value of the self-regulatory framework with regards to improving our understanding of individual differences in motivation, will be discussed in later sections.

Looking to other areas of individual difference study, a similar interactionist sentiment is found in the education based aptitude-treatment literature. As early as the 1960's educational researchers have been encouraging us to adjust our teaching and training efforts to address individual differences and needs (Cronbach, 1967). Early research in this area considered a host of individual differences including cognitive ability, achievement motivations, interests, creativity, and affect (Cronbach, 1967; Snow, 1986; Snow 1992). For simplicity, these varied individual differences were coined aptitudes. According to Cronbach (1967, pg23) an aptitude is "a complex of personal characteristics that accounts for an individuals end state after a particular treatment, that is, it determines what he learns, how much he learns, or how rapidly he learns...An aptitude includes whatever promotes the pupil's survival in a particular education environment." Simply stated, the focus of the aptitude-treatment literature is understanding which individual differences work best in which learning environments. More specifically early researchers suggested that the aptitude-treatment literature should focus on relatively stable individual differences (Snow, 1989; Snow 1992). That is,

predictable differences that cut across environments and situations even if those differences are somewhat influenced by situations.

Over the next several years, the aptitude-treatment literature became overly focused on cognitive ability and ultimately ignored the role played by individual differences such as achievement motivation (Snow 1986; Snow 1992). As a result, students have been separated by ability levels and training and education programs have largely remained fixed or non-adaptive. This approach essentially forces students to fit a generic learning system, which is adequate for some learners but not optimal for any set of individuals (Snow 1986; Snow 1992). This had led researchers to call for a broader approach to understanding the person-environment interaction in educational settings with the ultimate goal being to tailor education to meet individual needs (Snow, 1986; Snow, 1989; Snow, 1992).

In particular it is suggested that researchers look at aptitudes beyond cognitive ability, such as motivation (Snow, 1986; Snow, 1989; Snow, 1992). Several motivational concepts such as, the need to approach success and the need to avoid failure, the need for personal development vs. the need for conformity, and evaluation anxiety are highlighted as possible areas of interest (Snow, 1986; Snow, 1989; Snow, 1992). Similar to the warnings issued by motivational researchers, educational researchers communicate the need to understand how these constructs work together as opposed to studying a multitude of singular motivation constructs (Snow, 1992). Furthermore it has been suggested that researchers investigate both adaptive and maladaptive educational practices (Snow, 1986; Snow, 1992). This suggestion stems from the individual differences perspective. Specifically, when developing more tailored learning

environments and educational techniques it is as valuable for us to understand what does not work for one group as to understand what does work for another, as well as, understanding why these differences exist.

In summary, to meet growing demand to understand motivation and how it drives the individual in the changing work environment research needs to achieve a more interactionist perspective. However, achieving an interactionist perspective requires a more cohesive framework of individual and situational differences. As will be discussed in more depth below, many of the motivational concepts have recently been organized to form a more coherent framework of self-regulatory processes. This framework has the potential to provide researchers with the necessary tools to enhance our understanding of the person-environment interaction.

Self-Regulatory Processes

In recent years, the call for a more cohesive framework for understanding motivation has largely been answered by integrating the various literatures on achievement needs, motives, and values, goal orientation, goal setting, goal striving, and self-regulatory processes. The following pages will briefly highlight how a self-regulatory framework can help us better understand motivational processes. This will be followed by an in-depth discussion of goal orientation, one of the key motivational variables of interest to the current study.

Self-regulatory processes enable individuals to guide their goal-directed behaviors over time and across situations (e.g., Austin & Vancouver, 1996; Karoly, 1993). Theories of self-regulation generally involve the concept of a goal or referent which individuals work towards (e.g., Carver & Scheier, 1981; Kanfer & Ackerman, 1989;

Klein, 1989; Scheier & Carver, 1982) and the concept of a feedback loop or a process that allows individuals to gather information regarding their progress towards the goal or referent and make adjustments to reduce discrepancies between the current state and the desired state (e.g., Bandura, 1991; Carver & Scheier, 1981; Kanfer & Ackerman, 1989; Klein, 1989; Scheier & Carver, 1982). The effectiveness of these self- regulatory processes largely determine the progress an individual makes toward his/her goal, which in turn impacts the individual's affect, behaviors, perceptions of ability, and future goal selection (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Kanfer & Heggestad, 1997).

To simplify matters, the self-regulatory process can be broken into three components (e.g., Bandura, 1991; Karoly, 1993; Kozlowski, Toney, Mullins, Weissbein, Brown, & Bell, 2001; Zimmerman, 2000). The names of these components vary greatly across specific theories and authors as do the placement of the specific activities associated with each component; however, the basic ideas and activities are consistent across the board. For the purposes of the current paper, the self-regulatory process will be considered in terms of behavioral, cognitive, and affective components.

The behavioral component of self-regulation involves activities such as goal adjustment, determining practice needs, planning, and strategy changes (e.g., Kozlowski et al., 2001; Zimmerman, 2000). This component incorporates a number of psychological concepts and theories. For instance, one might notice similarities to action goals or developing implementation strategies (Gollwitzer, 1999), as well as similarities to theories of planned behavior (Ajzen, 1991), and action control theory (Kuhl, 1985). The activities incorporated into this aspect of self-regulation require conscious decisions

and actual behavioral changes or actions (e.g., Kozlowski et al., 2001; Zimmerman, 2000). These actions and decisions ultimately influence the cognitive and affective components of self-regulation, as well as, an individual's performance, reactions, and perceptions, of a given task or situation (e.g., Bandura, 1991; Dweck, 1996; Kozlowski et al., 2001; Zimmerman, 2000). In a training context, the behavioral component may directly impact practice, study time, withdrawal, material attended to, feedback seeking, and a host of other observable actions.

The cognitive component refers to self-monitoring and self-reflection activities (e.g., Bandura, 1991; Kozlowski et al., 2001). More specifically, self-monitoring and self-reflection refer to the underlying use of feedback loops to check for progress towards one's goals and identifying discrepancies (Carver & Scheier, 1981; Scheier & Carver, 1982; Kanfer & Ackerman, 1989). It is important to note there are essentially two types of monitoring going on here. The more automatic processes such as the negative feedback loop which require very little if any resources (Carver & Scheier, 1981; DeShon, Brown & Geenis, 1996). And the more active or metacognitively oriented processes such as thinking about one's thinking or progress towards a goal (Flavell, 1979; Nelson & Narens, 1990). Research and theory suggest that these more active processes may require attentional resources which could distract from or at least reduce resources available to other tasks (e.g., Kanfer, Ackerman, Murtha, Dugdale & Nelson, 1994). However from a training design perspective, research has demonstrated that as long as breaks are incorporated into the training system, even those self-regulation activities that require resources are not especially detrimental to learning or performance (Kanfer et al., 1994).

Irrespective of whether the monitoring is active or automatic, the cognitive component of the self-regulatory process provides individuals with valuable self-diagnostic information (Bandura, 1991). In particular, individuals can identify patterns of behaviors and strategies that are effective and or ineffective for them in varying situations or environments, determine what material or tasks they have mastered, what material or tasks they need additional practice on, and evaluate whether their goals are reasonable and or attainable (Bandura, 1991; Kluwe, 1987; Kozlowski et al., 2001; Zimmerman, 2000). Although the direct impact of this information varies among individuals there is little doubt that self-reflective cognitions will influence subsequent behavioral decisions and active affective responses (e.g., Bandura, 1991; Zimmerman, 2000). Whether an individual's behavioral adjustments are adaptive or maladaptive and the affective reactions are positive or negative may depend on what guides the individuals perceptions and if their attention is focused on success or failure (Bandura, 1991; Carver, Lawrence, & Scheier, 1996; Dweck, 1996; Higgins, 1997). Research suggests that not all individuals have the same degree of awareness with regard to these self-reflective processes (e.g., Tennyson & Rothen, 1979; Tennyson, 1980; Williams, 1993). The key question is what drives these differences? One potential source of these individual variations and responses in self-reflective cognitions (i.e., goal orientation) will be discussed in subsequent sections of this paper.

The affective component encompasses emotional reactions to the evaluations derived from the feedback loop (e.g., Bandura, 1991; Carver, Lawrence, & Scheier, 1996; Higgins, 1997; Kozlowski et al., 2001). More specifically, after an individual utilizes the cognitive component of the self-regulatory process to check for progress towards his/her

goal and identifies discrepancies, the individual is going to have an emotional reaction to the discrepancy information. This emotional reaction will generally be considered a positive or negative reaction and this reaction will subsequently influence behavioral decisions (e.g., Kozlowski et al., 2001; Zimmerman, 2000). If the individual perceives that their performance has improved or that adequate progress is being made toward a goal, a positive reaction to the information such as pride, joy, elation, or relief is likely (e.g., Carver, Lawrence, & Scheier, 1996; Dweck, 1996; Higgins, 1997). On the other hand, if the individual perceives that his progress or performance is poor or below expectations, a negative reaction such as anger, fear, depression, or anxiety is likely (e.g., Carver, Lawrence, & Scheier, 1996; Dweck, 1996; Higgins, 1997). Although there are a number of psychological concepts and theories that address self-regulatory affective reactions, perhaps one of the more influential is the theory of attributions.

Attributions are essentially the causes assigned to various forms of information including performance, events, and behaviors (Weiner, 1985). The cause that an individual assigns to the success or failure of a given event can impact future behavior, such as strategy choice, study time, task persistence or withdrawal, and perceptions of the self or one's self-concept (Baumeister, 1996; Fiske & Taylor, 1991; Zimmerman, 2000). According to Weiner's (1985) theory, the dimensions of attributions include locus, stability, and controllability. Locus refers to whether attributions are internal, directed at the individual or external such as the environment. Stability generally refers to how easy it is to change something. This dimension usually refers to stable ability and malleable effort perceptions. Finally, controllability refers to how much control and individual has over the cause of an event or performance outcome. Research suggests that it is better for

an individual's self-efficacy, happiness, and self concept to attribute success to internal, stable, controllable factors and failure to external, unstable, uncontrollable factors (e.g., Baumeister, 1996; Fiske & Taylor, 1991; Zimmerman, 2000). This suggests, that even if an individual experiences a form of negative affect (e.g., anxiety) it will have fewer negative impacts on the self-regulatory processes and future behaviors if the event causing the negative affect is attributed to external, unstable, uncontrollable factors.

Another important element of many self-regulation theories is the concept of goal hierarchies. The general idea behind goal hierarchies is that individuals have multiple goals and these goals are hierarchically arranged such that they influence each other as one moves up or down the hierarchy (Powers, 1973). The higher order goals, or those towards the top of the hierarchy are the broadest or least tangible goals such as a positive self-concept; while the lower order goals involve more discrete behaviors such as taking an exam (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Powers, 1973). To achieve the ultimate goal of a positive self-concept, one may choose a number of paths; however, all paths require addressing lower order goals, which can be connected to actual behaviors (Lord and Levy, 1994). It is the actual behaviors that we observe in daily life while self-regulation gives us insight into the processes underlying these behaviors.

In summary, self-regulatory processes are a mechanism that allow individuals to guide their goal-directed behaviors over time and across situations (e.g., Austin & Vancouver, 1996; Karoly, 1993). Individuals' goals are hierarchically arranged such that they influence each other as one moves up or down the hierarchy (Powers, 1973). It is the lower order goals that are linked actual behaviors that we observe in daily life and use

self-regulatory processes to explain (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Powers, 1973). These self-regulatory processes operate through a series of behavioral, affective, and cognitive components, which continually influence each other and our observable behaviors and reactions. From a motivation standpoint, self-regulatory processes provide us with generic organizing framework that helps us understand human behavior. The central question is how can we predict or understand why individuals can go through the same general processes and generate different behavioral, affective and cognitive responses? The simple answer is that every individual brings their own set experiences and beliefs that influence how information and situations are perceived and responded to (Bandura, 1991). One way these differences in beliefs and perceptions may be organized, is according to goal orientations.

Under the framework of self-regulation, individual motivational differences such as goal orientation may cause varied reactions to information and feedback regarding progress and performance (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot & Dweck, 1988; Dweck & Legget, 1988; VandeWalle & Cummings, 1998). These variations are likely to be compounded as individuals repeatedly move through self-regulatory feedback loops checking for discrepancies. Applied to a training context, the goals one sets in a training program and the behaviors employed as one moves through the training program will be affected by a number of factors. These factors may include aspects of the training environment, the instructional design or features of the training program, and past experience (e.g., Bandura, 1991; Kozlowski et al., 2001; Zimmerman, 2000). From a motivational standpoint, one of the key individual difference factors driving goal selection and ultimately self-regulatory processes is goal orientation

(e.g., VandeWalle, 2001). An individual's goal orientation is likely to function as a filter through which relevant information is interpreted (e.g., Dweck, 1996) and affective and behavioral decisions are made. Once a lower order goal is selected and the behaviors are initiated, the self-regulatory processes take over by guiding our behavior and motoring progress towards the goal (e.g., Baumeister, 1996). The concept of goal orientation and how it may help us achieve a better understanding of the person-environment interaction in workplace training is further explored below.

Goal Orientation

Goal orientation is a way of viewing learning opportunities or approaching an achievement situation (e.g., Dweck, 1986; Farr, Hoffmann, & Ringenbach, 1993; Fisher, 1998). It is considered to be an individual motivational difference that serves as a filter or orientates people towards particular goals and influences the interpretation of and reactions to information, events, and actions (e.g., Dweck, 1996). Over the past decade, goal orientation has become one of the most frequently researched motivation variables (Carr, DeShon, & Dobbins, 2001). Relationships have been demonstrated between goal orientation and a host of outcome variables including performance, task choice, feedback seeking, self-efficacy, metacognition, affective reactions, and learning (e.g., Butler, 1992; Dweck & Leggett, 1988; Phillips & Gully, 1997; VadeWalle & Cummings, 1997; Schmidt & Ford, 2003).

State/Trait Debate. Goal orientation has been investigated as a stable individual difference variable (e.g., Chen, Gully, Whiteman, & Kilcullen; Elliot & Church, 1997), a domain specific trait (e.g., VandeWalle, 1997), and a malleable state (e.g., Elliot & Harackiewicz, 1996; Steele-Johnson, Beauregard, Hoover, & Schmidt, 2000). Dweck's

(1986) initial conceptualization of goal orientation was clearly as a stable personality trait, which could be influenced by information and environmental factors. As a result, early research focused more energy on manipulating an individual's goal orientation rather than measuring it and understanding the tendencies, strengths and weaknesses associated with the various goal orientations (Button, Mathieu, & Zajac, 1996; Carr, DeShon, & Dobbins, 2001). More recently, the trait perspective has dominated research accounting for nearly 90% of the studies published after 1996 (Carr, DeShon, & Dobbins, 2001). Falling somewhere in between the state and trait extremes is the domain specific approach (Vandewalle, 1997). This approach suggests that goal orientation should be addressed at a midlevel of specificity; specifically, goal orientation should be considered in the major life domains such as academics, work, and athletics (Vandewalle, 1997). Although the state/trait debate has never really come to a conclusion, the current position is that goal orientation is a stable trait that can be manipulated by a strong situation (Button, Mathieu, & Zajac, 1996). Furthermore, it is believed that manipulated or state goal orientations are weaker than dispositional or trait based goal orientations (Elliot, 1999); suggesting that in most environments people are likely to revert to the tendencies, strategies, and interpretations associated with their domain specific goal orientation.

The current state/trait position for goal orientation suggests a blending of the more traditional state/trait perspectives found in the literature. This move towards blending the two perspectives is paralleled by a similar move in the personality literature (e.g., Fleeson, 2001; Mischel & Shoda, 1998). Historically, the personality literature has treated states and traits as entirely independent and opposing views (e.g., Mischel & Shoda, 1998). More recently, researchers have begun proposing that blending the two

views actually provides researchers with a better understanding of personality and behavior (e.g., Fleeson, 2001; Mischel & Shoda, 1998).

Mischel and Shoda (1998) use a cognitive processes approach to blend states and traits. Specifically, these authors suggest that states are context specific expressions of broader decontextualized traits. According to this view, traits are composed of stable sets of distinctive behavioral characteristics. These behavioral characteristics are selectively activated by the features of different environments leading to situation specific behavioral differences or the expression of states. As each situation is composed of different features, certain behavioral characteristics will be more or less salient in each situation leading to different levels of cognitive activation and ultimately the expression of different behaviors across time and situations. Additionally, this cognitive approach suggests that an individual's past experiences and self-regulatory processes influence how the features of the environment are interpreted, which further influences how salient certain features will be and the expression of behavioral characteristics. Simply stated, variations in human behavior across time and environments stems from the cognitive activation patterns produced through a combination of situational features and stable behavioral characteristics.

Fleeson (2001) takes a more statistically oriented approach to states and traits. Fleeson's approach suggests that traits represent a distribution of state behaviors manifested over time and that the central tendency of this distribution represents an average of the individual's states. More precisely, states reflect short-term behaviors and reactions to various situational cues, whereas, traits reflect the overall pattern of these short-term variations. This approach suggests that overtime, individuals express all

levels of a trait and that trait concepts should reflect both individual stability and individual variability. Furthermore, it is suggested that within person variability can be influenced by the number of cues in a situation related to a given trait. Simply stated, a mastery-oriented individual will respond with higher levels of a mastery orientation if the cues in the environment are consistent with a mastery orientation and in a less mastery oriented manner if the environmental cues are inconsistent with a mastery orientation. If one combines all of these short-term within person variations in mastery behaviors (e.g., states), the resulting distribution will reflect both stability and variability or trait mastery.

For the purposes of the current study, goal orientation will be viewed as a domain specific trait, specifically, goal orientation in a learning environment. This perspective most closely reflects the current trend of blending states and traits in the literature and provides the best fit for the current study. For instance, employing Mischel and Shoda's (1998) approach, each individual has a stable set of characteristics for their domain specific goal orientation, and these characteristics will be cognitively activated by situational cues. When individuals enter a training environment designed to have situational cues to match their domain specific goal orientation, their states and traits for the learning domain will match, providing a good fit between the individual and the training environment. Additionally, Mischel and Shoda's (1998) approach suggests that an individual's past experiences and self-regulatory processes will influence how the environment is interpreted and acted upon. As will be become evident later in this paper, this approach is consistent with the extended model proposed by the current study (See Figure 3).

Alternatively, if one considers Fleeson's approach, by the time an individual reaches higher education or enters the work force, he has over 12 years of experience in adopting a goal orientation for learning environments. Each of these individual learning experiences over the last 12 years represents a state goal orientation. If you average these experiences over the course of 12 plus years, the resulting distribution is a representation of the individual's trait goal orientation. When this individual enters a learning environment designed with situational cues to match their domain specific goal orientation, the individual will respond with behaviors that reflect the upper end of his goal orientation trait distribution; therefore, creating a good fit for the individual and the training environment. Regardless of whose approach best explains the blended state/trait dynamic, it is clear that the domain specific approach to goal orientation is a good representation of these concepts.

The Emerging Construct.

As goal orientation research has blossomed, so has our conceptualization of the construct. In its earliest form, goal orientation was composed of mastery and performance orientations, which anchored opposite ends of a continuum (Dweck, 1986). Individuals with a mastery or learning orientation typically view tasks as opportunities to increase their competence, learn new material, and challenge themselves (Dweck, 1986). Individuals with a performance orientation approach tasks with a desire to demonstrate their competence, acquire positive judgments and avoid negative judgments (Dweck, 1986). These two opposing orientations were thought to stem from an individual's beliefs regarding ability and effort (Horvath, Scheu, & DeShon, 2001). Specifically, individuals with a mastery orientation believe they can extend their abilities through

effort, practice, and learning new skills. In direct contrast, performance oriented individuals believe that ability is fixed or cannot be enhanced and that applying effort is an indication of low ability (Dweck, 1986; Nicholls, 1984).

The first significant revision to the construct of goal orientation as discussed above, is generally attributed to Button, Mathieu, and Zajac (1996) who proposed that performance and mastery orientations were actually separate constructs and not mirror images of one another. This perspective suggests that although individuals may have a dominant goal orientation they could be high or low on both orientations.

Through research endorsing the two-dimensional perspective our understanding of mastery oriented individuals has become well-documented (Button, Mathieu & Zajac, 1996; Elliot & Dweck, 1988; Vandewalle, 1997). A mastery orientation is typically associated with approach goals and a desire to achieve and develop one's skills and abilities (e.g., Elliot and Church 1997; Nicholls, 1984). In an effort to improve their skills and abilities, mastery oriented individuals tend to seek more feedback, expend more effort, use more effective study strategies, set more challenging goals, and persist in working toward these goals (Ames, 1984; Dweck & Leggett, 1988; Elliot & Dweck, 1988; Nicholls, 1984; VandeWalle & Cummings, 1998).

Research conducted in a variety of classroom, lab, and field studies suggests that a mastery orientation leads to few if any negative outcomes (Elliot, 1999). In particular, a mastery orientation is typically associated with positive outcomes such as setting more challenging goals, greater skill generalization, achieving high grades, reporting higher levels of self-efficacy, higher levels of intrinsic motivation, and higher levels of

metacognitive activity (e.g., Ames, 1984; Button, Mathieu & Zajac, 1996; Dweck & Leggett, 1988; Elliot, 1999; Elliot and Church 1997; Ford et al., 1998).

In terms of affective reactions, mastery individuals typically report higher levels of satisfaction, optimism, self-efficacy, and task enjoyment (e.g., Elliot, 1999; Elliot & Harackiewicz, 1996; Schmidt, 2001; Toney, 2000). It is believed that this positive outlook is associated with the ability to separate information about the person from information about a task or situation (e.g., Dweck, Chiu, & Hong, 1995; Dweck, 1996). For instance, research and theory suggest that mastery oriented individuals generally avoid internalizing negative feedback; therefore, protecting their self-concept. This allows mastery individuals to respond in a persistent and adaptive manner as opposed to withdrawing from challenges (e.g., Dweck, 1986; Dweck & Leggett, 1988; Nicholls, 1984). Furthermore, mastery oriented individuals are more likely to seek feedback, perceive feedback as valuable, and have less fear of failure (e.g., Dweck & Leggett, 1988; Elliot & Dweck, 1988; Farr, 1993; VandeWalle & Cummings, 1998; VandeWalle, 2003). By protecting their sense of self, these individuals are free to focus on the task, alter strategies, or apply additional effort to the problem (e.g, Dweck, 1986; Dweck & Leggett, 1988). As a result, mastery oriented individuals typically perform better than other goal orientations in the face of difficulty (e.g., Dweck & Leggett, 1988; Elliot & Dweck, 1988).

The research on performance oriented individuals however, has been far less conclusive. Initially it was hypothesized that in an achievement context a performance orientation led to less beneficial results than a mastery orientation. Specifically, it was expected that a performance orientation would lead to more superficial learning, lower

task enjoyment, and withdrawal from the task when faced with the possibility of failure (Elliot, 1999). It has been difficult to find consistent support for these beliefs. In any given study, the relationships between performance orientation and various outcome variables, individual differences, and antecedents may be positive, negative, or neutral (Elliot, 1999). After several years of inconsistent findings researchers once again began to reevaluate the construct of goal orientation.

Specifically, researchers started looking to the broader self-regulatory, goal setting, and motivational literatures for a better understanding of what was labeled the performance orientation in the goal orientation literature (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; VandeWalle, 1997). This has led to the incorporation of approach and avoidance concepts into theoretical models and measurement of goal orientation (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). Specifically, the concept of performance orientation has been split into approach goals or goals one works toward (e.g., learn three new facts about designing a web page), and avoid goals or goals designed to avoid a certain outcome (e.g., avoid failing the next training quiz; Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; VandeWalle, 1997). The theoretical rationale for this split can be traced as far back as early Greek Philosophy (see Elliot, 1999). In an effort to develop a more complete understanding of goal orientation, recent empirical research has begun to focus on the three-factor model of goal orientation. The three-factor model includes: (1) prove or approach goals focused on the desire to demonstrate competence; (2) avoid goals or

the desire to avoiding demonstrating incompetence; (3) mastery, approach goals focused on the desire to learn.

Clearly, the empirical research on prove and avoid individuals is less developed than mastery because these constructs were previously grouped together in the two-factor model as performance orientation. The goal orientation theory regarding the three-factor model suggests that, avoidance individuals are expected to set avoid goals, change their goals or lower their expectations when faced with difficulty, and perform lower than other orientations due to risk avoidance, low persistence, and more negative attitudes (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). Furthermore, avoid individuals are expected to use a number of withdrawal behaviors to reduce the negative impact on their self-concepts. Specifically, these individuals may withdraw from the task by quitting, reducing effort, and using self-handicapping (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997).

Empirical studies focusing on avoid orientations have found support for many of the theorized outcomes and behaviors highlighted above. A lab study conducted by Elliot and Harackiewicz (1996) found distinctly different patterns of results for avoid oriented individuals as compared to those who were prove and mastery oriented. Using a series of instructions designed to manipulate goals on a puzzle task, the study found that although avoid oriented individuals reported valuing competence and exerting as much effort as the prove and mastery oriented individuals, the avoid oriented individuals reported spending less time on the task, less enjoyment of the task, and less task involvement than the other two orientations. Furthermore, these differences were found under what the

researchers report as relatively benign circumstances. Specifically, the experiment had a minimal evaluation component due to the limited interaction between the experimenters and the participants, there were no references made to self-valued attributes such as intelligence in the experiment, and finally all feedback was either normative or positive thus maximizing positive competence perception. This suggests that differences between the three orientations may be even more pronounced in highly evaluative situations; thus leading to more deleterious effects for avoidance oriented individuals.

Elliot and Sheldon (1997) investigated the antecedents and consequences associated with the pursuit of avoidance goals over the course of a semester. Their results suggest that a fear of failure may lead to the pursuit of avoidance goals and that avoidance goals are negatively related to satisfaction with progress towards a goal, affective responses, and enjoyment and satisfaction of the goal pursuit. Beyond goal related outcomes, the study indicates that an avoidance orientation is also negatively related to self-esteem, life satisfaction, and general well being. Furthermore, the study found that perceived competence mediates the direct relationships mentioned above, although the exact mechanism driving the relationship between avoidance goals and perceived competence are still unclear. A similar semester long study conducted by Elliot and Church (1997) once again found that a fear of failure may lead to the pursuit of avoidance goals. It was also reported that avoidance was negatively related to intrinsic motivation and final grades. Whereas a desire to achieve and high competence expectations may lead to a mastery orientation; which was in turn was positively related to intrinsic motivation and unrelated final grades. A prove orientation however, was reported to stem from a desire to achieve, high competence expectations, and a fear of

failure; and found to be positively related to final grades. Based on these results, the authors conclude that different patterns of antecedents and consequences can be attributed to each of the three goal orientations, therefore; supporting a three-factor model.

Avoidance has also been investigated with regards to various learning and study strategies such as, effort, level of processing, organization, and metacognition. A study by Elliot, McGregor, and Gable (1999) found avoidance to be positively related to less adaptive strategies such as surface processing and disorganization, but negatively related adaptive strategies such as deep processing, effort, and persistence. As one might expect, these less adaptive strategies led to poorer exam performance.

A study by Schmidt and Ford (2003) found that the effectiveness of strategies may be dependent on an individual's goal orientation. Specifically, the study employed a metacognitive intervention designed to increase metacognitive activity. Although past research has demonstrated that increasing metacognitive activity is an effective way to improve performance and self-efficacy (e.g., Ford et al., 1998; Meloth, 1990; Payne and Manning 1992; Rosenshine, Meister, & Chapman, 1996), it was hypothesized that the effectiveness of metacognitive interventions may vary by goal orientation. As hypothesized, the study found that the metacognitive intervention was beneficial for low-avoidance individuals and detrimental to high avoidance individuals. This finding is consistent with goal orientation theory, which suggests that avoidance oriented individuals will withdraw from a task or situation to protect themselves from information suggesting failure, incompetence, or a need for improvement (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Nicholls, 1984; VandeWalle,

1997). In this case, a metacognitive intervention, or being directed to engage in thinking about what you do not know, was viewed as a threatening and metacognitive activity actually decreased.

Finally, studies by VandeWalle and colleagues (VandeWalle, 2001; VandeWalle, Cron, & Slocum, 2005) have found relationships between avoidance and a variety of other variables. Specifically, significant negative relationships have been found between avoidance orientation and effort, self-efficacy, willingness to seek feedback, the perceived value of feedback, goal level, openness to experience, and optimism. Significant positive relationships have been found between avoidance orientation and perceived cost of feedback seeking, neuroticism, fear of negative evaluation, and entity or fixed ability beliefs.

With regards to prove individuals, theory suggests that they will set approach goals, persist towards these goals despite negative feedback in an effort to demonstrate competence, and internalize negative feedback thus, leading to lower self-concepts (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). It has also been suggested that prove individuals are very concerned with impression management, competing with and performing better than others, and are very outcome focused (e.g., Elliot & Church, 1997; Horvath, Scheu, & DeShon, 2001; Vandewalle, 2001).

Although empirical studies have found support for the above-mentioned predictions, recent studies suggest a more complex view of prove oriented individuals. More specifically, studies have found evidence that prove goals stem from both a fear of failure and a desire to achieve (Elliot & Church, 1997). As previously mentioned,

avoidance is typically associated with a fear of failure, and mastery is typically associated with a desire to achieve. This suggests that the motives of prove oriented individuals can be a combination of mastery and avoid (Elliot & Church, 1997; Elliot, 1999), thus, leading to the mixed results discussed below.

A study conducted by Elliot and Harackiewicz (1996) found very similar patterns of results for prove and mastery oriented individuals. Specifically, prove and mastery oriented participants in a lab-based puzzle task reported similar levels of effort, valuing competence, time on task, task involvement, and task enjoyment. The authors suggest that these similarities are a function of the situation. That is, prove and mastery oriented individuals will exhibit similar patterns and behaviors in some contexts and very different patterns of behavior in others. Although more research is needed, it is possible that the evaluative nature of an environment may play a key role in determining the behavioral similarities and differences between prove and mastery orientations.

In a semester long field study, Elliot and Church (1997) found different patterns for each of the 3 orientations. The prove orientation was found to be positively related to grades and unrelated to intrinsic motivation, while mastery was unrelated to grades and positively related to intrinsic motivation and avoidance was negatively related to both grades and motivation. The authors note that although neither approach orientation (i.e., prove and mastery) had negative effects on achievement outcomes it is also true that neither approach orientation had positive effects on both outcomes; thus, suggesting that it would be most beneficial to simultaneously adopt both approach orientations and eliminate the avoid orientation.

Research by Elliot, McGregor, and Gable (1999) focusing on the relationships between goal orientation, study strategies, and exam performance in a classroom setting found overlap between prove and both the mastery and avoidance orientations. Specifically, a prove orientation was positively related to effort, persistence, exam performance, and surface processing. Similarly a mastery orientation was positively related to effort, and persistence, however, it was unrelated to exam performance and positively related to deep processing as opposed to surface processing. An avoidance orientation was found to be negatively related to exam performance, effort, and persistence but positively related to surface processing and disorganization.

Similarly, studies by VandeWalle and colleagues (VandeWalle, 2001; VandeWalle, Cron, & Slocum, 2005) have found consistencies between prove and both avoid and mastery orientations for a variety of variables. VandeWalle (2001) notes that frequently the relationship differences between prove and the other two orientations have been a matter of degree. For instance, both prove and avoid have significant positive relationships with entity or fixed ability beliefs but the relationship is much stronger for avoid individuals. While both mastery and prove have been found to have positive relationships with effort, but the relationship is much stronger for mastery individuals. A prove orientation has also been found to be positively related to competition, fear of negative evaluation, neuroticism, and negatively related to willingness to seek feedback and openness. Overall, a prove orientation may be the most difficult to manage and the most sensitive to environmental conditions. However, there is clear evidence that the boundary conditions associated with a prove orientation are not yet fully understood.

In summary, the current state of research and theory suggests that goal orientation is best represented using a three factor model which includes mastery, prove, and avoid orientations. Although research and theory are continually refining the construct of goal orientation, it appears that these three orientations can lead to different patterns of thoughts, reactions, and behaviors in a variety of situations. Understanding these patterns can help us predict behavior and potentially guide regulation and behavior to optimal levels. That is, if goal orientation serves as a filter and influences goals and the interpretation of and reactions to information, events, and actions (e.g., Dweck, 1996) we have the potential to frame information to be maximally effective for each type of individual. However, as discussed bellow, this potential has yet to be realized.

Despite the increased interest and research focus on goal orientation and it's implications for various work and educational activities during the past 20 years, there remain some key gaps in our understanding and application of this motivational construct. Of particular interest to the current study is the tendency in the literature to treat a mastery orientation as the only truly adaptive goal orientation is (e.g., Elliot and Church, 1997; Vandewalle, 2001). Although there is little doubt that a mastery orientation leads to few if any negative outcomes (e.g., Elliot, 1999; Elliot and Church, 1997), this should not imply that prove and avoid orientations are purely maladaptive. With regards to a prove orientation, a few studies have noted that being high on prove can be beneficial in some environments (e.g., Elliot and Church, 1997; Pintrich, 2000). In particular, the prove orientation may be especially beneficial when performance based outcomes (e.g., exam grades and sporting events) and limited errors or no errors (e.g., air traffic control) are critical aspects of the situation. A prove orientation may also be

highly beneficial when adopted in conjunction with a mastery orientation allowing individuals to capitalize on the strengths of both approach orientations (e.g., Elliot & Church, 1997; Pintrich, 2000).

The avoidance orientation however, has been almost exclusively viewed as maladaptive (Elliot & Church, 1997). The most positive endorsement found in the literature is a statement by Elliot and Harackiewicz (1996) indicating that avoidance "may be the 'great motivator' because it elicits strong affective investment and vigorous action resulting in successful accomplishments." Similarly, Elliot and Sheldon (1997) note that it is doubtful that avoidance is detrimental for all achievement relevant outcomes and it is important that we further explore this issue. This sentiment however has been lost in recent years and little if any work has been done to understand how we can effectively manage this orientation and structure situations to capitalize on any strengths and minimize the weaknesses associated with this orientation.

One will find in a review of the goal orientation literature, the sentiment regarding the superiority of the mastery is often reflected in both conceptual and empirical pieces (e.g., Elliot and Church, 1997; Vandewalle, 2001). This presumption has led to a focus on manipulating individuals and attempting to temporarily alter their mental states. From a logistics perspective, this approach faces the difficulties associated with successfully manipulating individuals and maintaining that manipulation long enough to have the desired impact. As previously mentioned, it is believed that manipulated goal orientations are weaker than dispositional or trait based goal orientations (Elliot, 1999), suggesting that in most environments people are likely to revert to the tendencies, strategies, and interpretations associated with their domain specific goal orientation. As a

result, prove and avoid oriented people are likely to find themselves attempting to function in mastery oriented environments, to which their tendencies, strategies, and interpretations are ill-suited.

From an applied psychological standpoint, we have historically placed a great deal of importance on individual differences. Unlike cognitive psychologists who prefer to ignore or wipe out individual differences and treat them as measurement error (Hofstadter, 1995; Kraiger, 1995; Matlin, 1984), more applied realms of psychology have clearly told us that we need to focus on the individual. Yet the move towards changing or manipulating individuals and their goal orientation so that we can treat them all the same is contrary to this approach.

A natural alternative to the manipulation approach would be to work with individuals' natural orientations, strengths, and weaknesses. For instance, if we know that avoid oriented individuals do not respond well to feedback and interventions highlighting their errors or weaknesses (e.g., Schmidt & Ford, 2003; VandeWalle, 2001; VandeWalle, Cron, & Slocum, 2005), then frame feedback and interventions in a way that would be acceptable and helpful to an avoid individual and less likely to invoke anxiety, withdrawal behaviors, and off-task thoughts. It is this individualized approach to maximizing the strengths and minimizing the weaknesses of each orientation that is a key focus of the current study. Specifically, developing computer-based learning environments that are optimized for each orientation.

The Environment Side of the Interactionist Perspective

Up until this point, the focus has been on understanding the forces that drive the individual difference side of the person-environment interaction. Specifically using self-

regulation as the organizing framework for individual differences in motivation and goal orientation as the filter, which determines how an individual views, approaches, and interprets self-regulatory processes. The focus of the following sections will be developing a better understanding of the environment and how computer-based learning environments can be customized to meet the needs of individuals. In particular, the following sections will highlight the concept of person-environment fit and how it relates to the development of computer-based learning environments.

Person-Environment Fit

One of the most pervasive concepts in psychology is that of "fit", specifically the fit between a person and his surroundings (Furnham, 2001; Schneider, 2001). Regardless of its many forms, applications, and conceptualizations, the one commonality in fit research is the understanding that fit is the degree of compatibility between a person and the environment (Kristoff, 1996). The underlying assumption of fit research is that the better an individual matches her environment the more effective and positive the person and her environment will be (Ostroff 1993; van Vianen, 2001). The vast body of research investigating the concept of person-environment fit supports this assumption. Specifically research indicates that a match between a person and the environment leads to a host of positive outcomes including higher levels of satisfaction, well-being, achievement, and commitment (e.g., Gustafson & Mumford, 1995; Meir, Melamed & Dinur, 1992; Walsh & Holland, 1992).

Over the years, a wide variety of psychology-based person-environment models and theoretical perspectives have emerged; however, the common thread remains understanding how people influence environments and how environments influence

people (Walsh, Price, & Craik, 1992). In its simplest form, the concept of person-environment fit suggests two distinct entities, namely the person and the environment (van Vianen, 2001). This perspective is reflected in the literature, as researchers have typically treated the two concepts as independent and as a result have tended to study person-environment fit while primarily focusing their attention on either the person or the environment but not both (van Vianen, 2001, Schneider, 2001). The following pages highlight these more independent approaches, as well as, some of the more integrative approaches to the study of person-environment fit.

The majority of the fit literature has focused on the person. Research focusing on the person has roots in studies of individual differences and primarily stems from two bodies of literature, personnel selection and vocational interests (Schneider, 2001). According to Schneider (2001) personnel selection research has employed an implicit theory of fit. Specifically, selection research identifies the knowledge, skills, ability, and personality traits required for a position and then proceeds to identify individuals with these attributes. Clearly the focus is on the person and how well they will fit the position or the work environment even though fit is never actually measured or assessed.

A similar individual difference or person-centered approach is evident in the recruitment literature, the main difference being that fit, or at least perceptions of fit, is actually assessed. This research has primarily focused on identifying individuals who believe that they match an organization's goals, values, norms, and attitudes. This literature has repeatedly demonstrated that individual fit perceptions are positively related to job choice, performance, work attitudes, and tenure (e.g., Bretz & Judge, 1994; Cable

& Judge, 1996; Chatman, 1991; Judge & Bretz, 1992; Rynes & Gerhart, 1990; Turban & Keon, 1993).

The focus of vocational interest research is on understanding and improving the fit, satisfaction, and productivity, between individuals and their chosen occupations (e.g., Holland, 1985; Walsh & Holland, 1992). It is believed that a match between an individual (i.e., personality, value orientations, and interests) and their vocation will lead to higher levels of well-being, stability, satisfaction, and achievement, whereas a mismatch yields, withdrawal, anxiety, tension, stress, dissatisfaction, low self-esteem, and poor performance (e.g., Holland, 1973; Kahn, Quinn, Snoek, & Rosenthal, 1964; Meir, Melamed & Dinur, 1995; Walsh & Holland, 1992). Vocational research has been applied to a number of domains including counseling, education, and career decision-making (Savickas & Gottfredson, 1999). One of the most prominent theories addressing vocational choice and person-environment fit is Holland's theory (1973; 1985). Unlike the person-centered approaches discussed above, the vocational interest research based on Holland's work employs an explicit theory of fit (Schneider, 2001), which typically uses a person-centered approach to measure both the person and the environment (Furnham, 2001; Schneider, 2001; Walsh & Holland, 1992). In other words, the defining features of Holland's model can be used to define either the person or the environment making for a more complete test of person-environment fit.

In comparison to the person-centered approach, there has been very little focus on the environment (Furnham, 2001; Schneider, 2001). The obvious reason for this is that the environment can be difficult to empirically pin down. For instance, what comprises an environment? Is the environment the job, the organization, or your work group? Is

the environment the objective characteristics such as the physical space and specific social factors or is it the subjective reactions and perceptions of those who occupy the environment (Furnham, 2001)? If one defines the environment as the job, what characteristics do you use to define the job and how can you make research about a particular job informative and generalizable to other organizations?

One approach person-job researchers have taken is to develop occupational classification systems that organize vast amounts of job related information into a flexible system that accommodate the changing nature of work and cut across organizations (e.g., Holland, 1958; Holland 1959; Oswald & Ferstl, 1999). Another approach has been to break the environment into various segments or levels such as social, physical, and cultural and determine how each aspect of the environment contributes to the concept of fit (e.g., Furnham & Walsh, 1991; Meir, Hadas, & Noyfeld, 1997). A similar, although less generalizable approach, has been to research very specific environments or domains. That is, to determine what impacts fit in a work environment vs. a family environment (Swindle & Moos, 1992). Regardless of approach however, the primary difference between person-centered and the environment-centered research has been which variables are treated as the main-effect (Schneider, 2001). Research focusing on the environment has typically investigated job satisfaction, job characteristics, work systems, and work rewards, and has virtually ignored individual differences as main effects (Schneider, 2001).

Instead of taking an either or approach, a small set of researchers have attempted to study person-environment fit as a unitary concept (Furnham, 2001). Specifically, these researchers assert that environments are dynamic and largely created by the people

behaving within them (e.g., Schneider, 1987). That is, environments cannot be separated from the people that function within them, and as a result environments should be defined in psychological terms, which can also be used to define individuals. This is the core concept behind Schneider's (1987) attraction-selection-attrition model. It is also the approach used by Ostroff (1993) to study the relationships between person-environment fit and organizational effectiveness. Specifically, Ostroff defined the environment as the organizational climate and asserted that climate has frequently been treated as analogous to personality in that both have been measured in terms of personal characteristics (e.g., warm and innovative). To remain consistent with this logic, the study measured both the climate and the individuals using the same sets of personal characteristics, values, and preferences (e.g., autonomy, achievement orientation, warmth, etc.).

A similar sentiment can be derived from earlier person-environment fit theories. For instance, Holland's (1973; 1985) vocational interest theory which seeks to define the environment in terms of individuals' personality traits (Furnham, 2001; Schneider, 2001; Walsh & Holland, 1992). The underlying assumption being, that environments are defined psychologically by those functioning in them and should therefore be defined and measured in that manner (Walsh & Holland, 1992). The bottom line, is that the typical environment can be difficult to measure and study if you acknowledge that there is a dynamic relationship between people and the environment and yet you try to treat the two pieces as entirely independent. Ideally to effectively study fit, both the person and the environment should be defined in similar terms if one is to truly understand how they interact.

In summary, although it is understood that matching attributes or creating a good fit between a person and an environment yields a variety of positive outcomes, little is known regarding which characteristics of people and the environment are crucial for achieving fit (van Vianen, 2001). Potential explanations for this lack of concrete knowledge are plentiful. Specifically there appear to be serious debates regarding how fit should be conceptualized, operationalize, measured, and calculated (e.g., Edwards, 1991; Kristoff, 1996; Schneider, 2001). However interesting these issues may be, such theoretical debates do little to address the practical concerns and potential applications of person-environment fit. As eloquently stated by Schneider (2001, pg. 142), "There is no reason to suspect that all ways of conceptualizing fit are not equally valid given certain questions, just as there is no reason to suspect that operationalizing fit in one particular way is the key to measurement problems."

Drawing from van Vianen (2001) and Schneider (2001) it seems reasonable to expect that the characteristics of people and the environment that are crucial for achieving fit will vary based on the questions one seeks to answer. The question of interest to the current study is, how can we use the motivation-based theory of goal orientation to guide the development of customized learning environments which allow us to capitalize on an individual's strengths and tendencies?

In theory, the answer to this question appears relatively simple. If goal orientation functions as a filter, which determines how an individual views, approaches, and interprets self-regulatory processes, then we should be able to create an environment that matches or mimics the way individuals approach learning tasks. For example, research suggests that when given the opportunity to control their learning environment,

mastery oriented individuals tend to access and explore more training support material and content areas than performance oriented individuals (Toney, 2000). This finding is consistent with goal orientation research and theory which suggests that mastery oriented individuals typically view tasks as opportunities to increase their competence, learn new material, and challenge themselves (Dweck, 1986). In terms of person-environment fit, the ideal training environment for a mastery oriented individual would be one that allows the learner more control over the training program content and provides opportunities to access training enrichment material. This type of environment would create a match between the individual's strengths and tendencies and the learning environment. This match should in turn produce higher levels of motivation, performance, self-efficacy, and satisfaction, and lower levels of withdrawal and frustration.

Recent advances in technology provide us with the unique opportunity to create and control learning environments. This ability eliminates many of the difficulties associated with investigating person-environment fit in pre-existing or real world situations. Specifically, we have the potential to define and develop the environment in terms of the individual, allowing us know when we have to good fit and when we have a misfit and then study the effects. There are few areas where this opportunity is more applicable than computer-based learning environments. By creating learning environments that match the learner, we can ultimately capitalize on the positive outcomes associated with person-environment fit and potentially address several of the obstacles currently hindering computer-based training (e.g., high drop-out rates, low motivation, etc). With regard to the current study, this involves developing and defining

the environments in terms of goal orientation; therefore, creating fit between the individual's dominant domain specific goal orientation and the learning environment.

To capitalize on this opportunity however, it is important to highlight what we know about computer-based learning and to identify which aspects or features of the learning environment should be customized to meet individual needs. The goal being, to create a match between the person and the environment. That is, how can we maximize the strengths and tendencies, while minimizing the weaknesses, associated with prove, avoid, and mastery goal orientations, in the customized learning environments. These issues are discussed in the following sections.

Computer-Based Training

Over the course of the past several years the advantages of computer-based training methods have taken center stage. Computer-based training has been praised for decreasing training costs and increasing flexibility and access to training because it is no longer restricted to a specific time, date, location, or number of people (e.g., Brown, Milner, Ford, & Golden, 1997; Hall, 1997; Garger, 1999). Despite the potential advantages of computer-based training, researchers and practitioners alike are learning that there a number of obstacles to overcome before new training methods and technology even begin to approach their full potential (e.g., Brown, Ford, & Milner, 1998; Filipczak, 1996; Mathieu & Martineau, 1997; Frankola, 2001). Two motivation related "obstacles" or challenges of particular relevance to the current study are the loss of quality training principles and the loss of an adaptable instructor. The reasons for these challenges and possible solutions are discussed in the following pages.

Traditional classroom based training methods call for a thorough needs analysis to establish training content (Goldstein, 1986). This information would in turn be used by the trainer to develop the training program with the goals of communicating the material and hopefully motivating the trainees to learn the material. As previously mentioned, motivation plays a key role in training effectiveness (Goldstein, 1993; Tannenbaum & Yukl, 1992) and can be enhanced by communicating relevance to the trainee, engaging and challenging the learner, and posing interesting questions, (MacLachlan, 1986). Furthermore, traditional training had the advantage of a live instructor who could alter training activities, training materials, and the presentation of the content to meet the needs of the students (Snow, 1986). Although some of these instructor-based adaptations may be based on test scores and other more formal forms of trainee assessment, most adaptations are based on instructor's instincts and years of experience identifying trainee strengths, weaknesses, interests, habits, and prior content knowledge (Snow, 1986).

Due to the high-tech nature of today's training programs, it is often the case that training is not being developed by trainers or instructional designers but by programmers (Reeves & Reeves, 1997). As a result, many computer-based training programs are driven by technology as opposed to theory (Yang & Moore, 1995). This can pose serious problems for the quality of training and ultimately motivation. Many programmers rely on nice colors, graphics, and interesting multimedia effects; however, research and practice has shown that these effects are not adequate substitutes for the traditional training principles and motivators (Reeves & Reeves, 1997). The critical issue becomes identifying how to successfully translate our more traditional training techniques to a new medium. To achieve a successful move to computers, we need to view the learner as an

active participant in the training system and not simply a passive receiver of training. Practically speaking, this means we need to actively engaged the learner and make them part of the training program instead of providing the equivalent of computer-based page-turners. This requires moving away from training research that focuses almost exclusively on the training program itself and instead taking a greater interest in the characteristics of trainees that may influence learning (Warr & Allan, 1998).

A similar focus on the characteristics of trainees that influence learning in a computer based-environment may help us to compensate for the loss of a live instructor. In terms of training design, learning, and motivation, the loss of a live instructor is perhaps the greatest challenge facing computer-based training. As previously mentioned, experienced instructors have learned to adapt to meet the needs of various learners; therefore, if we are to successfully replace instructors we must design training programs that can address the strengths, weaknesses, habits, and tendencies of various learners. Furthermore, we must provide learners with the same types of information and opportunities that an experienced instructor may use to improve learning (e.g., customized learning opportunities, practice, and feedback).

With regards to trainee characteristics, the current study is focused on varying the training environment to best reflect and manage the needs, strengths, tendencies, and weaknesses associated with, *avoid and mastery* goal orientations. Given the uncertainties associated with the *prove* orientation and the many ways in which prove is a blend of mastery and avoid components, the current study will focus on creating only two training environments. To create these environments, specific features of the training environment will need to be customized to match the needs of the avoid and mastery goal

orientations while providing learners with same types of information and opportunities that an experienced instructor may use to improve learning and assist those who are struggling.

Specifically, the current study uses varying degrees of learner control over content/sequencing of the training material and over practice opportunities for the two goal orientations; therefore, creating a fit between the individual and the training environment. The following sections will highlight what we know about learner control and practice issues and how these features of the training program can be customized to meet the needs of the two goal orientations. Additionally, the following sections will discuss how different types of feedback will be provided for the two goal orientations, as opposed to allowing learners control over feedback seeking. Due to the loss of a human instructor, feedback is a critical feature of computer-based instruction (Azevedo & Bernard, 1995) and not necessarily a feature learners should have control over.

Learner Control

Learner control refers to allowing the learner to make their own way through training materials (Brown, 1999) as opposed to the trainer or the program determining the course of training (Reeves, 1993). Learner control can include a variety of activities including, allowing the learner to select or determine the content, sequence, and pace of the training, as well as, choosing the type and amount of practice and feedback (e.g., Brown, 2001; Chung & Reiguluth, 1992; Hannafin, 1984; Milheim & Martin, 1991). In the traditional classroom model of training, trainers generally maintained control of the practice, feedback, content, sequence, and pace for an entire group. In most cases, opportunities for learner control were seriously limited or non-existent. A similar pattern

emerged for early computer-based training, where the control shifted from the trainer to the program. Once again, treating the learner as a passive recipient of training and not an active participant in the learning process.

Early research on learner control primarily focused on comparisons between program control and learner control (e.g., Reeves, 1993). This research stemmed from the belief that individualizing education and training programs would lead to improved methods for addressing the growing diversity among student populations (Steinberg, 1977). Specifically, it was expected that experienced learners would know what learning strategies would work best for them. For instance, how long they needed to practice, how quickly they should move through the material, what they needed to review, and what sequential order made the most sense for them to learn and organize information.

In an effort to empirically support these expectations, a host of studies emerged comparing the traditional one-size fits all program-controlled instruction to individualized learner controlled instruction (e.g., Avner, Moore, & Smith, 1980; Atkinson, 1972; Fry, 1972; Mager, 1961; Newman, 1957). Despite the intuitive appeal of learner control and a few early empirical successes (e.g., Avner, Moore, & Smith, 1980; Newman, 1957) the results of most learner control studies were relatively disappointing (Steinberg, 1977; Steinberg, 1989). Specifically, early research indicated that although some students seem to benefit from learner control, overall students learn less when they are given control over pacing, content, and sequence (Steinberg, 1989). Furthermore, most learners are poor judges of what they know and poor judges of what material and how much they need to practice (Steinberg, 1989). Finally, although learner control did

lead to better attitudes and higher levels of interest, it generally did not lead to better performance (Steinberg, 1989).

Despite the disappointing results, supporters of the learner control perspective continued to highlight the potential benefits associated with making the trainee a more active participant in the learning process. Specifically it was expected that learner control had the potential to improve performance, self-efficacy, motivation, depth of processing, and the development of mental models (e.g., Frese, Albrecht, Altmann, Lang, Papstein, Peyerl, Prumper, Schulte-Gocking, 1973; Hannafin, 1984; Mayer, 1976). Researchers supporting the learner control perspective asserted that the disappointing results of past studies have been due to a lack of understanding regarding the underlying psychological processes involved in learning, not the ineffectiveness of learner control (Steinberg, 1989; Williams, 1996). As a result, learner control research has shifted its focus towards understanding the underlying cognitive, behavioral, and affective processes triggered by learner control.

As it turns out, these early beliefs regarding the benefits of leaner control are generally consistent with more recent research, which suggests that increased activity results in more learning and higher performance (e.g., Brown, 1999; Goska & Ackerman, 1996). Furthermore, research suggests that having the opportunity to explore tasks/material (e.g., choosing content, or sequence) allows learners to infer important rules and relationships between concepts leading to better mental models (Frese et al., 1973; Frese & Zapf, 1994; Hatano & Inagaki, 1986; Smith, Ford, & Kozlowski, 1997). From a motivational standpoint, learner control allows trainees to move at a comfortable

pace, concentrate on material that is personally relevant and meets their training needs (Milheim & Martin, 1991).

Through research more directly addressing the underlying processes triggered by learner control, it has become clear that not all trainees can effectively handle learner control (e.g., Steinberg, 1989; Tennyson, Christensen, & Park, 1984). For instance, research suggests that those who are new to the material or have limited experience, and those who have low cognitive ability have difficulty using learner control effectively (e.g., Steinberg, 1989; Tennyson, Christensen, & Park, 1984; Toney & Ford, 2001). It has also been suggested that individuals low in persistence, individuals with poor learning strategies, and those with low self-efficacy do not effectively use learner control (e.g., Brown, 2001; Carrier & Williams, 1988; Young, 1996).

To ameliorate this issue and still capitalize on the benefits of learner control, researchers suggest building in guidance mechanisms such as structural support hierarchies and navigational features to avoid disorientation (Binder, 1989; Chung & Reiguluth, 1992; Gall & Hannafin, 1994). This extra guidance should help reduce the likelihood of frustration and motivation loss for those less skilled at learner control (Gay, Trumbull, & Mazur, 1991). Another approach that has been suggested is to allow learners varying degrees of learner control (e.g., McNeil & Nelson, 1991; Tennyson, 1980; Bell & Kozlowski, 2002). This approach is sometimes referred to as adaptive guidance and typically involves providing advice and feedback such as, what and how much to study, what to practice, and how to sequence the learning materials; however, the final decisions are left up to the learner. Research using these techniques suggests that providing guidance and limiting what learners have control over is an effective

compromise between program control and full learner control (e.g., Tennyson, 1980; Bell & Kozlowski, 2002).

The current study seeks to take the compromise between learner control and program control one step further. That is, instead of allowing all participants the same level of learner control, or limiting control based on cognitive ability, the current study suggests varying learner control based on goal orientation. Although there are a limited number of studies that have specifically investigated the relationships between goal orientation and learner control (e.g., Brown, 2001; Ford, et al., 1998; Schmidt & Ford, 2003; Toney, 2000), there are a number of studies that have identified individual differences in the effective/ineffective use of learner control that can be associated with a specific goal orientation (e.g., Carrier & Williams, 1988; Young, 1996). The case for varying the amount of control associated with each type of goal orientation is provided below.

As previously discussed, individuals with a mastery or learning orientation typically view tasks as opportunities to increase their competence, learn new material, and challenge themselves (Dweck, 1986). In an effort to improve their skills and abilities, mastery oriented individuals tend to seek more feedback, expend more effort, use more effective study strategies, exhibit higher levels of metacognitive activity, set more challenging goals, and persist in working toward these goals (e.g., Dweck & Leggett, 1988; Elliot, 1999; Elliot and Church 1997; Ford et al., 1998; VandeWalle & Cummings, 1998; VandeWalle, 2003). These general characteristics or tendencies associated with mastery oriented individuals match many of the characteristics associated with effective use of learner control.

For instance, learner control studies indicate that individuals with high task persistence, a characteristic associated with a mastery orientation, perform best under learner control (e.g., Carrier & Williams, 1988; Young, 1996). It has also been found that, individuals who report high levels of self-regulated learning strategies, such as, self-monitoring, high degrees of effort and persistence, and the effective use of study strategies such as rehearsing material, perform better under learner control than those who report low levels of self-regulated learning strategies (Young, 1996). Once again, these self-regulated learning strategies are typically associated with a mastery orientation. Similarly, research suggests that learners who engage in higher levels of metacognitive activity, or thinking about their thinking (Falvel, 1979), perform better in learner control situations than those who are low on metacognitive activity and that individuals high on metacognitive activity tend to have a mastery orientation (e.g., Ford et al, 1998; Schmidt, & Ford, 2003).

Although many of these studies focus on only one or two specific characteristics, looking across these studies the profile that emerges for individuals who are successful in learner control situations appears to be that of mastery oriented individuals. Therefore, the current study proposes that mastery oriented individuals are well equipped to handle learner control and a training environment developed to reflect the needs, strengths, and tendencies of mastery oriented individuals should provide them with ample learner control opportunities.

Alternatively, the profile that emerges for avoidance individuals suggests a very different course of action. Specifically, avoidance oriented individuals are expected to set avoid goals, change their goals or lower their expectations when faced with difficulty,

and perform lower than other orientations due to risk avoidance, low persistence, and more negative attitudes (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). These tendencies suggest that an environment created to help manage and support the needs of avoidance oriented individuals should anchor the opposite end of the continuum and should depend on program control or provide extremely limited learner control. This notion is supported by the findings of a several studies. Specifically, research has demonstrated that individuals with low persistence, a characteristic associated with an avoid orientation, struggle under learner control situations (e.g., Carrier & Williams, 1988). Research also suggests that individuals who adopt avoidance goals tend to be more superficially engaged with the learning material (Meece, 1994; Meece, Blumenfeld, & Hoyle, 1988). Specifically they are more likely to skip difficult material, look for the easy way out, and spend less time trying to work through problems. These tendencies clearly suggests that avoid oriented individual are ill suited for learner control and prime candidates for more structure and guidance.

Although these studies provide a relatively clear profile for tendencies and characteristics typically associated with an avoidance orientation, it is important to note, that few conclusions regarding avoidance can be drawn from studies directly addressing goal orientation and learner control because these studies employed the two dimensional model of goal orientation which combines the prove and avoid orientations, making it difficult to interpret the results. Schmidt and Ford (2003) conducted the only learner control study I am currently aware of that investigated the role of all three goal orientation dimensions. This study found that encouraging avoidance individuals to

employ metacognitive strategies and think about what they did not know, was actually detrimental to their performance and led to a reduction in strategy use; however the same technique was highly effective for mastery oriented individuals. These findings are consistent with goal orientation theory which indicates that avoid individuals withdraw when faced with difficulty and have a strong fear of failure, while mastery oriented individuals persist and strive to use strategies that will improve their competence (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). This study also provides further support for the notion that training environments need to be customized to manage and meet the needs of each goal orientation and that avoidance oriented individuals are ill-suited for environments that encourage or rely on learner control.

In summary, based on the extant research in the domains of goal orientation and learner control, the two training environments created for the current study will vary on the degree of learner control provided. Specifically, the mastery oriented environment will provide the learners with the most control and the avoid oriented environment will largely depend on program control.

Now that the degrees of control have been established, the question becomes, "what will the learners control?" This question reflects one of the common criticisms of learner control studies. That is, researchers typically fail to define exactly what the learner can control (Reeves, 1993); therefore, limiting our ability to evaluate the effects of various types of learner control on different learners and the behavioral, affective, and cognitive processes (Ross & Morrison, 1989). The current study will permit varying degrees of control over training content/sequence and practice opportunities. The

research associated with these types of learner control is highlighted in the following sections.

Content and sequence. The extant research on learner control over content and sequence suggests that allowing learners to determine what content is viewed and in what order it is viewed, can have motivational and mental model development benefits (e.g., Hatano & Inagaki, 1986; Milheim & Martin, 1991; Steinberg, 1989). The research also indicates that control over content and sequence is inappropriate for training programs where the material needs to be viewed in a particular order and inappropriate when prior knowledge is needed to maneuver the program and trainees are new to the material (e.g., Milheim & Martin, 1991; Park & Hannafin, 1993). Furthermore, control over content and sequence had been found to be detrimental for trainees who are low on cognitive ability and low in persistence, (e.g., Carrier & Williams, 1988; Milheim & Martin, 1991). Once again, the existing data suggests that control over content and sequence can be beneficial; however, full control is not appropriate for all training programs or all learners. The implications for the current study are highlighted below.

The first question becomes is control over the content and sequence appropriate for the current study? The content for the current study, web page design, does not have a required order; therefore, making it an ideal candidate for this type of learner control. The material is divided into to several segments and each segment contains a distinct skill set that does not require information from other segments to be learned successfully. Similar computer-based training programs on web page design have not found it necessary to designate a particular order for the training material (Schmidt, 2001; Schmidt & Ford, 2003; Toney, 2000). However, this does not mean that full

control over content and sequence is appropriate for all learners. Based on research and theory, the current study varies the amount of control available to the learners in the two training environments.

As previously mentioned, the mastery-oriented environment will allow the trainees the most control. Specifically trainees will be allowed to choose the order they view the material in and allow them to select how much of the material is viewed. That is, trainees in the mastery environment will be allowed to skip material if they choose to. This decision is based on past research, which indicates that mastery oriented individuals expend more effort, use more effective study strategies, and exhibit higher levels of metacognitive activity (e.g., Dweck & Leggett, 1988; Elliot & Dweck, 1988; Elliot, McGregor, & Gable, 1999; Ford et al., 1998). These tendencies suggest that mastery-oriented individuals are well equipped to handle this type of learner control because they are more likely to invest the effort and employ the strategies needed for them to learn the material. They are also likely to think about and understand their own learning needs; therefore, capitalizing on the opportunity to develop a strong working knowledge of the material while maintaining control. Additionally, a study by Toney (2000) found that mastery oriented individuals in a computer-based training situation tend to make better use of this type of learner control by exploring more hyper-links and training material than performance oriented individuals. This behavior is consistent with their high levels of persistence and the desire to learn and develop an understanding of the material as opposed to a focus on finding the material they need to pass an exam (e.g., Dweck & Leggett, 1988; Elliot, McGregor, & Gable, 1999). As a result, individuals who are a good fit in mastery oriented environment are unlikely to skip

material simply because they are looking for an easy way out or because they do not believe that the effort they invest will benefit their learning.

Alternatively, the avoid-oriented environment will provide trainees with less control. Specifically the training program will move all trainees through the material in the same order and all trainees will visit each of the major topic areas before exiting the training program. This decision is based on past research and theory, which indicates that avoid-oriented individuals are more likely to skip difficult material, look for the easy way out, and spend less time trying to work through problems (Meece, 1994; Meece, Blumenfeld, & Hoyle, 1988). In addition to preventing trainees from avoiding material due to a fear of failure, and low persistence (e.g., Carrier & Williams, 1988; Elliot, 1999), this program-controlled design reduces the amount of effort required by the trainee. That is, the trainees are not required to make decisions about what to study, or what material to view next, as such decisions and opportunities to control and manipulate instruction, are likely to unappealing who believe their own efforts will not affect outcomes (Carrier & Williams, 1988). Simply stated, this design recognizes the tendency for avoid oriented individuals to associate the need to expend effort as a weakness and an indicator of low ability (e.g., Dweck, 1986; Nicholls, 1984). Finally, the reduction in decision-making tasks frees-up cognitive resources, allowing trainees to focus their attention on the task.

Practice. We have all heard the adage "practice makes perfect" and consider it common knowledge that practice is a crucial element of the learning process. Typically, practice refers to physical or mental rehearsal of a task, knowledge, or skill, intended to help us achieve a desired level of proficiency (Cannon-Bowers, Rhodenizer, Salas, &

Bowers, 1998). Practice is believed to have a host of benefits including facilitating learning, increasing retention, and improving the transfer of training (e.g., Goldstein, 1993; Cannon-Bowers et al, 1998; Goska and Ackerman, 1996).

Although researchers and practitioners generally agree that practice plays a key role in the learning process, it is important to note that not all forms or strategies of practice are created equal. There is an extensive literature indicating that the utility of practice can vary based on a number of factors including individual differences, environmental conditions, task complexity, number and duration of practice activities, spacing of practice, and the attributions and inferences made about the results of practice (e.g., Goska and Ackerman, 1996; Ford, Quinones, Sego, Sorra, 1992; Ivancic & Hesketh, 1995; Schmidt & Bjork, 1992; Shea & Morgan, 1979).

Based on this literature, trainers and researchers alike have become rather adept at incorporating a variety of practice activities into traditional training programs in an attempt to meet the needs of the average trainee. However, it is important to note that most practice related activities and choices have been held constant for all trainees and have been under the control of the researcher or trainer. As training technology continues to evolve, more emphasis needs to be placed on customizing practice and understanding the learner choices regarding practice.

A recent study conducted by Brown (2001) investigated the use of practice in a learner control training situation. Employees of a large manufacturing firm volunteered to participate in a computerized version of a required training program. The program was designed to provide trainees with ample learner control over the instructional pace and practice opportunities. The results indicated that there was a good deal of variance in the

amount of time spent on the training program and on practice activities. Therefore, as one would expect, not all trainees chose to make full use of all the features the training program offered. The results clearly indicated that the employees who spent the most time using the training program and the various practice activities performed the best on the knowledge tests.

Similarly, Toney (2000) investigated the breadth and complexity of various seeking behaviors including practice under learner control conditions. The study found that the frequency of practice and the complexity of practice sought were positively related to performance. In addition to these overall findings, these two studies also provide us with insight on how to customize practice opportunities according to one's goal orientation.

For instance, both the Brown (2001) and Toney (2000) studies expected mastery oriented individuals to choose to engage in more practice activities than performance oriented individuals, due to their desire to learn and achieve. However, neither study found support for this hypothesis. Brown (2001) actually found that mastery oriented individuals engaged in fewer practice opportunities than performance oriented individuals. Similarly, Toney (2000) found that low mastery oriented individuals and individuals reporting lower levels of confidence actually sought more practice.

Although these results may at first appear counter intuitive, they are actually consistent with theory and research. For instance, it has been found that individuals in learner control situations tend to assume they know more than they do and exit training situations sooner than they should (e.g., Flavel, 1979. Tennyson, Tennyson, & Rothen, 1980). This tendency coupled with the self-confidence associated with mastery oriented

individuals, may explain the limited use of practice opportunities among those individuals generally well suited for learner control. To address this issue, it may be necessary to employ another strategy found to be successful with mastery oriented individuals, that is, encourage individuals to think about their thinking (e.g., Schmidt 2001; Schmidt & Ford, 2003) by prompting them to consider practice activities. Specifically, in the design of the mastery oriented training environment, the current study intends to allow mastery oriented individuals to choose and direct their own practice activities; however, if practices exercises have not been accessed for a given segment of the training program, the trainee will be asked if they would like to review the practice activities before moving on to the next section or training topic. This design allows the trainee to maintain control over practice decisions, while reminding individuals to engage in effective learning strategies; therefore, capitalizing on the strengths associated with a mastery orientation and managing the tendency to become over confident and ineffectively use practice opportunities.

Returning to the Brown (2001) and Toney (2000) studies, it becomes clear that the findings regarding performance and low mastery oriented individuals actually seeking more practice are also consistent with theory and research. Specifically, avoidance oriented individuals and to some extent prove oriented individuals are motivated to avoid failure and to avoid making errors, as these would be considered signs of incompetence (e.g., Dweck, 1986; Elliot, 1999; Ivancic & Hesketh, 1995; Kanfer & Ackerman, 1989).

Although research suggests that avoidance individuals may seek practice to help them avoid failure and making errors in an evaluation situation, research also suggests that individuals who adopt avoidance goals tend to be more superficially engaged with

the learning material (Meece, 1994; Meece, Blumenfeld, & Hoyle, 1988). Specifically, they are more likely to skip difficult material, look for the easy way out, and spend less time trying to work through problems. Therefore, it is likely that avoid individuals will be especially in need of practice to help them focus on applying and learning the material; however, if they are superficially engaged, they are also likely to encounter difficulties and may try to withdraw from the practice or avoid it all together once they find it difficult. As a result, the training environment for avoid individuals will manage these tendencies by maintaining control. Specifically, the program will direct trainees to practice screens and move them through the practice materials gradually increasing the difficulty. This approach to practice, will allow the avoid oriented individual to learn in a safe, relatively non- evaluative environment, and ultimately increase their training performance. Additionally, this increase in performance can be obtained without requiring the trainee to make the decision to exert additional effort when faced with difficulty, as such a decision, would be a sign of incompetence to an avoidance oriented individual (e.g., Dweck, 1986; Nicholls, 1984). In this case, program control over the decision actually protects the avoid oriented individual from maladaptive behaviors.

Feedback. Feedback is information about an individual's performance or progress towards a goal. Ashford and Cummings (1983) define feedback as a subset of information available to individuals in their environment. Specifically, feedback provides information about behaviors and evaluates the quality of those behaviors (London, 1997).

Although feedback has a number of purposes, of particular interest to the current study is the important role feedback plays in the learning and self-regulatory processes.

Specifically, feedback allows people to identify what they have learned, what they have achieved, and where they should focus future effort to improve their performance and reduce or eliminate discrepancies (e.g., Kulger & DeNisi, 1996; London, 1997; Tennyson, Christensen, & Park, 1984).

Ideally, all individuals would respond to feedback in a positive and constructive manner, that is, all individuals would view feedback as an opportunity to improve and learn; however, this is rarely the case. Reactions to feedback vary greatly among individuals due to a number of factors including the source of feedback, the frequency of feedback, the purpose of feedback, what type of feedback is presented, and perhaps most importantly how the feedback is interpreted (e.g., Ashford and Cummings, 1983; Ilgen, Fisher, & Taylor, 1979; Kozlowski, Toney, Mullins, Weissbein, Brown, & Bell, 2001; Kulger & DeNisi, 1996; London, 1997).

There is a growing body of literature that demonstrates the influence of goal orientation on how feedback is interpreted (e.g., Park, Schmidt, Scheu, & DeShon, 2007; Tuckey, Brewer, & Williamson, 2002; VandeWalle, 2003; VandeWalle & Cummings, 1997). More specifically, research and theory indicate that mastery oriented individuals typically view feedback as task focused diagnostic information that can guide and improve behaviors, leading to increased task competence (e.g., Farr, 1993; Vandewalle & Cummings, 1997). This is in sharp contrast to performance oriented individuals who tend to view feedback as an evaluation of the self or ego focused and not as task related (e.g., Kanfer, 1990; Vandewalle & Cummings, 1997).

This distinction between ego-focused and task-focused information and tendencies is critical to understanding how to best optimize feedback situations for

different goal orientations. When information is regarded as task-focused, the higher order goal of maintaining a positive self-concept is not jeopardized by receiving feedback, because the feedback does not directly threaten the individual or their abilities (e.g., Ashford & Cummings, 1983; Baumeister, 1996). Ego-focused information on the other hand, is immediately internalized and viewed as a direct reflection of self-worth (e.g., Ashford & Cummings, 1983; Baumeister, 1996). In most cases, mastery oriented individuals interpret feedback from a task-oriented perspective, where as, prove and avoid oriented individuals interpret feedback from an ego-oriented perspective (e.g., Ashford & Cummings, 1983; Dweck, 1986; Dweck & Leggett, 1988; Farr, 1993; Kanfer, 1990; Vandewalle & Cummings, 1997).

In addition to influencing the interpretation of feedback, goal orientation has been found to influence responses to feedback (e.g., VandeWalle, 2003; Dweck & Leggett, 1988). The response differences across goal orientations are especially pertinent with regards to negative feedback. Specifically, when faced with negative feedback, mastery oriented individuals tend to persist at the task, increase their effort, and become more solution oriented (e.g., Dweck & Leggett, 1988; Elliot & Dweck, 1988; VandeWalle, 2003). These mastery oriented response patterns are typically regarded as highly adaptive in a learning or achievement situation (e.g., Dweck & Leggett, 1988; Elliot & Dweck, 1988;VandeWalle, 2003). Alternatively, performance oriented individuals tend to rely on more maladaptive response patterns, such as, decreasing their effort, withdrawing from the task, and making negative self-attributions. (e.g., Dweck and Leggett, 1988; Elliot and Dweck, 1988; VandeWalle, 2003).

The question becomes, what does this mean for the design of feedback delivery in computer-based environments? As in most environments, in computer-based environments there are three ways feedback can be obtained. Specifically, feedback can be provided, feedback can be inferred, and feedback can be sought (Ashford & Cummings, 1983). Due to the critical role played by feedback in a computer-based training situation (Azevedo & Bernard, 1995), the current study intends to provide feedback as opposed to allowing trainees to choose or control feedback. Inferring feedback, on the other hand, is something we have limited control over in any environment including those which are computer-based. Inferring feedback involves observing or monitoring what occurs in the environment and drawing conclusions (Ashford & Cummings, 1983). Any inferences drawn from the environment are out of our control and are likely to pattern themselves after the individuals natural tendencies (e.g., ego vs. task); however, research does suggest that even inferences require effort and performance/ego oriented individuals are unlikely to invest this effort (Ashford & Cummings, 1983). The rationale for providing feedback as opposed to relying on feedback seeking is discussed in greater detail below.

As previously mentioned, feedback is a crucial component of the learning process; specifically, it allows people to identify what they have learned, what they have achieved, and where they should focus future effort to improve their performance (e.g., Kulger & DeNisi, 1996; London, 1997; Tennyson, Christensen, & Park, 1984). However, as alluded to above, feedback can also be perceived to have costs and these costs become especially salient when individuals are put in a position to seek feedback (e.g., Ashford and Cummings, 1983; Park, Schmidt, Scheu, & DeShon, 2007; Tuckey,

Brewer, & Williamson, 2002). For instance, the public nature of seeking feedback from others can lead to self-presentation costs. These are costs associated with making you look bad to others by revealing uncertainty and potentially drawing attention to personal weaknesses. Research indicates that fear of self-presentation costs leads to less feedback seeking (e.g., Ashford 1986; Fedor, Rensvold, & Adams, 1992; Vandewalle & Cummings, 1997). Another type of cost associated with feedback seeking is ego costs. Ego costs refer to the threat to one's sense of self, which stems from hearing negative information or receiving negative feedback (Ashford 1989). In a computer-based environment that does not involve teams or other venues for sharing information with fellow trainees or supervisors, the costs associated with the feedback seeking perceptions of others are virtually eliminated. Ego related costs however, remain. The feedback seeking avoidance associated with ego costs (e.g., Ashford & Cummings, 1983; Park, Schmidt, Scheu, & DeShon, 2007; Tuckey, Brewer, & Williamson, 2002), coupled with the tendency for learners to assume they know more than actually they do and potentially not seek feedback (e.g., Flavel, 1979. Tennyson, Tennyson, & Rothen, 1980), suggests that feedback is not necessarily a feature learners should have control over.

Now that it has been established that feedback will be provided as opposed to sought, the question becomes what types of feedback will be provided? Despite the recognition that goal orientation influences the interpretation of feedback and its purpose (VandeWalle, 2003) most studies, aside from those focusing on feedback choice, provide all individuals with the same type of feedback. The current study proposes that different types of feedback be provided in the two training environments. Specifically, mastery oriented individuals will receive diagnostic feedback and avoid oriented individuals will

receive explanatory feedback. Feedback will be provided to all trainees during the quizzes at the end of each training segment. The rationale for providing these types of feedback is discussed in greater detail below.

Research and theory suggests that mastery oriented individuals prefer process oriented or diagnostic feedback (e.g., Farr, 1993; Park, Schmidt, Scheu, & DeShon, 2007; Vandewalle & Cummings, 1997). Diagnostic feedback refers to corrective information and strategies. It is likely that this type of feedback is viewed by mastery oriented individuals as useful because it is consistent with mastery oriented goals (e.g., learning and meeting challenges). Specifically, this type of feedback is task related and provides guidance for how to alter strategies, where to direct effort, and how to improve competence. Furthermore, this type of feedback presents the learning situation as a challenge and encourages the trainee to invest additional effort. These types of challenging situations which can be addressed through hard work and effort have been shown to lead to high levels of satisfaction, task involvement, and task enjoyment for mastery oriented individuals (e.g., Elliot, 1999; Elliot & Harackiewicz, 1996). Therefore this type of feedback should lead to a good fit for a mastery-oriented individual in terms of interpretation, and affective and behavioral responses.

Alternatively, research indicates that avoid oriented individuals prefer receiving either no feedback at all or self-affirming feedback (e.g., London, 1997; Park, Schmidt, Scheu, & DeShon, 2007). It is likely that these preferences stem from a fear of failure and a desire to protect their self-concepts from negative information (e.g., Ashford and Cummings, 1983;). As neither of these forms of feedback are especially useful from guidance or performance improvement perspective, the current study will provide

explanatory feedback in the avoid oriented environment. Explanatory feedback, is additional information provided after a trainee responds to questions on a particular topic. The information is typically designed to provide explanations or support material to improve a trainees understanding of the topic and improve their chances of correctly answering future questions on the topic or performing topic related skills. Explanatory feedback is task-based information, which has been found to be related to learning outcomes (Hancock, Thurman, & Hubbard, 1995) and to be more beneficial than outcome feedback alone (Pridemore & Klien, 1991). This suggests that elaborating on learning material may prove useful for learners, especially when the material is relatively new or not well learned.

This elaboration of material is likely to be especially beneficial for avoid oriented individuals, who tend to be more superficially engaged with the learning material, more likely to skip difficult material, look for the easy way out, and spend less time trying to work through problems on their own (Meece, 1994; Meece, Blumenfeld, & Hoyle, 1988). Essentially, explanatory feedback provides avoid oriented individuals with a second exposure to the training material in small doses and does not require the trainee to invest the effort involved in returning to the training material to review areas they are still having difficulty with. Additionally, explanatory feedback has the added benefit of being relatively non-evaluative, and as a result, less threatening to the self-concept. Therefore, this type of feedback should lead to a good fit for avoid-oriented individual in terms of interpretation, and affective and behavioral responses.

Current Study Overview

Advances in computer technology have provided us with the opportunity to customize computer-based training to meet an individual's needs as opposed to generic training aimed at the group level (e.g., Brown, 2001; Filipczak, 1996; Garger, 1999; Snow, 1986); however, this opportunity has yet to be realized beyond the domain of cognitive ability. The current study will investigate the potential of the motivation-based theory of goal orientation to guide the development of two customized learning environments. It is expected that customizing the learning environment will allow us to capitalize on the strengths and tendencies associated with the goal orientations, while minimizing the weaknesses, ultimately improving learning, and satisfaction, and reducing anxiety.

It is important to note, that the two learning environments developed for the current study are designed to support the individual's needs rather than to induce an avoid or mastery oriented state. More precisely, support refers to simultaneously maximizing the strengths and managing the weaknesses associated with each orientation. For instance, the avoid oriented environment provides structure and limited learner control over training content and sequencing; therefore, preventing avoid oriented trainees from skipping material due to a fear of failure and low persistence, as opposed to, encouraging avoidance of this material. This is in sharp contrast to past research, which has manipulated aspects of the environment (e.g., instructions, goals, difficulty levels) to enhance the tendencies of each goal orientation without managing the maladaptive tendencies that frequently derail learners. Thus, when referring to mastery and avoid

oriented learning environments in the following sections, the author is referring to customized supportive learning environments.

Through the development of supportive customized environments, the current study hopes to create a good fit between the learner and the environment. Specifically, the present study employs a more unitary fit perspective similar to that of Ostroff (1993), Schneider (1987), and Holland (1973; 1985), by defining both the environments and the individual learners in terms of goal orientation. For the purposes of the current study, fit is operationalized as a match between the trainees' goal orientation and the learning environment. For instance, an individual high in mastery orientation learning in the mastery environment would be considered a good fit, whereas, an individual low on avoid orientation learning in the avoid environment would be considered a poor fit. As depicted in Table 1, the present study is a 2 by 2 design that will focus on four of the 6 cells. Specific hypotheses will be outlined for each of these cells in the following pages.

Table 1. 2 X 2 Study Design

GOAL ORIENTATION	ENVIRONMENT	
	Mastery	**Avoid**
Mastery	X	X
Prove	--	--
Avoid	X	X

In addition to good fit, the present study will also investigate what is expected to be the poor fit of an individual high in mastery orientation in an avoid environment and an individual high in avoidance orientation in an mastery environment. As previously

discussed, a mastery orientation stems from desire to achieve (Elliot & Church, 1997) and usually results in seeking diagnostic feedback, expending more effort, using more effective study strategies, setting more challenging goals, and persisting in working toward these goals (Ames, 1984; Dweck & Leggett, 1988; Elliot & Dweck, 1988; Nicholls, 1984; VandeWalle & Cummings, 1998). As a result the mastery oriented learning environment has been designed to provide diagnostic feedback and to allow maximum control over training content/sequence and practice activities. This type of feedback and control are expected to be detrimental to avoidance oriented individuals whose orientation stems from fear of failure (Elliot & Church, 1997) and usually results in a fear of negative evaluation, risk avoidance, low persistence, withdrawal behaviors, limited effort investment, and more negative attitudes (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). To manage these maladaptive tendencies, the avoid oriented learning environment has been designed to provide explanatory feedback, and limited control over training content/sequence and practice activities. Although beneficial and supportive for an avoidance individual, this type of feedback and limited control are expected to foster frustration and boredom for mastery individuals (Dweck, 1986) while simultaneously preventing the use of their strengths such as the effective adjustment of learning strategies. Specific hypotheses will be outlined for these two cells in the following pages.

Current Study Models and Hypotheses

As previously mentioned, one learning environment will be developed to manage and reflect the needs, weaknesses, strengths, and tendencies associated with *mastery and avoid* goal orientations, for a total of two environments (i.e., avoid and mastery). Each

training environment will contain the same basic content; however, the environments will vary in terms of the three design features previous discussed. Specifically, the amount of control over sequencing and content, the amount of control over practice decisions, and the type of feedback provided. These design features will be varied to create the best possible environmental fit for the two goal orientations. As depicted in Figure 1, it is expected that an individual's domain specific goal orientation will interact with the training environment to influence training outcomes.

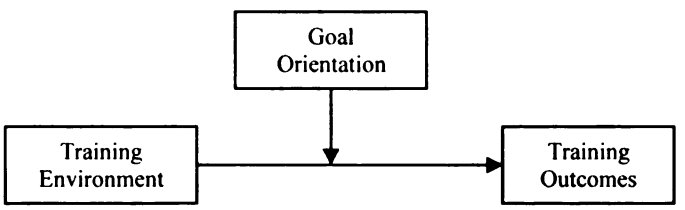

Figure 1. Conceptual Model

The complete model depicting the variables of interest and the specific hypotheses is presented in Figure 2. The relationships in this model are further described below, moving from back to front.

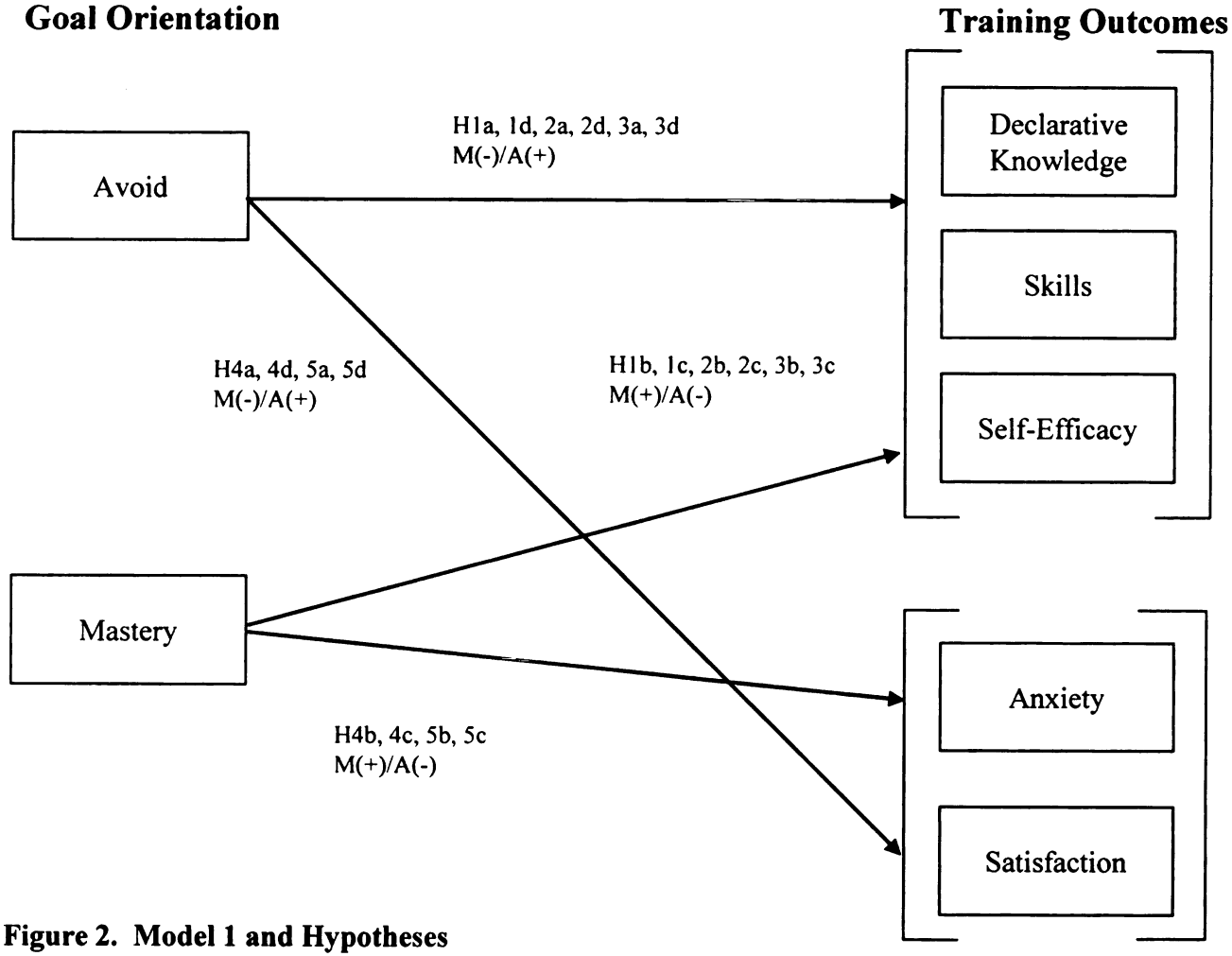

Figure 2. Model 1 and Hypotheses

Note: The environment is represented by the M/A under each hypothesis.

Goal Orientation and the Training Environment

As previously discussed, goal orientation is a way of viewing learning opportunities or approaching an achievement situation (e.g., Dweck, 1986; Farr, Hoffmann, & Ringenbach, 1993; Fisher, 1998). It is considered to be an individual motivational difference that serves as a filter or orientates people towards particular goals and influences the interpretation of and reactions to information, events, and actions (e.g., Dweck, 1996). For the purposes of the current study, three training environments have been developed to reflect and manage the needs, weaknesses, and strengths and tendencies of each goal orientation. It is expected that the trainees' goal orientation will interact with the training environment, such that, the better the fit, the more positive the training outcomes. For the purposes of the current study, fit is operationalized as a match between the trainees' goal orientation and the learning environment. For instance, an individual high in mastery orientation learning in the mastery environment would be considered a good fit, whereas, an individual low on avoid orientation learning in the avoid environment would be considered a poor fit. The expected relationships between goal orientation, the environment, and each of the training outcomes are described in greater detail below.

Over the years, goal orientation has been found to be related to various learning outcomes. In particular, both mastery and prove orientations have been found to be positively related to effort, grades, exam scores, performance, and self-efficacy (e.g., Button, Mathieu, & Zajac, 1996; Elliot, & Church, 1997; Elliot, & Harackiewicz, 1996; Elliot, McGregor, & Gable, 1999; Ford et al, 1998). This suggests that both mastery and prove orientations have the potential to lead to higher levels of declarative knowledge,

skill development, and self-efficacy. Up until this point however, research investigating the relationship between an avoid orientation and learning outcomes, has consistently found negative relationships between an avoidance orientation and effort, grades, performance, and self-efficacy (e.g., Elliot & McGregor, 1999; Elliot, McGregor, & Gable, 1999; VandeWalle, 2001; VandeWalle, Cron, & Slocum, 2005). Although, perceived competence and minimally evaluative situations have been found to minimize the negative relationships between avoidance and various outcomes (Elliot, & Harackiewicz, 1996; Elliot & Sheldon, 1997). Therefore suggesting, that avoidance oriented individuals can achieve positive relationships with learning outcomes if they are provided with enough structure and support to manage the maladaptive behaviors that typically derail their success.

The key difference between past research and the current study is the number of mechanisms that have been put in place to enhance learning while simultaneously maximizing the strengths and managing the weaknesses associated with each orientation. Specifically, each training environment incorporates quality design elements such as feedback and practice, which have been shown to lead to higher levels of declarative knowledge, skill development, and self-efficacy (e.g., Brown, 2001; Ford et al, 1998; Toney, 2000). Additionally, each of these environments contains design elements that have been customized to best meet the needs and tendencies of each goal orientation by enhancing their strengths and managing their weaknesses. Therefore, creating a match or a good fit between the trainee and the environment.

To further support the notion that each of these training environments should lead to positive learning outcomes when matched with the correct trainees, we can look to the

fit literature. The underlying assumption of fit research is that the better an individual matches her environment the more effective and positive the person and her environment will be (Ostroff 1993; van Vianen, 2001). Whereas a mismatch yields, withdrawal, anxiety, tension, stress, dissatisfaction, low self-esteem, and poor performance (e.g., Holland, 1973; Kahn, Quinn, Snoek, & Rosenthal, 1964; Meir, Melamed & Dinur, 1995; Walsh & Holland, 1992). The positive effects associated with a good fit, are expected to extend to training and achievement contexts. Although rare, there are a few studies that have specifically investigated and found positive relationships between person environment congruence and academic achievement. In these studies, fit or congruence between the students and the faculty members or the student and the college major was assessed using vocational interests batteries. These studies have found a good fit led to higher performance levels and higher grades (e.g., Posthuma & Navran, 1970; Reutefors, Schneider, Overtone, 1979). Research investigating academic congruence or fit has found also congruence to be related to higher levels of self-efficacy (Lent, Brown, & Larkin, 1987). These studies further support the idea that a good fit between an individual's goal orientation and the environment should lead to higher levels of declarative knowledge, skill development, and self-efficacy.

Finally, building off the broader fit literature, a recent study by Jagacinski, Madden, and Reider (2001) investigated a matching hypothesis regarding the instructions provided in a training program and the individual's goal oriented approach to achievement tasks. Specifically, the study looked at the impact of providing ego-related instructions, which would put greater emphasis on the individuals' role and task-related instructions, which would put greater emphasis on the task itself to individuals who

approach tasks from either a task oriented (mastery) or an ego oriented (performance) perspective. Although the results were weak, there was evidence that matching instructions to an individual's dominant orientation can have a positive impact on performance. However, this effect was only found when the instructions activated an individual's strengths and not when the instructions activated the individual's weaknesses. For instance, individuals who approach tasks from a task perspective who were provided with task-based instructions performed significantly better than those provided with ego-based instructions. However, individuals who approach tasks from an ego perspective who were provided with ego-based instructions actually performed worse on difficult tasks. This finding is consistent with the underlying concept of the current study, that is, when developing an environment for a particular type of individual, it is important to capitalize on the strengths and tendencies associated with each of the goal orientations, while, managing the weaknesses. For instance, an individual who interprets difficulty with a task as a personal failure, who is then encouraged to believe the difficulty is their fault, is likely to self-destruct; because instead of managing their weaknesses, you are encouraging their expression. It would have been more productive to provide an ego-oriented individual with non-personally threatening or task based instructions to keep the individual engaged in the task and to prevent withdrawal and other self-destructive behaviors. Contrary to Jagacinski et al.'s (2001) hypotheses, it was found that when faced with a difficult task, ego-oriented individuals actually performed better when provided with task-based instructions. Overall, this study provides us with additional evidence that a good fit can yield more positive training outcomes, as long as that fit is designed to both support strengths and manage weaknesses.

Looking across the evidence from research on goal orientation, the incorporation of quality training design principles such as practice and feedback, and the fit literature it is expected that the trainees' goal orientation will interact with the training environment, such that, the better the fit, the more positive the learning outcomes. Specifically, it is hypothesized that a good fit will lead to higher declarative knowledge scores:

> *Hypothesis 1a: High avoidance trainees in an avoidance-oriented learning environment will receive higher declarative knowledge scores than low avoidance trainees.*
>
> *Hypothesis 1b: High mastery trainees in a mastery-oriented learning environment will receive higher declarative knowledge scores than low mastery trainees.*

Alternatively, it is expected that a poor fit will lead to lower declarative knowledge scores:

> *Hypothesis 1c: High mastery trainees in an avoidance-oriented learning environment will receive lower declarative knowledge scores than low mastery trainees.*
>
> *Hypothesis 1d: High avoidance trainees in a mastery-oriented learning environment will receive lower declarative knowledge scores than low avoidance trainees.*

Similarly, it is expected that a good fit will lead to higher scores on the skills test and a poor fit will lead to lower scores on the skills test:

> *Hypothesis 2a: High avoidance trainees in an avoidance-oriented learning environment will score higher on the skills test than low avoidance trainees.*
>
> *Hypothesis 2b: High mastery trainees in a mastery environment-oriented learning will score higher on the skills test than low mastery trainees.*
>
> *Hypothesis 2c: High mastery trainees an avoidance-oriented learning environment will score lower on the skills test than low mastery trainees.*
>
> *Hypothesis 2d: High avoidance trainees in a mastery-oriented learning environment will score lower on the skills test than low mastery trainees.*

Finally with regards to learning outcomes, it is expected that a good fit will lead to higher levels of self-efficacy and a poor fit will lead to lower of self-efficacy:

> *Hypothesis 3a: High avoidance trainees in an avoidance-oriented learning environment will report higher levels of post-training self-efficacy than low avoidance trainees.*
>
> *Hypothesis 3b: High mastery trainees in a mastery-oriented learning environment will report levels higher of post-training self-efficacy than low mastery trainees.*
>
> *Hypothesis 3c: High mastery trainees in an avoidance-oriented learning environment will report lower levels of post-training self-efficacy than low mastery trainees.*
>
> *Hypothesis 3d: High avoidance trainees in a mastery-oriented learning environment will report lower levels of post-training self-efficacy than low avoidance trainees.*

In addition to learning outcomes, reactions such as satisfaction with the training program may play an important role in trainees' receptivity to the training (Goldstein & Ford, 2002). In the current study, each training environment has been designed to capitalize on the strengths and manage the weaknesses associated with each goal orientation, in an effort to improve performance and self-efficacy and reduce negative behaviors and negative perceptions the self. Similar effects have been found in past research to have positive affects on various satisfaction variables. For instance, it has been found that improving an individual's perceptions of competence can have positive effects on satisfaction with progress, satisfaction with performance, life satisfaction, self-esteem, and general well being (Elliot & Sheldon, 1997). Additionally, research investigating the benefits of congruence or fit in the workplace, has consistently found that a good fit leads to higher levels of personal, occupational, and organizational satisfaction (e.g., Bretz & Judge, 1994; Hener & Meir, 1981; Meir, & Erez, 1981; Meir, Melamed, & Dinur, 1995; Walsh & Holland, 1992). It is expected that similar effects on

satisfaction will be found for a training program that matches the needs associated with the trainees' goal orientation. Therefore, it is hypothesized that:

Hypothesis 4a: High avoidance trainees in an avoidance-oriented learning environment will report higher levels of satisfaction than low avoidance trainees.

Hypothesis 4b: High mastery trainees in a mastery-oriented learning environment will report higher levels of satisfaction than low mastery trainees.

Alternatively, it is expected that a poor fit will lead to lower levels of satisfaction:

Hypothesis 4c: High mastery trainees in an avoidance-oriented learning environment will report lower levels of satisfaction than low mastery trainees.

Hypothesis 4d: High avoidance trainees in a mastery-oriented learning environment will report lower levels of satisfaction than low avoidance trainees.

Similarly it is expected that designing the training programs to capitalize on the strengths and manage the weaknesses associated with each goal orientation will lead to lower levels of anxiety. As previously mentioned, state anxiety is a temporary emotional state or condition characterized by tension, fear, and heightened autonomic nervous system activity (Gaudry & Spielberger, 1971). By creating a better fit between the person and the environment, the fear of failure and the resulting state anxiety should be reduced. This notion is supported by fit research has consistently found that a good fit leads to lower levels of anxiety (e.g., Meir, Melamed, & Dinur, 1995; Walsh & Holland, 1992). Similar ideas were espoused by Snow (1986; 1989; 1992) who expected that tailoring education programs to students would result in lower levels of fear of failure and anxiety. Therefore, it is hypothesized that:

Hypothesis 5a: High avoidance trainees in an avoidance-oriented learning environment will report lower levels of state anxiety than low avoidance trainees.

Hypothesis 5b: High mastery trainees in a mastery-oriented learning environment will report lower levels of state anxiety than low mastery trainees.

Alternatively, it is expected that a poor fit will lead to higher levels of state anxiety:

Hypothesis 5c: High mastery trainees in an avoidance-oriented learning environment will report higher levels of state anxiety than low mastery trainees.

Hypothesis 5d: High avoidance trainees in a mastery-oriented learning environment will report higher levels of state anxiety than low avoidance trainees.

The Extended Model

The first set of hypotheses were based on a simple model that focused on the key areas of interest for the current study, namely, the environment, goal orientation, and training outcomes. The following set of hypotheses is based on a more complex model (See Figure 3), which incorporates aspects of self-regulation. The goal is to improve our understanding of the broader motivational system by investigating how global self-regulatory processes may become differentiated across people and situations and operate to guide the actual behaviors that we observe in daily life.

As previously discussed, self-regulatory processes are a mechanism that allow individuals to guide their goal-directed behaviors over time and across situations (e.g., Austin & Vancouver, 1996; Karoly, 1993). These global self-regulatory processes operate through a series of behavioral, affective, and cognitive components, which continually influence each other and our observable behaviors and reactions. An individual's goal orientation is expected to interact with the training environment and function as a filter (e.g., Dweck, 1996) through which all information interpreted. Ultimately, the training environment and its interaction with goal orientation will influence the cognitive, affective, and behavioral components of self-regulation. These self-regulatory processes will in turn influence training outcomes.

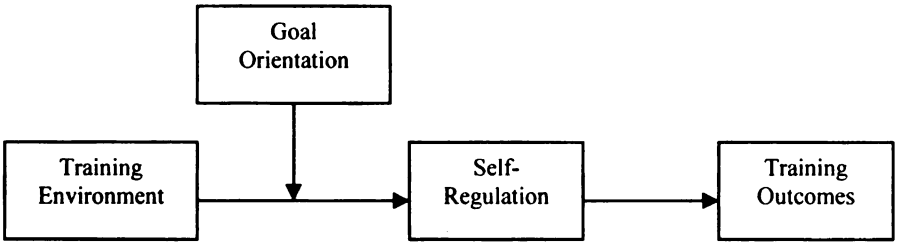

Figure 3. Extended Model

Due to the design of the training environments some of the self-regulatory behaviors and processes typically observed are already accounted for, such as, feedback and practice choices. Therefore, to improve our understanding of the broader motivational system it is important to select aspects of the self-regulatory process that are not pre-determined by the training program. Specifically the current study will focus on the desire to withdraw (behavioral) and off task thoughts (cognitive). Each of these self-regulatory components and their expected relationships are discussed below (See Figure 4).

Desire to Withdraw

Withdrawal refers to behaviors such as quitting, physically removing oneself from a situation or an environment, or withholding behavioral effort such as choosing not to practice. In computer-based training, quitting or the failing to complete the training program is a consistent problem. Research suggests, that computer based courses have a dropout rate 10-20% higher than traditional instructor led courses (Frankola, 2001). There are a number of motivation based reasons individuals may choose to withdraw from a task or training program, including a desire to protect their sense of self and boredom. The desire to feel good about yourself or to have a positive self-concept is a natural human need or goal (Baumeister, 1996). It is how one achieves this positive

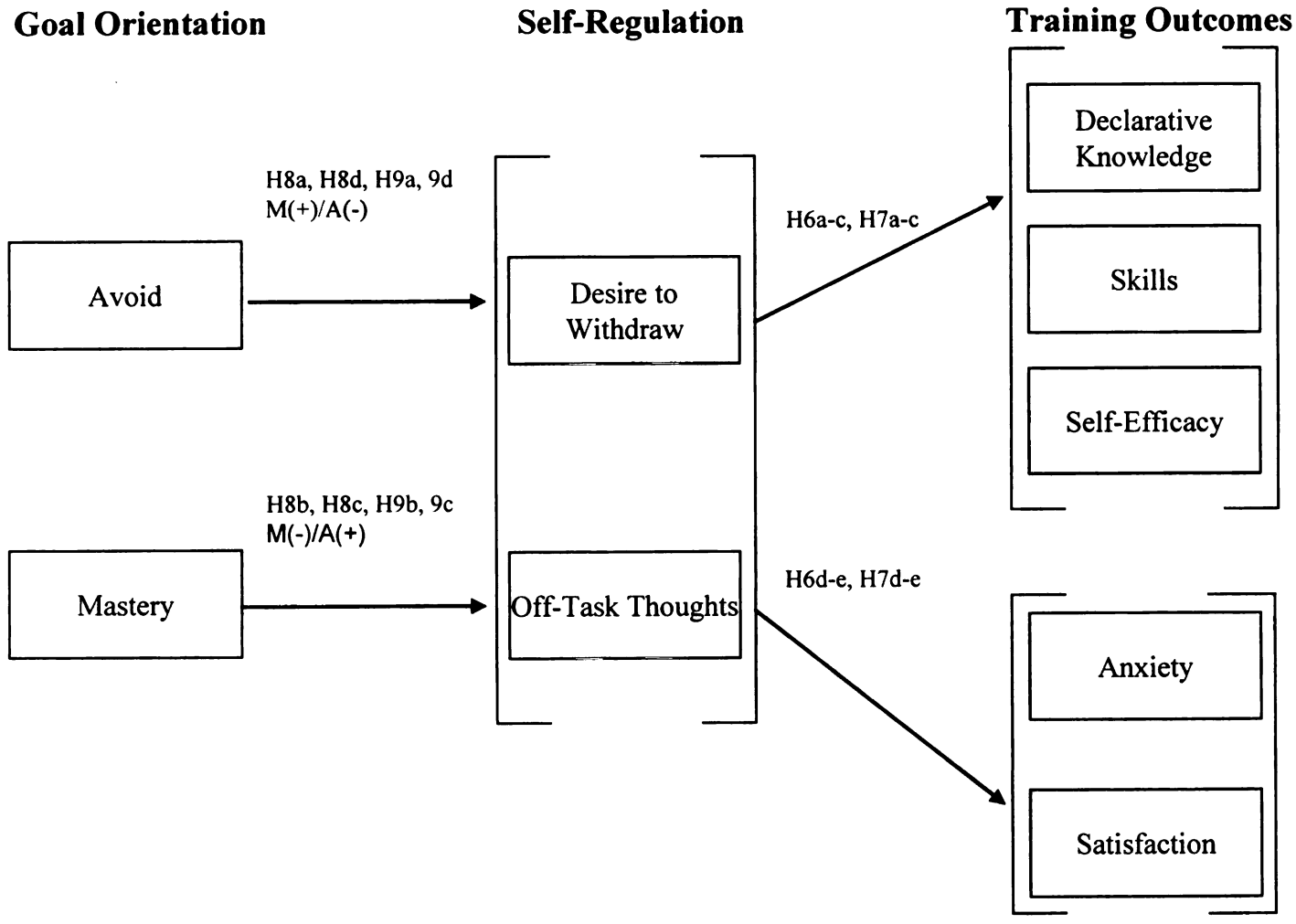

Figure 4. Model 2 and Hypotheses

Note: The environment is represented by the M/A under each hypothesis.

self-concept that tends to differ across goal orientations (e.g., Dweck, 1986; Carr, DeShon, & Dobbins, 2001). Specifically, research indicates that performance oriented individuals tend to view failure and difficulty with a task as an indication of low ability (e.g., Ames, 1984; Elliot & Dweck, 1988). These low ability perceptions tend to result in withdrawal behaviors, which provide the individual with an alternative excuse for their poor performance, that is, "I have the ability to do this task but I am not really trying" (e.g., Ames, 1984; Elliot & Dweck, 1988).

Alternatively, mastery oriented individuals tend to view difficulty as a cue to increase their effort and improve their strategies (e.g., Elliot & Dweck, 1988; Nicholls, 1984). This group of individuals enjoys being challenged and interprets both challenges and expending effort to meet these challenges, as a positive reflection on their sense of self; therefore, difficulty does not result in withdrawal behaviors (e.g., Ames, 1984; Elliot & Dweck, 1988; Nicholls, 1984). However, when faced with a task that requires limited effort, mastery oriented individuals report being bored, less satisfied, and disappointed and begin to lose interest in the task (Dweck, 1986). Thus, for mastery oriented individuals, withdrawal behaviors are more likely to stem from boredom and a lack of difficulty.

In the current study, although trainees have the option to discontinue the experiment at any time, it is expected that like most studies, the vast majority of participants will complete the experiment. Therefore, unlike the real world, actually quitting or withdrawing from the training program is relatively unlikely. However, this does not mean that many of the trainees would not quit under other circumstances. In an

effort to help us better explain real world withdrawal behaviors, the current study will look at the trainees' desire to withdraw from the training program.

Regardless of the motivation behind withdrawal behaviors or the desire to withdraw (i.e., protecting the self-concept or boredom), it is expected that the associated reduction in effort applied towards learning the material will lead to lower levels of learning outcomes. Therefore, it is hypothesized that:

Hypothesis 6a: Desire to withdraw will be negatively related to declarative knowledge scores.

Hypothesis 6b: Desire to withdraw will be negatively related to scores on the skills test.

Hypothesis 6c: Desire to withdraw will be negatively related to self-efficacy.

Similar to learning outcomes, it is expected that withdrawal behaviors will have an impact on reaction-based learning outcomes as well. In particular, for performance oriented, or prove and avoid oriented individuals, who are engaging in withdrawal behaviors to protect their self-concept, it is expected that they will also find fault with the training program and report being less satisfied. By finding fault with the training program and indicating low satisfaction, these individuals can further protect their self-concepts by attributing difficulty with the task to a non-ability-related source. This performance-oriented pattern, of using an outside source as an excuse for difficulty, is consistent with research and theory (e.g., Baumeister, 1996; Carr, DeShon, & Dobbins, 2001). Alternatively, mastery oriented individuals who are engaging in withdrawal behaviors, are likely to report low satisfaction with the training program because they are actually bored, disappointed, and have lost interest in the task (Dweck, 1986). Therefore, regardless of the motivation behind the withdrawal behaviors or the desire to withdraw, it is hypothesized that:

Hypothesis 6d: Desire to withdraw will be negatively related to satisfaction with the training.

Finally, it is expected that withdrawal behaviors or the desire to withdraw will be positively related to state anxiety. This expectation stems from the fact that, state anxiety is associated with feelings of tension, frustration, and fear (Gaudry & Spielberger, 1971). Such feelings are likely to accompany the need to protect one's self concept due to poor performance. Therefore, regardless of the motivation behind the withdrawal behaviors, it is hypothesized that:

Hypothesis 6e: Desire to withdraw will be positively related to state anxiety.

Off Task Thoughts

From a cognitive perspective, effort can be conceptualized in a number of ways including, the amount of time spent on a task, the amount of cognitive resources necessary for a task, and off task thoughts or the amount of attention or cognitive effort focused on/off a given task (e.g., Paas, 1992). In recent years, researchers have become increasingly interested in off task thoughts, due to the recognition that individuals may appear to be spending time on a task, while their attention is elsewhere. This type of mindless review of material is unlikely to lead to learning (e.g., Salomon, 1983; Salomon, 1985) and is difficult to capture with other conceptualizations of mental effort such as time on task.

Off task attention may have special significance for computer-based learning due to the increased opportunities for learner control (Salomon, 1985). Specifically, the more control learners have over the learning process, the more important their voluntary engagement in the task becomes (Salomon, 1985). This notion has been applied as a post-hoc explanation in a number of learner control situations, where strategies that

typically enhance learning for trainees, such as providing feedback, have failed for some students and not others (e.g., Hancock, Thurman, & Hubbard, 1995; Williams 1996).

Research specifically investigating the concept of off task thoughts in training situations indicates that those who exert greater cognitive effort, or have fewer off task thoughts, acquire higher levels of knowledge and skill (Fisher & Ford, 1998; Kanfer & Ackerman, 1989). These findings are consistent with the idea that mindfulness or exerting cognitive effort leads to a greater depth of information processing and places less of a strain on cognitive resources than splitting our attention between the task and other thoughts (Kanfer & Ackerman, 1989; Salomon, 1983; Salomon, 1985). Therefore, it is hypothesized that:

Hypothesis 7a: Off-task thoughts will be negatively related to declarative knowledge scores.

Hypothesis 7b: Off-task thoughts will be negatively related to scores on the skills test.

In addition to interfering with learning, off task thoughts may serve as a self-defense mechanism, that is, if individuals believe that they are not doing well, they may engage in off task thoughts or a reduction in cognitive effort as a means of self handicapping (Baumeister, 1996). Simply stated, off tasks thoughts may serve as a convenient excuse – "I am not doing well on this task only because I am not really trying." Alternatively, individuals who are confident in their progress or performance are likely to be learning more, have higher self-efficacy, and engage in fewer off-task thoughts. This expectation is consistent with the findings of a study by Dobbins (2002), where off task thoughts or limited cognitive effort, was found to be negatively related to self-efficacy. Therefore, it is hypothesized that:

Hypothesis 7c: Off-task thoughts will be negatively related to self-efficacy.

Off task thoughts are also expected to be related to non-learning outcomes. For instance, although it is possible to be satisfied with a training program and still perform poorly, it is expected that individuals who are engaging in off task thoughts as a defense mechanism for poor performance will also find fault with the training program and report being less satisfied. This would be consistent with the theory of cognitive dissonance, which indicates that individuals have a need to rationalize their behavior and feel tension when their thoughts, beliefs, and actions are inconsistent (e.g., Festinger, 1957; Myers, 1993; Sherman & Gorkin, 1980). As a result, individuals tend to adjust their thoughts and behaviors to eliminate inconsistencies and tension (e.g., Festinger, 1957; Myers, 1993; Sherman & Gorkin, 1980). This desire to be consistent tends to become more enhanced after decisions are made (Knox & Inkster, 1968; Myers, 1993; Young, Walker, & Arrowood, 1977), such as, the decision to reduce cognitive effort and engage in off task thoughts. Therefore, it is hypothesized that:

> *Hypothesis 7d: Off-task thoughts will be negatively related to satisfaction with the training program.*

Finally, it is expected that engaging in off task thoughts will be positively related to state anxiety. As previously discussed, state anxiety is a temporary emotional state or condition characterized by tension, fear, and heightened autonomic nervous system activity (Gaudry & Spielberger, 1971). Additionally, state anxiety has been found to have deleterious effects on learning, performance, and academic achievement (e.g., Colquitt, et al.1998; Gaudry & Spielberger, 1971; Weissbein, 2000). If individuals are engaging in off task thoughts as a defense mechanism for poor performance, it is likely that feelings of anxiety are associated with the need for a defense and the threat of poor performance. Therefore, it is hypothesized that:

Hypothesis 7e: Off-task thoughts will be positively related to anxiety.

Goal Orientation and the Training Environment

Each of the training programs in the current study has been designed to capitalize on the strengths and manage the weaknesses associated with each goal orientation. It is expected that this will lead to a good fit between the individual and the training program and ultimately result in lower levels of withdrawal behaviors or the desire to withdraw. For instance, the mastery-oriented environment was designed to permit the highest degree of learner control, which requires trainees to invest effort to determine what material to view next, how much practice is needed, and how to alter strategies and behaviors in response to feedback. For mastery oriented individuals this produces a good fit in that working through the training program is a learning opportunity that poses a challenge and requires effort; therefore, leading to lower levels of boredom and disappointment, and ultimately lower levels of withdrawal. Similarly, the training environments designed for prove and avoid individuals have been designed to reduce threats to the self-concept and maladaptive behavioral responses such as the desire to withdraw. These environments also permit lower levels of learner control; therefore, reducing the amount of effort perceive to be invested by trainees and further reducing ability related threats to the self-concept. Therefore, it is hypothesized that:

Hypothesis 8a: High avoidance trainees in an avoidance-oriented learning environment will indicate a lower desire to withdraw than low avoidance trainees.

Hypothesis 8b: High mastery trainees in a mastery-oriented learning environment will indicate a lower desire to withdraw than low mastery trainees.

Alternatively, it is expected that a poor fit will lead to a greater desire to withdraw. Specifically, when faced with a task that requires limited effort, mastery oriented

individuals report being bored, less satisfied, and disappointed and begin to lose interest in the task (Dweck, 1986). Thus, for high mastery oriented individuals, the type of feedback, lack of difficulty, and limited control associated with the avoidance-oriented learning environment is likely to lead to withdrawal behaviors stemming from boredom. Similarly, the lack of support mechanisms for high avoid individuals in the mastery-oriented learning environment is likely to lead to typical avoidance oriented withdrawal behaviors.

Hypothesis 8c: High mastery trainees in an avoidance-oriented learning environment will indicate a higher desire to withdraw than low mastery trainees.

Hypothesis 8d: High avoidance trainees in a mastery-oriented learning environment will indicate a higher desire to withdraw than low avoidance trainees.

As previously mentioned, it is expected that designing the training programs to capitalize on the strengths and manage the weaknesses associated with each goal orientation will lead to a good fit between the individual and the training program. Furthermore a good fit should yield higher levels of confidence and higher performance expectations therefore creating less of a need for self-handicapping and off task thoughts. Therefore, it is hypothesized that a good fit will lead to fewer off task thoughts:

Hypothesis 9a: High avoidance trainees in an avoidance-oriented learning environment will report fewer off task thoughts than low avoidance trainees.

Hypothesis 9b: High mastery trainees in a mastery-oriented learning environment will report fewer off task thoughts than low mastery trainees.

Alternatively, it is expected that the boredom, anxiety, and self-handicapping associated with a poor fit will lead to an increase in off-task thoughts.

Hypothesis 9c: High mastery trainees an avoidance-oriented learning environment will report more off task thoughts than low mastery trainees.

Hypothesis 9d: High avoidance trainees in a mastery-oriented learning environment will report more off task thoughts than low avoidance trainees.

CHAPTER 2: METHOD

Overview

Participants in this study completed a web-based training program on how to design their own web pages. The participants were randomly assigned to one of two training environments designed to match the needs, strengths, and tendencies associated with either avoid or mastery goal orientations. Each training environment contained the same basic content but varied in terms of the amount of control over sequencing and content, the amount of control over practice decisions, and the type of feedback provided.

Participants

Participants were undergraduates at Michigan State University enrolled in psychology courses, which offered course credit for participating in experiments. A power analysis suggested the need for approximately 130-150 participants for the current study. Although there are not many effect sizes that directly relate to the relationships that will be tested in this experiment, the few that exist sufficient power to detect medium effect sizes.

For instance, Colquitt, et al.1998 meta-analysis reported moderate relationships between anxiety and various training outcomes although a specific relationship between anxiety and transfer was not reported. Weissbein (2000) reports a small ($\approx$.10) and moderate ($\approx$.30) relationships between anxiety and training outcomes including an application task.

Past research has also found practice activities to be positively related to learning outcomes. These relationships have generally been in the moderate to high range. Specifically, Toney (2000) reports moderate relationships between practice complexity

(≈.30) and self-efficacy, as well as, practice frequency (≈.26) and self-efficacy. Additionally, Toney (2000) reports strong relationships between practice complexity and performance (≈.54), as well as, practice frequency (≈.52) and performance. Similarly, Brown (1999) had multiple measures of practice and performance generally in the moderate ranging from .22 to .45. Finally, (Ford et al., 1998) report moderate relationships between practice and knowledge (≈.21), as well as, moderate relationships between practice and performance (≈.28).

Similarly, past research has found feedback to be related to learning outcomes. These relationships have generally spanned the entire range. For instance, feedback was found to be positively related to learning by Toney (2000). This study employed multiple measures of feedback and found that the relationships between feedback and learning ranged from .17 - .21. VandeWalle and Cimmings (1997) report a moderately positive relationship between feedback seeking and learning (≈.39). VandeWalle, Cron, and Slocum (2005) report low to moderate relationships between feedback and self-efficacy (≈.20) and feedback and performance (≈.11). Where as Nease, Mudgett, and Quinones (1999) report strong relationships between positive feedback and self-efficacy (≈.76, .63, .59).

Finally, past research has found off-task thoughts and attention to be negatively related to various learning outcomes. Ford and Fisher (1998) report moderate negative relationships between off-task attention and verbal knowledge (≈ -.35), as well as, moderate negative relationships between off-task attention and transfer (≈-.33). Similarly, Dobbins (2002) reports multiple moderate relationships between off-task attention and self-efficacy (≈-.38, -.28, -. 29 -.16).

Based on this information, the current study expected to find moderate effect sizes. Cohen (1992) states that a total sample size of 68 is necessary to detect a correlation at a medium effect size with a power of .80 and an alpha of .05. A sample size of 107 is needed to test significant multiple correlations with 8 predictors and a medium effect size. It is estimated that a sample size of 28-30 per cell is necessary to detect a medium effect with a four-group factorial design, for a total of 112-120 subjects. As the current study used the more powerful test of multiple regression and not a factorial ANOVA to analyze the data for the current study, it was proposed that 130-150 participants would be included in the study. This meets the estimates for a factorial ANOVA and exceeds the estimates for multiple regression.

Procedure

Participants completed the experiment in a university computer laboratory. All computers used for the experiment were equipped with Microsoft Internet Explorer and the Dream Weaver web-page development software. Participants were provided with an internet address, which was used to access the web-based experiment and the training environments. Upon accessing the introductory experiment web page, participants found and read instructions for completing the experiment. Participants were told that they would learn how to design their own internet web page. They were also told that they would have the opportunity to practice what they learned, take quizzes at the end of each lesson, and receive feedback on these quizzes. Additionally, participants were told that at the conclusion of the training they would take a final quiz and develop and submit to the experimenter their own web pages using the material they learned in training.

Next, participants read the informed consent form and indicated their agreement to participate in the experiment by entering their personal identification number (PID) and continuing with the training program. Anyone who did not wish to participate in the experiment could exit the training program and discontinue the experiment at that point, or at any other point during the training. The consent form explained the nature and procedures of the experiment, the risks and benefits of the experiment, and their right to withdraw participation at any time without penalty (Appendix A). Contact information was provided for the researcher, the Psychology Department, and UCRIHS.

Participants then completed several short measures of their individual characteristics (Appendix B). Specifically, they answered questionnaires to establish their demographic information such as age, gender, GPA, and SAT/ACT scores (SAT/ACT scores were used as a proxy for cognitive ability), domain specific prove, avoid, and mastery goal orientations, pre-training self-efficacy, pre-training state anxiety, and prior experience with the internet and creating web pages. After completing these questionnaires, participants were randomly assigned to one of the two training environments (i.e., avoid or mastery).

The training program was presented to participants as a series of training lessons or major topic areas. Each lesson was divided into several smaller topic areas and each topic was presented on its own web page (Appendix C). At the end of each lesson, the participants took a brief quiz, the results of this quiz were used as the basis for the feedback provided. All trainees were informed that their goal was to learn the content of the training program to the best of their abilities so that they could successfully complete a series of exercises at the completion of the training program. How trainees moved

through the training program, that is, decisions regarding content and sequence, opportunities for practice, and types of feedback, depended on which training environment trainees are randomly assigned to. The specific training environments are discussed in the following section.

Upon completion of the training program, all participants completed a series of learning measures and questionnaires (Appendix B). Specifically, they completed a multiple choice declarative knowledge quiz and a skill-based exercise requiring them to demonstrate specific tasks learned in the training program. Participants also answered questionnaires to establish their post-training self-efficacy, post-training state anxiety, satisfaction with the training program, attributions, desire to withdraw, and off-task thoughts. Upon completion of the training program and skills test, participants read a debriefing form (see Appendix E) detailing the nature of the experiment.

Prior to running any experimental participants through the procedure described above, both of the environments were pilot tested to ensure that there were no computer programming or data capture errors. Any participants used in this process were not counted towards the current study participant total.

Training Environments

As previously mentioned, the current study used the motivation-based theory of goal orientation to guide the development of two customized learning environments. These environments were developed to manage and reflect the needs, weaknesses, strengths, and tendencies associated with avoid and mastery goal orientations. Both training environments contained the same basic content (i.e., web page development); however, the environments varied in terms of the three design features. Specifically, the

amount of control over sequencing and content, the amount of control over practice decisions, and the type of feedback provided. The theory and research supporting each these variations was explained in earlier sections; the current section will provide a brief overview of the two learning environments.

The mastery oriented learning environment was designed to provide diagnostic feedback and to allow maximum control over training content/sequence and practice activities. Diagnostic feedback refers to corrective information and strategies. It is likely that this type of feedback is viewed by mastery oriented individuals as useful because it is consistent with mastery oriented goals (e.g., learning and meeting challenges). Specifically, this type of feedback is task related and provides guidance for how to alter strategies (see Appendix D for feedback samples), where to direct effort, and how to improve competence, which have been shown to lead to high levels of satisfaction, task involvement, and task enjoyment for mastery oriented individuals (e.g., Elliot, 1999; Elliot & Harackiewicz, 1996). Therefore this type of feedback should lead to a good fit for a mastery-oriented individual in terms of interpretation, affective, and behavioral responses. Additionally, the mastery-oriented environment allows the trainees to choose the order they view the training material in and allow them to select how much of the training material is viewed. That is, trainees in the mastery environment will be allowed to skip material if they choose to. This decision is based on past research, which indicates that mastery oriented individuals expend more effort, use more effective study strategies, and exhibit higher levels of metacognitive activity (e.g., Dweck & Leggett, 1988; Elliot & Dweck, 1988; Elliot, McGregor, & Gable, 1999; Ford et al., 1998). These tendencies suggest that mastery-oriented individuals are well equipped to handle this type

of learner control because they are more likely to invest the effort and employ the strategies needed for them to learn the material. Finally, the design of the mastery oriented training environment allows mastery oriented individuals to choose and direct their own practice activities; however, if practices exercises have not been accessed for a given segment of the training program, the trainee will be asked if they would like to review the practice activities before moving on to the next section or training topic. This design allows the trainee to maintain control over practice decisions, while reminding individuals to engage in effective learning strategies; therefore, capitalizing on the strengths associated with a mastery orientation and managing the tendency to become over confident and ineffectively use practice opportunities.

The avoid oriented learning environment was designed to provide explanatory feedback, and limited control over training content/sequence and practice activities. Explanatory feedback, is additional information provided after a trainee responds to questions on a particular topic. The information is typically designed to provide explanations or support material to improve a trainees understanding of the topic and improve their chances of correctly answering future questions on the topic or performing topic related skills. Explanatory feedback is relatively non-evaluative task-based information, which has been found to be related to learning outcomes (Hancock, Thurman, & Hubbard, 1995) and to be more beneficial than outcome feedback alone (Pridemore & Klien, 1991). This elaboration of material is likely to be especially beneficial for avoid oriented individuals, who tend to be more superficially engaged with the learning material, more likely to skip difficult material, look for the easy way out, and spend less time trying to work through problems on their own (Meece, 1994; Meece,

Blumenfeld, & Hoyle, 1988). Essentially, explanatory feedback provides avoid oriented individuals with a second exposure to the training material in small doses and does not require the trainee to invest the effort involved in returning to the training material to review areas they are still having difficulty with (see Appendix D for feedback samples). Additionally, the avoid-oriented environment will provide trainees with limited control over training content and sequence. Specifically the training program moves all trainees through the material in the same order and all trainees will visit each of the major topic areas before exiting the training program. This decision is based on past research and theory, which indicates that avoid-oriented individuals are more likely to skip difficult material, look for the easy way out, and spend less time trying to work through problems (Meece, 1994; Meece, Blumenfeld, & Hoyle, 1988). In addition to preventing trainees from avoiding material due to a fear of failure, and low persistence (e.g., Carrier & Williams, 1988; Elliot, 1999), this program-controlled design reduces the amount of effort required by the trainee, as the need to expend effort is generally viewed as a weakness and an indicator of low ability by avoid oriented individuals (e.g., Dweck, 1986; Nicholls, 1984). Finally, the training environment for avoid individuals will direct trainees to practice screens and move them through the practice materials gradually increasing the difficulty. This approach to practice, will allow the avoid oriented individual to learn in a safe, relatively non- evaluative environment, and ultimately increase their training performance. Additionally, this increase in performance can be obtained without requiring the trainee to make the decision to exert additional effort by practicing.

Measures

The subjects completed a variety of measures pre and post-training. Each of these measures is described below. The actual questions are provided in Appendix B.

Demographics. Information regarding various demographic variables including sex, race, and GPA. ACT and SAT scores, were collected as a proxy for cognitive ability.

Prior computer experience. Prior experience with computers, the Internet, and web programs was assessed using a 22 item measure including all 12 items from the

Potosky & Bobko (1998) CUE scale and additional items developed by Schmidt (2000). The internal consistency reliability for the original scales range from .71 to .87. The items were rated on a 5-point likert scale, which ranged from strongly disagree (1) to strongly agree (5). Sample items include, "I am good at using computers", "I frequently use the web as an information resource" and "I spend time making my own pages for the web."

Goal orientation. Goal orientation was measured using a 24-item domain specific measure developed by Horvath, Scheu, & DeShon (2001; 2004). The measure is composed of three factors, prove, avoid, and mastery. The items were rated on a 5-point likert scale, which ranged from strongly disagree (1) to strongly agree (5). In past studies, the reliability estimates for each of the factors have been in the acceptable range falling between .70 and .95. Sample items include, "In classes, I enjoy showing myself how good I am", "In classes, I avoid situations where I might demonstrate poor performance to myself", "I enjoy working on challenging class assignments so that I can learn new things."

State anxiety. State anxiety was measured using the State-Trait Anxiety Inventory (STAI) for adults. The state version of the STAI is a 20-item measure developed by Spielberger (1977). The measure was designed to assess temporary anxiety and asks respondents to indicate how the feel "right now"; for the current study, respondents were asked to indicate how they felt before and after they completed the training program. The items were rated on a 5-point likert scale, which ranged from not at all (1) to very much so (5). Sample items include, "I feel confident", and "I am tense".

Satisfaction with the training program. Satisfaction with the training program was assessed using a 26-item measure developed for this study. The measure was designed to tap reactions to various aspects of the training program including satisfaction with order of the training content (5 items), practice opportunities (5 items), feedback (5 items), and general satisfaction/enjoyment (10 items). The items were rated on a 5-point likert scale, which ranged from "strongly disagree" (1) to "strongly agree" (5). Sample items include, "The training program provided useful feedback", "I enjoyed the training program", and "The training prepared me to use my new web development skills."

Pre and post-training self-efficacy. Pre and Post-Training Self-Efficacy were assessed using two measures adapted by Schmidt (2000). The first measure assessed self-efficacy for learning to create web pages in the training program. This nine-item measure was adapted from the self-efficacy sub-scale of Pintrich and DeGroot's (1990) Motivated Strategies for Learning Questionnaire (MSLQ). The internal consistency reliability for the original scale was .89. The internal consistency reliability for Schmidt (2000) was .92. The items were rated on a 5-point likert scale, which ranged from "strongly disagree" (1) to "strongly agree" (5). Sample items include, " I expect to do

very well in this training course", and "I'm certain I can understand the ideas taught in this course." The second measure assessed self-efficacy for actually creating web pages. This seven-item measure was adapted from Hollenbeck and Brief (1987). The internal consistency reliability for the original scale was .82. The internal consistency reliability for Schmidt (2000) was .71. The items were rated on a 5-point likert scale, which ranged from "strongly disagree" (1) to "strongly agree" (5). Sample items include, "I can meet the challenges of creating a basic web page", and "I am confident in my understanding of how different elements of web page design are related."

Declarative knowledge. Declarative knowledge was assessed with a 35-item multiple-choice quiz adapted from Schmidt (2000), with several items testing the knowledge of each lesson. Responses were scored so that one point was gained for each correct answer, allowing scores to range from 0 to 35. Similar items differing in content were used on the mini quizzes after each lesson.

Skill-based performance. Skill-based performance was assessed with a 17-item test adapted from Schmidt (2000). For each item, trainees were given specific web page task to complete. Participants were asked to edit a web page by attempting to complete the tasks described in each of the 25 items. Some items contained multiple tasks; however, each task was independent, such that failure to complete one task did not prevent the completion of other tasks. Participants were asked to spend no more than 15 minutes on this measure. Revised web pages were saved as a unique file for each participant. Tasks were scored so that a score of one point was given for each task that was successfully completed. The range of possible scores was between 0 and 40.

Desire to withdraw. The desire to withdraw[1] was assessed using a 12-item measure developed for this study. The measure was designed to tap many of the behaviors associated with withdrawal including, the desire to quit, a reduction in effort, self-handicapping in terms of choosing not to practice, choosing not to try, and claiming boredom. The items were rated on a 5-point likert scale, which ranged from strongly disagree (1) to strongly agree (5). Sample items include, "I often considered quitting the training program", "I found this training program so boring that I did not want to complete it", and "By the end of the training program I was investing very little effort."

Off-task thoughts. Off-task thoughts was assessed using a 14-item measure developed by Fisher (1995). The items were rated on a 5-point likert scale, which ranged from strongly disagree (1) to strongly agree (5). The internal consistency reliability for the original scale was .89. Sample items include, "I daydreamed while I was learning", and "I thought about how well or how poorly I was doing."

Motivation to learn. Motivation to learn was assessed using a 10-item measure developed by Weissbein (2000). The items were rated on a 5-point likert scale, which ranged from strongly disagree (1) to strongly agree (5). The internal consistency reliability for the original scale was .95. Sample items include, "I was motivated to learn the skills emphasized in the training program", "I wanted to improve my web development skills."

Structural manipulation check. The structural manipulation check contained 6 yes/no items developed for this study. This measure was designed to assess participants'

[1] It is important to note that trainees have the option to discontinue the experiment at any time; however, it is expected that the vast majority of participants will complete the experiment. The current measure was designed to help us to understand why so many trainees fail to complete computer-based training in real-world work and educational environments.

perceptions of the structural elements of the training environments. Specifically, the type of feedback received, and control over training topics, order, and practice. Sample items include, "I had control over when to practice" and "I received strategy-based feedback."

Psychological manipulation check. The psychological manipulation check contained 10 items developed for this study. This measure was designed to determine if the training environments resulted in the expected psychological effects. For instance, did a mastery oriented individual in the mastery oriented environment (i.e., good fit) feel relaxed, focused, and interested in learning while a mastery oriented individual in the avoid oriented environment (i.e., poor fit) felt stressed, frustrated, and bored. The items were rated on a 5-point likert scale, which ranged from strongly disagree (1) to strongly agree (5). Sample items include, "The training program was set up in a way that made it easy for me to learn", I felt very focused during the training program".

Number of practices completed. To better capture the participants' involvement in the training program, a post hoc measure of the number of practice exercise attempted was added to the study. This variable was computed by counting the number of practice files created and saved by each participant. Based on the design of the study, each practice file had a unique name that could be easily counted. It is important to note that these files were simply counted and not scored.

Number of quizzes completed. To better capture the participants' involvement in the training program, a post hoc measure of the number of quizzes completed was added to the study. This variable was computed by counting the number of quizzes that had answers for each question. It is important to note that the number of completed quizzes were counted and not scored.

CHAPTER 3: RESULTS

Pilot Testing

To insure that the training environments were functioning as intended and correctly capturing the data, a series of pilot tests were conducted. The first set of test involved 6 graduate student subject matter experts (SMEs). All SMEs had previous experience with web based surveys and experiments. The SMEs were provided with a description of how each of the environments should function and asked to test the environments for errors, programming bugs, and other potential flaws. All findings were addressed before moving to the final set of pilot tests. The final set of pilot tests involved 10 undergraduate students from the subject pool. The purpose of this set of tests was to insure proper data capture, proper environment functioning, and to establish appropriate timing for the skills test. Based on the results of these tests the skills test timing was reduced from 20 minutes to 15 minutes and additional questions were added to the skills test to avoid ceiling effects.

Missing Data

Originally 186 subjects participated in the study. As their data was archived it became clear that despite all the reminders built into the learning environments, the experimenter's verbal and written reminders to save all work to the network, and safeguards such as viewing files lists and backing up all work to a floppy disk at the end of the experiment, a number of participants failed to successfully save their work. Specifically it was discovered that 22 participants saved blank files, lost key files, or repeatedly saved the same work under multiple names. As a result, 22 participants had missing skills scores. To account for this loss of data, an additional 20 participants were

added to the study for a total of 206 participants. Analyses indicated no demographic differences between those who failed to save the necessary files and those who were successful. Additionally, hypotheses were tested using pairwise and listwise deletion and demonstrated no changes in the results. Sixteen participants also failed to provide an SAT or ACT score. Analyses involving these scores were run both with missing data and using mean replacement; no differences were found. Due to the design of the computerized data capture, there was no missing data for other variables[2].

Manipulation Checks

Upon completion of the training, all participants regardless of experimental condition were asked to complete a series of questions designed to assess the effectiveness of the psychological and structural manipulations in this study.

The structural manipulation check consisted of six yes/no items assessing the participants' perceptions of their degree of control over the order of the training content, control over practice opportunities, and perceptions regarding the type of feedback received. Individuals in the avoid environment received explanatory feedback and had very limited control over what material they viewed and the order in which the material was presented. Alternatively, individuals in the mastery environment received strategy feedback and had maximum control over what material they viewed and the order in which the material was presented. The frequency data clearly illustrates that the majority of participants in the mastery environment correctly recognized the structural elements built into the training environment. Alternatively, the majority of participants in the

[2] It is important to note that the number of practices completed is based on the saved files and missing files would result in missing data for this variable as well.

avoid environment mistakenly perceived more control over the learning experience than they actually had. Using a Chi-square test of independence, it was determined that despite the confusion regarding the avoid environment, there were significant group differences in perceptions of the structural elements. The one exception was the item regarding strategy feedback. Participants in both conditions believed that the feedback they received was strategy based. Table 2 presents the frequency data for each of the items in the structural manipulation check.

Table 2. Structural Manipulation Frequencies

Item	Answer	Mastery	Avoid
I had control over what training topics I looked at.*	Yes	98%	78%
	No	2%	22%
I had control over what order I read training materials in.*	Yes	98%	49%
	No	2%	51%
I had control over when to practice.*	Yes	98%	55%
	No	2%	45%
I had control over how much to practice.*	Yes	95%	63%
	No	5%	37%
I received strategy-based feedback.	Yes	74%	79%
	No	26%	21%
I received feedback that explained the answers to the quiz questions.*	Yes	40%	100%
	No	60%	0%

* $p<.05$; ** $p<.01$

The psychological manipulation check consisted of 10 likert-type items assessing the psychological impact of the training environment design. As the training environments were designed to elicit different responses for different goal orientations, the data were reviewed several ways. First independent t-tests were run to look for

overall mean differences between the environments. As expected, no between environment differences were found. Second median splits were used to create high and low variables for avoid and mastery orientations and t-tests were run to look for differences by goal orientation within each environment. Although one would expect different responses for different goal orientations in each environment, no differences were found.

Finally, a series of profiles were created using the median splits to check for differences by goal orientation profile within each environment. Specifically, high avoid/high mastery, low avoid/high mastery, low avoid/low mastery, and high avoid//low mastery. Although a few significant and near significant differences were found, there were no statistically clear patterns supporting the expected response differences for goal orientation profiles within each environment. Despite the lack of statistical differences, several of the profile-based means were in the direction one would expect for the environment. For instance, the means for individuals with a low avoid/high mastery profile in a mastery environment were generally higher than the means for individuals in the avoid environment on items related to ease of learning, desire to learn, and focus, suggesting a slightly better fit for mastery individuals in a mastery environment. Similarly, the means for individuals with a high avoid/low mastery profile in the avoid environment were generally higher than the means for individuals in the mastery environment on items related to desire to learn, method of learning, comfort with training, and limited choices suggesting a slightly better fit for avoid individuals in an avoid environment. The profile means within environment are presented in Table 3.

Table 3. Psychological Manipulation Check Means

Item	Environment	High Avoid/High Mastery	Low Avoid/High Mastery	Low Avoid/Low Mastery	High Avoid/Low Mastery
The training program was set up in a way that made it easy for me to learn.	Avoid	3.94	3.81	4.19	3.61
	Mastery	4.05	4.06	4.08	3.67
The training program made me want to learn.	Avoid	3.93	3.15	3.35	2.94
	Mastery	3.35	3.65	3.25	2.87
I felt very relaxed during the training program.	Avoid	3.11	3.85	3.46	3.35
	Mastery	3.55	3.84	3.79	3.37
This was a good way for me to learn the material.	Avoid	3.67	3.85	4.00*	3.61
	Mastery	3.85	3.94	3.54	3.50
I felt very focused during the training program.	Avoid	3.11	3.19	3.69	2.97
	Mastery	3.35	3.65	3.29	3.03
I was very comfortable learning the material this way.	Avoid	3.67	3.85	4.12*	3.35
	Mastery	3.85	3.84	3.75	3.30
The training program required too much effort.	Avoid	2.67	2.31	2.04	2.45
	Mastery	2.35	2.42	2.46	2.67
The training program did not provide me with enough choices.	Avoid	2.61*	2.23	2.04	2.52
	Mastery	2.10	2.45	2.04	2.37
I was frustrated with the design of the training program.	Avoid	2.33	2.31	2.04	2.42
	Mastery	2.10	2.42	2.08	2.77
The training program did not provide enough structure.	Avoid	2.17	2.04	1.92	2.26
	Mastery	2.05	2.03	2.00	2.40

* $p<.05$; ** $p<.01$

Factor and Reliability Analyses

A series of principal axis factor analyses with varimax rotations were conducted to check the dimensionality of measures. The first factor analysis examined the self-efficacy for the training program and the self-efficacy for creating web pages measures to determine if they should be combined or used as independent measures. A principal axis factor analysis with varimax rotation using Eigen values greater than one to determine the number of factors extracted indicated that there were two factors. The first factor accounted for 37% of the variance and included all the items from the training measure and the second factor accounted for 27% of the variance and included all the items from the web page measure. As a result of this analysis the two self-efficacy measures were kept independent.

The second factor analysis examined the factor structure of the satisfaction measure. The measure was composed 5 items regarding the of order of the training content, 5 items regarding the practice opportunities, 5 items regarding feedback, and 10 items regarding the general satisfaction/enjoyment. A principal axis factor analysis with varimax rotation using Eigen values greater than one to determine the number of factors extracted indicated that there were six factors; none of which were interpretable. Additionally, a principal axis factor analysis with varimax rotation forcing four factors was run. Similarly, this analysis did not yield a clearly interpretable structure. Reliability analyses however, resulted in acceptable alphas (i.e., all above .70) for each of the 4 item groupings. As a result, satisfaction was used as 4 separate measures in all subsequent analyses.

Coefficient alpha was calculated for each of the measures and is presented along the diagonal in Table 5. Alpha was at or above .70 for all measures except the structural manipulation check and satisfaction with the order the content was presented in during the training. It is expected that small number of items, 6 and 5 respectively, was the primary reason for the lower alpha on these two measures.

Descriptive Statistics

Table 4 presents the overall means and standard deviations for all the variables in the study, as well as, the means and standard deviations by environment. Tables 5, 6, 7 present the correlations across all the data and within environment. Results of interest are highlighted below.

Examination of the means by environment demonstrates very few differences between the two learning environments. A few differences of interest include a higher skills mean for the avoid environment. This result is consistent with the higher number of quizzes and practice exercises completed by those in the avoid environment. Essentially the more one practices and receives feedback through the quizzes the more skills he/she develops. This higher mean is likely a direct result of the environmental design which requires those in the avoid environment to complete the quizzes and practice exercises as a way to reduce avoid tendencies that restrict learning successes. Also of interest is the higher mean for post training anxiety in the avoid environment. This may reflect a greater knowledge of personal strengths and weakness with the training material due to the increased number of quizzes and practice exercises. Although interesting, the anxiety trend is not statistically significant.

Similarly there are interesting trends for the mastery environment including slightly higher means for declarative knowledge, motivation to learn, practice and order satisfaction. While these differences are very small and far from statistically significant, they are consistent with previous learner control research.

In addition to means being consistent with the literature, the patterns of significant correlations are consistent with what one would expect based on the goal orientation literature (see Table 5). Specifically, an avoid orientation is negatively related to both measures of self-efficacy, mastery orientation, motivation to learn, GPA, and general satisfaction with the training. Alternatively, an avoid orientation is positively related to the desire to withdraw, off-task thoughts, anxiety and prove orientation. A mastery orientation is negatively related to the desire to withdraw and positively related to both measures of self-efficacy, prove orientation, motivation to learn, general satisfaction with the training, and satisfaction with feedback. A prove orientation is not negatively related to any of the key variables in the study and is positively related to both measures of self-efficacy, avoid and mastery orientation, off-task thoughts, and satisfaction with training order.

Table 4. Descriptives by Environment

	Overall		Avoid Environment		Mastery Environment		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**d**
ACT/SAT	0.65	0.74	0.67	0.67	0.63	0.81	-0.05
Computer Experience	72.81	10.96	73.30	11.77	72.33	10.16	-0.09
Avoid	19.79	5.45	19.79	5.30	19.79	5.61	0.00
Mastery	30.77	4.13	30.47	3.98	31.06	4.28	0.14
Prove	26.69	4.91	26.36	4.65	27.02	5.14	0.13
Training Self-efficacy	30.80	5.80	31.28	5.86	30.33	5.73	-0.16
Web Development Self-efficacy	21.76	5.00	22.25	5.28	21.29	4.69	-0.19
Post Training Self-efficacy	31.37	6.29	31.48	6.74	31.27	5.85	-0.03
Post Web Development Self-efficacy	23.74	5.39	23.97	5.75	23.51	5.03	-0.09
Desire to Withdraw	29.86	9.32	29.88	9.07	29.85	9.60	0.00
Off task Thoughts	38.68	8.23	38.32	8.91	39.04	7.53	0.09
Skills*	26.89	8.88	28.62	8.46	25.24	9.00	-0.39
Declarative Knowledge	26.93	4.07	26.68	4.19	27.16	3.96	0.12
Motivation to Learn	35.03	7.07	34.87	6.48	35.19	7.62	0.05
PMC	36.26	6.15	36.21	5.91	36.30	6.40	0.01
SMC*	7.34	1.38	7.74	1.61	6.96	0.98	-0.59
Practice Satisfaction	18.92	2.92	18.58	2.82	19.25	3.00	0.23
Order Satisfaction	19.21	2.20	19.06	2.24	19.36	2.16	0.14
General Satisfaction	35.69	5.77	35.56	5.22	35.81	6.27	0.04
Feedback Satisfaction	18.02	3.58	18.21	3.26	17.84	3.87	-0.10
Quizzes Completed*	5.32	1.25	5.85	0.59	4.80	1.49	-0.92
Practices Completed*	9.12	4.03	10.53	2.85	7.81	4.50	-0.72
Anxiety	45.87	10.05	46.08	9.45	45.68	10.64	-0.04
Post Anxiety	47.42	11.48	48.50	11.81	46.38	11.11	-0.19

* = significant differences between environments

* p<.05; **p<.01

Table 5. Overall Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Environment[a]	(n/a)															
2. Cognitive Ability	-.03	(n/a)														
3. Computer Experience	-.04	.17*	*(.87)*													
4. Avoid Orientation	.00	-.05	-.12	*(.83)*												
5. Mastery Orientation	.07	-.04	.19**	-.25**	*(.90)*											
6. Prove Orientation	.07	.03	.28**	.14*	.07	*(.82)*										
7. Training SE	-.08	.10	.61**	-.18**	.32**	.30**	*(.93)*									
8. Web Development SE	-.10	.16*	.69**	-.14*	.20**	.25**	.75**	*(.87)*								
9. Post Training SE	-.02	.20**	.55**	-.20**	.23**	.15*	.68**	.55**	*(.94)*							
10. Post Web Dev SE	-.04	.16*	.59**	-.17*	.19**	.14*	.61**	.66**	.84**	*(.91)*						
11. Desire to withdraw	.00	-.22**	-.21**	.20**	-.14*	.04	-.24**	-.13	-.48**	-.47**	*(.94)*					
12. Off task thoughts	.04	-.25**	-.19**	.41**	-.02	.20**	-.19**	-.14*	-.39**	-.38**	.54**	*(.83)*				
13. Skills	-.19**	.35**	.30**	-.05	-.09	.04	.17*	.17*	.34**	.35**	-.39**	-.32**	(n/a)			
14. Declarative Knowledge	.06	.42**	.17*	-.05	-.03	.03	.16*	.13	.30**	.29**	-.46**	-.29**	.59**	(.71)		
15. Satisfaction Overall	.03	.06	.16*	-.07	.17	.06	.25**	.15*	.46**	.45**	-.64**	-.28**	.23**	.30**	(.93)	
16. Motivation to Learn	.02	.11	.15*	-.15*	.27*	.01	.19**	.11	.38**	.38**	-.71**	-.31	.22**	.28**	.56**	(.93)
17. Year in school	.15*	.01	.04	-.04	.07**	.00	.04	.08	-.02	.02	.03	-.12	-.19**	-.06	-.12	.00
18. Age	.13	.20**	.03	.05	.10	.08	.01	.07	-.11	-.08	-.04	-.02	-.25**	-.04	-.13	.07
19. Gender[b]	.01	-.14	-.29**	-.03	.12	-.03	-.21**	-.25**	-.24**	-.30**	.06	.14*	-.10	-.02	.02	-.07
20. Race[c]	-.04	.25**	-.13	.04	-.16*	-.15*	-.22**	-.13	-.11	-.16*	.00	.04	.15*	.28**	.01	-.01
21. GPA	-.03	.16*	-.16*	-.19**	-.05	.08	-.14*	-.15*	-.06	-.10	-.06	-.08	.19*	.20**	-.05	.02
22. Practice Satisfaction	.11	.06	.02	.07	.10	.03	.04	.05	.25**	.26**	-.36**	-.09	.16*	.25**	.75**	.36**
23. Order Satisfaction	.07	.14*	.24**	-.08	.13	.14*	.20**	.13	.42**	.37**	-.57**	-.30**	.24**	.32**	.72**	.42**
24. General Satisfaction	.02	.08	.19	-.14*	.15*	.03	.28**	.18**	.46**	.46**	-.70**	-.35**	.25**	.32**	.92**	.60**
25. Feedback Satisfaction	-.05	-.06	.06	-.03	.15*	.00	.20**	.08	.33**	.33**	-.35**	-.12	.08	.09	.78**	.34**
26. College Major	.05	-.04	-.03	.06	-.02	-.01	-.06	-.04	-.06	-.06	-.02	-.08	.00	.04	.05	-.01

Table 5. Overall Correlation Matrix (continued)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
27. Quizzes completed	-.42**	.16*	.09	.02	-.07	.05	.02	.05	.05	.13	-.11	-.04	.37**	.27**	.07	.00
28. Practices completed	-.34**	.24**	.06	.04	-.03	.03	.02	.07	.11	.16*	-.17*	-.13	.54**	.39**	.21**	.11
29. Pre-Anxiety (High)	-.02	-.05	-.14	.44**	-.07	.12	-.24**	-.16*	-.20**	-.16*	.27**	.31**	-.08	-.05	-.19**	-.12
30. Post Anxiety (High)	-.09	-.17*	-.28**	.32**	.00	.07	-.28**	-.23**	-.48**	-.43**	.46**	.45**	-.24**	-.21**	-.40**	-.26**
31. PMC	.01	.27**	.23**	-.21**	.11	.00	.29**	.22**	.57**	.56**	-.70**	-.50**	.39**	.44**	.75**	.54**
32. SMC	-.28**	.12	.08	-.06	-.04	.11	.08	.08	-.02	-.03	.07	.00	.11	.10	-.13	-.08

a= avoid =1 mastery =2

b= male = 1 female =2

c= minority =1 majority =2

* p<.05; **p<.01

Table 5. Overall Correlation Matrix (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1. Environment[a]																
2. Cognitive Ability																
3. Computer Experience																
4. Avoid Orientation																
5. Mastery Orientation																
6. Prove Orientation																
7. Training SE																
8. Web Development SE																
9. Post Training SE																
10. Post Web Dev SE																
11. Desire to withdraw																
12. Off task thoughts																
13. Skills																
14. Declarative Knowledge																
15. Satisfaction Overall																
16. Motivation to Learn																
17. Year in school	(n/a)															
18. Age	.57**	(n/a)														
19. Gender[b]	-.12	-.06	(n/a)													
20. Race[c]	-.12	-.02	.06	(n/a)												
21. GPA	-.11	-.01	.20**	.17*	(n/a)											
22. Practice Satisfaction	-.11	-.07	.05	.09	.01	(.79)										
23. Order Satisfaction	-.03	-.06	-.09	.05	.01	.44**	(.62)									
24. General Satisfaction	-.06	-.07	.03	-.04	-.06	.58**	.64**	(.89)								
25. Feedback Satisfaction	-.18*	-.19**	.02	-.01	-.07	.49**	.39**	.59**	(.88)							
26. College Major	-.05	-.07	-.13	.08	-.08	.01	.14*	.01	.06	(n/a)						

Table 5. Overall Correlation Matrix (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
27. Quizzes completed	-.17*	-.18**	-.11	.04	.05	.08	.07	.05	.04	.04	(n/a)					
28. Practices completed	-.18*	-.15*	-.07	.16*	.12	.34**	.13*	.15*	.12	.07	.57	(n/a)				
29. Pre-Anxiety (High)	.02	.00	.06	-.06	.07	-.07	-.26**	-.18**	-.12	-.08	-.09	.02	*.93*			
30. Post Anxiety (High)	-.01	.10	.16*	.03	.11	-.22**	-.40**	-.43**	-.23**	-.05	-.12	-.02	.70**	*.95*		
31. PMC	-.03	-.08	-.11	.05	.02	.48**	.68**	.76**	.46**	.04	.19**	.27**	-.28**	-.56**	*.89*	
32. SMC	.10	.06	-.02	.10	.04	-.14*	-.07	-.09	-.14*	-.21**	.13*	.17*	.00	.04	-.14*	*.55*

a= avoid =1 mastery =2

b= male = 1 female =2

c= minority =1 majority =2

* p<.05; **p<.01

Table 6. Avoid Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Environment[a]	1.00															
2. Cognitive Ability	0.21*	1.00														
3. Computer Experience	-0.23*	-0.06	1.00													
4. Avoid Orientation	-0.05	0.28**	-0.36**	1.00												
5. Mastery Orientation	0.08	0.38**	-0.03	0.10	1.00											
6. Prove Orientation	0.24*	0.66**	-0.17	0.35**	0.34**	1.00										
7. Training SE	0.26**	0.72**	-0.14	0.20*	0.30**	0.74**	1.00									
8. Web Development SE	0.36**	0.62**	-0.23*	0.26**	0.19	0.70**	0.59**	1.00								
9. Post Training SE	0.24*	0.67**	-0.13	0.21*	0.17	0.65**	0.68**	0.86**	1.00							
10. Post Web Dev SE	-0.26**	-0.20*	0.13	-0.02	0.05	-0.18	-0.03	-0.55**	-0.44**	1.00						
11. Desire to withdraw	-0.26**	-0.21*	0.37**	0.01	0.12	-0.22	-0.20*	-0.44**	-0.38**	0.60**	1.00					
12. Off task thoughts	0.40**	0.45**	0.00	-0.01	0.22*	0.29**	0.27*	0.43**	0.42**	-0.43**	-0.27**	1.00				
13. Skills	0.44**	0.21*	-0.05	-0.08	0.10	0.15	0.10	0.37**	0.26**	-0.51**	-0.31**	0.60**	1.00			
14. Declarative Knowledge	0.09	0.17	-0.02	0.03	0.07	0.23*	0.05	0.42**	0.33**	-0.59**	-0.26**	0.23*	0.28**	1.00		
15. Satisfaction Overall	0.18	0.09	-0.13	0.19	-0.03	0.16	-0.04	0.43**	0.29**	-0.70**	-0.37**	0.28**	0.29**	0.52**	1.00	
16. Motivation to Learn	0.07	0.03	-0.12	0.14	-0.03	-0.01	0.00	0.05	0.10	-0.07	-0.24*	-0.02	0.00	-0.08	0.13	1.00
17. Year in school	0.00	0.09	-0.14	0.22*	-0.06	0.03	0.04	0.02	0.11	-0.03	-0.16	-0.01	0.02	-0.15	0.08	0.77**
18. Age	-0.19	-0.31**	-0.15	-0.02	0.00	-0.26**	-0.25*	-0.26**	-0.27**	0.14	0.14	-0.05	-0.03	0.02	-0.14	-0.11
19. Gender[b]	0.16	-0.12	0.05	-0.17	-0.13	-0.23*	-0.09	-0.07	-0.14	-0.15	-0.03	0.23*	0.39**	0.16	0.09	-0.15
20. Race[c]	0.05	-0.20*	-0.19	-0.05	0.08	-0.11	-0.11	-0.04	-0.08	0.01	0.06	0.11	0.12	-0.07	-0.01	-0.02
21. GPA	-0.02	0.06	0.13	-0.01	0.03	0.13	0.03	0.22	0.18	-0.33	-0.06	0.20	0.24*	0.82**	0.37**	-0.14
22. Practice Satisfaction	0.10	0.25*	-0.06	-0.02	0.30**	0.19	0.06	0.43**	0.32**	-0.56**	-0.38**	0.30**	0.37**	0.67**	0.39**	0.02
23. Order Satisfaction	0.18	0.15	-0.06	0.01	0.00	0.19	0.01	0.43**	0.30**	-0.67**	-0.37**	0.25*	0.29**	0.91**	0.54**	0.02
24. General Satisfaction	-0.01	0.06	-0.03	0.10	-0.03	0.22*	0.08	0.24*	0.23*	-0.25**	0.02	0.01	0.01	0.71**	0.32**	-0.18
25. Feedback Satisfaction	-0.01	-0.06	-0.02	0.01	-0.07	-0.12	-0.10	-0.11	-0.12	-0.02	-0.19	-0.07	-0.04	-0.08	-0.03	0.00
26. College Major	0.12	0.19	0.12	-0.01	0.17	-0.12	0.01	-0.02	0.00	0.02	0.18	0.26*	0.24*	0.00	-0.19	0.02

Table 6. Avoid Correlation Matrix (continued)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
27. Quizzes completed	0.16	0.19	0.17	-0.13	0.20	-0.09	0.03	0.05	0.11	-0.22*	0.07	0.58**	0.35**	0.19	0.07	0.00
28. Practices completed	-0.10	-0.16	0.35	-0.16	-0.06	-0.32**	-0.15	-0.25*	-0.16	0.27**	0.35**	-0.09	-0.08	-0.23*	-0.18	0.06
29. Pre-Anxiety (High)	-0.37**	-0.32**	0.27**	-0.04	-0.05	-0.37**	-0.28**	-0.52**	-0.43**	0.52**	0.49**	-0.27**	-0.33**	-0.36**	-0.27**	-0.04
30. Post Anxiety (High)	0.35**	0.28**	-0.23**	0.02	0.06	0.28**	0.22*	0.59**	0.51**	-0.71**	-0.57**	0.40**	0.42**	0.67**	0.51**	0.08
31. PMC	0.10	0.16	-0.18*	0.01	0.18	0.17	0.14	0.10	0.03	0.00	-0.04	0.16	0.27**	-0.03	-0.06	0.08

a= avoid =1 mastery =2

b= male = 1 female =2

c= minority =1 majority =2

* p<.05; ** p<.01

Table 6. Avoid Correlation Matrix (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1. Environment[a]															
2. Cognitive Ability															
3. Computer Experience															
4. Avoid Orientation															
5. Mastery Orientation															
6. Prove Orientation															
7. Training SE															
8. Web Development SE															
9. Post Training SE															
10. Post Web Dev SE															
11. Desire to withdraw															
12. Off task thoughts															
13. Skills															
14. Declarative Knowledge															
15. Satisfaction Overall															
16. Motivation to Learn															
17. Year in school	1.00														
18. Age	-0.14	1.00													
19. Gender[b]	-0.22*	0.19	1.00												
20. Race[c]	-0.06	0.21*	0.19	1.00											
21. GPA	-0.17	0.12	0.19	-0.04	1.00										
22. Practice Satisfaction	-0.02	-0.14	0.09	0.03	0.42**	1.00									
23. Order Satisfaction	-0.06	0.02	0.16	-0.11	0.65**	0.59**	1.00								
24. General Satisfaction	-0.23*	0.03	0.09	-0.03	0.54**	0.22*	0.47**	1.00							
25. Feedback Satisfaction	0.00	-0.07	0.07	-0.05	-0.08	0.10	-0.10	-0.11	1.00						
26. College Major	0.03	0.03	0.16	-0.13	-0.01	0.10	0.00	-0.06	-0.11	1.00					

Table 6. Avoid Correlation Matrix (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
27. Quizzes completed	-0.05	0.09	0.30**	0.03	0.27**	0.21*	0.13	0.07	-0.06	0.42**	1.00				
28. Practices completed	-0.04	-0.06	-0.03	-0.02	-0.12	-0.26**	-0.20*	-0.15	0.00	0.13	0.11	1.00			
29. Pre-Anxiety (High)	-0.06	0.12	-0.07	0.04	-0.15	-0.38**	-0.41**	-0.16	0.05	0.04	-0.03	0.74**	1.00		
30. Post Anxiety (High)	0.02	-0.21*	0.14	-0.04	0.45**	0.62**	0.71**	0.29**	-0.02	0.03	0.20*	-0.31**	-0.62**	1.00	
31. PMC	0.05	-0.03	0.15	0.10	-0.05	0.03	0.00	-0.08	-0.24*	0.03	0.17	-0.10	-0.04	-0.09	*1.00*

a= avoid =1 mastery =2

b= male = 1 female =2

c= minority =1 majority =2

* $p<.05$; ** $p<.01$

Table 7. Mastery Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Environment[a]	1.00															
2. Cognitive Ability	0.12	1.00														
3. Computer Experience	0.10	-0.18	1.00													
4. Avoid Orientation	-0.03	0.10	-0.16	1.00												
5. Mastery Orientation	-0.01	0.20*	0.28**	0.04	1.00											
6. Prove Orientation	-0.02	0.55**	-0.19	0.30**	0.28**	1.00										
7. Training SE	0.07	0.65**	-0.14	0.21*	0.22*	0.76**	1.00									
8. Web Development SE	0.05	0.46**	-0.17	0.20*	0.12	0.67**	0.51**	1.00								
9. Post Training SE	0.09	0.49**	-0.22	0.19	0.11	0.57**	0.62**	0.82**	1.00							
10. Post Web Dev SE	-0.18	-0.22*	0.26**	-0.24**	0.04	-0.29**	-0.23*	-0.42**	-0.52**	1.00						
11. Desire to withdraw	-0.22*	-0.15	0.45**	-0.07	0.28*	-0.15	-0.05	-0.33**	-0.37**	0.49**	1.00					
12. Off task thoughts	0.28**	0.13	-0.10	-0.13	-0.08	0.03	0.04	0.24*	0.26*	-0.36**	-0.38**	1.00				
13. Skills	0.36**	0.13	-0.05	0.02	-0.03	0.19	0.18	0.22*	0.33*	-0.42**	-0.28**	0.64**	1.00			
14. Declarative Knowledge	0.03	0.16	-0.12	0.28**	0.04	0.27**	0.26**	0.51**	0.59**	-0.67**	-0.31**	0.24*	0.32**	1.00		
15. Satisfaction Overall	0.05	0.21*	-0.17	0.32**	0.04	0.22*	0.25*	0.34**	0.48**	-0.72**	-0.27**	0.20	0.28**	0.58**	1.00	
16. Motivation to Learn	-0.03	0.07	0.04	-0.02	0.01	0.11	0.20*	-0.08	-0.05	0.11	0.00	-0.31**	-0.15	-0.16	-0.11	1.00
17. Year in school	0.27**	0.02	0.13	0.05	0.14	0.02	0.12	-0.20*	-0.19	-0.05	0.05	-0.34**	-0.09	-0.13	0.06	0.50**
18. Age	-0.09	-0.27**	0.08	0.25**	-0.05	-0.15	-0.26**	-0.22*	-0.33**	-0.03	0.14	-0.14	-0.01	0.01	-0.02	-0.14
19. Gender[b]	0.29**	-0.15	0.02	-0.15	-0.15	-0.22**	-0.17	-0.16	-0.19	0.14	0.12	0.06	0.17	-0.12	-0.09	-0.09
20. Race[c]	0.24*	-0.10	-0.18	-0.05	0.09	-0.17	-0.21*	-0.09	-0.13	-0.13	-0.25*	0.27**	0.29**	-0.02	0.04	-0.20*
21. GPA	0.11	-0.02	0.03	0.18	0.02	-0.03	0.09	0.29**	0.35**	-0.39**	-0.14	0.17	0.26**	0.71**	0.35**	-0.12
22. Practice Satisfaction	0.17	0.24*	-0.11	0.26**	-0.01	0.22*	0.22*	0.41**	0.44**	-0.58**	-0.22*	0.21*	0.27**	0.77**	0.45**	-0.09
23. Order Satisfaction	0.01	0.23*	-0.21*	0.26**	0.05	0.36**	0.35**	0.51**	0.62**	-0.74**	-0.35**	0.27**	0.34**	0.93**	0.64**	-0.13
24. General Satisfaction	-0.09	0.06	-0.03	0.20*	0.03	0.19	0.08	0.43**	0.43**	-0.43**	-0.25*	0.12	0.17	0.83**	0.36**	-0.16
25. College Major	-0.06	0.00	0.15	-0.06	0.04	0.02	0.04	0.00	0.02	-0.02	0.06	0.10	0.11	0.17	0.01	-0.13
26. Quizzes completed	0.17	0.04	-0.01	-0.07	0.07	0.03	0.01	0.09	0.20*	-0.18	-0.13	0.38**	0.40**	0.12	0.07	-0.18

Table 7. Mastery Correlation Matrix (continued)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
27. Quizzes completed	0.27**	-0.04	-0.02	0.07	-0.02	0.03	0.05	0.15	0.19	-0.17	-0.25**	0.49	0.51**	0.26**	0.16	-0.22*
28. Practices completed	-0.01	-0.13	0.51**	0.01	0.26**	-0.17	-0.18	-0.16	-0.16	0.26**	0.27**	-0.08	-0.02	-0.16	-0.08	-0.01
29. Pre-Anxiety (High)	0.02	-0.26**	0.37**	0.05	0.20*	-0.20*	-0.21*	-0.44**	-0.44**	0.40**	0.42**	-0.25*	-0.08	-0.44**	-0.25*	0.04
30. Post Anxiety (High)	0.18	0.19	-0.18	0.18	-0.06	0.30**	0.24*	0.55**	0.62**	-0.70**	-0.44**	0.39**	0.46**	0.81**	0.57**	-0.13
31. PMC	0.15	-0.09	0.10	-0.07	0.07	-0.11	-0.08	-0.25*	-0.18	0.19*	0.11	-0.08	-0.13	-0.28**	-0.10	0.29**

a= avoid =1 mastery =2

b= male = 1 female =2

c= minority =1 majority =2

* p<.05; **p<.01

Table 7. Mastery Correlation Matrix (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1. Environment[a]															
2. Cognitive Ability															
3. Computer Experience															
4. Avoid Orientation															
5. Mastery Orientation															
6. Prove Orientation															
7. Training SE															
8. Web Development SE															
9. Post Training SE															
10. Post Web Dev SE															
11. Desire to withdraw															
12. Off task thoughts															
13. Skills															
14. Declarative Knowledge															
15. Satisfaction Overall															
16. Motivation to Learn															
17. Year in school	1.00														
18. Age	-0.02	1.00													
19. Gender[b]	0.07	-0.06	1.00												
20. Race[c]	0.01	0.19	0.16	1.00											
21. GPA	-0.06	-0.02	0.01	0.06	1.00										
22. Practice Satisfaction	-0.10	-0.04	0.01	-0.01	0.45**	1.00									
23. Order Satisfaction	-0.08	0.03	-0.20*	-0.01	0.52**	0.69**	1.00								
24. General Satisfaction	-0.18	0.01	-0.09	-0.11	0.48**	0.55**	0.68**	1.00							
25. College Major	-0.12	-0.19	0.10	-0.10	0.09	0.19	0.10	0.23*	1.00						
26. Quizzes completed	-0.17	-0.18	-0.02	0.11	0.21*	0.12	0.09	0.05	0.15	1.00					

Table 7. Mastery Correlation Matrix (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
27. Practices completed	-0.13	-0.15	0.07	0.18	0.50**	0.13	0.17	0.13	0.20*	0.53**					
28. Practices completed	0.02	0.16	-0.10	0.16	-0.03	-0.26**	-0.16	-0.09	-0.16	-0.20*					
29. Pre-Anxiety (High)	0.21*	0.20*	0.13	0.17	-0.26**	-0.41**	-0.45**	-0.31**	-0.14	-0.28**					
30. Post Anxiety (High)	-0.14	-0.03	-0.03	0.08	0.50**	0.73**	0.80**	0.59**	0.11	0.30**					
31. PMC	0.17	-0.01	0.02	-0.08	-0.22*	-0.19*	-0.22*	-0.30**	-0.14	0.01					

a= avoid =1 mastery =2

b= male = 1 female =2

c= minority =1 majority =2

* p<.05; **p<.01

Analysis Strategy for Hypothesis Tests

With the exception of Hypotheses 6 and 7, the remaining hypotheses propose that the most positive (or least negative) outcomes arise from a match between trainees' goal orientation and the learning environment and, conversely, that the least positive (most negative) outcomes result when goal orientation and the environment are mismatched. Operationally, these hypotheses predict an interaction between avoidance goal orientation and the training environment on the respective learning outcome, such that higher avoidance orientation will lead to *more positive* outcomes when in an avoidance learning environment and, but *more negative* outcomes when in a mastery learning environment. Similarly, these hypotheses predict an interaction between mastery goal orientation and the training environment, such that higher mastery orientation will lead to *more positive* outcomes when in a mastery learning environment and, but *less positive (or more negative)* outcomes when in an avoidance learning environment.

Each of these hypotheses were tested with a three-step hierarchical regression analysis. In the first step of the analysis, the seven control variables were entered, which included cognitive ability, computer experience, anxiety, two aspects of self-efficacy (efficacy for using the Internet more generally, and self-efficacy for the training program itself), the number of quizzes completed, and the number of practice exercises completed. In the second step, the main effects for all three dimensions of goal orientation and the main effects for training environment were added. Finally, in the third step, two interaction terms were added: (1) the interaction of training environment and trainee

avoidance orientation, and (2) the interaction of training environment and trainee mastery orientation.[3] Below, each of these analyses is described in detail.

Hypotheses 1a - 1d: Goal Orientation x Training Environment on Declarative Knowledge

To test Hypothesis 1a – 1d, the hierarchical regression approach described above was followed, with declarative knowledge as the dependent variable. The results of these analyses are summarized in Table 8. The set of control variables[4] entered in the first step accounted for significant variance in declarative knowledge ($R^2 = .32$, $F_{(7, 179)} = 12.13$, $p < .001$). Specifically, cognitive ability, self-efficacy for the training program, and the number of practice exercises were significant. The addition of the three dimensions of goal orientation and the training environment in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .06$, $F_{(4, 175)} = 4.27$, $p < .01$). Examination of the individual parameters in Step 2 reveals that none of the three goal orientation dimensions accounted for significant unique variance in declarative knowledge. However, training environment did account for unique variance ($b = .265$, $t = 3.90$, $p < .001$), such that trainees in the less structured mastery environment exhibited greater declarative knowledge than those in the more structured avoid environment. Finally, the addition of the interaction terms in the third step failed to account for incremental variance in declarative knowledge ($\Delta R^2 = .00$, $F_{(2, 173)} = 0.05$, $p = .951$). Thus, Hypotheses 1a – 1d were not supported.

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[3] The hypotheses were also tested using more targeted hierarchical regression analyses that included only the dimension of goal orientation in question for the specific hypothesis being tested (for example, excluding mastery and prove orientation and the mastery X environment interaction term from the tests of H1a and H1d.) Those analyses produced substantively identical results as the reported analyses and therefore are not discussed below.

[4] Reducing the number of control variables did not change the results for the various hypotheses.

Hypotheses 2a - 2d: Goal Orientation x Training Environment on Skills

To test Hypothesis 2a – 2d, the hierarchical regression approach described above was followed, with skills as the dependent variable. The results of these analyses are summarized in Table 9. The set of control variables entered in the first step accounted for significant variance in skills (R^2 =.43, $F_{(7, 162)} = 17.25, p < .001$). Specifically, cognitive ability, computer experience, and the number of practice exercises were significant. The addition of the three dimensions of goal orientation and the training environment in the second step failed to account for incremental variance in skills (ΔR^2 = .02, $F_{(4, 158)} = 1.12, p$ =.35). Finally, the addition of the interaction terms in the third step failed to account for incremental variance in skills (ΔR^2 = .01, $F_{(2, 156)} = 0.86, p$ = .43). Thus, Hypotheses 2a – 2d were not supported.

Table 8. Hierarchical Regression Analysis Results for Hypothesis 1 (Declarative Knowledge)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	0.33**	0.32**	0.32**
Computer Experience	0.02		
Anxiety	0.06		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.2*		
Quizzes Completed	0.07		
Practices Completed	0.31**		
2: Cognitive Ability	0.3**	0.38**	0.06**
Computer Experience	0.02		
Anxiety	0.11		
Web Development Self-efficacy	-0.08		
Training Self-efficacy	0.27**		
Quizzes Completed	0.15*		
Practices Completed	0.36**		
Avoid Orientation	-0.06		
Prove Orientation	-0.04		
Mastery Orientation	-0.11		
Environment	0.27**		
3: Cognitive Ability	0.31**	0.38**	0.00
Computer Experience	0.02		
Anxiety	0.11		
Web Development Self-efficacy	-0.08		
Training Self-efficacy	0.27**		
Quizzes Completed	0.15*		
Practices Completed	0.36**		
Avoid Orientation	-0.02		
Prove Orientation	-0.04		
Mastery Orientation	-0.15		
Environment	0.21		
Avoid X Environment	-0.06		
Mastery X Environment	0.11		

n = 186; * p<.05; **p<.01

Table 9. Hierarchical Regression Analysis Results for Hypothesis 2 (Skills)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	0.21**	0.43**	0.43**
Computer Experience	0.25**		
Anxiety	-0.06		
Web Development Self-efficacy	-0.12		
Training Self-efficacy	0.09		
Quizzes Completed	0.03		
Practices Completed	0.49**		
2: Cognitive Ability	0.2**	0.44**	0.02
Computer Experience	0.25**		
Anxiety	-0.02		
Web Development Self-efficacy	-0.13		
Training Self-efficacy	0.13		
Quizzes Completed	0.02		
Practices Completed	0.5**		
Avoid Orientation	-0.10		
Prove Orientation	-0.04		
Mastery Orientation	-0.10		
Environment	0.00		
3: Cognitive Ability	0.21**	0.45**	0.01
Computer Experience	0.23**		
Anxiety	-0.01		
Web Development Self-efficacy	-0.12		
Training Self-efficacy	0.12		
Quizzes Completed	0.01		
Practices Completed	0.5**		
Avoid Orientation	0.14		
Prove Orientation	-0.03		
Mastery Orientation	0.11		
Environment	0.75		
Avoid * Environment	-0.38		
Mastery * Environment	-0.53		

n = 169; * p<.05; **p<.01

Hypotheses 3a - 3d: Goal Orientation x Training Environment on Post Training Self-Efficacy

To test Hypothesis 3a – 3d, the hierarchical regression approach described above was followed, with post training self-efficacy as the dependent variable. The results of these analyses are summarized in Table 10. The set of control variables entered in the first step accounted for significant variance in post training self-efficacy ($R^2 = .53$, $F_{(7, 179)} = 28.50$, $p < .001$). Specifically, self-efficacy for the training program, and computer experience were significant. The addition of the three dimensions of goal orientation and the training environment in the second step failed to account for incremental variance in post training self-efficacy ($\Delta R^2 = .02$, $F_{(4, 175)} = 1.72$, $p = .15$). Finally, the addition of the interaction terms in the third step failed to account for incremental variance in post training self efficacy ($\Delta R^2 = .00$, $F_{(2, 173)} = 0.45$, $p = .641$). Thus, Hypotheses 3a – 3d were not supported.

Hypotheses 4a - 4d: Goal Orientation x Training Environment on Satisfaction

To test Hypothesis 4a – 4d, the hierarchical regression approach described above was followed, with overall satisfaction and various aspects of satisfaction (i.e., satisfaction with practice, feedback, order, and general satisfaction) as the dependent variable. The results of these analyses are summarized in Tables 11-14. The set of control variables entered in the first step accounted for significant variance in overall satisfaction ($R^2 = .15$, $F_{(7, 179)} = 4.40$, $p < .001$). Specifically, self-efficacy for the training program, and the number of practice exercises were significant. The addition of the three dimensions of goal orientation and the training environment in the second step

failed to account for incremental variance in overall satisfaction ($\Delta R^2 = .01$, $F_{(4, 175)} = .71$, $p = .59$).

Table 10. Hierarchical Regression Analysis Results for Hypothesis 3 (Post Training Self Efficacy)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	0.09	0.53**	0.53**
Computer Experience	0.18		
Anxiety	-0.01		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.58**		
Quizzes Completed	-0.06		
Practices Completed	0.12		
2: Cognitive Ability	0.08	0.55**	0.02
Computer Experience	0.18		
Anxiety	0.05		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.6**		
Quizzes Completed	-0.03		
Practices Completed	0.13*		
Avoid Orientation	-0.11		
Prove Orientation	-0.07		
Mastery Orientation	0.01		
Environment	0.05		
3: Cognitive Ability	0.07	0.55**	0.00
Computer Experience	0.18		
Anxiety	0.05		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.6**		
Quizzes Completed	-0.03		
Practices Completed	0.14*		
Avoid Orientation	-0.21		
Prove Orientation	-0.08		
Mastery Orientation	0.10		
Environment	0.16		
Avoid * Environment	0.16		
Mastery * Environment	-0.25		

n = 186; * p<.05; **p<.01

Table 11. Hierarchical Regression Analysis Results for Hypothesis 4 (Satisfaction with Practice)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	-0.04	0.19**	0.19**
Computer Experience	-0.09		
Anxiety	-0.09		
Web Development Self-efficacy	0.07		
Training Self-efficacy	-0.02		
Quizzes Completed	-0.16		
Practices Completed	0.5**		
2: Cognitive Ability	-0.05	0.25**	0.06**
Computer Experience	-0.10		
Anxiety	-0.11		
Web Development Self-efficacy	0.11		
Training Self-efficacy	-0.06		
Quizzes Completed	-0.07		
Practices Completed	0.53**		
Avoid Orientation	0.10		
Prove Orientation	0.00		
Mastery Orientation	0.12		
Environment	0.22**		
3: Cognitive Ability	-0.03	0.25**	0.00
Computer Experience	-0.12		
Anxiety	-0.10		
Web Development Self-efficacy	0.12		
Training Self-efficacy	-0.07		
Quizzes Completed	-0.08		
Practices Completed	0.53**		
Avoid Orientation	0.30		
Prove Orientation	0.01		
Mastery Orientation	0.23		
Environment	0.69		
Avoid * Environment	-0.33		
Mastery * Environment	-0.26		

n = 186; * p<.05; **p<.01

Table 12. Hierarchical Regression Analysis Results for Hypothesis 4 (Satisfaction with Order)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	0.07	0.13**	0.13**
Computer Experience	0.19*		
Anxiety	-0.22**		
Web Development Self-efficacy	-0.19		
Training Self-efficacy	0.13		
Quizes Completed	-0.08		
Practices Completed	0.2*		
2: Cognitive Ability	0.08	0.15**	0.02
Computer Experience	0.17		
Anxiety	-0.24**		
Web Development Self-efficacy	-0.16		
Training Self-efficacy	0.07		
Quizzes Completed	-0.05		
Practices Completed	0.21		
Avoid Orientation	0.03		
Prove Orientation	0.08		
Mastery Orientation	0.09		
Environment	0.07		
3: Cognitive Ability	0.09	0.17**	0.02
Computer Experience	0.19		
Anxiety	-0.24**		
Web Development Self-efficacy	-0.17		
Training Self-efficacy	0.06		
Quizzes Completed	-0.04		
Practices Completed	0.19*		
Avoid Orientation	0.19		
Prove Orientation	0.09		
Mastery Orientation	-0.26		
Environment	-0.59		
Avoid * Environment	-0.27		
Mastery * Environment	0.96		

n = 186; * p<.05; **p<.01

Table 13. Hierarchical Regression Analysis Results for Hypothesis 4 (Satisfaction with Training)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	0.01	0.12**	0.12**
Computer Experience	0.03		
Anxiety	-0.10		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.29		
Quizzes Completed	-0.06		
Practices Completed	0.21		
2: Cognitive Ability	0.01	0.13**	0.01
Computer Experience	0.02		
Anxiety	-0.06		
Web Development Self-efficacy	-0.08		
Training Self-efficacy	0.29		
Quizzes Completed	-0.04		
Practices Completed	0.22		
Avoid Orientation	-0.08		
Prove Orientation	-0.04		
Mastery Orientation	0.03		
Environment	0.05		
3: Cognitive Ability	0.02	0.14**	0.02
Computer Experience	0.03		
Anxiety	-0.06		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.28*		
Quizzes Completed	-0.03		
Practices Completed	0.2*		
Avoid Orientation	0.17		
Prove Orientation	-0.03		
Mastery Orientation	-0.22		
Environment	-0.28		
Avoid * Environment	-0.40		
Mastery * Environment	0.71		

n = 186; * p<.05; **p<.01

Table 14. Hierarchical Regression Analysis Results for Hypothesis 4 (Satisfaction with Feedback)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	-0.11	0.1**	0.1**
Computer Experience	-0.06		
Anxiety	-0.07		
Web Development Self-efficacy	-0.13		
Training Self-efficacy	0.32**		
Quizzes Completed	-0.02		
Practices Completed	0.2*		
2: Cognitive Ability	-0.10	0.11**	0.01
Computer Experience	-0.06		
Anxiety	-0.07		
Web Development Self-efficacy	-0.12		
Training Self-efficacy	0.29		
Quizzes Completed	-0.03		
Practices Completed	0.19*		
Avoid Orientation	0.01		
Prove Orientation	-0.03		
Mastery Orientation	0.09		
Environment	-0.05		
3: Cognitive Ability	-0.11	0.11**	0.00
Computer Experience	-0.05		
Anxiety	-0.08		
Web Development Self-efficacy	-0.13		
Training Self-efficacy	0.29		
Quizzes Completed	-0.03		
Practices Completed	0.19*		
Avoid Orientation	-0.10		
Prove Orientation	-0.03		
Mastery Orientation	0.05		
Environment	-0.27		
Avoid * Environment	0.17		
Mastery * Environment	0.11		

n = 186; * p<.05; **p<.01

Finally, the addition of the interaction terms in the third step failed to account for incremental variance in overall satisfaction ($\Delta R^2 = .00$, $F_{(2, 173)} = 0.77$, $p = .46$). Thus, Hypotheses 4a – 4d were not supported for overall satisfaction.

The set of control variables entered in the first step accounted for significant variance in satisfaction with practice ($R^2 = .43$, $F_{(7, 179)} = 5.87$, $p < .001$). Specifically, the number of practice exercises completed was significant and the number of quizzes completed was nearly significant. The addition of the three dimensions of goal orientation and the training environment in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .06$, $F_{(4, 175)} = 3.36$, $p < .01$). Examination of the individual parameters in Step 2 reveals that none of the three goal orientation dimensions accounted for significant unique variance in satisfaction with practice. However, training environment did account for unique variance ($b = .216$, $t = 2.87$, $p < .05$), such that trainees in the less structured mastery environment exhibited greater satisfaction with practice than those in the more structured avoid environment. Finally, the addition of the interaction terms in the third step failed to account for incremental variance in declarative knowledge ($\Delta R^2 = .00$, $F_{(2, 173)} = 0.43$, $p = .65$). Thus, Hypotheses 4a – 4d were not supported for satisfaction with practice.

The set of control variables entered in the first step accounted for significant variance in satisfaction with training order ($R^2 = .13$, $F_{(7, 179)} = 3.89$, $p < .001$). Specifically, pre-training anxiety, and the number of practice exercises were significant. The addition of the three dimensions of goal orientation and the training environment in the second step failed to account for incremental variance in satisfaction with training

order ($\Delta R^2 = .02$, $F_{(4, 175)} = .98$, $p = .42$). Finally, the addition of the interaction terms in the third step failed to account for incremental variance in satisfaction with training order ($\Delta R^2 = .02$, $F_{(2, 173)} = 1.87$, $p = .16$). Thus, Hypotheses 4a – 4d were not supported for satisfaction with training order.

The set of control variables entered in the first step accounted for significant variance in general satisfaction ($R^2 = .12$, $F_{(7, 179)} = 3.36$, $p < .002$). Specifically, self-efficacy for the training program, and the number of practice exercises were significant. The addition of the three dimensions of goal orientation and the training environment in the second step failed to account for incremental variance in general satisfaction ($\Delta R^2 = .01$, $F_{(4, 175)} = .55$, $p = .70$). Finally, the addition of the interaction terms in the third step failed to account for incremental variance in general satisfaction ($\Delta R^2 = .02$, $F_{(2, 173)} = 1.62$, $p = .20$). Thus, Hypotheses 4a – 4d were not supported for general satisfaction.

The set of control variables entered in the first step accounted for significant variance in satisfaction with feedback ($R^2 = .10$, $F_{(7, 179)} = 2.81$, $p < .01$). Specifically, self-efficacy for the training program, and the number of practice exercises were significant. The addition of the three dimensions of goal orientation and the training environment in the second step failed to account for incremental variance in satisfaction with feedback ($\Delta R^2 = .01$, $F_{(4, 175)} = .46$, $p = .77$). Finally, the addition of the interaction terms in the third step failed to account for incremental variance in satisfaction with feedback ($\Delta R^2 = .00$, $F_{(2, 173)} = 0.09$, $p = .913$). Thus, Hypotheses 4a – 4d were not supported for satisfaction with feedback.

Hypotheses 5a - 5d: Goal Orientation x Training Environment on Post Training Anxiety

To test Hypothesis 5a – 5d, the hierarchical regression approach described above was followed, with post training anxiety as the dependent variable. The results of these analyses are summarized in Table 15. The set of control variables entered in the first step accounted for significant variance in post training anxiety ($R^2 = .55$, $F_{(7, 179)} = 31.66$, $p < .001$). Specifically, pre-training anxiety was significant and computer experience cognitive ability were nearly significant. The addition of the three dimensions of goal orientation and the training environment in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .36$, $F_{(4, 175)} = 2.81$, $p < .05$). Examination of the individual parameters in Step 2 reveals that none of the three goal orientation dimensions accounted for significant unique variance in post training anxiety. However, training environment did account for unique variance ($b = -.131$, $t = -2.34$, $p < .05$), such that trainees in the more structured avoid environment exhibited greater post training anxiety than those in the less structured mastery environment. Finally, the addition of the interaction terms in the third step failed to account for incremental variance in anxiety ($\Delta R^2 = .00$, $F_{(2, 173)} = 0.01$, $p = .994$). Thus, Hypotheses 5a – 5d were not supported.

Hypotheses 6a – 6e: Desire to Withdraw and the Various Outcome Variables

Each of these hypotheses was tested with a two-step hierarchical regression analysis. In the first step of the analysis, the seven control variables were entered, which included cognitive ability, computer experience, anxiety, two aspects of self-efficacy (efficacy for using the Internet more generally, and self-efficacy for the training program itself), the number of quizzes completed, and the number of practice exercises completed.

Table 15. Hierarchical Regression Analysis Results for Hypothesis 5 (Post Training Anxiety)

Step:	Variable	β	R^2	ΔR^2
1:	Cognitive Ability	-0.10	0.55**	0.55**
	Computer Experience	-0.13		
	Anxiety	0.68**		
	Web Development Self-efficacy	-0.01		
	Training Self-efficacy	0.01		
	Quizzes Completed	-0.05		
	Practices Completed	0.00		
2:	Cognitive Ability	-0.08	0.58**	0.03*
	Computer Experience	-0.14*		
	Anxiety	0.63**		
	Web Development Self-efficacy	0.00		
	Training Self-efficacy	-0.06		
	Quizzes Completed	-0.10		
	Practices Completed	-0.03		
	Avoid Orientation	0.07		
	Prove Orientation	0.09		
	Mastery Orientation	0.10		
	Environment	-0.13*		
3:	Cognitive Ability	-0.08	0.58**	0.00
	Computer Experience	-0.14*		
	Anxiety	0.63**		
	Web Development Self-efficacy	0.00		
	Training Self-efficacy	-0.06		
	Quizzes Completed	-0.09		
	Practices Completed	-0.03		
	Avoid Orientation	0.06		
	Prove Orientation	0.09		
	Mastery Orientation	0.08		
	Environment	-0.18		
	Avoid * Environment	0.01		
	Mastery * Environment	0.05		

n = 186; * p<.05; **p<.01

In the second step, desire to withdraw was added. Below, each of these analyses is described in detail. The results of these analyses are summarized in Table16-24. Hypothesis 6a predicted that the desire to withdraw would be negatively related to declarative knowledge scores. The set of control variables entered in the first step accounted for significant variance in declarative knowledge scores (R^2 = .32, $F_{(7, 179)}$ = 12.1, $p < .001$). Specifically, cognitive ability, self-efficacy for the training program, and the number of practice exercises were significant. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained (ΔR^2 = .11, $F_{(1, 178)}$ =16.63, $p < .001$). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = -.356, t =-5.74, $p < .001$), such that those with less desire to withdraw had higher declarative knowledge scores. Thus, support was found for hypothesis 6a.

Hypothesis 6b predicted that the desire to withdraw would be negatively related to scores on the skills test. The set of control variables entered in the first step accounted for significant variance in skill scores (R^2 = .43, $F_{(7, 162)}$ = 17.25, $p < .001$). Specifically, computer experience, cognitive ability, and the number of practice exercises were significant. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained (ΔR^2 = .05, $F_{(1, 161)}$ =18.34, $p < .001$). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = -.249, t =-3.92, $p < .001$), such that those with less desire to withdraw had higher skill scores. Thus, support was found for hypothesis 6b.

Hypothesis 6c predicted that the desire to withdraw would be negatively related to post training self-efficacy. This hypothesis was tested for both self-efficacy for creating

web pages and self-efficacy for the training program. With regards to creating web pages, the set of control variables entered in the first step accounted for significant variance in post training self-efficacy (R^2 = .52, $F_{(7, 179)}$ = 27.50, p < .001). Specifically, computer experience, self-efficacy for the training program, and self-efficacy for using the Internet more generally exercises were significant. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained (ΔR^2 = .11, $F_{(1, 178)}$ =38.22, p < .001). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = -.369, t =-7.42, p < .001), such that those with less desire to withdraw had higher self-efficacy for creating web pages. With regards to self-efficacy for the training program, the set of control variables entered in the first step accounted for significant variance in post training self-efficacy (R^2 = .53, $F_{(7, 179)}$ = 28.50, p < .001). Specifically, computer experience and self-efficacy for the training program were significant. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained (ΔR^2 = .09, $F_{(1, 178)}$ =35.36, p < .001). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = -.322, t =-6.32, p < .001), such that those with less desire to withdraw had higher self-efficacy for the training program. Thus, support was found for hypothesis 6c with regards to both types of post training self-efficacy.

Hypothesis 6d predicted that the desire to withdraw would be negatively related to satisfaction with the training. Support was found for hypothesis 6d for each of the four satisfaction measures. These results are discussed in detail below.

For satisfaction with practice opportunities, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings ($R^2 = .19$, $F_{(7, 179)} = 5.87$, $p < .001$). Specifically, the number of practice exercises completed was significant and the number of quizzes completed was nearly significant at $p < .059$. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .09$, $F_{(1, 178)} = 8.62$, $p < .001$). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance ($b = -.333$, $t = -4.78$, $p < .001$), such that those with less desire to withdraw had higher satisfaction with practice opportunities.

For satisfaction with training order/sequencing, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings ($R^2 = .13$, $F_{(7, 179)} = 3.89$, $p < .001$). Specifically, the number of practice exercises completed and pre-training anxiety were significant; computer experience was nearly significant at the $p = .55$ level. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .21$, $F_{(1, 178)} = 11.71$, $p < .001$). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance ($b = -.505$, $t = -7.61$, $p < .001$), such that those with less desire to withdraw had higher satisfaction with the training order/sequencing.

For general satisfaction with training, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings ($R^2 = .12$, $F_{(7, 179)} = 3.36$, $p < .01$). Specifically, the number of practice exercises completed and self-efficacy for the training program were significant. The addition of the desire to withdraw in the

second step resulted in a significant increase in variance explained (ΔR^2 = .38, $F_{(1, 178)}$ =21.73 p < .001). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = -.672, t =-11.53, p < .001), such that those with less desire to withdraw had higher general satisfaction with the training.

Finally for satisfaction with feedback, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings (R^2 = .10, $F_{(7, 179)}$ = 2.81, p < .01). Specifically, the number of practice exercises completed and self-efficacy for the training program were significant. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained (ΔR^2 = .08, $F_{(1, 178)}$ =4.86 p < .001). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = -.310, t =-4.17, p < .001), such that those with less desire to withdraw had higher satisfaction with feedback.

Hypothesis 6e predicted that the desire to withdraw will be positively related to state anxiety. The set of control variables entered in the first step accounted for significant variance in post training anxiety (R^2 = .55, $F_{(7, 179)}$ = 31.66, p < .001). Specifically, pre-training anxiety was significant and the number of practice exercises completed and cognitive ability were nearly significant at p=.56 and p = .66 levels respectively. The addition of the desire to withdraw in the second step resulted in a significant increase in variance explained (ΔR^2 = .05, $F_{(1, 178)}$ =34.38, p < .001). Examination of the individual parameters in Step 2 reveals that desire to withdraw did account for unique variance (b = .254, t =4.94 p < .001), such that those with a greater desire to withdraw had higher post training anxiety.

Hypotheses 7a – 7e: Off Task Thoughts and the Various Outcome Variables

Each of these hypotheses was tested with a two-step hierarchical regression analysis. In the first step of the analysis, the seven control variables were entered, which included cognitive ability, computer experience, anxiety, two aspects of self-efficacy (efficacy for using the Internet more generally, and self-efficacy for the training program itself), the number of quizzes completed, and the number of practice exercises completed.

Table 16. Hierarchical Regression Analysis Results for Hypothesis 6 (Declarative Knowledge)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.02	0.32**	0.32**
Anxiety	0.06		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.2*		
Quizzes Completed	0.07		
Practices Completed	0.31**		
Cognitive Ability	0.33**		
2: Computer Experience	-0.03	0.43**	0.11**
Anxiety	0.12*		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.12		
Quizzes Completed	0.07		
Practices Completed	0.25**		
Cognitive Ability	0.27**		
Desire to Withdraw	-0.36**		

n = 186; * p<.05; **p<.01

Table 17. Hierarchical Regression Analysis Results for Hypothesis 6 (Skills)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.25**	0.43**	0.43**
Anxiety	-0.06		
Web Development Self-efficacy	-0.12		
Training Self-efficacy	0.09		
Quizzes Completed	0.03		
Practices Completed	0.49**		
Cognitive Ability	0.21**		
2: Computer Experience	0.22**	0.48**	0.05**
Anxiety	0.00		
Web Development Self-efficacy	-0.08		
Training Self-efficacy	0.04		
Quizzes Completed	0.04		
Practices Completed	0.43**		
Cognitive Ability	0.16		
Desire to Withdraw	-.25**		

n = 169; * p<.05; **p<.01

Table 18. Hierarchical Regression Analysis Results for Hypothesis 6 (Web Development Self-Efficacy)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.21**	0.52**	0.52**
Anxiety	0.02		
Web Development Self-efficacy	0.34**		
Training Self-efficacy	0.23**		
Quizzes Completed	0.05		
Practices Completed	0.10		
Cognitive Ability	0.01		
2: Computer Experience	0.15	0.63**	0.11**
Anxiety	0.08		
Web Development Self-efficacy	0.42**		
Training Self-efficacy	0.14*		
Quizzes Completed	0.05		
Practices Completed	0.04		
Cognitive Ability	-0.04		
Desire to Withdraw	-.37**		

n = 186; * p<.05; **p<.01

Table 19. Hierarchical Regression Analysis Results for Hypothesis 6 (Post-Training Self-Efficacy)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.18	0.53**	0.53**
Anxiety	-0.01		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.58**		
Quizzes Completed	-0.06		
Practices Completed	0.12		
Cognitive Ability	0.09		
2: Computer Experience	0.13*	0.61**	0.09**
Anxiety	0.04		
Web Development Self-efficacy	0.05		
Training Self-efficacy	0.5**		
Quizzes Completed	-0.06		
Practices Completed	0.06		
Cognitive Ability	0.04		
Desire to Withdraw	-.32**		

n = 186; * p<.05; **p<.01

Table 20. Hierarchical Regression Analysis Results for Hypothesis 6 (Satisfaction with Practice)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	-0.09	0.43**	0.43**
Anxiety	-0.09		
Web Development Self-efficacy	0.07		
Training Self-efficacy	-0.02		
Quizzes Completed	-0.16		
Practices Completed	0.5**		
Cognitive Ability	-0.04		
2: Computer Experience	-0.14	0.53**	0.09**
Anxiety	-0.03		
Web Development Self-efficacy	0.15		
Training Self-efficacy	-0.10		
Quizzes Completed	-0.16*		
Practices Completed	0.45**		
Cognitive Ability	-0.09		
Desire to Withdraw	-0.33**		

n = 186; * p<.05; **p<.01

Table 21. Hierarchical Regression Analysis Results for Hypothesis 6 (Satisfaction with Order)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.19*	0.13**	0.13**
Anxiety	-0.22**		
Web Development Self-efficacy	-0.19		
Training Self-efficacy	0.13		
Quizzes Completed	-0.08		
Practices Completed	0.2*		
Cognitive Ability	0.07		
2: Computer Experience	0.12	0.35**	0.21**
Anxiety	-0.13*		
Web Development Self-efficacy	-0.08		
Training Self-efficacy	0.01		
Quizzes Completed	-0.08		
Practices Completed	0.12		
Cognitive Ability	0.00		
Desire to Withdraw	-0.5**		

n = 186; * p<.05; **p<.01

Table 22. Hierarchical Regression Analysis Results for Hypothesis 6 (Training)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.03	0.17**	0.17**
Anxiety	-0.10		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.29		
Quizzes Completed	-0.06		
Practices Completed	0.21		
Cognitive Ability	0.01		
2: Computer Experience	-0.07	0.49**	0.38**
Anxiety	0.02		
Web Development Self-efficacy	0.05		
Training Self-efficacy	0.13		
Quizzes Completed	-0.06		
Practices Completed	0.10		
Cognitive Ability	-0.09		
Desire to Withdraw	-0.67**		

n = 186; * p<.05; **p<.01

Table 23. Hierarchical Regression Analysis Results for Hypothesis 6 (Feedback)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	-0.06	0.1**	0.1**
Anxiety	-0.07		
Web Development Self-efficacy	-0.13		
Training Self-efficacy	0.32**		
Quizzes Completed	-0.02		
Practices Completed	0.2*		
Cognitive Ability	-0.11		
2: Computer Experience	-0.10	0.18**	0.08**
Anxiety	-0.02		
Web Development Self-efficacy	-0.06		
Training Self-efficacy	0.25*		
Quizzes Completed	-0.03		
Practices Completed	0.15		
Cognitive Ability	-0.16*		
Desire to Withdraw	-0.31**		

n = 186; * p<.05; **p<.01

Table 24. Hierarchical Regression Analysis Results for Hypothesis 6 (Post Anxiety)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	-0.13	0.55**	0.55**
Anxiety	0.68**		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.01		
Quizzes Completed	-0.05		
Practices Completed	0.00		
Cognitive Ability	-0.10		
2: Computer Experience	-0.10	0.61**	0.05**
Anxiety	0.64**		
Web Development Self-efficacy	-0.07		
Training Self-efficacy	0.07		
Quizzes Completed	-0.05		
Practices Completed	0.04		
Cognitive Ability	-0.06		
Desire to Withdraw	0.25**		

n = 186; * p<.05; **p<.01

In the second step, off task was added. Below, each of these analyses is described in detail. The results of these analyses are summarized in Table 25-33.

Hypothesis 7a predicted that off-task thoughts would be negatively related to declarative knowledge scores. The set of control variables entered in the first step accounted for significant variance in declarative knowledge scores ($R^2 = .32$, $F_{(7, 179)} = 12.13, p < .001$). Specifically, self-efficacy for the training program, the number of practice exercises completed, and cognitive ability were significant. The addition of the off-task thoughts in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .02$, $F_{(1, 178)} = 11.40, p < .001$). Examination of the individual parameters in Step 2 reveals that off-task thoughts did account for unique variance ($b = -.142$, $t = -2.13, p < .05$), such that those with fewer off-task thoughts had higher declarative knowledge scores. Thus, support was found for hypothesis 7a.

Hypothesis 7b predicted that off-task thoughts would be negatively related to scores on the skills test. The set of control variables entered in the first step accounted for significant variance in skill scores ($R^2 = .43$, $F_{(7, 162)} = 17.25, p < .001$). Specifically, computer experience, practice exercises completed, and cognitive ability were significant. The addition of the off-task thoughts in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .03$, $F_{(1, 161)} = 16.94, p < .001$). Examination of the individual parameters in Step 2 reveals that off-task thoughts did account for unique variance ($b = -.187$, $t = -2.98, p < .01$), such that those with fewer off-task thoughts had higher skills scores. Thus, support was found for hypothesis 7b.

Hypothesis 7c predicted that off-task thoughts would be negatively related to post training self-efficacy. This hypothesis was tested for both self-efficacy for creating web

pages and self-efficacy for the training program. With regards to creating web pages, the set of control variables entered in the first step accounted for significant variance in post training self-efficacy (R^2 = .52, $F_{(7, 179)}$ = 27.50, p < .001). Specifically, computer experience, self-efficacy for the training program, and self-efficacy for using the Internet more generally exercises were significant. The addition of off-task thoughts in the second step resulted in a significant increase in variance explained (ΔR^2 = .07, $F_{(1, 178)}$ =31.50, p < .001). Examination of the individual parameters in Step 2 reveals that off-task thoughts did account for unique variance (b = -.285, t =-5.40, p < .001), such that those with fewer off-task thoughts had higher self-efficacy for creating web pages. With regards to self-efficacy for the training program, the set of control variables entered in the first step accounted for significant variance in post training self-efficacy (R^2 = .53, $F_{(7, 179)}$ = 28.50, p < .001). Specifically, computer experience and self-efficacy for the training program were significant. The addition of off-task thoughts in the second step resulted in a significant increase in variance explained (ΔR^2 = .07, $F_{(1, 178)}$ =32.26, p < .001). Examination of the individual parameters in Step 2 reveals that off-task thoughts did account for unique variance (b = -.278, t =-5.31, p < .001), such that those with fewer off-task thoughts had higher self-efficacy for the training program. Thus, support was found for hypothesis 7c with regards to both types of post training self-efficacy.

Hypothesis 7d predicted off-task thoughts would be negatively related to satisfaction with the training. Support was found for hypothesis 7d for two of the four satisfaction measures. These results are discussed in detail below.

For satisfaction with practice opportunities, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings (R^2 = .19, $F_{(7, 179)}$ =

5.87, $p < .001$). Specifically, the number of practice exercises completed was significant and the number of quizzes completed was nearly significant at $p < .059$. The addition of off-task thoughts in the second step failed to account for incremental variance in satisfaction ratings. Thus, this hypothesis was not supported for practice opportunities.

For satisfaction with training order/sequencing, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings ($R^2 = .13$, $F_{(7, 179)} = 3.89, p < .001$). Specifically, the number of practice exercises completed and pre-training anxiety were significant; computer experience was nearly significant at the $p = .55$ level. The addition of off-task thoughts in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .03$, $F_{(1, 178)} = 4.15, p < .001$). Examination of the individual parameters in Step 2 reveals that off-task thoughts did account for unique variance ($b = -.173$, $t = -2.31, p < .001$), such that those with fewer that off-task thoughts had higher satisfaction with the training order/sequencing.

For general satisfaction with training, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings ($R^2 = .12$, $F_{(7, 179)} = 3.36, p < .01$). Specifically, the number of practice exercises completed and self-efficacy for the training program were significant. The addition of off task thoughts in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .07$, $F_{(1, 178)} = 5.02\ p < .001$). Examination of the individual parameters in Step 2 reveals that off task thoughts did account for unique variance ($b = -.285$, $t = -3.85, p < .001$), such that those with fewer off task thoughts had higher general satisfaction with the training.

Finally for satisfaction with feedback, the set of control variables entered in the first step accounted for significant variance in satisfaction ratings ($R^2 = .10$, $F_{(7, 179)} =$

2.81, $p < .01$). Specifically, the number of practice exercises completed and self-efficacy for the training program were significant. The addition of off-task thoughts in the second step failed to account for incremental variance in satisfaction ratings. Thus, this hypothesis was not supported for satisfaction with feedback.

Hypothesis 7e predicted that off-task thoughts will be positively related to state anxiety. The set of control variables entered in the first step accounted for significant variance in post training anxiety ($R^2 = .55$, $F_{(7, 179)} = 31.66$, $p < .001$). Specifically, pre-training anxiety was significant and the number of practice exercises completed and cognitive ability were nearly significant at p=.56 and $p = .66$ levels respectively. The addition of off-task thoughts in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .05$, $F_{(1, 178)} = 33.72$, $p < .001$). Examination of the individual

Table 25. Hierarchical Regression Analysis Results for Hypothesis 7 (Declarative Knowledge)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.02	0.32**	0.32**
Anxiety	0.06		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.2*		
Quizzes Completed	0.07		
Practices Completed	0.31**		
Cognitive Ability	0.33**		
2: Computer Experience	0.00	0.34**	0.02*
Anxiety	0.09		
Web Development Self-efficacy	-0.08		
Training Self-efficacy	0.19*		
Quizzes Completed	0.07		
Practices Completed	0.29**		
Cognitive Ability	0.3**		
Off Task Thoughts	-0.14		

n = 186; * p<.05; **p<.01

Table 26. Hierarchical Regression Analysis Results for Hypothesis 7 (Skills)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.25**	0.43**	0.43**
Anxiety	-0.06		
Web Development Self-efficacy	-0.12		
Training Self-efficacy	0.09		
Quizzes Completed	0.03		
Practices Completed	0.49**		
Cognitive Ability	0.21**		
2: Computer Experience	0.22**	0.46**	0.03**
Anxiety	-0.02		
Web Development Self-efficacy	-0.10		
Training Self-efficacy	0.08		
Quizzes Completed	0.03		
Practices Completed	0.47**		
Cognitive Ability	0.17**		
Off Task Thoughts	-.19**		

n = 169; * p<.05; **p<.01

Table 27. Hierarchical Regression Analysis Results for Hypothesis 7 (Web Development Self-Efficacy)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.21**	0.52**	0.52**
Anxiety	0.02		
Web Development Self-efficacy	0.34**		
Training Self-efficacy	0.23**		
Quizzes Completed	0.05		
Practices Completed	0.10		
Cognitive Ability	0.01		
2: Computer Experience	0.16	0.59**	0.07**
Anxiety	0.09		
Web Development Self-efficacy	0.37**		
Training Self-efficacy	0.21**		
Quizzes Completed	0.06		
Practices Completed	0.07		
Cognitive Ability	-0.04		
Off Task Thoughts	-.28**		

n = 186; * p<.05; **p<.01

Table 28. Hierarchical Regression Analysis Results for Hypothesis 7 (Post-Training Self-Efficacy)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.18	0.53**	0.53**
Anxiety	-0.01		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.58**		
Quizzes Completed	-0.06		
Practices Completed	0.12		
Cognitive Ability	0.09		
2: Computer Experience	0.14*	0.59**	0.07*
Anxiety	0.06		
Web Development Self-efficacy	0.01		
Training Self-efficacy	0.56**		
Quizzes Completed	-0.05		
Practices Completed	0.08		
Cognitive Ability	0.03		
Off Task Thoughts	-.28**		

n = 186; * p<.05; **p<.01

Table 29. Hierarchical Regression Analysis Results for Hypothesis 7 (Satisfaction with Practice)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	-0.09	0.19**	0.19**
Anxiety	-0.09		
Web Development Self-efficacy	0.07		
Training Self-efficacy	-0.02		
Quizzes Completed	-0.16		
Practices Completed	0.5**		
Cognitive Ability	-0.04		
2: Computer Experience	-0.09	0.19**	0.00
Anxiety	-0.08		
Web Development Self-efficacy	0.08		
Training Self-efficacy	-0.03		
Quizzes Completed	-0.16		
Practices Completed	0.5**		
Cognitive Ability	-0.04		
Off Task Thoughts	-0.01		

n = 186; * p<.05; **p<.01

Table 30. Hierarchical Regression Analysis Results for Hypothesis 7 (Satisfaction with Order)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.19*	0.13**	0.13**
Anxiety	-.22**		
Web Development Self-efficacy	-0.19		
Training Self-efficacy	0.13		
Quizzes Completed	-0.08		
Practices Completed	0.2*		
Cognitive Ability	0.07		
2: Computer Experience	0.16	0.16**	0.03*
Anxiety	-0.18		
Web Development Self-efficacy	-0.17		
Training Self-efficacy	0.12		
Quizzes Completed	-0.08		
Practices Completed	0.18*		
Cognitive Ability	0.04		
Off Task Thoughts	-0.17*		

n = 186; * p<.05; **p<.01

Table 31. Hierarchical Regression Analysis Results for Hypothesis 7 (Training)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	0.03	0.12**	0.12**
Anxiety	-0.10		
Web Development Self-efficacy	-0.09		
Training Self-efficacy	0.29		
Quizzes Completed	-0.06		
Practices Completed	0.21		
Cognitive Ability	0.01		
2: Computer Experience	-0.02	0.18**	0.07**
Anxiety	-0.03		
Web Development Self-efficacy	-0.07		
Training Self-efficacy	0.27		
Quizzes Completed	-0.05		
Practices Completed	0.17*		
Cognitive Ability	-0.04		
Off Task Thoughts	-.28**		

n = 186; * p<.05; **p<.01

Table 32. Hierarchical Regression Analysis Results for Hypothesis 7 (Feedback)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	-0.06	0.10**	0.10**
Anxiety	-0.07		
Web Development Self-efficacy	-0.13		
Training Self-efficacy	0.32**		
Quizzes Completed	-0.02		
Practices Completed	0.2*		
Cognitive Ability	-0.11		
2: Computer Experience	-0.07	0.11**	0.01
Anxiety	-0.05		
Web Development Self-efficacy	-0.12		
Training Self-efficacy	0.31**		
Quizzes Completed	-0.02		
Practices Completed	0.19*		
Cognitive Ability	-0.13		
Off Task Thoughts	-0.10		

n = 186; * p<.05; **p<.01

Table 33. Hierarchical Regression Analysis Results for Hypothesis 7 (Post Anxiety)

Step: Variable	β	R^2	ΔR^2
1: Computer Experience	-0.13	0.55**	0.55**
Anxiety	0.68**		
Web Development Self-efficacy	-0.01		
Training Self-efficacy	0.01		
Quizzes Completed	-0.05		
Practices Completed	0.00		
Cognitive Ability	-0.10		
2: Computer Experience	-0.10	0.6**	0.05**
Anxiety	0.62**		
Web Development Self-efficacy	-0.03		
Training Self-efficacy	0.02		
Quizzes Completed	-0.06		
Practices Completed	0.03		
Cognitive Ability	-0.05		
Off Task Thoughts	0.24**		

n = 186; * p<.05; **p<.01

parameters in Step 2 reveals that off-task thoughts did account for unique variance (b = .243, t =4.970 $p < .001$), such that those with a greater off task thoughts had higher post training anxiety.

Hypotheses 8a - 8d: Goal Orientation x Training Environment on Desire to Withdraw

To test Hypothesis 8a – 8d, the hierarchical regression approach previously described for hypotheses 1-5 described above was followed, with desire to withdraw as the dependent variable. The results of these analyses are summarized in Table 34. The set of control variables entered in the first step accounted for significant variance in desire to withdraw ($R^2 = .16, F_{(7, 179)} = 5.03, p < .001$). Specifically, cognitive ability, pre-training anxiety, the number of practice exercises completed and self-efficacy for the training program were significant. The addition of the three dimensions of goal orientation and the training environment in the second step failed to account for incremental variance in satisfaction with feedback ($\Delta R^2 = .01, F_{(4, 175)} = 3.45, p = .001$). Finally, the addition of the interaction terms in the third step failed to account for incremental desire to withdraw ($\Delta R^2 = .02, F_{(2, 173)} = 3.21, p = .001$). Thus, Hypotheses 8a – 8d were not supported.

Table 34. Hierarchical Regression Analysis Results for Hypothesis 8 (Desire to Withdraw)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	-0.16*	0.16**	0.16**
Computer Experience	-0.14		
Anxiety	0.17		
Web Development Self-efficacy	0.21		
Training Self-efficacy	-0.24*		
Quizzes Completed	0.00		
Practices Completed	-0.17*		
2: Cognitive Ability	-0.15*	0.18**	0.01
Computer Experience	-0.15		
Anxiety	0.13		
Web Development Self-efficacy	0.21		
Training Self-efficacy	-0.26*		
Quizzes Completed	-0.03		
Practices Completed	-0.17*		
Avoid Orientation	0.05		
Prove Orientation	0.09		
Mastery Orientation	-0.03		
Environment	-0.05		
3: Cognitive Ability	-0.16*	0.19**	0.02
Computer Experience	-0.16		
Anxiety	0.14		
Web Development Self-efficacy	0.22		
Training Self-efficacy	-0.25*		
Quizzes Completed	-0.04		
Practices Completed	-0.15		
Avoid Orientation	-0.13		
Prove Orientation	0.08		
Mastery Orientation	0.29		
Environment	0.51		
Avoid * Environment	0.29		
Mastery * Environment	-0.87		

n = 186; * p<.05; **p<.01

Hypotheses 9a - 9d: Goal Orientation x Training Environment on Off Task Thoughts

To test Hypothesis 9a – 9d, the hierarchical regression approach described above was followed, with off task thoughts as the dependent variable. The results of these analyses are summarized in Table 35. The set of control variables entered in the first step accounted for significant variance off task thoughts ($R^2 = .16$, $F_{(7, 179)} = 4.95$ $p < .001$). Specifically, pre-training anxiety was significant and cognitive ability were significant. The addition of the three dimensions of goal orientation and the training environment in the second step resulted in a significant increase in variance explained ($\Delta R^2 = .14$, $F_{(4, 175)} = 6.97$, $p < .001$). Examination of the individual parameters in Step 2 reveals that prove ($b = .229$, $t = 3.37$, $p < .001$) and avoid ($b = .314$, $t = 4.29$, $p < .001$) goal orientation dimensions accounted for significant unique variance in off task thoughts, such that prove and avoid oriented individuals exhibited more off task thoughts than mastery oriented individuals. Additionally, the training environment did not account for unique variance ($b = .002$, $t = .034$, $p < .05$). Finally, the addition of the interaction terms in the third step failed to account for incremental variance in off task thoughts ($\Delta R^2 = .01$, $F_{(2, 173)} = 6.01$, $p = .001$). Thus, Hypotheses 9a – 9d were not supported.

Full Model

Given the lack of support for the majority of the individual hypotheses in the two models, it was determined that there was no need to discuss the poor fit of the overall models. Alternatively, this section discusses a simpler model that does fit the data and confirms many of the relationships established by previous research.

Table 35. Hierarchical Regression Analysis Results for Hypothesis 9 (Off Task Thoughts)

Step: Variable	β	R^2	ΔR^2
1: Cognitive Ability	-0.19**	0.16**	0.16**
Computer Experience	-0.15		
Anxiety	0.25**		
Web Development Self-efficacy	0.08		
Training Self-efficacy	-0.06		
Quizzes Completed	0.04		
Practices Completed	-0.13		
2: Cognitive Ability	-0.18**	0.31**	0.14**
Computer Experience	-0.17		
Anxiety	0.08		
Web Development Self-efficacy	0.12		
Training Self-efficacy	-0.17		
Quizzes Completed	0.03		
Practices Completed	-0.15		
Avoid Orientation	0.31**		
Prove Orientation	0.23**		
Mastery Orientation	0.12		
Environment	0.00		
3: Cognitive Ability	-0.16	0.31**	.01
Computer Experience	-0.2*		
Anxiety	0.09		
Web Development Self-efficacy	0.14		
Training Self-efficacy	-0.18		
Quizzes Completed	0.02		
Practices Completed	-0.14		
Avoid Orientation	0.52*		
Prove Orientation	0.24**		
Mastery Orientation	0.37		
Environment	0.81		
Avoid * Environment	-0.33		
Mastery * Environment	-0.63		

n = 186; * p<.05; **p<.01

Specifically, at the start of this study a case was developed for an interactionist approach to better understand how an individual functions within the learning environment. All indications are that the environmental portions of the study failed to produce the desired effects; however, the patterns of individual differences are consistent with previous research. As one would expect, goal orientation predicts the various self regulatory process variables (i.e., motivation to learn, off task thoughts, desire to withdraw), which in turn predict the various outcome variables (i.e., declarative knowledge, skills, satisfaction, post training-anxiety, and post training self efficacy) when one controls for ability. This is essentially the extended model presented in the current study without the environment component.

Structural equation modeling using the MPlus software package was conducted to test the model described above and depicted in Figure 5. To determine the fit of this model, several indicators were considered including the chi-square goodness-of-fit statistic, root mean square error of approximation (RMSEA), the Tucker Lewis Index (TLI), and the comparative fit index (CFI). This structural model, along with the standardized parameter estimates are displayed in Figure 5. The model resulted in a χ^2 value of 107.961, df = 63, $p > .01$; RMSEA = .045; TLI = .964; CFI = .985. A significant chi-square indicates the covariances in the data are significantly different from those of the proposed model, suggesting a poor fit. However, Arbuckle (1997) indicates that the chi-square is nearly always significant and proposes that more appropriate index of fit is the ratio between the chi-square and the degrees of freedom, with ratios less than 2 indicating good fit.

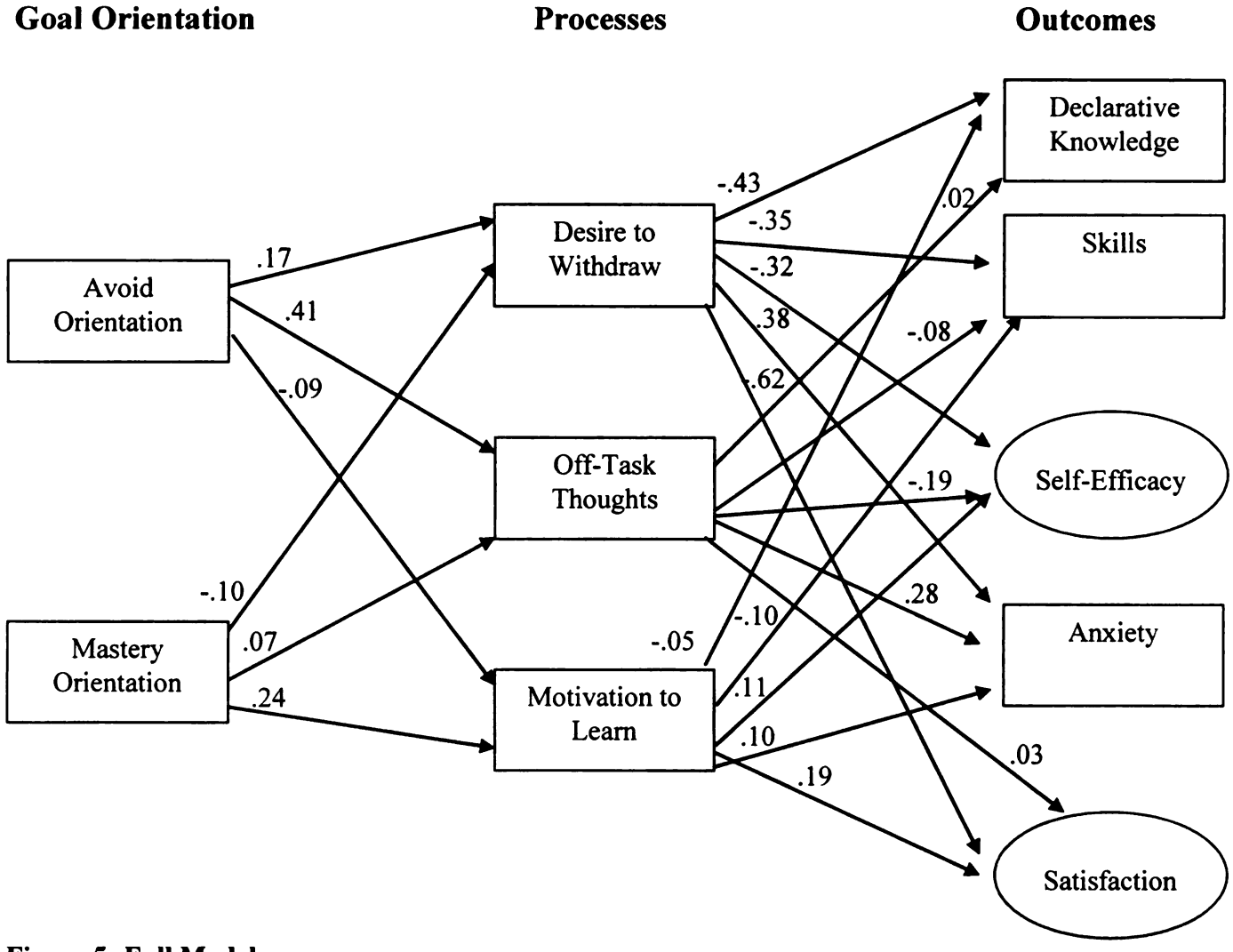


Figure 5: Full Model
Note: Model was run controlling for ability

The current model would falls within this criteria (i.e., 1.69) suggesting a reasonable fit. Similarly suggesting the current model fits are the RMSEA values of which are less than .08 and the CFI and TLI values which are above .90. While these results are far from revolutionary, they do confirm the expected relationships for the various individual differences variables.

Exploratory Analyses

A wide array of exploratory analyses were conducted in an effort to gain a better understanding of the data and to find support for slightly modified hypotheses. These analyses are briefly outlined below, however, where analyses failed to demonstrate meaningful results, in depth discussions are not included.

Given the limited main effects found for the environments, there was some concern that the sample may not have had enough of a skills/ability range with regards to the creation of web pages, thus limiting the variance available for analyses. A closer look at the computer experience items 21-22, which are specific experience creating web pages and working with the DreamWeaver software indicated this was not the source of the limited results. Specifically, only 24% of the sample indicated they knew how to create web pages, 28% indicated they had some former training on web pages, and only 8% of the sample was familiar with the DreamWeaver software. Furthermore, the wide score ranges for the declarative knowledge and the skills test further support adequate variance.

A number of alternative regression models were investigated in an effort to find support for the hypotheses. In particular, regression models were run using various combinations of the seven control variables and with no control variables at all. While

each of the control variables at some point accounted for significant variance across the various hypotheses, the removal of these variables did not yield consistent improvements for any of the models or blocks of hypotheses.

A series of regression models were also run looking for a three way interaction between cognitive ability, goal orientation, and environment; as opposed to all prior analyses for this study which were run using cognitive ability as a covariate. This set of regression analyses was inspired by the numerous historical studies investigating individual differences in learning environments with a focus on cognitive ability. Similar to all previous analyses, cognitive ability continued to contribute significantly to a number of the regression models used to predict various training outcomes (e.g., declarative knowledge, skills, desire to withdraw, and off task thoughts); however, the inclusion of cognitive ability did not lead to any significant three way interactions or any consistent and meaningful two way interactions with environment. There were some consistent findings for the interactions between cognitive ability and avoid orientation with regards to the various satisfaction variables. In particular, individuals with higher cognitive ability and higher avoid orientations had lower satisfaction with practice, feedback, and general satisfaction with the training program. This pattern was just short of significant for satisfaction with order. While these findings are significant, they are not easily explained unless one considers that there may be a tendency for high ability/high avoidance people to be less satisfied in general, as opposed less satisfied with any particular aspects of the training or the training environments. Research has suggested that avoid oriented individuals have lower levels of satisfaction (e.g., Elliot & Sheldon, 1997); however, this has not previously been suggested as a function of ability.

Given the more recent goal orientation literature indicates that individuals can exhibit multiple goal orientations (e.g., Button, Mathieu, & Zajac, 1996; Vandewalle, 1997), a series of analyses was run to investigate various goal orientation profiles (e.g., high avoid/high master, low avoid/high mastery, etc). Three sets of profiles were created and used in a variety of analyses; these profiles included interaction terms, dichotomous splits, and extreme splits using top third/bottom third. The dichotomous and extreme splits failed to improve the outcomes of the hypotheses and did not yield any meaningful results. The profiles created using interaction terms also failed to produce outcomes related to the study hypotheses.

CHAPTER 4: DISCUSSION

The purpose of this study was to investigate goal orientation theory as a means of developing customized computer based learning environments designed to support the learner's needs and create a good fit between the learner and the environment. Specifically, avoid and mastery learning environments were created to allow us to capitalize on the strengths and tendencies associated with each goal orientation, while minimizing the weaknesses in an effort to improve learning and satisfaction while reducing anxiety. This approach is in sharp contrast to previous research which has either focused on manipulating the learner to fit an environment or manipulated aspects of the environment to enhance positive tendencies without managing the maladaptive tendencies that frequently derail learners.

The study's first model proposed that an individual's goal orientation would interact with the training environment to influence training outcomes. The model was not supported by the data. Although each type of goal orientation demonstrated the expected relationships with other variables in the study, goal orientation did not interact with the environment as expected. The study's second model extended the first to include self-regulatory processes. Specifically, this model proposed that the training environment and its interaction with goal orientation would influence the cognitive, affective, and behavioral components of self regulation which would in turn influence the training outcomes. This model was partially supported by the data. In particular, off task thoughts and the desire to withdraw, the self regulatory processes included in the model as they were not pre-determined by the training environment, were related to training outcomes. Once again however, no support was found for the interaction between the

training environment and goal orientation nor its influence the cognitive, affective, and behavioral components of self regulation. Despite the lack of support for the proposed models, this study provides potential insights for future research and practice with regards to supporting learners in an increasingly technology oriented training environments. The following pages highlight some of the interesting findings of this study and their implications for future research and practice.

Goal Orientation

As previously discussed, all three goal orientations (prove, avoid, and mastery) demonstrated the expected relationships with other variables in the study. Specifically, the avoid orientation was negatively related to both measures of self-efficacy, mastery orientation, motivation to learn, GPA, and general satisfaction with the training and positively related to the desire to withdraw, off-task thoughts, anxiety and prove orientation. Where as a mastery orientation was negatively related to the desire to withdraw and positively related to both measures of self-efficacy, prove orientation, motivation to learn, general satisfaction with the training, and satisfaction with feedback. These findings are consistent with previous studies (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; VandeWalle, 2001; VandeWalle, Cron, & Slocum, 2005) and suggest that the lack of results for the current study are not a result of poor measures. These results also support previous research regarding the importance of understanding how goal orientation influences individual choices, reactions, affect, and behavior. What remains unclear is how researchers and practitioners can use this information to support individuals with avoidant tendencies. It has been well established that there are many benefits to a

mastery orientation (e.g., Ames, 1984; Button, Mathieu & Zajac, 1996; Dweck & Leggett, 1988; Elliot, 1999; Elliot and Church 1997; Ford et al., 1998), however, aside from changing a person's state so they are less avoid oriented for a period of time, research has yet to demonstrate how to successfully support an avoid oriented individual through a learning process without manipulating and changing their frame of mind. While the current study used previous research to establish how this might be done, the lack of results clearly demonstrates additional research is needed.

The results of the current study also provide further support for the three factor model of goal orientation. In particular, the relationships demonstrated between a prove goal orientation and the other variables in the study support previous research (e.g., Elliot & Church, 1997; Elliot, 1999; Elliot & Harackiewicz , 1996; VandeWalle, 2001) and provide additional support for the notion that the prove orientation is a is a blend of mastery and avoid components. Specifically, the current study found that the prove orientation was not negatively related to any of the key variables in the study and is positively related to both measures of self-efficacy, avoid and mastery orientation, off-task thoughts, and satisfaction with training order; clearly this pattern of results demonstrates a mix of the avoid and mastery relationships reported for the current study.

Self Regulatory Processes

The current study focused on two indicators of self-regulatory processes which were not predetermined by the training program design. Specifically, the current study focused on off task thoughts, a cognitive aspect of self regulation, and the desire to withdraw, a behavioral aspect of self regulation.

Researchers have become increasingly interested in off task thoughts, due to the recognition that individuals may appear to be spending time on a task, while their attention is elsewhere. This type of mindless review of material is unlikely to lead to learning (e.g., Salomon, 1983; Salomon, 1985) and is difficult to capture with other conceptualizations of mental effort such as time on task. Off task attention is likely have special significance for computer-based learning due to the increased opportunities for learner control (Salomon, 1985). Specifically, the more control learners have over the learning process, the more important their voluntary engagement in the task becomes (Salomon, 1985).

The results of the current study clearly demonstrate the importance of off task thoughts to a variety of training outcomes including a positive relationship with anxiety and negative relationships with declarative knowledge, skills, self efficacy, satisfaction with training order and general satisfaction with the training. Furthermore, off task thoughts are positively related to prove and avoid goal orientations. This pattern of relationships suggests that finding ways to reduce off task thoughts among prove and avoid oriented individuals would go a long way to improving training outcomes.

Withdrawal refers to behaviors such as quitting, physically removing oneself from a situation or an environment, or withholding behavioral effort such as choosing not to practice. In computer-based training, quitting or the failing to complete the training program is a consistent problem. Research suggests, that computer based courses have a dropout rate 10-20% higher than traditional instructor led courses (Frankola, 2001). In the current study, although trainees had the option to discontinue the experiment at any time, it was expected that like most studies, the vast majority of participants would

complete the experiment. Thus, our focus was on the desire to withdraw from the training program.

Similar to off task thoughts, the desire to withdraw was related to a variety of training outcomes including a positive relationship with anxiety and negative relationships with declarative knowledge, skills, self efficacy, satisfaction with training order, satisfaction with feedback, satisfaction with practice opportunities, and general satisfaction with the training. The desire to withdraw also had positive relationships with prove and avoid goal orientations, suggesting that future research should focus on how the desire to withdraw can be minimized for avoid and prove oriented learners to enhance their training performance.

Environment

The current study sought to create two supportive learning environments; one for mastery oriented individuals and one for avoid oriented individuals. Despite the different features built into each of the training environments, the environment differences had little impact on training outcomes with the exception of small results for skills, declarative knowledge, satisfaction with practice, and anxiety. In particular, the skills means for trainees in the avoid environment were slightly higher than the skills means for trainees in the mastery environment. While this difference was not statistically significant, the pattern of greater skill achievement would be consistent with the increase in practice exercises and quizzes completed in the more structured environment.

One significant difference between the environments was higher declarative knowledge scores for the mastery environment. This finding is consistent with previous learner control research which suggests that given the opportunity to explore a training

program can yield greater learning (e.g., Frese et al., 1973; Frese & Zapf, 1994; Hatano & Inagaki, 1986; Smith, Ford, & Kozlowski, 1997).

The higher satisfaction with practice in the mastery environment is likely related to the fact that participants could choose not to practice in this environment. While this may be preferred by some learners, this preference is clearly not ideal for learning as evidenced by the higher skill scores in the avoid environment which generated lower satisfaction ratings but required practice.

Finally, the higher post training anxiety scores in the avoid environment are likely due to learners having a better sense of what they do not know from their involvement in the required quizzes and practice activities. Although past research has demonstrated that increasing metacognitive activity, or thinking about ones thinking, is an effective way to improve performance and self-efficacy (e.g., Ford et al., 1998; Meloth, 1990; Payne and Manning 1992; Rosenshine, Meister, & Chapman, 1996), Schmidt and Ford (2003) found that the effectiveness of metacognitive interventions may vary by goal orientation. The study found that the metacognitive intervention was beneficial for low-avoidance individuals and detrimental to high avoidance individuals. This finding is consistent with goal orientation theory, which suggests that avoidance oriented individuals will withdraw from a task or situation to protect themselves from information suggesting failure, incompetence, or a need for improvement (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Nicholls, 1984; VandeWalle, 1997). In this case, practice and quizzes may have functioned similarly to a metacognitive intervention, and proved threatening and anxiety elevating for learners.

The limited results distinguishing between the environments suggests that the environmental differences may not have been strong enough from a user's perspective to create the expected results. This explanation is bolstered by the mixed results found with the structural manipulation check. Specifically, trainees in the avoid environment believed they had more control over the training choices than they actually did. This could be due to a lack of understanding of the training environment or due to their ability to circumvent the more controlled aspects of the training environment (i.e., gaming the system). This possibility is discussed further in the limitations section. Alternatively, the higher than expected ratings regarding degrees of control for the avoid environment could simply reflect they types of skewed judgments that can occur in between subject designs (Birnbaum, 1999). According to Birnbaum (1999), the participant's perceptions or judgments of control may have been more accurate if they had been exposed to both environments.

Another potential explanation for the disappointing level of differences between the environments is simply the difficulty in creating an environment that truly fits the participant. While the current study used research and theory to create environments that supported the learners' strengths and managed their weaknesses, the learners may not have felt they fit with the learning environments. Future research may want to consider fit perceptions and compare how well these perceptions of fit mesh with the fit envisioned by the design of the program. Additionally perceptions of fit may be enhanced if one educates learners about the features of the program and how those features (e.g., required practice, control over content sequencing) are designed to improve learning and support the participant. While the explanation may not make participants

enjoy practicing, they may see how this feature of the program has assisted them by requiring the use of an effective learning strategy and thus perceive a better fit.

Developing a Supportive Prove Environment

Given the state of the existing literature and the higher level of clarity around the avoid and mastery orientations, the current study focused on the development of supportive learning environments for avoid and mastery goal orientations. However, thought was given to how a supportive prove environment could be developed; the following paragraphs highlight the research supporting these ideas.

Studies have found evidence that prove goals stem from both a fear of failure and a desire to achieve (Elliot & Church, 1997), which suggests that the motives of prove oriented individuals can be a combination of mastery and avoid (Elliot & Church, 1997; Elliot, 1999). A prove orientation is typically associated with setting approach goals, persisting towards these goals despite negative feedback in an effort to demonstrate competence, and internalizing negative feedback thus, leading to lower self-concepts (Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Elliot, 1999; Horvath, Scheu, & DeShon, 2001; Vandewalle, 1997). It has also been suggested that prove individuals are very concerned with impression management, competing with and performing better than others, and are very outcome focused (e.g., Elliot & Church, 1997; Horvath, Scheu, & DeShon, 2001; Vandewalle, 2001).

This would suggest that an environment developed for prove individuals should allow a level of learner control that falls between the control provided mastery individuals and the limited control provided avoid individuals. This would allow us to capitalize on the strengths associated with a prove orientation (e.g., outcome focus, task

involvement, persistence to demonstrate competence) and minimize or manage the weakness (e.g., fear of failure, surface processing and disorganization). The following paragraphs outline how this moderate level of control would be organized around order/sequencing of the training, practice, and feedback.

A prove-oriented environment would allow the trainees to choose the order they view the material in, however, trainees would be required to go to all major topic areas before exiting the training program. This design would provide prove trainees with a moderate amount of control, that is, enough control to maintain the motivational benefits while preventing maladaptive behavioral patterns. Specifically, this decision is based on past research, which indicates that prove-oriented individuals generally report effort and task involvement levels similar to those of mastery oriented individuals (e.g., Elliot & Harackiewicz, 1996; Elliot, McGregor, & Gable, 1999); however, they also have a tendency to be highly outcome focused causing them to focus on how to pass an exam or impress others rather than learning as much as possible (e.g., Elliot & Church, 1997; Elliot, McGregor, & Gable, 1999). This suggests that prove oriented individuals, will not find investing the effort needed to make decisions about what material to view next unappealing and are likely to be involved enough in the task to enjoy having some control. However, similar to avoid oriented individuals, they may look for the easy way out and skip material if they were allowed to do so. Thus, to prevent this maladaptive tendency, the design requires all trainees will visit each of the major topic areas before exiting the training program.

In terms of practice, research suggests that seeking out and engaging in practice opportunities would be a safe way of insuring one performs well on the task in an

evaluation situation. For prove individuals, there may be the added incentive of demonstrating competence to themselves by performing well on practice activities (e.g., Carr, DeShon, & Dobbins, 2001; DeShon & Gillespie, 2005; Horvath, Scheu, & DeShon, 2001). For prove individuals, achieving success in the safe environment of practice opportunities would be likely to increase their self-confidence and motivation for evaluation situations. However, the desire or need to achieve success when practicing, is also likely to lead individuals to focus on easier material. This would be consistent with some of the early learner control literature, which found that many trainees had a tendency to focus on practicing what is easy and avoided practicing the more difficult material (Montanelli & Steinberg, 1975; Lahey, Crawford, & Hurlock, 1975). To capitalize on the prove oriented individuals desire to practice and prevent the inefficient focus on easy material, the training environment for prove individuals will direct trainees to practice screens and allow them to select practice exercises; however, the exercises will gradually and automatically increase in difficulty. This design is consistent with previous research, which suggests that the number of practice exercises at any given level should be limited to avoid inefficient use (e.g., Montanelli & Steinberg, 1975; Lahey, Crawford, & Hurlock, 1975).

With regards to the feedback component of a prove supportive learning environment, prove oriented individuals will receive normative feedback. Research suggests that prove oriented individuals prefer outcome related feedback over process feedback because they perceive ability as fixed and believe there is little that process oriented feedback can do to help them improve their performance (e.g., Butler, 1993; Tuckey, Brewer, & Williamson, 2002; VandeWalle, 2003). Normative feedback is

information about outcomes such as, exam scores, percentile rankings, and grades, which directly compares your performance to that of others. It is likely that the preference for normative feedback among prove individuals stems from the desire to demonstrate competence and to compete with others (e.g., Butler, 1993; Park, Schmidt, Scheu, & DeShon, 2007; Tuckey, Brewer, & Williamson, 2002; VandeWalle, 2003). Furthermore, normative feedback is likely to help prove oriented individuals to maintain their confidence by reducing uncertainty about their performance, which is crucial for maintaining adaptive responses such as applying effort and persisting with the task (e.g., Ashford & Cummings, 1983; Park, Schmidt, Scheu, & DeShon, 2007). This is especially relevant in a prove supportive environment in which poor feedback could be followed by applying effort to additional practice activities in an attempt to demonstrate competence on the final quiz.

Given the results of the current study, which support the notion that prove orientation tends to blend aspects of the avoid and mastery orientation, it would be interesting to see how each of the goal orientations would function in a blended environment designed to support the prove orientation.

Training and Technology

Over the past few years, technology has continued to revolutionize training such that it is no longer restricted to the classroom. This trend has moved far beyond employers looking to reduce the costs associated with employee training and is now a common component of higher education. A study by Allen and Seaman (2003) reports that 1.6 million students took at least one online course in the Fall of 2002, thus, 11% of all US higher education students took at least one on-line course in the Fall of 2002. This

number is likely to be significantly higher in the current Spring 2008 semester. Despite the proliferation of technology based training and learning opportunities, limited progress has been made in addressing the many challenges associated with technology based learning platforms. Articles outlining these challenges continue to list maintaining participant motivation and interest among the biggest challenges for alternative training media (e.g., Carter, 2004; Frankola, 2001). To address these challenges, a number of educational institutions are now using blended models. This model typically combines an instructor, generally in more of a facilitator role, with technology based training platforms such as web based lecture notes, message and bulletin boards, and video clips. The addition of an instructor and at times even live class room activities allows for increased interactions with an expert and with peers, which some suspect helps to alleviate the motivational issues associated with pure technology based systems (e.g., Mallinin, 2001; Prendergast, 2004).

From the perspective of educational institutions, there is increasing concern and debate over the growth of technology based courses. In particular, there are questions around how to maintain course quality control, the changing role of instructors, and how to prepare instructors for these changes (e.g., Allen & Seaman, 2003; Prendergast, 2004; Twigg, 2001). While is it recognized that instructors serve more as facilitators and less as lecturers and that teaching a purely on-line course or a blended course requires different skills and approaches than a traditional class (e.g., Ascough, 2002; Prendergast, 2004; Yang & Cornelious, 2005; Zheng & Smaldino, 2003), there is limited research available to help map out these differences and delineate improvements.

Even with all the recognition of changes that have occurred and the many that are still needed to improve the results of technology based courses, there is still a focus on one size fits all learning and a movement to place the burden on the student to adapt to the new realties of training and education. This pattern is evident in a number of recent studies which indicate students need to take more responsibility for adjusting their learning styles (e.g., Hughes, 2004; Palloff & Pratt, 2003) to fit on-line courses. In particular it has been suggested that students need to be more introspective, cognitively oriented, flexible, and self evaluative to succeed (e.g., Ascough, 2002; Palloff & Pratt, 2003). One will find little if any discussions on how the training experience can be changed or improved to support learners who do not meet the emerging profile for success.

Despite the recognition that we need to improve participant motivation and training quality for technology based training to be fully effective, research on how to achieve this continues to lag far behind the increasing usage of technology based training. A recent study by Klein, Noe, and Wang (2006), exemplifies the type of research needed in this area. Specifically, this study used a quasi-experimental design to investigate classroom vs. blended learning and determine how perceptions of the environment impacted motivation to learn and a variety of outcomes including course satisfaction and grades. Additionally, a meta analysis by Sitzmann, Kraiger, Stewart, and Wisher (2006), compared the effectiveness of classroom based vs. computer-based training. The study outlines a number of boundary conditions they believe drive the relative effectiveness of these programs. For instance, the study suggests that computer-based training may be better suited to training declarative knowledge, courses that occur over an extended

period of time, and in situations where additional practice activities, practice opportunities, and feedback are needed. This suggests that instructional designers may want to choose the course delivery mechanism (computer, classroom, blended) based on careful evaluation of these boundary conditions.

Perhaps future research should also consider moving out of the laboratory and taking a more observational and case study type of approach among the many real world applications of this technology in order to better understand who succeeds and who struggles in these environments, what strategies they employ, what cognitive differences, if any, drive success in technology based learning environments. Once we have a better understanding of the key issues and changes needed to be successful in a technology based training environments, then it would be wise to return to a controlled laboratory setting and test these observations in conjunction with learning and motivational theory.

Limitations

This study had a number of limitations which may have contributed to the limited findings and may constrain the conclusions that can be drawn. Of particular concern are the constraints associated with using a laboratory setting and a student sample. While the training program was real and the content should have appealed to a number of participants, the amount of information participants needed to learn and apply in three hours may have overwhelmed participants and shifted their focus to goals not associated with the study. For instance, some participants may have become more focused on finishing the study on time and obtaining experimental credit than with actually learning the material and using the resources provided by the training environments. This may have included skipping or simply clicking through practice activities and quizzes, failing

to follow feedback suggestions, and skipping or simply clicking through key segments of the training. While the training program was designed to guide and direct participants, safe guards such as requiring a certain amount of time on each screen to prevent mindless clicking and advancement through the system were not programmed into the study. A recent study of off task behaviors among students using intelligent tutor software (Baker, Corbett, Koedinger, & Wagner, 2004) found that many students were 'gaming the system' or learning how to advance through the software without actually using the software to learn. The Baker et al study suggests this behavior was more prevalent among students high on learned helplessness and performance orientations. With regards to the current study, 'gaming the system' would have eliminated the learning environmental differences built in to benefit the participants, possibly contributing to the lack of results. It is also possible that a non student sample, such as employees focused on building skills necessary for their job, would be less inclined to 'game the system'. Future studies should build in safe guards making it more difficult to 'game the system' and consider spreading the training out over a period of several days. By making the training less intense, it may reduced mental overload which may increase frustrations and the tendency to disengage and 'game the system'.

Extending the training duration over a period of days may also allow more time and more opportunities for the environmental differences to have the desired impact. While the support elements were designed into the environment to help control maladaptive behaviors, these features may not have had enough time have the positive impact expected. If the use of the environment was extended over a period of days, these features may have become more important and more salient to the participants.

Finally, it is possible that many of the students who participated in the study had enough previous knowledge of web page development that the learning environments had less impact than expected. Specifically, it is possible that mastery oriented people focused on hunting for new web development information and strategies while circumventing the learning environment features. Alternatively, avoid oriented individuals may have focused on the items they were already familiar with to prevent any possibility of failure. While the analyses did control for previous experience, the combination of experience and 'gaming the system' was not accounted for with either safeguards or measures that could be controlled for in analyses.

Conclusions

The current study attempted to unify the theory and research from a number of different literature streams including motivation, goal orientation, self regulation, person-environment fit, training, and learner control in an effort to improve how we support and treat trainees in technology based learning environments. While many aspects of the current study did not work as expected, the limited results simply highlight how much more we have to learn about supporting technology based education efforts. As companies, municipalities, universities, and other education providers continue to embrace technology based training/education platforms and reduce student interactions with trained educators, it is critical that we find ways to better understand and improve the quality of the experience and the learning that stems from that experience. Future research needs to take a closer look at the opportunities, issues, and limitations created by new training platforms both in the laboratory and in the many real-world experiences of learners currently in these environments.

Appendix A

INFORMED CONSENT FORM

LEARN TO MAKE YOUR OWN WEB PAGE

Explanation of research: The learning behaviors of trainees in a web-based training program will be examined.

Procedures and estimate of time: During the experiment, you will complete a series of survey style questions. You will also complete a training program that will teach you how to create a web page. You will have opportunities to practice these skills, take quizzes, and receive feedback. At the end of the study, you will be asked to create and submit your own web page. The study is expected to take 3 hours.

Participation: Participation in this study is voluntary. You may choose not to participate in some or all parts of the study. You may discontinue the experiment at any time without penalty. You will receive credit for any time you invest in the study (1 credit per half hour). If you choose not to participate in this study, you can find other experimental alternatives on the subject pool web site you used to sign up for this study. You may also see your instructor for non-experimental credit opportunities.

Confidentiality: Your privacy will be protected to the maximum extent allowable by law. Data gathered from you during this study will be strictly confidential. Your name will not be associated with your responses. Your responses will remain anonymous in any research reports. At your request, the results will be made available to you.

Risks and costs: There are no risks or costs associated with your participation.

Principal investigator: The investigator and his/her associates will be available to answer any questions you may have. Kevin Ford, fordjk@pilot.msu.edu, (517) 353-5006. Department of Psychology, Psychology Research Building, Michigan State University, East Lansing, MI 48824

Co-investigator: Christine Scheu, cscheu@msu.edu, 355-5255, Department of Psychology, Psychology Research Building, Michigan State University, East Lansing, MI 48824

University Committee on Research Involving Human Subjects: You may contact this office if you if have any questions in relation to your role or rights as a research subject or if you feel your questions have not been adequately answered by the investigators. Ashir Kumar, 355-2180; UCRIHS@msu.edu, 202 Olds Hall, Michigan State University, East Lansing, MI 48824-1046.

Please DO NOT use the "Back" or "Forward" features of your browser! Use only the links to go to and from pages within this study. DO NOT open up other web sites from within this browser window!

Agreement to Participate

I agree to participate:

___ Yes ___ No

If you marked "Yes," please enter your PID number (do **NOT** enter the A in the box to the right):
A_____

Please enter your pilot login (your email address **without** the @pilot.msu.edu): _____

(The information above is being collected for purposes of documenting your participation and providing credit.)

Appendix B

Measures

Demographics

1. Year in school.
   a. -Freshman
   b. -Sophomore
   c. -Junior
   d. -Senior
2. Age. _____
3. Gender.
   a. -Male
   b. -Female
4. Race.
   a. -African American
   b. -Asian American
   c. -Hispanic American
   d. -Middle Eastern American
   e. -Native American
   f. -White American
   g. -Other
5. Cumulative GPA
   a. -Less than 1.0
   b. -1.0 – 1.5
   c. -1.6 –2.0
   d. -2.1 – 2.5
   e. -2.6 – 3.0
6. Please enter your ACT or SAT total test score. _____
7. Major
   a. -Psychology
   b. -Non-Psychology

Computer Experience

1. I frequently read computer magazines or other sources of information that describe new computer technology.
2. I know how to recover deleted or lost data on a computer or PC.
3. I know what a LAN (Local Area Network) is.
4. I know what an operating system is.
5. I know how to write computer programs.
6. I know how to install software on a personal computer.
7. I know what email is.
8. I know what a database is.
9. I am computer literate.
10. I regularly use a PC for word processing.
11. I often use a mainframe computer system.
12. I frequently use the web as an information resource.
13. I am good at using computers.
14. I know what the internet is.
15. I frequently surf the web.
16. I frequently use the web as an information resource.
17. I spend time making my own pages for the web.
18. I surf the web for enjoyment.
19. I think about making my own web pages.
20. I know how to make web pages.
21. I have taken classes or received formal instruction on creating web pages.
22. I have used Dreamweaver to create my own web pages.

Domain Specific Goal Orientation

Avoidance

1. Some class assignments make me so anxious that I want to quit.
2. In classes, I try to hide from others that they are better than me.
3. I am anxious because I know my family and friends will compare my failures classes to those of others.
4. In classes, I avoid situations where I might demonstrate poor performance to myself.
5. Because I know my work will be compared to that of others in class, I get so nervous that I procrastinate.
6. I worry about taking on a task in class because my performance would prove to others that I have low ability.
7. In classes, I try to avoid discovering that others are better than me.
8. I am reluctant to ask questions in class because others may think I'm incompetent.

Performance

1. It makes me feel good to have an audience when I outperform others in classes.
2. It is important to me to perform better than my classmates.
3. It is important to me to impress others by doing a good job in class.
4. I want others to recognize that I am one of the best in class.
5. I enjoy proving my ability to others in classes.
6. I feel good when I can prove to myself that I am better than my classmates.
7. I want to show myself how good I am in classes.
8. In classes, I enjoy showing myself how good I am.

Mastery

1. In classes, I feel good when I am doing something that helps me grow.
2. I prefer to work on assignments in classes that force me to learn new things.
3. I enjoy challenging and difficult class assignments where I'll learn new skills.
4. In classes, I enjoy opportunities to extend the range of my abilities.
5. I am willing to work on a challenging class assignment that I can learn a lot from.
6. The opportunity to learn new things in classes is important to me.
7. I enjoy working on challenging class assignments so that I can learn new things.
8. The opportunity to do challenging class assignments is important to me.

State Anxiety

1. I feel calm
2. I feel secure
3. I am tense
4. I feel strained
5. I feel at ease
6. I feel upset
7. I am presently worrying over possible misfortunes
8. I feel satisfied
9. I feel frightened
10. I feel comfortable
11. I feel confident
12. I feel nervous
13. I am jittery
14. I feel indecisive
15. I am relaxed
16. I feel content
17. I am worried
18. I feel confused
19. I feel steady
20. I feel pleasant

Satisfaction with the Training Program

1. The training program provided useful feedback.
2. The training program provided enough feedback.
3. I liked the type of feedback that was provided.
4. The feedback helped me to learn the material.
5. The feedback was motivating.
6. The practice activities helped me to learn the material.
7. The training program provided sufficient practice opportunities.
8. I liked the practice exercises.
9. The practice exercises helped me decide what skills I had learned.

10. The practice exercises were motivating.
11. The training was presented in a logical order.
12. The training program provided too much information.
13. I liked being able to choose what topics to look at.
14. The information provided in the training program was interesting.
15. The training material was well organized.
16. The training material prepared me to use my new web development skills.
17. The training was motivating.
18. I knew what was expected of me in the training program.
19. The training was boring.
20. The skills I learned in the training program will allow me to develop web pages.
21. I enjoyed the training program.
22. The training program was a waste of my time.
23. I was disappointed with the training program.
24. I found the training to be useful.
25. I would recommend this training program to others.
26. Overall I was satisfied with the training program.

Self-efficacy for training program

1. Compared with others in this training program, I expect to do well.
2. I'm certain I can understand the ideas taught in this course.
3. I expect to do very well in this training course.
4. Compared with others in this course, I think I'm a good trainee.
5. I'm sure I can do an excellent job on the tasks assigned in this training course.
6. I think I will perform well in this course.
7. My learning skills are excellent compared with other trainees in this course.
8. Compared with other trainees in this course I think I know a lot about the subject.
9. I know that I will be able to learn the material for this training course.

Self-efficacy for creating web pages

1. I can meet the challenges of creating a basic web page.
2. I am confident in my understanding of how different elements of web page design are related.
3. I can create a web page on my own, without help.
4. I am certain that I can manage the requirements of web page design, even when problems occur.
5. I believe I can handle more difficult elements of web page design.
6. I am confident that I can meet the challenges of creating web pages that are more complex.
7. Compared with others in this training program, I believe I learned a lot about creating web pages.

Declarative Knowledge.

1. Which is not a good reason to place a link on your web page?
   a. -To point to extra information on another web page
   b. -To point to another web page related to content on your web page
   c. -To connect to another one of your own web pages
   d. -You can't think of anything else to put on your web page

2. How does a hyperlink work?
   a. -It uses the address of another web page
   b. -It uses the title of another web page
   c. -It uses meta tags from another web page
   d. -It uses magic

3. How do you place a link on your web page?
   a. -Modify, make link
   b. -Insert, Link...
   c. -Text, Add a Hyperlink...
   d. -Right mouse button, Select Hyperlink

4. If you are making a link to another web site, the relative to box should contain what option?
   a. -www:
   b. -Path:
   c. -Document:
   d. -Site Root:

5. How do you know a link is in place on your web page?
   a. -You can't tell
   b. -It is underlined
   c. -It is a different color
   d. -It is underlined and a different color

6. How do you remove a link from your web page?
   a. -Edit, Hyperlink...
   b. -Insert, Hyperlink...
   c. -Right mouse click, Remove Link
   d. -View, Select Hyperlink

7. What are the two attributes that specify the amount of space around and within the cells of a table?
   a. -Borders and cell height
   b. -Cell padding and cell spacing
   c. -Cell padding and row height
   d. -Borders and cell spacing

8. What name should you save your first web page document under?
   a. -user
   b. -index
   c. -any name you want
   d. -Your pilot login name

9. In what folder should you save your web pages?
   a. -web
   b. -www
   c. -snapshots
   d. -any folder

10. How many web pages can you have on the MSU server system?
    a. -only one, and it must be named "index.html"
    b. -several web pages; the one named "index.html" is your home page
    c. -only two; "index.html" and one other web page
    d. -only one, but it can have any name you want

11. How are graphics files uploaded to the Internet?
    a. -by saving each one separately
    b. -by saving them as a group of files
    c. -automatically when the html file is saved
    d. -only by using FTP

12. How do you open a new browser window to locate your web page?
    a. -New, Browser window...
    b. -Tools, New window...
    c. -Edit, New, Window
    d. -File, New, Window

13. What do you need to know to find your web page on the Internet?
    a. -The page title
    b. -The document name
    c. -The address
    d. -Your pilot password

14. Which of the following is the correct prefix for an MSU student's web page address?
    a. -http://www.msu.edu/user/
    b. -http://www.msu.edu/
    c. -http://www.msu.edu/pilot/
    d. -ftp://www.msu.edu/user/

15. Which statement about changing the background colors of a web page is true?
    a. -You can change the colors, but there are only a couple from which to choose
    b. -You can change the colors, and it is easy to do
    c. -You can change the colors, but it is difficult to do
    d. -You can't change the colors

16. Which menu is used in order to change the background colors on a web page?
    a. -Modify
    b. -Insert
    c. -Format
    d. -View

17. Which sets the colors for all of the non-linking text that you write?
    a. -Body text
    b. -Normal text
    c. -Hyperlinks
    d. -Followed hyperlinks

18. How do you set the colors for text on a web page?
    a. -View, Font..., Effects
    b. -Modify, Page Properties, Text
    c. -Modify, Page Properties, Active Links
    d. -Format, Text colors...

19. Why are tables useful on a web page?
    a. -Because all text on web pages must be in tables
    b. -Because you can't use the tab key to create columns
    c. -No particular reason; they're just fun to make
    d. -Tables are not useful; you can't put tables on a web page

20. How do you place a table on a web page?
    a. -Table, Insert table...
    b. -Insert, Table...
    c. -Insert, Object...
    d. -You can't

21. Which of the following do you use the text menu for?
    a. -Aligning text
    b. -Inserting Graphics
    c. -Choosing the color for links
    d. -Adding text to tables

22. When should you begin planning the content for your web page?
    a. -Before you do anything else
    b. -Before you post it to the Internet
    c. -After you post it to the Internet and see how it looks
    d. -You don't need to plan your content as long as you have links and graphics

23. Which of the following is not something to think about when planning your web page?
    a. -Your audience
    b. -How you want your page to look
    c. -How someone else's page looks
    d. -What links you might want on your page

24. Where does the title for your web page usually appear?
    a. -At the top of the web page
    b. -At the top of the Internet browser
    c. -In the Address field
    d. -You can't see it

25. Why should you have a title for your web page?
    a. -There is no reason to have a title
    b. -A title is required for web pages
    c. -A title makes your web page look nicer
    d. -Search engines can find your web page more easily

26. What is it important for your web page title to contain?
    a. -Your name
    b. -The Internet address for your web page
    c. -The most important aspect of the page's content
    d. -It doesn't really matter what is in the title

27. What is the purpose of keywords?
    a. -They allow you to link to specific sections of your web page
    b. -To keep the search engines away from your page
    c. -To organize the information on your page
    d. -To help visitors find your web page

28. What happens if you don't create a title for your web page?
    a. -No title appears in the title bar of the browser
    b. -Your web page won't load to the Internet
    c. -Your document name is used as a title

29. What can't you do with a horizontal line?
    a. -Move it
    b. -Hide it
    c. -Delete it
    d. -Align it

30. Which of the following is not a graphic that can be inserted on a web page?
    a. -Photo
    b. -Horizontal Line
    c. -Chart
    d. -Table

31. Which menu is used in order to place a graphic on a web page?
    a. -Edit
    b. -Insert
    c. -Format
    d. -Tools

32. What can you do with a graphic once you have inserted it on a web page?
    a. -Resize it
    b. -Change its color
    c. -Rotate it
    d. -Nothing

33. Which of the following is not an alignment option for horizontal lines and graphics?
    a. -Left
    b. -Center
    c. -Right
    d. -None

34. What is the maximum number of words you should put on a single web page?
    a. -800
    b. -500
    c. -100
    d. -300

35. Which of the following is NOT true about table borders?
    a. -you can change the color
    b. -you can change the size
    c. -tables always have to have borders
    d. -tables without borders have dotted lines in design view

Web Page Exercises

***Instructions*: In Dreamweaver open a blank page. Perform each of the following tasks.**

NOTE: You should spend NO MORE than 15 minutes (total, not 15 minutes per item) on these exercises. The timer in the upper left corner of this page displays the time remaining for these exercises. Additionally, a message will appear on your

screen when time has expired. Don't be surprised if you are not able to successfully complete all items in the allotted time. Don't worry, just do as many as you can.

---

1. Save the blank page in Dreamweaver as *student ID*.html (ex. if student id is A12345678, save as 12345678.html). Save the file in the "P:/web" folder.
2. Make the title of the page "Creating Web Pages"
3. Change the background color of the page to a shade of blue.
4. Type in the words "Web Page Exercises".
5. Change the color of the normal text to White.
6. Create a text link to www.msu.edu and one to www.usatoday.com
7. Change the color of the above links to Yellow
8. Insert the following Keywords into this page: Michigan State University
9. Type in the "Michigan State University" and format all the text so that it is a) bold, b) italicized, and c) size 7.
10. Center the line from item 9
11. Insert a horizontal rule directly below where it says Michigan State University
12. Edit the horizontal line below by a) making the line thicker, b) set the width to 50% of the window, and c) position it on the right side of the window.
13. Insert the image below and increase the size of the image.

14. Create a link in the image inserted in step 13, so that it will link to www.io.psy.msu.edu
15. Remove the link to www.usatoday.com, without deleting the text itself.
16. Create a table with 5 rows and 4 columns. Make the table border = 4, make the border green.
17. Change the table's background to yellow, make the cell padding 9, set the table width to 80%, align the table to the right.
18. Insert an image below the table.
19. Add the following alternative representation (ALT text) to the image from step 18: Quiz Item Number 19
20. At the bottom of the page, make a new line that reads: Go to the top of the page. Using this text, create a link to first line of the page, created in step 4.
21. Change the background for one cell in the table from step 16 to pink.

22. Type the word "Spartan" into one cell of the table. Make the word green, underlined, and centered. Change the font to Geneva.

23. Make a link to your email address in another cell of the table.

When you are finished working on these exercises, SAVE YOUR WORK and click the link at the bottom of the page to continue. However, do not click the link to continue until you are done working on these exercises. You are not required to successfully complete all items (complete as many as you can within 15 minutes). However, after you have clicked the link to continue, you cannot return to work on these exercises!

Skill-based Performance Rating Sheet.

ID Number:_____ Total Checks _____

√	Task
	Make the title of the page "Creating Web Pages"
	Make the background a shade of blue
	Type in the words "Web Page Exercises"
	Make the normal text White
	Create a link to www.msu.edu
	Create a link to www.usatoday.com
	Change the color of the links above to Yellow
	Insert the following key words "Michigan State University"
	Type in the words "Michigan State University"
	Make "Michigan State University" Bold
	Make "Michigan State University" Italicized
	Make "Michigan State University" font size 7
	Make "Michigan State University" centered
	Insert a horizontal line below "Michigan State University"
	Make the horizontal line thicker
	Make the horizontal line width 50%
	Make the horizontal line positioned on the Right side of the page
	Insert the Image provided
	Increase the size of the image provided
	Create a link the image provided to www.io.psy.msu.edu
	Remove the link to www.usatoday.com without removing the text
	Create a table with 5 rows and 4 columns
	Set the table border to = 4
	Make the table border Green
	Make the table background Yellow
	Make the table cell padding = 9
	Set the table width to = 80%
	Align the table to the right
	Insert an image below the table
	Make "quiz item 21" the ALT text for the new image
	Add the sentence "Go to the top of the page"
	Create a target for the first line of the page
	Create a target link from the first line of the web page to "Go to the top of the page"
	Change background of one cell of the table to Pink
	Type the word "Spartan" into once cell of the table
	Make the word "Spartan" Green
	Make the word "Spartan" Underlined
	Make the word "Spartan" Centered
	Make the word "Spartan" in Geneva Font
	Make a link to your email address in another cell of the table

Desire to Withdraw

1. I often considered quitting the training program.
2. I found this training program so difficult that I did not want to complete it.
3. I was so bored that I stopped trying to learn the material.
4. I chose not to put much effort into the training program.
5. I could have learned these skills if I had not stopped trying.
6. I found this training program so boring that I did not want to complete it.
7. I could not wait for the training program to be over.
8. By the end of the training program I was investing very little effort.
9. As I worked through the training program, I realized that I had no desire to learn this material.
10. I found that I had no desire to improve my skills.
11. I was so bored that I wanted to quit.
12. I decided that trying to learn this material was not worth my time and effort.

Off-task Thoughts

1. I thought about how much time I had spent learning the material.
2. I wondered about my performance compared with others.
3. I wondered how well others have done on the quizzes.
4. I thought about how hard the material was to learn.
5. I wondered about how hard the quiz might be.
6. I took mental breaks while I was learning.
7. I became frustrated with my ability to learn the material.
8. I thought about how well or how poorly I was doing.
9. I got mad at myself while I was learning the material.
10. I daydreamed while I was learning.
11. I lost interest in learning the material for short periods of time.
12. I thought about other things that I have to do today.
13. I let my mind wander while I was learning the materials.
14. I found myself thinking about other things because I was bored with the training.

Motivation to Learn

1. I was motivated to learn the skills emphasized in the training program.
2. I tried to learn as much as I could from the training program.
3. I was interested in learning the training material.
4. I wanted to improve my web development skills.
5. One reason I decided to attend the training program was to improve my web development skills.
6. I was willing to exert effort to improve my skills.
7. I worked hard to learn the material in the training program.
8. I concentrated on learning the material in the training program.
9. I tried my best to become a good web page developer in the training.
10. I invested the effort I needed to learn the material.

Psychological Manipulation Check

1. The training program was set up in a way that made it easy for me to learn.
2. The training program made me want to learn.
3. I felt very relaxed during the training program.
4. This was a good way for me to learn the material.
5. I felt very focused during the training program.
6. I was very comfortable learning the material this way.
7. The training program required too much effort.
8. The training program did not provide me with enough choices.
9. I was frustrated with the design of the training program.
10. The training program did not provide enough structure.

Structural Manipulation Check

1. I had control over what training topics I looked at.
2. I had control over what order I read training materials in.
3. I had control over when to practice.
4. I had control over how much to practice.
5. I received strategy-based feedback.
6. I received feedback that explained the answers to the quiz questions.

Appendix C

Create Your Web Page

Welcome to the training course!

The purpose of this training is to teach you how to create your own web page using the Dreamweaver software. Your goal is to do your best!

This entire study is expected to take approximately 3 hours. After answering a series of brief questionnaires, you will be presented with a web-based training program that will teach you to create web pages using Dreamweaver . The training program will provide you with opportunities to practice what you have learned, take quizzes at the end of each lesson, and receive feedback on these quizzes. Instruction will be provided in each of six lessons. You will have approximately 2 hours (or less if you choose) to study the material in the training program, so use your time wisely.

After you have completed the training program, you will answer another series of questionnaires and take a final quiz. You will then have an opportunity to apply what you have learned by developing and submitting to the experimenter your own web page using the material they learned in training.

If you have any questions at any time during the experiment, quietly raise your hand and the experimenter will come around to help you.

Now, please read the following instructions carefully...

Please DO NOT use the "Back" or "Forward" buttons at the top of your browser window!

Warnings

You may be removed from *any* psychology experiment if you behave in a disruptive manner.

If you are removed, you will not receive credit.

In addition to physically disruptive behavior, the following behaviors will be considered disruptive:

- When you are asked to enter responses, you enter random characters or random words.
- You submit a final web page that includes inappropriate material such as pornography or foul language.

The purpose of this study is to learn to create web pages by learning the material contained within this training program. Therefore, you are NOT to use the help files that

are included with Dreamweaver. Doing so may result in your removal from this experiment without receiving credit.

Before beginning the training, you must read the Informed Consent information and agree to participate.

NOTE: The consent form and the training will open in a second smaller window. This original window will remain open.

Go on to the Informed Consent.

Introduction for the Mastery Environment

Welcome to the training course!
Welcome to the web page training program. This program will teach you how to create web pages using Dreamweaver. You can use the menu on the left to navigate through the training program. This is a self-directed training program, meaning that it is up to you to decide how to go about learning the information in this program. You can visit the pages in any order you wish, for as long as you need, and can return to previously viewed pages as often as you like. When you feel you have finished the training and are ready to move on click the "Exit" link.

Introduction for the Avoid Environment

Welcome to the web page training program. This program will teach you how to create web pages using Dreamweaver. Use the continue link at the bottom of each page to move through the training program. You can return to previously viewed sections as often as you like using the menu on the left. The menu will only allow you return to previously viewed sections, NOT to move forward in the training. When you have completed each section of the training and are ready to move on click the "Exit" link.

First StepsGetting Started

Opening Dreamweaver:

For this training program you will need to use Dreamweaver to create your web page from scratch. Right now, open Dreamweaver by clicking on the start menu at the bottom of your screen, go to programs, development applications, web, Dreamweaver. This program takes several minutes to open, so just sit back and relax for a moment.

1. Now that Dreamweaver is open, go the the View menu at the top of the page, and make sure there is a check mark next to Design. If there isn't, click on design. This view allows you to develop your web page without having to learn HTML programming.

2. Next, go to the Windows menu at the top of the page. Under the Windows menu, select Hide All Panels (if this option is not available you are all set).

3. Go to the View menu, Visual Aids -- Make sure the following items have check marks: Table borders, Layer Borders, Image Maps, and Invisible Elements. If any of these items are unchecked, click on them. (Note that frame borders should be unchecked).

After making the adjustments noted above, you are ready to begin creating your web page. Save your document as an HTML document. To do this you will pull down the File menu and choose Save as.... Name your file "page1" and save it to the "web" folder on the P:\ drive (i.e. P:\web).

You have just created a web page! Nothing too exciting yet, just a blank white page. In the sections that follow, you will receive instruction on how to add text, links, graphics, and more to give your page a little "life."

Design rules

If you've spent much time exploring the Web, you've almost certainly encountered some badly designed Web sites. Since almost anyone can create Web pages, it's not surprising that many sites are confusing, overwhelming, ugly, or incredibly slo-o-o-ow. Tantalizing content can be hidden forever from the world when a site is poorly designed.

While it's not easy to create a well-designed site, following a few rules can help. The following set of rules should help you to create pages that are much better organized and easier for your visitors to appreciate:

- Keep your pages short (200 - 500 words) and focused. If you have several topics on your web page that are each of moderate length (200-500 words), you should create a separate web page for each topic, along with an index page that has links to each of the topics. For example, each topic in this training program is on a separate page.

- Maintain consistency among your pages. When your web site consists of more than one page, it is important to keep the style (colors, layout, titles, etc.) of all the pages similar. Because one mouse-click can send someone to a new site at any time, a consistent style provides a significant visual cue to let people know they're still at the same site. This has been done with this training program--all the pages maintain a similar look and format.

- Use subheads. Insert subheads to break up large blocks of text and make each section stand out. Subheads will draw the viewers' attention to the key sections of your page and allow them to find the information they need more quickly.

Choosing the content

One of the first steps in creating a web page is to decide what you will put on your web page. A web page can be about anything you choose. A few ideas include special interests, an area of expertise you have, your family, TV shows, your favorite music, favorite sport or team, your resume, a page advertising or selling some product or products, or anything else you can imagine. Any of these things will add value to your web page.

Second, think about your audience. Who do you want or expect to be visiting your web page? Will it be other people who share your interest? Or will it be mostly family and friends who want to see the latest photos you have taken? If your visitors will be family members who rarely use the Internet, you may want to set up your web page differently than if you are trying to appeal to a high-tech audience.

Once you have decided on the general content of what you want to showcase on your web page, begin thinking about how you want it to appear on the page. Also, begin thinking about and noting the addresses for other web sites that are related to or will support the content on your web page. This information will be useful when you begin to add links on your web page.

First Steps Quiz

1. In what folder should you save your web pages?
    a. web
    b. www
    c. my documents
    d. any folder you want

2. Why should you keep the style of your web pages consistent?
    a. It requires less work. It will make your web pages load faster.
    b. It will make your web pages load faster.
    c. So visitors will know when they have left your web site.
    d. To make your web pages look more organized.

3. If your web page contains 1000 words, what should you do?
    a. Leave it alone, it doesn't matter how many words are on a page.
    b. Consider splitting the information into multiple web pages. Consider splitting the information into multiple web pages.
    c. Add graphics to break-up the text.
    d. Use subheads to organize the information in sections.

4. When you are planning your web page, which of the following things should you consider?
    a. Bandwidth
    b. Your audience
    c. What your web address will be
    d. How many visitors will come to your page

BasicsWeb page title

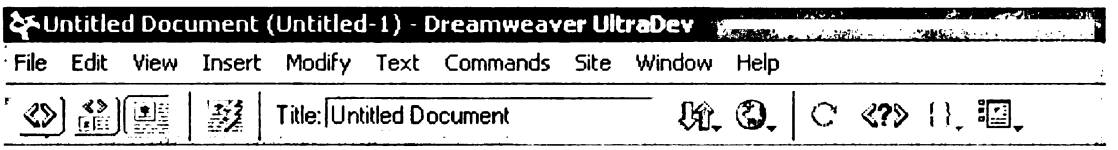
Internet browsers typically have a "title bar" at the very top of the browser window. This title bar will display the title of the web page currently in the browser window. For example, the title displayed in the title bar for this page is "Web Page Training."

It is important to enter a carefully worded title, because the title describes your page in many ways. Web directories such as Yahoo! use the title as a primary reference for what the page is about. So, if you give your page a poorly worded title, it may not come up when folks search on the very topic your page is all about.

An effective title should accurately describe the content of the page in as few words as possible--no more than 6 to 8 words. The most important aspect of the web page content should be included in the title.

How to Create a Title

Although your document has a file name, you will notice that the page is still labeled as *untitled* in the Dreamweaver menu bar at the top of the page.



1. If the menu bar is not visible:
   · In Dreamweaver choose the View menu and click on the Toolbar option.
   · Alternatively, you can use the following keyboard combination to make the menu visible "ctrl+shift+T".
2. In the title field, type in the title of your page.
3. Then click on your document to see the page title updated.

Page colors

By default, the visitor's web browser chooses the colors for the text, links, and background of a page. Generally, the default background will be white, the main text will be black, and the hyperlinks will be in blue.

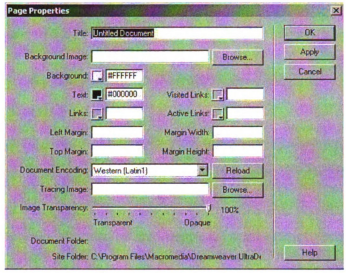
If you want to control how the page will appear to others, you can specify the colors you want to be applied to your page, rather than letting the visitor's web browser apply the default colors. This adds uniqueness and personality to your page. Using custom colors has an immediate and noticeable effect on the appearance of your page. Plus, changing the colors is very easy to do.

You can assign custom colors to each of the following page elements:

- *Normal Text*: All text in the page that is not a link.
- *Link Text:* All links in the page, except those that are active or followed (described next).
- *Active Link Text:* A link is active for as long as a visitor is clicking it, from the time they press the mouse button until the mouse button is released. This specifies what color the link will be while it is being clicked.
- *Followed Link Text:* These are links that the visitor has previously used through his or her browser. Usually this color is different from the color of the hyperlinks, so that visitors to your web page will know what links they have already clicked on.
- *Background:* This is the area that sits behind the text or images on the page. The background never covers or affects other elements in the page.

Here's how to change the background color:

1. In Dreamweaver, choose Modify, Page Properties. The dialogue box that opens up should look like this:



2. Click in the little box next to the word Background.

3. Using the eyedropper, select the color that you want to use for the background by clicking on the color cube. All the color cubes contain web safe colors. These colors will appear the same in all web browsers (Microsoft Explorer, Netscape Navigator) and in all systems (Windows or Macintosh). Other colors may not look the same to all users. To obtain additional colors, click in the color wheel above the web safe color cubes. Here you can adjust the color hue and other properties. To exit this window click on either Cancel or Ok.

4. To see how the background will look on your page, click on the Apply button.

5. When you have found the color you want to use, click on OK button to exit the dialogue box.

To change the other colors, such as text colors and link colors, open the Page Properties dialogue box and repeat these steps.

Keywords

Most people who publish a web page want others who have an interest in the page's topic to find and view their page. Web search pages like Yahoo! (www.yahoo.com) and Excite (www.excite.com) allow people to search the web for pages that cover particular topics they are interested in. If your web page is about classic cars, you would like your web page to be found when someone enters search terms related to your site, like "vintage cars," etc.

Just as having the right title will help visitors find your page when they search a topic, you can also use "keywords" to further help interested visitors find your web page.

Keywords do not appear anywhere on your web page. You specify them in the same manner as the title of your web page. Adding keywords related to the content of your site increases the chances that those interested in your web page's topic will be able to find your page through searches. You can have just about as many keywords as you can think of, and the more specific names and phrases you include, the better your web page will fare in search results.

Here's how to add keywords in Composer:

1. In Dreamweaver, choose Insert, Head Tags, Keywords.
2. Click in the Keywords dialogue box.
3. Type your keywords. Put a comma (but no spaces) between keywords.
4. Click OK.

Formatting text

One of the most important elements of any web page is, of course, the text. Although the text generally conveys the content of your page, or the ideas and information you want to share with your visitors, it can also contribute to the look or aesthetic appeal of your page. Dreamweaver allows you to modify a number of properties that determine the look of your text.

If you can use a word processor such as Microsoft Word, you will find that most text operations are the same. To work with text we will use the Text menu.

Here is how to format text:

Font:
1. Select the characters you want to format.
2. Go to the Text menu, Font.
3. Click the name of the font you want to apply.

Size:
1. Select the characters you want to format.
2. Go to the Text menu, Size.
3. Click the font size you want to apply.
4. You can also use the Text menu, Size Change option to adjust the font size.

Color:
1. Select the characters you want to format.
2. Go to the Text menu, Color.
3. Click the color you want to apply to the text.

Bold, Italicized, Underlined:
1. Select the characters you want to format.
2. Go to the Text menu, Styles.
3. Select the style you want to achieve-- bold, underline, or italics

4. To undo a style, for instance, to un-bold, repeat steps 1 and 2 and click on bold again. When a style is in use, the style will have a checkmark next to it.
5. To remove all styles from a selection of text, select the characters you want to format, Go to the Text menu, HTML Styles, and select clear style selection.

Alignment:
1. Select the characters you want to format.
2. Go to the Text menu, Align.
3. Click the Align Left, Center, or Align Right icon to achieve the desired text alignment

Basics Practice 1

1. In Dreamweaver, go to the file menu, and select new.

2. Name your file "basicsp1" and save it to the "web" folder on the P:\ drive (i.e. P:\web).

3. Make the title of you page "Practice"

4. Make the background of the page a shade of green.

5. Type the words "Testing 1,2,3".

6. Make the text in step 5 a shade of red.

7. Save your work and return to the training.

Basics Practice 2

1. In Dreamweaver, go to the file menu, and select new.

2. Name your file "basicsp2" and save it to the "web" folder on the P:\ drive (i.e. P:\web).

3. Add the following key words to your page: Hockey, MSU, Green, White

4. Type the words "Web Page."

5. Make the words from step 4: Bold and Underline

6. Make the word "Web" a color other than black .

7. Save your work and return to the training.

Basics Practice 3

1. In Dreamweaver, go to the file menu, and select new.

2. Name your file "basicsp3" and save it to the "web" folder on the P:\ drive (i.e P:\web).

3. Type the words "One fine day" and center them on the page.

4. Use the color wheel to make the background of the page a shade of yellow.
5. Put the words from step 3, in a font size of 7.
6. Make the active link text purple.
7. Save your work and return to the training.

Basics Quiz

1. How do you create a title for your web page?
   a. Format, title
   b. Type it into the title field
   c. Insert, Autotext
   d. Insert, Title...

2. What is the maximum number of words your title should have?
   a. 3 to 4
   b. 6 to 8
   c. 10 to 15
   d. 25-30

3. What is a web safe color?
   a. A color that you choose from the color wheel
   b. A color that appears the same in all browsers
   c. The only type of color that you can use on a web page
   d. A color that can be printed on most computer printers

4. How do you set the colors for active links on a web page?
   a. View, Font..., Effects
   b. Modify, Page Properties, Text
   c. Modify, Page Properties, Active Links
   d. Format, Text colors...

5. Where do keywords appear on your web page?
   a. In the title bar
   b. In the text of the page
   c. They are hidden in the graphics
   d. Key words are not visible on the page

6. Which menu would you use to make your text bold?
   a. Format
   b. View
   c. Modify
   d. Text

7. Which of the following is a font size available in Dreamweaver?
   a. 4
   b. 10
   c. 12

GraphicsFinding images

One of the first steps in using images is to find images to use and save them to your computer. First, in your browser, choose File, New, Window. In the new Window, you can go to any web site that you wish that contains images you wish to include in your web page. Then, put the cursor over the image you want to include, click the right mouse button, and choose Save Image As... Save the image in your "web" folder on the MSU server (i.e. P:\web). The image is now ready to be added to your web page.

Background images

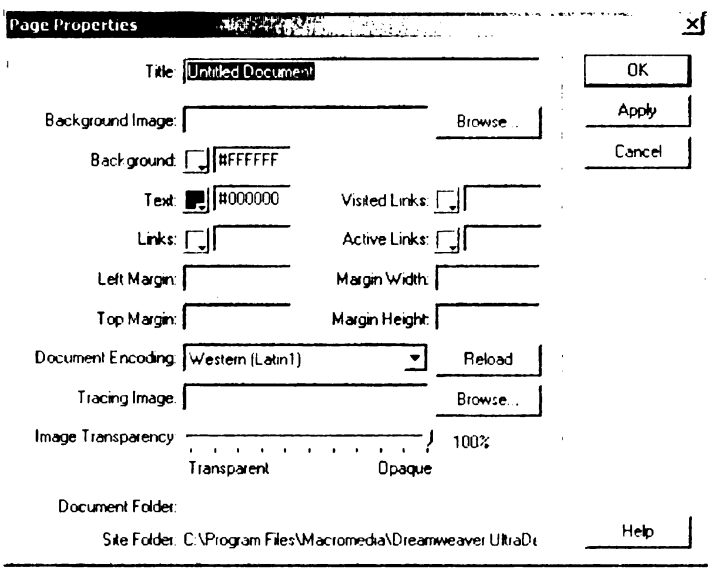
One of the easiest and most common places to use graphics is as the background of your page. Instead of having a plain color for the background of your web page, you can have a texture, or a picture that will cover the entire background area. Examples of textures include marble, wood, burlap, and water droplets.

Just be sure that you choose a text color that can be seen over the background texture. A background image that has a lot of contrast (a combination of light and dark colors) will make it more difficult to read the text that is placed over it, so choose your background carefully.

Background images are "tiled" by the browser, meaning that the image is repeated across the entire background. This means that even a very small image will fill the entire background. Click the following image to see it as a background.

To create a background image:

1. Make sure the image you want to use is in the same directory (folder) as your web page.
2. In Dreamweaver, choose Modify, Page Properties. The dialogue box that opens up should look like this:



3. Where is says Background image, type in the filename of the image you want to use, or click on the Browse button and select the image.

4. To see how the background image will look on your page, click on the Apply button.
5. Click OK to exit the dialogue box.

Horizontal lines

Another simple type of graphic to insert on your web page is called a "horizontal line". These are the straight lines that appear on web pages that are often used to separate different sections of the page. These can be plain gray lines like the ones in this training program, or can be more decorative to give the page more character, depending on the image you want to convey.

To insert a horizontal line:

1. Click in your page at the spot where you want to insert the line.
2. Click on the Insert menu, then Horizontal Rule.

Now that you have a line, you can format the line to customize the look of it.

To format a line:

1. Right-click on the line and select Properties. A dialogue box will open.
2. Set the following options as you prefer:
    - Dimensions
        - H: Height or how thick the line is. Enter a number here.
        - W: Width or how far across the page the line will fill. Enter a number here.
    - Alignment
        - *Left*: Line is positioned on the left side of the page
        - *Center*: Line is positioned in the center of the page
        - *Right*: Line is positioned on the right side of the page
    - Shading: Gives the line a three-dimensional look. You can check or un check this box.
3. When you have finished customizing the line, close the dialogue box by clicking on the X in the upper left hand corner.

Inserting and Resizing Images

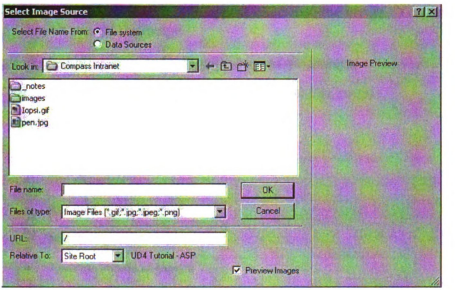
Most web pages include at least some minimal graphics. Graphics include both photos and clip-art drawings.

To insert a picture:

1. Make sure the image you want to use is in the same directory (folder) as your web page.

2. Click on your page at the spot where you want to insert the image.

3. Click the Insert menu, and select Image. A dialogue box will open that looks like this:



4. Select the image you want to insert by selecting the file. The name of the file will now appear in the white text box under the heading File Name.

5. Click OK.

6. If the image is not where you want it, click on the image to select it (a border will appear around the image). Holding the mouse button down, use the mouse to drag the image to a new location.

OK, so now you've got a picture on the page, but it may be either bigger or smaller than you want. You can resize the picture to fit the space you want. Keep in mind, however, that image quality may not be as good when the image is resized, so experiment and see what looks best to you.

To change the size or shape of an image:

1. Click on the image to select it (a border will appear around the image).

2. Position your cursor in one of the corners. The arrow-shaped cursor will change to a double-headed arrow when you are in the right spot

3. Click and Hold down the left mouse button and drag the corner in towards the center of the picture to reduce the size of the image, or out to increase the size.

NOTE: You can also resize a picture from the top, bottom or side edges, but if you do, you will lose the original proportions of the image. You will retain the original proportions if you click and drag from the corners.

Aligning text with graphics

The text will automatically adjust around the point where you insert the image. However, you can specify where you want text to appear relative to the image. You can also have the text appear all around the image.

To change the text alignment and wrapping around the images:

1. Click on the image to select it (a border will appear around the image).
2. Click the right mouse button and go to the align option.
3. Select the text alignment you want.
    - Top alignment
    - Absolute middle alignment
    - Middle alignment
    - Absolute bottom alignment
    - Bottom alignment
    - Text wrap left

Image Alternatives

The images you use on your page can also have a text Alternative representation, also known as ALT text. This is text that will be displayed while the image is still being loaded. It will also be used by text only browsers such as LYNX. Additionally, this text will be displayed when a visitor to your site holds the mouse cursor over the image for a few seconds. Choose alternative text that will make sense if it is seen instead of the image. That is, that will convey the same message as the image. If there is no message, it is better to have nothing.

To specify an alternative representation (ALT text) for an image:

1. Select the image by single-clicking on it.
2. Right Click, select Properties. The dialogue box will open up.
3. Type the alternative text into the "Alt" field in the lower right hand corner of the dialog box.
4. Close the dialogue box by clicking on the X in the upper left hand corner.

Graphics Practice 1

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "graphp1" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Type the word "Hello".
4. Insert the following image as a background.

4. Change the text color from step 3 to make it visible on this background.
5. Save your work and return to the training.

Graphics Practice 2

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "graphp2" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Insert 2 horizontal rules into your page.
4. Make the first one thicker.
5. Make the second shorter.
6. Align the second one to the right.
7. Save your work and return to the training.

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "graphp3" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Insert the following image into your page:

4. Make the Alt, Text "Psychology Graphic".
5. Type the words "Testing 1,2,3" and align them with the top of the graphic.
6. Insert the graphic from step 3 again, and make it larger.
7. Save your work and return to the training.

Graphics Quiz

1. How do you turn a graphic into a background image?
    a. Go to Modify, Page Properties, and select the background file
    b. You cannot use a graphic as a background
    c. Go to insert picture
    d. Go to view, backgrounds, select one of the available graphics
2. What folder should you save your background images to?
    a. web folder
    b. my documents
    c. any folder will work
    d. snap shots folder

3. Which of the following characteristics of a horizontal line cannot be changed?
    a. Alignment
    b. Width
    c. Height
    d. Color
4. Which menu do you use to add a horizontal line to your page?
    a. Edit
    b. Insert
    c. Modify
    d. Format
5. When resizing an image, it is best to drag it from what point?
    a. The center of the image
    b. The top of the image
    c. The corner of the image
    d. The bottom of the image
6. Which of the following is NOT an option for aligning text around an image?
    a. Absolute middle alignment
    b. Bottom alignment
    c. Text wrap left
    d. Text center
7. When is ALT text displayed?
    a. Never
    b. When the image is missing from the correct file
    c. While the image loads
    d. After the image loads

Links

Understanding links

One of the main features of a web page is the fact that it contains links to other sites on the web. A hyperlink is a link you create between your web page and another web page on the Internet. The other web page can be another one of your own web pages or it can be someone else's web page. This is done by including the address of the other web page in your web page.

For example, the menu on the left contains links to the pages that make up this training program. When you click on a link, it automatically goes to the address listed.

You may want to add links on your web page. These links can point your visitors toward other web pages you have, or to other web pages on the Internet that are related to the

content of your web page. For example, if you have information on your web page about your favorite musician, you might have a link to that musician's official web site. Or if your web page details information about the MSU football team, you might want to include a link to the ESPN web page that provides the Big Ten football conference standings, or your team's statistics. In this way, you can help your visitors find more information that you either don't have, or don't have the time or desire to constantly update on your web page.

A link can point to a number of resources in addition to other sites. It can point to email addresses, newsgroups, or files such as Word documents, sound files, videos, etc. Links can also point to particular places within the same web page.

Creating text links

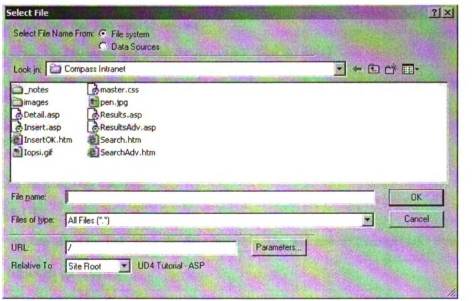
Links have two main parts:

1. The actual text (or graphic) that appears on your web page
2. The URL of the page, file, to be accessed when the link is clicked.

You can format the text part of the link just as you would any other text, except that the link will be automatically underlined once a URL is associated with it.

To create a link to another web page:

1. Select the text that you want to make into a link.
2. Go to the Modify menu and select Make Link. The following dialogue box will appear.



3. In the box that says Relative To, select the Site Root option. In the box that says URL, type in the web address
   (ex. www.wor.com).
4. Click OK.

To create a link to file or to page in your own web site folder:

1. Select the text that you want to make into a link.
2. Go to the Modify menu and select Make Link.
3. In the box that says Relative To, select the Document option.
4. Where it says file name, type in the name of the file you want to link to. You can also use the Look In area to browse and click on the file (including other pages in your web folder) you want to connect to. The file name will automatically be entered into the file name field. This option is a good way to prevent errors.
5. Click OK.

You can also create links to an email addresses. When a visitor clicks on one of these links, it will open the users default email program with a message addressed to the address specified in the link (ex. sample link).

To create a link to an email address:

1. Select the text that you want to make into a link.
2. Go to the Insert menu and select Email Link.
3. In the box that will appear, type in the email address where it says E-mail (ex. mailto:sparty@msu.edu).
4. Click OK.

Changing and removing links

1. Select the link that you want to remove.
2. Go to the Modify menu and select Remove Link from the menu.
3. Or you can select the link, click the right mouse button, and select "Remove Link" from the menu.

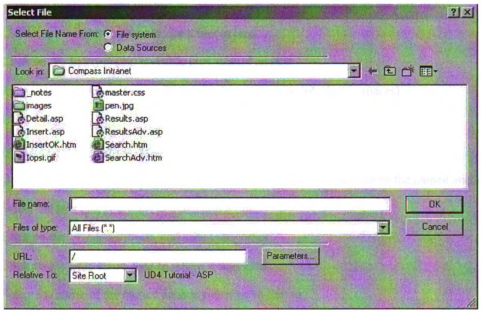
1. Select the link that you want to change.
2. Go to the Modify menu and select Change Link from the menu.
3. Make the necessary changes.
4. Click OK.
5. Or you can select the link, click the right mouse button, and select "Change Link" from the menu.

Creating links in graphics

You may want visitors to be able to link to another web page by clicking on a graphic rather than by clicking on text. (You can learn more about inserting graphics on your web page in another lesson.) For example, if you have a photo of Beaumont Tower on your web page, you can embed a link to the MSU home page in the graphic. That way, when a visitor clicks on the photo they will be linked to the MSU page.

Making an image into a link is simply a matter of attaching the URL to the image. It is done just like creating a text link, except you select an image, instead of text, before creating the link:

1. Select the image that you want to make into a link.
2. Go to the Modify menu and select Make Link.



3. If you are linking to another web page, in the box that says Relative To, select the Site Root option. In the box that says URL, type in the web address *(ex. www.wor.com)*. If you are linking to a file or to another page on your site, in the box that says Relative To, select the Document option. Where it says file name, type in the name of the file you want to link to. You can also use the Look In area to browse and click on the file (including other pages in your web folder) you want to connect to.
4. Click OK.

To remove the link from the graphic, go to the Modify menu and select Remove Link from the menu.

Creating Named Anchors

When you click on a link, the page will load showing you the top of the file in the browser. You can then scroll down to see the rest of the page. But there may be times when you want to create not only a link to a page, but a link to a specific part of a page that is not necessarily the top of the page. If you have a lot of information on your web page, you may want to create links near the top of the page that will make it easier for visitors to get to specific information located further down on your web page.

This is what named anchors (also known as targets) do. They take a visitor to an exact spot on a page, rather than just to the top of the page.

Creating named anchors is a two-stage process. First, you must create the named anchor in the destination page (the page the link will take the visitor). Second, you must create a link to that named anchor. The link can be in the same page as the named anchor, or it can link to a named anchor on a different page.

To create Named Anchors in a page:

1. Open the page you want the link to lead to (it can be the same page as the link itself).
2. Click a spot where you would like a link to lead.
3. Click on the Insert menu, invisible tags, named anchor.
4. Type in a name for the target. (Note: Anchor names cannot contain spaces)
5. Click OK.

To create a link to a Named Anchor:

1. Open the page that you want to put the link in (it can be the same page as the named anchor).
2. Select the text that you want to make into a link.
3. Click on the Windows menu, and select properties.
4. Click on the little arrow next to where it says Link.
5. Select the name of the named anchor you want to link to.
6. Close the dialogue box by clicking on the X in the upper left hand corner.

To remove a link, hold the mouse pointer over the link and click the right mouse button. Select "Remove Link" from the menu.

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "linksp1" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Type the word "weather" and make it a link to www.weather.com
4. Make a link to your email address.
5. Make the active link in step 4 red.
6. Save your work and return to the training.

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "linksp2" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Make a link to another file in your web directory.
4. Type the word "news" and make it a link to www.msn.com

Insert the graphic below and make it a link to www.msu.edu

5. Remove the link to News without removing the text.
6. Save your work and return to the training.

Links Practice 3

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "linksp3" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Type the word "hello" and make it a named anchor.
4. Type the word "testing" and link it to the hello anchor from step 1.
5. Make the visited links orange.
6. Save your work and return to the training.

Links Quiz

1. Which of the following is NOT true about links?
    a. Links can be made to email addresses
    b. Links can be used to go to other web pages
    c. Links to parts of your own web page will not work
    d. Links can be used for sound files
2. How do you add a link to your web page?
    a. Select the text, modify, make link
    b. Select the text, insert, link
    c. Select the text, view, add link
    d. Select the text, text, format, link
3. How do you remove a link without deleting the text?
    a. Select the link and hit the delete key
    b. Modify, Change Link
    c. Modify, Remove Link
    d. Edit, Remove Link
4. If you are making a link to your web site, the relative to box should contain what option?
    a. www:
    b. Path:
    c. Document:
    d. Site Root:
5. Which of the following cannot be used as a link?
    a. Text

b. Graphics
c. Named anchors
d. Tables

6. How do you add a named anchor?
   a. Insert menu, invisible tags, named anchor
   b. Modify, Change Link, add anchor
   c. View, invisible tags, insert anchor
   d. Select the text, modify, make link

Tables

Table Basics

Alignment of text and images is a serious problem in web documents. Tabs don't work in web pages like they do in word processing programs like Microsoft Word. You can't use tabs to line up columns, for example. You can't just keep hitting the space bar, either. So, if you want to format any information or pictures in columns, you will need to use a table.

For example, here is one way a table can help you format your web page:

	Favorite players	
Baseball	Basketball	Football
Manny Ramirez	Grant Hill	Terrell Davis

In a normal document, you would use tabs to create the columns, but in an HTML document you must use tables to create the columns.

A table, regardless of the medium in which it appears, is chunks of information arranged in rows and columns. The grid of rows and columns forms the cells in which you can organize text. A cell is the box made from the intersection of a row and column. You can put text or images in a table cell.

Creating a basic table:

1. Click the spot on your page where you want to insert a table.
2. Click the Insert menu, Table. A dialogue box will appear, asking you about the characteristics of your table.
3. In the box, insert the number of rows and columns you will need.
4. Click OK. A table will appear on your page.
5. Click in any table cell and enter text or pictures as you would anywhere else on your page.

Once you have created a table, you can easily add or delete rows and columns. To add more rows, you simply hit the tab key when you are in the last cell (bottom-right cell) in the table and another row will appear. To make other additions to the table, place your cursor some place in the table, go to the Modify menu, Table, and select the appropriate add option

To remove a row or column, or entire table:

1. Click in the row or column you want to delete.
2. On the Modify menu, click Table, select the appropriate delete option.
3. Or you can click on Table to delete the entire table, row to delete just the selected row, or column to delete just the selected column.

To merge or split cells

1. Click in the cell you want to split or cells you want to merge.
2. On the Modify menu, click Table, select the appropriate split or merge option.

Table Borders

You can choose to have a border that surrounds the table to give it a "framed" look. For example, here is the same table with a border:

	Favorite players	
Baseball	Basketball	Football
Manny Ramirez	Grant Hill	Terrell Davis

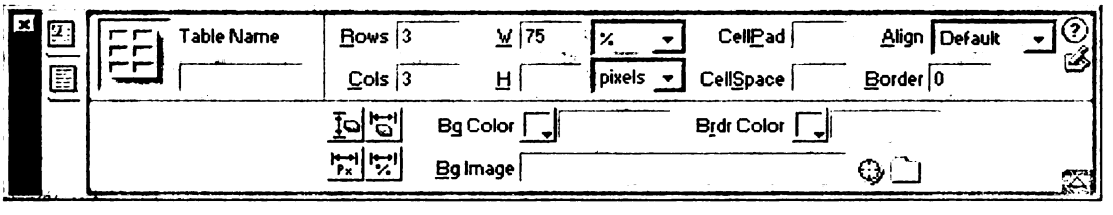
and without a border:

	Favorite players	
Baseball	Basketball	Football
Manny Ramirez	Grant Hill	Terrell Davis

You can also adjust the size of the border around your table. When you have no borders on a table, you will still see a double dashed line around the table. This is to help you work with your table and will not be seen visible when the page is viewed in a web browser.

To modify table borders:

1. Place your cursor at the corner of the table and click A black border should appear around the table.
2. Go to the windows menu and select properties. The following dialogue box should appear.



3. Click in the box labeled "Border" and enter a number for the width of the border. The default border is set at 1. If you do not want a border, enter a zero. If you want a thicker border, enter a number higher than 1.
4. If you want to change the color of the border (the default is a shade of gray), click where it says Brdr Color and select your preferred color.

5. Click on the X in the upper left hand corner to exit the dialogue box.

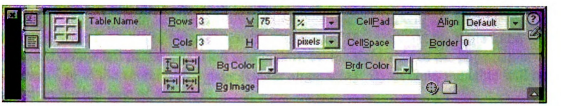
Table and Cell Colors

By default, the background for a table and all of its cells will be transparent, meaning that it will take on whatever background you have specified for the page. However, you can assign custom colors to the table as a whole, or to individual cells within the table, that is different from the rest of the page. This can add emphasis to the table and its contents and help it to stand out from the rest of the page.

To change a table's background color:

1. Place your cursor at the corner of the table and click A black border should appear around the table.

2. Go to the windows menu and select properties. The following dialogue box should appear.



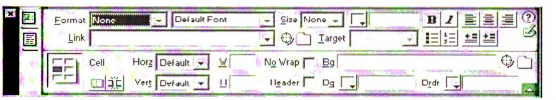
3. Click in the box labeled "Bg Color" and select your preferred color.

4. Click on the X in the upper left hand corner to exit the dialogue box.

To change the background color of a particular cell:

1. Click inside the cell.

2. Go to the windows menu and select properties. The following dialogue box should appear.



3. Click in the box labeled "Bg" and select your preferred color.

4. Click on the X in the upper left hand corner to exit the dialogue box.

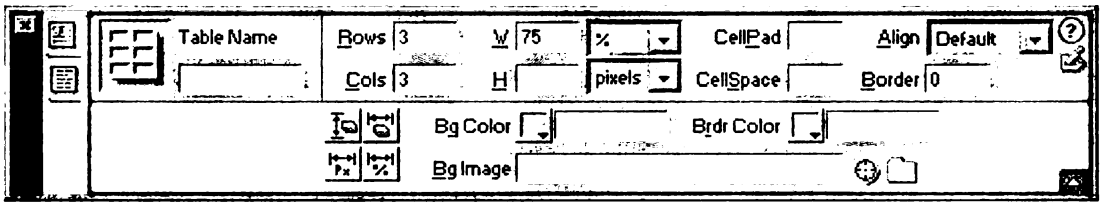
Table Width and Alignment

By default, the table will be the 75% of the width of the page. However, you can make it larger or smaller.

The primary way to set the table width is as a percentage of the page width. For example, you could set the table to be 80% of the page width. Then, whatever size a visitor's browser window, the table will be 80% as wide. When the page is made smaller, the table gets proportionally smaller, and vice versa.

To change a table's width:

1. Place your cursor at the corner of the table and click A black border should appear around the table.
2. Go to the windows menu and select properties. The following dialogue box should appear.



3. Where W, enter your preferred width.
4. Click on the X in the upper left hand corner to exit the dialogue box.

If the table width is set to less than 100% of the page width, you will need to decide where you want the table to be positioned (or aligned). Do you want the table to be positioned on the left of the page (left alignment), on the right side of the page (right alignment), or in the center of the page (center alignment)? By default, the table will be aligned on the left side of the page.

To change a table's alignment:

1. Place your cursor at the corner of the table and click A black border should appear around the table.
2. Go to the windows menu and select properties. The dialogue box from above should appear.
3. Where it says align, choose your preference (right, left, center, default which is the same as left).
4. Click on the X in the upper left hand corner to exit the dialogue box.

Cell Padding and Spacing

Two attributes specify the amount of space around and within the cells.

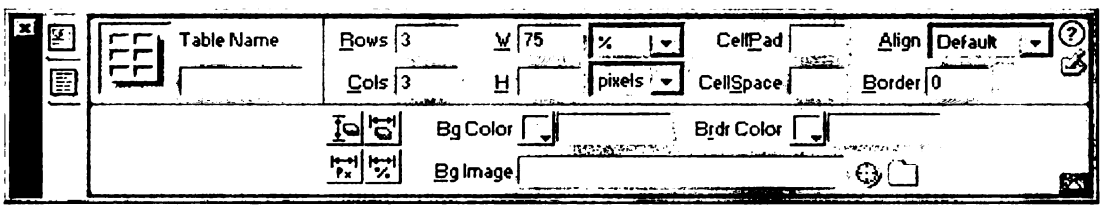
- Cellpadding - specifies the amount of blank space around the contents within each cell. For cell padding the default is 1, for no space enter a 0, for more space, enter a number large than 1.
- Cellspacing - specifies the amount of blank space between cells. For cell spacing the default is 2, for no space enter a 0, for more space, enter a number large than 2.

Each produces a slightly different effect, as shown below. Incidentally, the three examples are each contained within a separate cell of a larger table which has BORDER=0; this is a handy technique for creating columns.

Border=10 Cellpadding=0 Cellspacing=0	Border=1 Cellpadding=10 Cellspacing=0	Border=1 Cellpadding=0 Cellspacing=10

To change cell padding and spacing:

1. Place your cursor at the corner of the table and click A black border should appear around the table.
2. Go to the windows menu and select properties. The following dialogue box should appear.



3. Where it says cell padding and cell spacing, enter your preferred numbers.
4. Click on the X in the upper left hand corner to exit the dialogue box.

Tables Practice 11. In Dreamweaver, go to the file menu, and select new.

2. Name your file "tables1" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Insert a table with 4 columns and 5 rows.
4. Merge the first two cells in row one of the table created in step 3.
5. Set the borders to 3.
6. Make the borders blue.
7. Save your work and return to the training.

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "tables2" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Insert a table with 3 columns and 3 rows.
4. Make the table's background color pink.
5. Set the table width to 50%.
6. Center the table.
7. Save your work and return to the training.

1. In Dreamweaver, go to the file menu, and select new.
2. Name your file "tables3" and save it to the "web" folder on the P:\ drive (i.e. P:\web).
3. Insert a table with 3 columns and 5 rows.
4. Make the cell padding 10.
5. Make the cell spacing 5.
6. Make one cell blue.
7. Save your work and return to the training.

Tables Quiz

1. How do you add a table to your web page?
    a. Insert, table
    b. Modify, insert table
    c. Edit, add table
    d. View, insert table
2. How do you add a row to your table?
    a. Hit the tab key in the last cell of the last row
    b. Go to insert, table, add row
    c. You can't, you have to delete the table and start over
    d. Go to edit, table
3. How do you remove a table's border?
    a. You can't
    b. Set the border to -1
    c. Set the border to 0
    d. Go to format, tables, delete border
4. Which of the following cannot be done to a table border?
    a. Change the color of the border
    b. Change the size of the border
    c. Delete the border entirely
    d. Create a dotted lines appearance for the web
5. Which of the following cannot be done?
    a. Change the background color for the table
    b. Give each cell a different background color
    c. Align the table with the top of the page
    d. Increase the spacing around the cells
6. Which is true about the default settings for a table?
    a. The default table spacing is 5
    b. The default cell padding is 10
    c. The default border is 0
    d. The default cell spacing is 2

PublishingPublishing your page

To load your web page on the Internet, you must save it to your space on the MSU internet server. All MSU students are provided with space on the MSU internet server to which they can post a web page.

First, pull down the File menu and choose Save. Save your document to the "web" folder on the P:\ drive (P:\web) and give it the name "index". If you already have a file called "index", simply give your page a different name. When you have saved your page to your "web" folder, the page has been published to the internet.

Any graphics you have placed on your web page should automatically save to the "web" folder.

Note that this method of publishing your web page can only be done from the MSU microlab computers. Another method of publishing web pages from non-MSU microlab computers (using FTP software) is described elsewhere in this training program.

Locating your web page on the Internet:

Now, to view your web page on the Internet, you need to know the address.

1. You will want to open a new browser window so that you don't lose your place in the training program. Pull down the File menu and choose New and Window.

2. Type in the following address: http://www.msu.edu/user/

3. After this you would type your pilot login, followed by a forward slash (/). Then type "index.html" (or whatever you named your page) and you should be able to see your web page! For example, if your pilot login was sparty, you would type in http://www.msu.edu/user/sparty/index.html

It isn't a requirement that you name your web page "index.html." However, index.html is the standard name to give to your primary web page. In fact, if the URL to your page is "http://www.msu.edu/user/sparty/index.html" and you simply enter "http://www.msu.edu/user/sparty/" without the "index.html" at the end, the server will assume that index.html is the page you are wanting to view and the server will load the page properly. Therefore, unless you already have a page named index.html or index.htm, this is the name you should give your web page.

Publishing your page Using FTP programs

FTP stands for File Transfer Protocol. This program allows you to transfer documents from one file to another on a network to which you have access. All MSU students have access to the MSU server through the pilot network. While you must be logged on to a computer on campus to save your web pages directly to your web directory, you can use FTP to upload your web pages from any computer with an internet connection. This is the primary advantage of using FTP.

The FTP program you will be using is a DOS command-based program. You have to know the right commands in order to transfer files.

The following steps show you how to upload you web page to the MSU server using FTP:

1. Click on the Windows "Start" button, then click Run...

2. In the Run box, type "c:\winnt\system32\ftp.exe" and press enter.

3. At the "ftp>" prompt, type: open
4. After the word "To", type: pilot.msu.edu
5. After "User (pilot.msu.edu: (none)):" type your pilot e-mail login.
6. When it prompts you for your password, type that in.
7. At the next "ftp>" prompt, enter the following: cd web and press enter.
8. At the next "ftp>" promt type: put a:\index.html (or whatever the path name is for where your web page file is saved; i.e. c:/mydocuments/index.html) and press enter.
9. Now your web page is online.

The last step is to upload an graphics you have on your page. You do this in the same way.

At the "ftp>" prompt type: put c:\graphicname.gif (or the path name for your graphic)

Just be sure to substitute the actual name of your graphic, and to know whether it is a .gif or a .jpg file.

Testing and troubleshooting

Once you have loaded your web page onto the Internet, you should check it to make sure all of the text and graphics look the way you want, and that all of the links work.

If one of the links doesn't work, hold the mouse pointer over the link until the address appears. Try to figure out why the link isn't working. Is the address correct? Did you remember the "http://" prefix?

If your graphics don't work, or your page didn't load at all, try to figure out why. Make sure you typed in the correct file names when you loaded them. Try loading them again.

If your page didn't load, are you sure you uploaded your page correctly (did you save it in your "web" directory)?

Did you save the page with an HTML or HTM extension (ex. index.htm or index.html)? Although you can save your page with either an HTML or HTM extension and the page will look and work exactly the same, when you attempt to view your page on the web, the URL must include the same extension that you used when you saved the file. For example, if your user ID is SPARTY and you saved your web page as "page1.htm", then the proper URL would be http://www.msu.edu/user/sparty/page1.htm. Notice the .htm at the end of the URL matches the end of the file as it was saved. If you tried to enter http://www.msu.edu/user/sparty/page1.html (*notice the "L" at the end of this URL*), you would get an error message.

After making corrections, you will need to press the "Refresh" key on your toolbar to see the changes take effect when you check your page again on the Internet.

Keep checking and troubleshooting until your web page looks just right. This may take a few tries.

Browser compatibility

An important thing to keep in mind when creating web pages is that the same page may look very different in different browsers, and certain features that work great in one browser may not work at all in another.

The two most commonly used web browsers are Netscape Navigator and Microsoft Internet Explorer. You should test your page out with each of these browsers to make sure that it displays as you intended.

Another point to consider is that different versions of the same browser may have markedly different capabilities. You must be aware that some of the features of your page may not work the same, if at all, on an older browser. For example, Netscape Navigator 4.7 has more features than does Netscape Navigator 3.2. Many internet users still surf with older browsers, so it is advisable to test your page with older browsers, as well.

Publishing Quiz

1. Which of the following could be the complete web address of someone in this training?
    a. http://www.msu.edu/user/sparty/index.html
    b. http://www.user/sparty/index.html
    c. http://www.msu.edu/user
    d. msu.edu/user/sparty/index.html
2. Which of the following is NOT true?
    a. The name Index is often used to name primary web pages.
    b. You must name your web page index or it will not work
    c. You can name your web page anything
    d. Your web page should be saved to your web folder
3. Which of the following is NOT true?
    a. You can use FTP to upload your web pages from any computer with an internet connection
    b. FTP stands for File Transfer Protocol
    c. You cannot use FTP to upload graphics
    d. The last step is to upload graphics you have on your page
4. Which of the following is NOT true about troubleshooting?
    a. After making corrections, you will need to press the "Refresh" key to see your changes
    b. You can check for links that don't work correctly
    c. You can check for graphics that don't load correctly
    d. If your page does not load, you know that it is was deleted.
5. Which of the following is NOT true about browsers?
    a. The two most commonly used web browsers are Netscape Navigator and Microsoft Internet Explorer.
    b. Some pages may look very different in different browsers
    c. You should test you web page in multiple browsers.
    d. Netscape Navigator 3.2 has the same capabilities as Netscape Navigator 4.7

Exiting

Are you sure you want to end the training program? You CANNOT return to training later.

If you want to go back to the training material use the menu to the left.

If you are ready to leave the training program and move on to the next part of the experiment, use the link below.

Click here to exit the training

Appendix D

Feedback Examples

Diagnostic Feedback

- You may find it helpful to review the material on web page titles.
- You may find it helpful to browse the "tools" menu in Dreamweaver.

Normative Feedback

- You answered 87% of the questions correctly on this quiz.
- Approximately 40% of trainees answer this question correctly.

Explanatory Feedback

Question:
Where does the title for your web page appear?

a. At the top of the web page
b. At the top of the Internet browser
c. At the bottom of the Internet browser

Feedback:

Internet browsers typically have a "title bar" at the very top of the browser window. This title bar will display the title of the web page currently in the browser window. For example, the title displayed in the title bar for this page is "Web Page Training."

Question:

What is the maximum number of words you *should* put on a single web page?

a. 800
b. 500
c. 100
d. 300

Feedback:

Keep your pages short (200 - 500 words) and focused. If you have several topics on your web page that are of each of moderate length (200-500 words), you should create a separate web page for each topic, along with an index page that has links to each of the topics. For example, each topic in this training program is on a separate page.

Appendix E

Debriefing Statement

You have completed the experiment. You will receive 6 credits for your participation. The credit will be entered into the subject pool system within 7 days. Please allow at least 7 days for the credit to be entered before contacting the experimenter or the psychology department.

The purpose of this experiment is to improve our understanding of how different people approach tasks such as training. There are many ways an individual can approach tasks and these approaches can affect their motivation on these tasks. More specifically, the current study investigates the potential for customizing computer-based training by creating multiple learning environments. Three learning environments were developed to reflect needs associated with various learning/motivational styles. Participants were randomly assigned to one of three training programs. The training programs only differed in terms of the type of feedback the participants received, the practice options provided, and the amount of control over the sequencing of the training material. Each of the participants learned all the basics needed to create web pages including, formatting text, inserting graphics, creating tables and hyperlinks, and more.

The particular approaches we were studying are called Goal Orientations. Psychological research has identified three types of goal orientations. Training programs were developed to support the needs of each of these Goal Orientations. The first is called a Mastery orientation. A mastery orientation is typically associated with a desire to achieve and develop one's skills and abilities. In an effort to improve their skills and abilities, mastery oriented individuals tend to seek more feedback, expend more effort, use more effective study strategies, set more challenging goals, and persist in working toward these goals. As a result, this training environment allowed more choices over content, feedback, and practice. For this group, increased choices tend to be motivating as opposed to overwhelming.

The other two types of Goal Orientation tend to focus more on performance than learning. A Prove orientation is generally motivated to prove to themselves or to others that they are intelligent and competent with respect to the training material. Prove individuals, typically persist towards their goals despite negative feedback in an effort to demonstrate competence, and take negative feedback personally thus, leading to lower self-images. It has also been suggested that prove individuals are very concerned with impression management, competing with and performing better than others, and are very outcome (e.g., grade) focused. As a result, this training environment allowed some choices over content, feedback, and practice. However, more structure was provided in this environment to help the learner persist and maintain a positive self-image.

Finally you could have an Avoid orientation, where your goal is to avoid showing yourself or others that you are incompetent or unknowledgeable about the training material. Avoidance individuals typically change their goals or lower their expectations when faced with difficulty, and perform lower than other orientations due to risk avoidance, low persistence, and more negative attitudes. Avoid individuals typically use a number of withdrawal behaviors to reduce the negative impact on their self-image. Specifically, these individuals may withdraw from the task by quitting, reducing effort, and using self-handicapping. As a result, the training environment was designed to be non-evaluative and to provide more structure and fewer choices to reduce the effort needed to complete the program, avoid overwhelming the learner, and to encourage them to persist if they encounter difficulty.

Research indicates that you can have one or more of these orientations and that each orientation has its strengths and weaknesses. This study tried to create training programs that maximize the strengths and minimize the weaknesses of each orientation.

If you have any other questions about this research or about this experiment, feel free to contact me at cscheu@msu.edu.

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