ABSTRACT

Name: Jennifer Rebecca Banas

Department: Educational Technology, Research, and Assessment

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Approved by:

Date:

Rhonda Robinson

Dissertation Director

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NORTHERN ILLINOIS UNIVERSITY

ABSTRACT

This dissertation explored elements from communication, behavior, and learning theories as a means of positively affecting motivation and cognitive performance. Little or no research exists to show how these concepts could be collapsed into an instructional design technique that stimulates and sustains situational interest in a task as a means of generating motivation and improving cognitive performance. A behavioral construct, tailored lesson introduction was regarded as a unique way of integrating those elements. In an experimental-control design study, 98 college education majors at a Midwestern university were asked to pre- and postappraise an online lesson about website evaluation, complete a postinstruction cognitive assessment, and attribute their performance to affect- or competence-related factors.

Participants in the experimental groups were exposed to tailored lesson introductions designed to make the lesson more personally relevant; participants in the control group were only exposed to the lesson's existing standard introduction. A risk assessment tool was used to identify and sort the experimental group participants into one of three message categories based on their perceptions about the lesson's topic. These participants, then, were exposed to an appropriate tailored introduction prior to beginning the lesson. It was hypothesized that students exposed to the tailored lesson introduction would report being more motivated to learn. Consequentially, it was also hypothesized that those students would perform significantly better on a postinstruction cognitive

assessment. And finally, it was hypothesized that there would be a significant difference in the way students attribute their performance.

Results indicated that learners, on some motivation subscales, were more motivated and more likely to attribute their performance to the affective-related components of the lesson, as well as their own competence. Additionally, perceived relevancy of the lesson was found to be correlated to participants' learning intentions and actual effort given. With regards to cognitive performance, there was not a significant difference between the experimental and control groups, but there was a positive trend towards higher quiz scores ($p < .10$). This positive trend, along with increased levels of motivation and greater affect- and competence-related performance attribution ratings, justifies additional research into the effects of tailoring on learning outcomes and motivation. An in-depth discussion of the results, implications of the findings, and suggestions for future research are discussed at in the final chapter.

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THE IMPACT OF A TAILORED LESSON INTRODUCTION ON LEARNERS' MOTIVATION AND COGNITIVE PERFORMANCE

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In accordance with departmental and Graduate School policies, this dissertation is accepted in partial fulfillment of degree requirements.

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Dissertation Director

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Date

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CHAPTER 1

INTRODUCTION TO THE STUDY

Context of the Problem

According to the Association for Educational Communications and Technology (AECT), educational technology is "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (as cited in Reiser & Dempsey, 2007, p. 6). The dynamic nature of educational technology as a field precludes that new technologies and trends will both emerge from and cause change unto each of its domains. Reigeluth (1983) stated, "As our technological society increases its rate of change, education will become increasingly important, and there will be an increasing need to make our methods of instruction more effective, efficient, and appealing" (p.8). Much of this weight falls on the domain of instructional design.

As a field, instructional design is primarily concerned with "deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for specific course content and a specific student population" (Reigeluth, 1983, p.7). Without calling it as such, Dewey (1900), an early advocate for research-based educational practices, saw instructional design as a necessary science to better link theory and instruction. Since Dewey's time, much research has been devoted to instructional

Assumptions

Tailored materials are designed to be context-specific and to cater to the experiences, beliefs, and needs of the individual. Tailoring supports both the cognitive and situative approaches to understanding learning (Anderson, Greeno, Reder & Simon 1997; Anderson, Reder, & Simon, 1997), as well as the theory of successful intelligence (Sternberg, n.d.; Sternberg, Torff, & Grigorenko, 1998). With regards to the former, this study assumed that learners would bring knowledge, skills, and memories retained from past experiences, which they would adapt and apply to the learning task in this experiment. With regards to the latter, this study also assumed that the learners were "successfully intelligent people" (Sternberg et al. 1998) who uniquely approach learning analytically, creatively, and practically. Successfully intelligent people, according to Sternberg et al. (1998), can identify their strengths and their weaknesses, and then capitalize on and compensate for them, respectively.

Delimitations

Three major threats to external validity existed in this study. These threats included the interaction effect of testing and selection, the interaction effect of selection bias, and the reactive effects of experimental arrangements (Hawthorne effect). With regards to the interaction effect of testing and selection, the motivation survey administered prior to instruction may have cued learners to consider giving more effort to the task than they might otherwise have. In a non-experimental setting, learners would

normally not be asked to disclose their learning intentions and make a task appraisal prior to instruction. With regards to the second delimitation, selection bias, the subject pool was limited to education college majors enrolled in educational technology courses. Because these students were education majors, they may have held a higher regard for the lesson topic (website evaluation skills) than non-education majors or the public. Finally, with regards to the third delimitation, the reactive effects of experimental arrangements, learners in this study may have put forth greater effort and rated the learning materials more highly than if they were not participating in a study.

Limitations

According to Smith and Ragan (2004) there are five avenues of intrinsic motivation research: competence, curiosity, autonomy, volition, and goal orientation. One of the limitations of this study relates to the fifth avenue, goal orientation. One's goal-orientation can make a great difference in learning outcomes (Smith & Ragan, 2004). There are two different kinds of goal orientation, performance and learning goals. Performance goal orientation is related to recognition; learning goal orientation is related to "an internalized intention to learn" (Smith & Ragan, 2004, p. 3). Greene and Miller (1996) found that performance goal orientation was associated with shallow processing and lower achievement. Learning goal orientation, on the other hand, was associated with meaningful cognitive engagement and higher achievement. Based on this information, performance-goal learners in this experiment may have demonstrated less cognitive achievement; learning goal learners in this experiment may have demonstrated

higher levels of cognitive achievement, regardless of their exposure or non-exposure to the tailored lesson introduction. Because there was no control for goal-orientation in this study, it was not possible to make distinctions in achievement related to these two orientations.

In addition to goal orientation, there are two other similar limitations that may have affected the credibility of the study. These limitations might have included variations in the learner's use of the internet to locate health information and existing information literacy skills. A preassessment was not conducted to control for either of these skills. A preassessment was also not conducted to control for learners' general affect at the beginning of the experiment before either group was distributed a directions packet. A detailed discussion of the study's limitations, including these, can be found in Chapter 5.

Significance of the Study

Results from this research study may advance the fields of instructional technology and education by helping designers and developers create new soft and hard technologies that match the personal characteristics of the learner better. Potential soft technologies may include new learning and teaching models and processes that combine concepts from communications theory with behavioral, cognitive, and learning theories. Subsequently, potential new hard technologies such as tailored electronic textbooks, online learning tutorials, and educational software programs, which incorporate these new models and uncovered processes, can be developed. Based on the premise that

tailored educational materials are more likely to capture and hold the attention of learners, these potential technologies might result in improved teaching and learning outcomes. Rather than students gleaning information from one-size-fits-all learning materials, tailored learning materials cater to the individual. These caterings might include examples that incorporate individuals who share similar backgrounds and life experiences; photographs of people from similar demographic groupings; or a writing style that fits the dialect, intelligence, and unique learning style of its user. In doing so, learners might find these learning materials more personally relevant, thus paying greater heed to the information that lies within.

This dissertation continues with a review of the theory and literature related to the study in Chapter 2. Chapter 3 explores the methodology of the experiment including research design, participants, materials, and variables studied. In Chapter 4, results of the experiment with respect to the four research questions are described, as well as other nonhypothesized findings. Chapter 5 provides an in-depth discussion of the results, connections to the existing literature, implications of the findings, limitations of the results, and suggestions for future research.

CHAPTER 2

REVIEW OF THE LITERATURE

The following analysis of literature will review concepts related to motivation, interest, and learning; tailoring as a communications theory-based, message design technique; behavioral construct tailoring as a theoretically organized method of message design; and measuring motivation as a function of learning intention and effort. The purpose of this review is to present and summarize the literature related to this study, to critique and analyze the research to date, to uncover further questions, and to illustrate, from findings, how a tailored lesson introduction could motivate students to learn a suggested skill, improve cognitive performance, and positively influence affect- and competence-related performance attributions.

Motivation and Interest

Motivation

In the context of education, motivation has been studied as a means of improving the quality of learning. "Motivation," states Brophy in a historical literature review, (1999) "is a theoretical concept used to explain the initiation, direction, intensity, and persistence of behavior, especially goal-directed behavior" (p. 2) Early researchers in

education, such as Skinner, talked about using reinforcement as a means of bringing behavior under control. In his 1947 study with pigeons, for example, Skinner determined that a stimulus cues learners to recognize that certain behaviors will bring about a specific reward (Skinner, 1947). Once a desired behavior pattern is established, a prescribed frequency of reinforcement must be administered to encourage continuation of the behavior and withheld to discourage nonperformance of the behavior.

Eventually, the research on motivation in education shifted from a behavioral to a cognitive perspective. From the cognitive perspective, reinforcement plays a role in maximizing the probability of desired learning outcomes, but greater emphasis is placed on learners' subjective experiences and the qualities that make learners unique from one another (Brophy, 1999). These distinctions are evident at a young age and become even more evident as a learner ages. Eccles, Wigfield, Harold, and Blumenfield (1993), for example, found that children, even as young as first grade, held differentiated self-beliefs about school subject areas even though they came from similar backgrounds. Value and expectancy perceptions played a major role in these differentiations.

Although now used with students in the classroom, early cognitive models and theories incorporated value-expectancy perceptions as a means of addressing issues related to employee performance and motivation in the workplace. Vroom (1964), one of the first to study expectancy-value perceptions and behaviors, found that workers were more likely to expend effort when the product of their effort was a valued outcome. Porter and Lawler (1968) took Vroom's work a little further and found that that one's abilities and perceptions to perform a task play a mediating role in leaner effort. In other

words, in order for effort to occur, a person must value the task and believe that he or she can succeed at the task. These two factors, task value and expected success, would later serve to function as major components in Keller's (1983) ARCS model of motivation.

According to Keller and Burkman (1993), "The motivation to learn depends largely on the learner's personality, the nature of the thing or skill to be learned, and the learner's perceptions of the value and difficulty of learning it" (p. 4). To motivate learners, Keller (1983) indicated that learning should strive to arouse curiosity (attention), to connect instruction to important needs and motives (relevance), to develop confidence and a sense of control over success (confidence), and to provide a combination of extrinsic and intrinsic rewards that are compatible with the learner's anticipations (satisfaction). These four components make up the ARCS model of motivation.

As a formula for increasing learner motivation, the ARCS model of motivation has been used in a variety of settings. More recently, the ARCS model has been used as a means of improving instruction in self-directed learning environments. In one such environment, ARCS components were used to design motivational email messages (Gabrielle, 2003). The intention of the email messages was to encourage students to access supplemental instructional materials as a means of improving their academic performance. Gabrielle regarded this suggested behavior as an example self-directed learning (learning behavior that includes taking responsibility for one's own learning, ability to use basic study skills, openness to learning opportunities, etc.). While Gabrielle was unable to show a difference in academic performance, a post-intervention survey

indicated that students in the experimental group (who received the motivational email messages) were significantly more likely to become self-directed learners (p =.004).

In another study, ARCS components were used to design motivational letters sent at various times to students enrolled in a distance education course as a means of improving completion rates (Visser, Plomp, Arimault, & Kuiper, 2002). Visser, Plomp, Arimault, and Kuiper (2002) noted a statistically significant difference between experimental and control groups (who did not receive a motivational letter) with regards to perceived course relevance and satisfaction (both components of the ARCS model) and cognitive performance ($p < .001$), and an increase in course completion rates. Although use of the ARCS model led to significantly positive outcomes in both of these the Gabrielle (2003) and Visser et al. (2002) studies, Keller and Song (2001) warn against oversaturating motivational messages.

Keller and Song (2001) found that overexposure to motivational messages can actually hinder potential positive outcomes. In a computer-assisted instruction study conducted with high school biology students, Keller and Song imbedded ARCS components into the context of the lesson. This imbedding took place on two levels: motivationally adaptive (ARCS components integrated at least one time each during instruction) and motivationally saturated (ARCS components integrated multiple times each during instruction). A third level was also included – motivationally minimized (no ARCS components integrated into instruction.) The purpose of the messages was to overcome motivational deficiencies and improve learning achievement. Students exposed to the motivationally adaptive learning environment were found to rate learning

materials significantly more relevant than students exposed to the motivationally saturated or motivationally minimized learning environments. Additionally, the motivationally adaptive group rated their confidence about and satisfaction with the materials higher (though not significantly) than the motivationally saturated group, as well as the motivationally minimized group. Finally, the motivationally adaptive group significantly outperformed the motivationally saturated group (as well as the standard, motivationally minimized group) with regards to cognitive achievement. One of the reasons for these results, according to Keller and Song (2001), may be that while the motivationally saturated group received more encouragement, the extra reading they were required to do may have placed a burden on the learning experience. This finding concurs with an earlier Keller (1983) study which stated that, "It should never be assumed in the context of the model of motivational design that more of something is automatically to be preferred" (p. 400). Thus it seems that while motivationally enhanced learning materials can lead to greater satisfaction with learning materials and improve cognitive achievement, there is a point of diminishing returns when those enhancements requires learners to process too much information.

In this dissertation's experiment, an existing lesson was adapted to include an introduction designed to increase learner motivation, improve cognitive achievement, and foster greater affective- and competence-related performance attribution ratings. Taking into consideration the ARCS model of motivation (Keller, 1983), arousing curiosity and stimulating interest was seen as a means to this end. While only tailoring a lesson introduction made this dissertation's experiment manageable, the decision was also a

precaution against over saturating the instructional materials with motivational components, as advised by Keller and Song (2001). The next section in this chapter discusses the relationship between interest and motivation and how that relationship applies to enhancing learning materials

Interest

"Interest,"according to Hidi (1990), "is central in determining how we select and persist in processing certain types of information in preference to others" (p. 549). To elaborate further, Dewey (1916) stated the interest was an interactive process between the learner and his or her environment; it is a state in which "self and world are engaged with each other in a developing situation" (p. 126). In this regard, interest is an important mental resource for learning.

Foundational studies into interest found a direct link between interest and cognitive performance. Estes and Vaughn (1973), for example, found that when students read materials they rated as personally interesting, they significantly performed higher on tests designed to measure retention and ability to infer. In another study, Asher, Hymel, and Wigfield (1978) found a strong relationship between interest factors and learners' text comprehension and recall. Similarly, Renninger and Wozniak (1985) found interest to be a powerful determinant of learner attention, recognition and recall. In all three of these studies, interest was associated with improved cognitive performance, thus suggesting some relationship between interest and learning.

Gaining attention (arousing interest and curiosity) is one of the four necessary conditions in Keller's ARCS model of motivation. "Interest is a condition that exists when there is an unexpected or inconsistent event in the perceptual environment, or there is a gap between a given and desired state of knowledge" (Keller, 1983, p. 400). The "gap" arouses curiosity and learners become motivated to fill it. According to Maw and Maw (1968), early researchers of curiosity, a curious person:

1. reacts positively to new, strange, incongruous or mysterious elements in his environment by moving toward them or manipulating them;
2. exhibits a need or desire to know more about himself and/or his environment;
3. scans his surroundings seeking new experiences;
4. persists in examining and exploring stimuli in order to know more about them (p. 2).

To generate interest and arouse curiosity, Keller (1983) suggests using anecdotes or other devices that inject a personal, emotional element into otherwise purely intellectual or procedural material. In this dissertation's study, for example, a personal health threat and a suggested solution were described in the context of a lesson introduction. The idea of arousing interest and offering an immediate opportunity to satisfy curiosity via a suggested learning experience is very much like generating Linnenbrink and Pintrich's (2002) concept of situational interest.

Situational interest, unlike personal interest (both described in Chapter 1), is "based entirely on the features of the learning context and may be short-term or long-lasting" (Linnenbrink & Pintrich, 2002, p. 319). This description concurs with Alexander,

Kulikowich, and Jetton (1994), in a meta-analysis of 66 studies about subject matter and interest, came to the conclusion that situational interest relates to the "aspects within the immediate situation that produced temporary excitement, attention, or interest" (p. 232). Situational interest has often been studied within the content of text learning. In a review of 14 studies on situational interest and text learning, Schiefele (1999) found the average correlation between situational interest and text learning to be .33 ($p < .05$). Thus, when learners find the content of a text to be interesting, they, consequently, glean more from what they read.

Garner, Alexander, Gillingham, Kulikowich, and Brown (1991) warn, however, that interest can sometimes divert learners away from the important generalizations of the text. In two different studies, these researchers had undergraduates read about a physicist and his scientific work. In both studies, students recalled more about the physicist's personal background than his scientific work. Although parts of the text were interesting, they were the wrong parts, thus drawing students away from learning materials intended purpose. Educators and instructional designers, then, not only need to make sure that learning materials are sufficiently, but not overly, motivationally adaptive (Keller & Song, 2001), but they also need to consider the direction of learner interest when arousing curiosity.

To engage students in a learning task, educators and instructional designers must uncover and apply proven techniques to arouse interest. By presenting an unexpected event or a gap in knowledge, particularly one that injects a personal, emotional element, an individual is given a reason to learn. When that event or gap is presented within the

context of planned instruction, an educator can then present an immediate opportunity to cure their curiosity (or close the gap). Thus, in stimulating curiosity, an educator can motivate learners to pay greater attention to instruction and the information therein. This concept concurs with Thorndike (1935), who believed that learning was not only influenced by personal interest but also by the interestingness of the suggested the task. In this dissertation's study, lesson introductions, based on learners' perceptions about the lesson's topic, a health threat and a suggested response, were designed to capture and maintain learners' interest. The next section discusses how tailoring can be a useful message design strategy to accomplish this task.

Tailoring and Elaboration

Tailoring

Tailoring offers educators a motivational strategy to stimulate learner interest. Tailored communications are designed to reach a specific individual and are based on that individual's unique characteristics as derived from a formal assessment. Strecher and Kreuter (1999) explain the rationale for tailoring as a process. By tailoring materials, unessential information is eliminated; what remains is more personally relevant to the recipient. When information is relevant, it is more likely to be thoughtfully processed, and thus, more successful than non-tailored information, in guiding a person to make a suggested behavior change (Petty & Cacioppo, 1981; Strecher & Kreuter, 1999). The

next paragraph describes studies where increasing relevancy, via tailoring, led to significantly positive cognitive, affective, and/or behavioral outcomes.

Recent studies show tailored education materials to be more effective in generating interest in a topic, increasing knowledge, and eliciting behavior change than non-tailored materials ((Kreuter, Farrell, Olevitch, & Brennan, 2000). In a nutrition education study about fat, fruit, and vegetable intake, for example, Onema, Brug, and Lechner (2001) found that a tailored, educational software program was more appreciated by ($p < .01$) and rated more personally relevant ($p < .01$) by participants. Additionally, participants exposed to the tailored program were more likely to report an intention to change their eating habits ($p < .01$). Similarly, in a smoking-cessation education study, Dijkstra (2005) found that participants exposed to tailored materials were significantly more likely to report quitting activity after 4 months than those exposed to the non-tailored materials, 48.7% versus 28.6% respectively. In a breast cancer and mammography education study, Rimer, Halabi, Sugg-Skinner, Lipkus, Strigo, Kaplan, and Samsa (2002) found that experimental group participants receiving tailored education materials had significantly greater knowledge about and more accurate risk perceptions of breast cancer than participants receiving the usual care and generic materials. And finally, in a non-health education study involving tailoring, Anand and Ross (1987) found that middle-school students exposed to story problems based on their personal interests and hobbies (as extracted from interviews conducted prior to instruction) outperformed students exposed to less personally relevant problems.

The last study, like the others described above, demonstrated that tailored education materials have the ability to motivate people to learn a suggested skill because they are personally relevant and thus, more meaningful. Aside from Anand and Ross (1987) and Rimer et al. (2002), however, there are few studies of tailoring as a technique to improve cognitive performance and generally speaking, there are fewer examples of how it can be used as a message design technique to motivate individuals to learn. Most studies investigating the effects of tailoring were with regards to the adoption of suggested health behaviors (Dijkstra, 2005; Onema, Brug, & Lechner, 2001; Rimer et al., 2002). Keller (1983), cited in the previous section, believed that educators can increase motivation by injecting a personal, emotional element into otherwise purely intellectual or procedural material. Personally relevant, meaningful instruction and materials work because they ignite the elaboration process (Petty & Cacioppo, 1981). The elaboration process and its relationship to tailoring are described in the next section.

Elaboration

Although most of the studies described above specifically cite health education research, the roots of tailoring lie in communications theory. According to Kreuter, Oswald, Bull, & Clark (2000), theories and models of information processing explain why tailored health communications may be more effective than non-tailored approaches. This section discusses one of those information processing models, Petty and Cacioppo's (1981) elaboration likelihood model (ELM). The ELM suggests that people are more

likely to process, or elaborate, information thoughtfully if it is perceived to be personally relevant.

The ELM was originally created to explain inconsistencies in attitude outcomes produced in the propaganda-based persuasion studies conducted by Hovland, Janis, and Kelley during World War II (Petty, Barden, & Wheeler, 2002). In a literature review, Ajzen (1992) indicated that these studies and others that followed examined the effects of source credibility and attractiveness, receiver intelligence, fear appeals, order of presentation, and other variables on message processing. The learning theories and models that evolved from these studies, such as Keller's (1983) ARCS model of motivation, viewed persuasion as a function of attention, comprehension, acceptance, and retention. Ajzen (1992) furthered that little was said in past research about the actual content of the message or about the extent to which it was processed. Message content and extent of processing, however, play a primary role in the ELM.

The ELM is based on the assumption that people are active processors of information. They consider a message, relate it to previously encountered information, and then think about its relevance in their own lives, i.e. elaboration. Elaboration occurs on a continuum. On this continuum, information processes range from those requiring no thinking to those requiring careful consideration. How a message is processed and the extent to which it is scrutinized distinguishes central route processing from peripheral route processing. The route used to produce the attitude change is critical because each route leads to different consequences (Petty & Cacioppo, 1981).

Peripheral route processing relies on simple cues in the information and heuristics with little cognitive processing. Conditions leading to peripherally processed messages are situations in which the information is perceived to be inconsequential, irrelevant, or unfamiliar. In a study conducted with college students, for example, those who were told about a university regulation that was to come about in 10 years were found to be much less likely to adopt an attitude about the regulation than those who were told the regulation would come about in the next year (Petty, Heesecker, & Hughes, 1997). In other words, because the information was perceived to be irrelevant, a significantly observable attitude was not formed. If an individual does not internalize an attitude, any change, including learning, will not be permanent (Petty & Cacioppo, 1981).

Central route processing, unlike peripheral route processing, occurs when the message receiver carefully considers new information and its relationship to existing cognitive schema (Petty et al., 2002). In another study conducted with college students, participants were told that the university was considering the institution of comprehensive graduation exams (Sivacek & Crano, 1982). Afterwards, students were given the opportunity to sign petitions and volunteer in efforts to oppose the exams. The researchers, in their analysis, found a direct relationship between finding the information to be relevant and strong attitudes about and behaviors to oppose the exam. This concurs with Petty and Cacioppo (1981), who indicated that when information is relevant, elaboration occurs. When elaboration occurs, attitudes are processed via the central route and, consequently, they are stronger (Petty & Cacioppo, 1981).

Strength of argument plays an important role in the elaboration process. Stephenson, Benoit, and Tschida (2001), in a test of the ELM, found that the strength of an argument was directly associated with increasing positive cognitive responses. In other words, the stronger the case for a concept, the more favorable the attitude towards that concept. Since tailored materials are based on a formal assessment of an individual, it should stand to reason that tailored materials make for a stronger case than non-tailored materials in motivating learners simply by generating interest via personalization.

Despite the greater likelihood of increased motivation, less is known about the situations in which tailoring will/will not be effective or the components within the message that elicit central route processing. Also, just because tailoring can make learning materials more meaningful, built-in relevancy does not necessarily make them strategically meaningful. In other words, tailored learning materials might capture the attention of the audience, but may not point learners in the direction of that instructional event's central purpose. More research is needed to investigate ways to better ensure the direction educators and instructional designers point their learners. Behavioral construct tailoring offers a means to strategically accomplish this task. The next section describes the concept of behavioral construct tailoring and how the concept works.

Message Content and Design

Behavioral construct Tailoring

Behavioral construct tailoring is a technique used to improve the attractiveness, relevancy, and purpose of tailored messages such that they point learners in the direction intended by the educator or instructional designer. According to Kreuter, Oswald, Bull, and Clark (2000), behavioral construct tailoring is when a message designer uses established behavioral construct theories to form the structural content of a message. Such theories could include, but are definitely not limited to, Bandura's social cognitive theory (Bandura, 1986), which posits that environmental, personal, and social factors interact to illicit specific behaviors; or the stages-of-change theoretical model (Prochaska & DiClemente, 1983), which posits that behavior change is a phased response; or self-determination theory (Deci & Ryan, 1985, 1991), which examines the development and functioning of personality and the degree to which behaviors are volitional and self-determined. Any one of these theories could serve as the base upon which the context-relevant characteristics of an individual could be assessed and applied to the design of motivationally adaptive message. In this regard, behavioral construct tailoring becomes a strategic, prescriptive means of stimulating interest in an effort to elicit a specific, desired response.

The key to behavioral construct tailoring is finding the most appropriate behavioral construct model to produce a desired outcome. Success depends on the ability of the message designer to identify correctly the behavioral and psychosocial issues

related to the desired attitude or behavior, and to accurately assess the unique characteristics of the targeted audience as they relate to those issues. For example, in this dissertation's study, the desired outcome was to increase participants' motivation to learn a suggested skill and consequently, improve their cognitive performance of that skill. It was also hoped that after instruction, participants would attribute their performance to the value of the task and to their own competence. Without identifying the correct behavioral and psychosocial issues involved and without assessing the unique characteristics of an individual as they relate to those issues, the outcome is "roughly the equivalent of a clothing tailor taking a customer's waist, inseam and outseam measurements to make a pair of trousers, but not asking about the preferred style, color, or fabric" (Kreuter, Farrell, et al., 2000, p. 313). The pants would fit, but the customer might not wear them.

While tailoring is a means to increase relevancy and foster interest, behavioral construct tailoring mandates the direction of that interest and fine-tunes the way it guides the learner there. In doing so, the problem of interest diverting learners away from the important generalizations of the text, as found by Garner et al. (1991), is avoided. Although there is a theoretical basis for behavioral construct tailoring, there is little research that explores the differences between "general" tailoring (such as name, gender, ethnicity, etc.) and behavioral construct tailoring. This dissertation's study will employ the use of behavioral construct tailoring but will not investigate the differences between generally tailored and behavioral construct-tailored materials. These differences, however, are worth investigating in future studies.

Because the topic of the lesson in this dissertation's study was health threat-related, Witte's (1994) extended parallel process model (EPPM), was found to be a viable behavioral construct model to guide the tailoring process. The EPPM, a behavior model that offers insight into the processing of and response to a health threat message, was used to design the structural content of the experimental tailored lesson introductions. To aid in the design of those lesson introductions, a formative evaluation was conducted. The purpose of this evaluation was to construct an audience profile and to identify beliefs to change, reinforce, and introduce in order to elicit the desired outcome. A description of the evaluation, procedures, and outcomes are described in Appendix A. The next section, however, describes the EPPM and its role in this study.

The Extended Parallel Process Model

As stated in the previous section, the quality of tailored materials can be enhanced when the tailoring is based on a behavioral construct theory. The extended parallel process model (Witte, 1994) is a fear appeal theory that suggests health messages act as an external stimuli to initiate two different cognitive appraisals, threat and efficacy (see Figure 1). Based on these appraisals, one of three outcomes will surface: low/no response, danger-control response, or fear-control response (Witte, Meyer, & Martell, 2001).

The first cognitive appraisal is the threat. Threat, in this context, is "a danger or harm that exists in the environment whether individuals know it or not" (Witte, 1994, p. 114). There are two kinds of threats: actual and perceived. According to Witte et al.

(2001), perceived threat and its two underlying dimensions, severity and susceptibility, play key roles in persuasive message acceptance or rejection. People first consider whether the threat is relevant to them and whether the threat is significant. If the threat is deemed irrelevant or not severe, the information is not processed any further. In contrast, if people consider the threat to be relevant or severe, they become fearful and motivated to act (Witte, 1994; Witte & Allen, 2000; Witte et al., 2001). At this point, the second cognitive appraisal, efficacy, occurs.

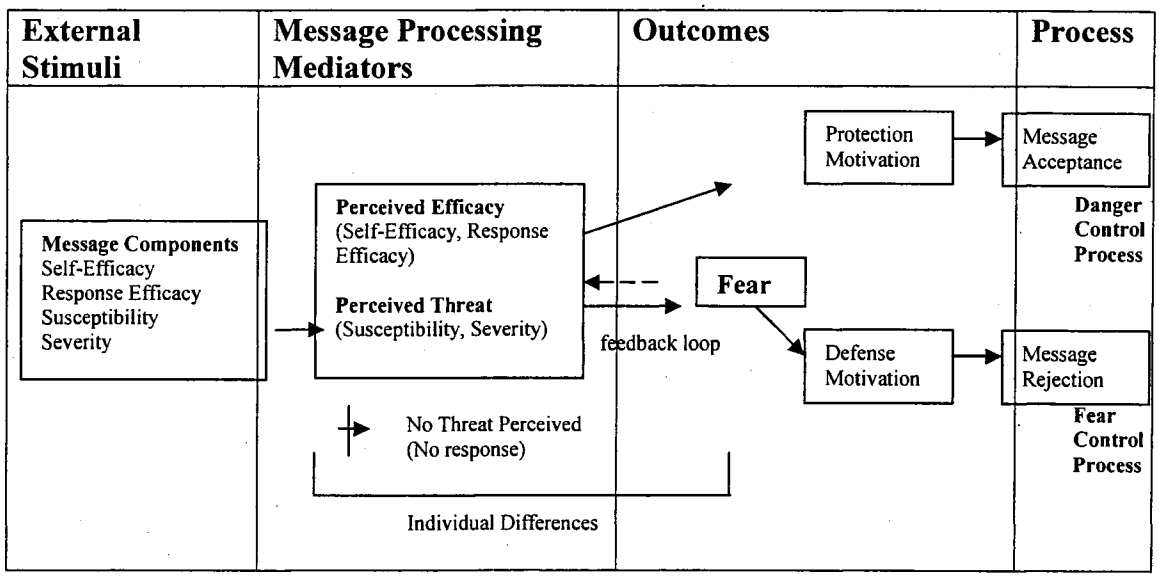

Figure 1. The Extended Parallel Process Model (Witte, 1994)

Efficacy, a message processing mediator (see Figure 1), refers to the effectiveness, feasibility, and ease with which a recommended response averts a threat. The two underlying dimensions of efficacy are response efficacy (the effectiveness of a specific response) and self-efficacy (the ability to carry out a recommended response).

High threat and efficacy perceptions are associated with individuals becoming motivated to control the danger; high threat, but low efficacy perceptions, however, are associated with individuals becoming motivated to control the fear. Danger-control behaviors include learning more about the threat or taking action to reduce or eliminate the threat; fear-control behaviors usually include a form of message rejection. There have been several studies conducted to confirm the presence of these danger-control and fear-control behavior outcomes as identified in the EPPM. The next paragraph describes four of these studies.

Studies conducted to confirm the presence of danger- and fear-control behaviors, as identified in the EPPM, do suggest that these specific categories of behaviors exist. In a study where participants were exposed to messages about electromagnetic fields, for example, Witte (1998) found that high threat and high efficacy were associated with significantly greater safety protection behaviors ($p < .05$). Similarly, college students exposed to messages about the threat of rape were more likely to declare an intention to learn how to practice self-defense when they perceived high amounts of threat and efficacy ($p < .05$) (Morrison, 2005). In contrast, when participants, in a meningitis study, perceived threat to be high, but efficacy to be low, they did not act to reduce their risk, by way of requesting a vaccination (Gore & Bracken, 2005). Similarly, Witte (1994) found that sexually active, unmarried participants, who perceived high threat but low efficacy after reviewing HIV/AIDS education materials, were more likely to exhibit defense-avoidance or message minimization, both message rejection responses. Although all four of these observed the different threats and different responses, they support the theory

behind Witte's (1994) EPPM that depending on one's threat and efficacy perceptions, one responds to a suggested response in different ways.

As evidenced from the studies described above, high threat and efficacy perceptions lead to danger-control responses, in which individuals work to eliminate or reduce a threat. In order to propagate such a response, a persuasive message needs to generate strong threat and efficacy perceptions (Witte et al., 2001). In this study, for example, the threat was presented as adverse health outcomes from not knowing how to perform the skill taught in the lesson. The suggested response to eliminate the threat was learning the skill. In this regard, this dissertation's experiment was designed to further the literature supporting the use of EPPM in behavioral construct tailoring.

To generate strong threat and efficacy perceptions, educators must first assess their target audience's existing perceptions. A risk assessment can be an effective tool to gather this information. Once audience perceptions are known, an educator can choose to address the audience as a whole (if the audience is assumed to be homogeneous) or on an individual/small-group basis. In this study, participants' perceptions were gathered by way of a risk assessment tool called the Risk Behavior Diagnosis Scale (Witte, Cameron, McKeon, & Berkowitz, 1996). A detailed description of this tool and its components are discussed in the next section.

Assessment Tools

Although assessment tools are usually described in the methodology section of a dissertation, the complexity of two assessment tools used in this study justifies a

literature-supported, detailed description for each of them. The following two sub-sections describe the Risk Behavior Diagnosis Scale (Witte, Cameron, McKeon, & Berkowitz, 1996), which was used to gather audience perceptions about the lesson's topic, and the Online Motivation Questionnaire, which was modified and used to evaluate participant's motivation at various times throughout the experiment.

Assessing Risk Perception

The Risk Behavior Diagnosis Scale (Witte, Cameron, McKeon, & Berkowitz, 1996), theoretically grounded in Witte's (1994) Extended parallel process model (described in the previous section), was used to identify participants' risk response state (danger-control, fear-control, or no/low threat). The Risk Behavior Diagnosis (RBD) Scale is a 12-item assessment that evaluates an individual's perceived threat severity and susceptibility as well as their perceived self- and response-efficacy (see Appendix B). Used extensively by the student health center at Michigan State University (Witte et al., 2001), the RBD has been shown to help educators and health practitioners develop an appropriate and motivating health message (Witte et al., 2006). In this study, the Risk Behavior Diagnosis (RBD) Scale was used to sort experimental group participants into one of three different threat and efficacy categories so that they would be exposed to an appropriately tailored and motivating lesson introduction.

The RBD Scale's "fill-in-the-blank" design allows an educator to plug in any threat and recommended response. (In the case of this study, for example, the threat was risks associated with not knowing how to evaluate websites and the recommended

response was completing an online tutorial that would show someone how.) Each item in the RBD was based on a 7-point scale ranging from "1-strongly disagree" to "7-strongly agree." An individual's overall score is determined by subtracting the sum of their threat responses from the sum of their efficacy responses. This overall score is referred to as the critical value. The critical value can be either a negative or positive number or zero. These values indicate whether an individual is in danger-control, fear-control, or a low threat perception state, respectively. Once an educator knows a learner's critical value, he/she can work to move that individual into a danger-control response state (described in the previous section). The danger-control response state, as well as the fear-control (also described in the previous section) and low/no threat response states, is described in more detail in the Intervention Materials section of Chapter 3.

Measuring Motivation

According to Boekaerts (1992, 1996), learners' appraisals of a concrete learning task affects their commitment to the task and effort given. Because learners' task appraisals may change over the course of instruction, so too might their level of motivation (Crombach, Boekaerts, & Voeten, 2003). In two studies conducted with high school students, researchers also found that the relationship between learners' task appraisals and learners' levels of motivation varied from subject to subject (Boekaerts, Otten, & Voeten, 2003). Math tasks were rated as less attractive, but students reported putting in as much effort as they would to a more attractive history task. For this reason, motivation must be treated as a situation-specific concept and assessment of it must occur

often and throughout instruction in order to capture an accurate evaluation of learning task and learners' motivation (Boekaerts, Otten, & Voeten, 2003; Seegers & Boekaerts, 1993).

In this study, a modified version of Boekaerts (2002) Online Motivation Questionnaire (OMQ) was used to measure learner motivation before instruction, after instruction, and after the cognitive assessment (see Appendix D). According to Boekaerts (2002), task appraisals given prior to instruction are useful in that they explain "variance in learning intention, emotional state, and reported effort...because [these] appraisals incorporate students' perception of local conditions" (p. 80). Task appraisals given postinstruction, on the other hand, explain learners' actual effort given. Differences between pretask learning intention and post-task reported effort indicate that the learners' perception about the task or their ability changed during the course of instruction. In this case, additional research could be done to extrapolate the causes.

The final part of the modified OMQ is administered after cognitive assessment scores are revealed. This assessment explains how learners to attribute their performance—to the affective components of the task, to their competence, to both, or neither. According to Weiner (1986), attributions influence future task appraisals and academic self-concept. Boekaerts, Otten, and Voeten (2003) maintain that performance attributions vary from task to task and from subject to subject. In their 2003 study, the type of examination in a school subject explained 15% of attribution variance. For this reason, learner motivation and the factors affecting it must be assessed on a case-by-case basis.

Conducting a motivational analysis for every learning task in every academic subject would be an enormous task for educators and instructional designers to tackle. It could be worth the cost and effort, however, when new learning methods are being tested and old methods stop working. These results, along with the results of future studies, could be used in the development of new instructional methods and learning materials. For example, the modified OMQ was used in this dissertation's study to evaluate the impact of a behavioral construct tailored lesson introduction on learner motivation, cognitive performance, and performance attributions. The next section describes the conceptual model for this study and the role that the OMQ and the RBD assessments described in this section played in the experiment.

Conceptual Model for the Present Study

Existing literature reveals connections between interest, motivation, and learning; tailoring as a motivational message design technique; and behavioral construct tailoring as a means of improving learner-characteristic message design; but, little or no research shows how these concepts could be combined into an instructional message design technique that stimulates and sustains situational interest in a given task. This instructional message design experiment sought to examine the effects of a behavioral construct-tailored lesson introduction on learner motivation, cognitive performance, and performance attributions (see Figure 2). One half of the study's participants (the experimental group) were exposed to a tailored introduction before proceeding to the lesson. The other half (the control group) directly linked to the existing standard

introduction. The content of the tailored lesson introduction was based on behavior-construct theory, the extended parallel process model (Witte, 1994). The tailored introduction an experimental group participant was exposed depended on their responses to a risk assessment tool, the Risk Behavior Diagnosis (RBD) Scale (Witte, Cameron, McKeon, & Berkowitz, 1996).

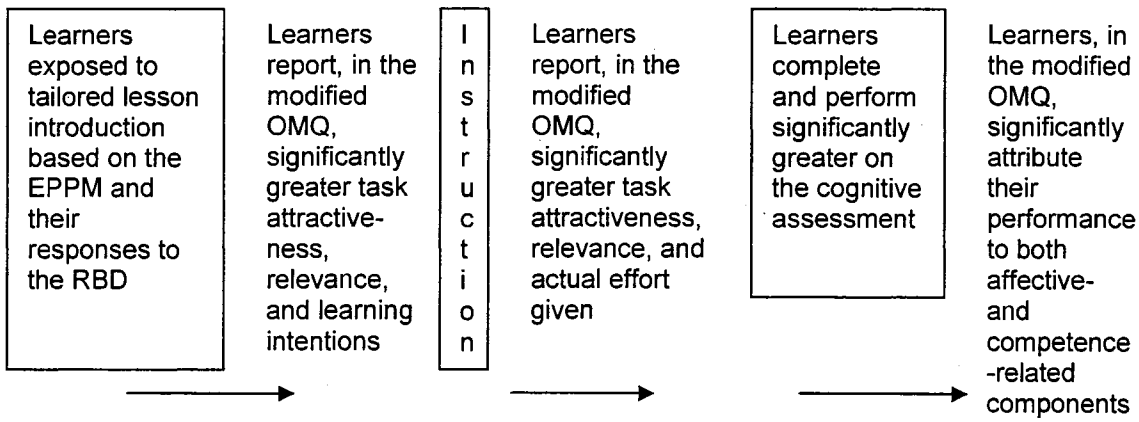

Figure 2. Conceptual Model of the Study

During instruction, participants completed a three-part motivation survey and one cognitive assessment. The motivation survey was a modified version of Boekaerts' (2002) Online Motivation Questionnaire (OMQ). The survey components were administered before instruction, after instruction, and after cognitive assessment score were revealed. The survey collected perceptions about task attractiveness, task relevance, learning intentions, and effort given, as well as affective and competence-related performance attributions. Instruction, in this study, consisted of an existing online

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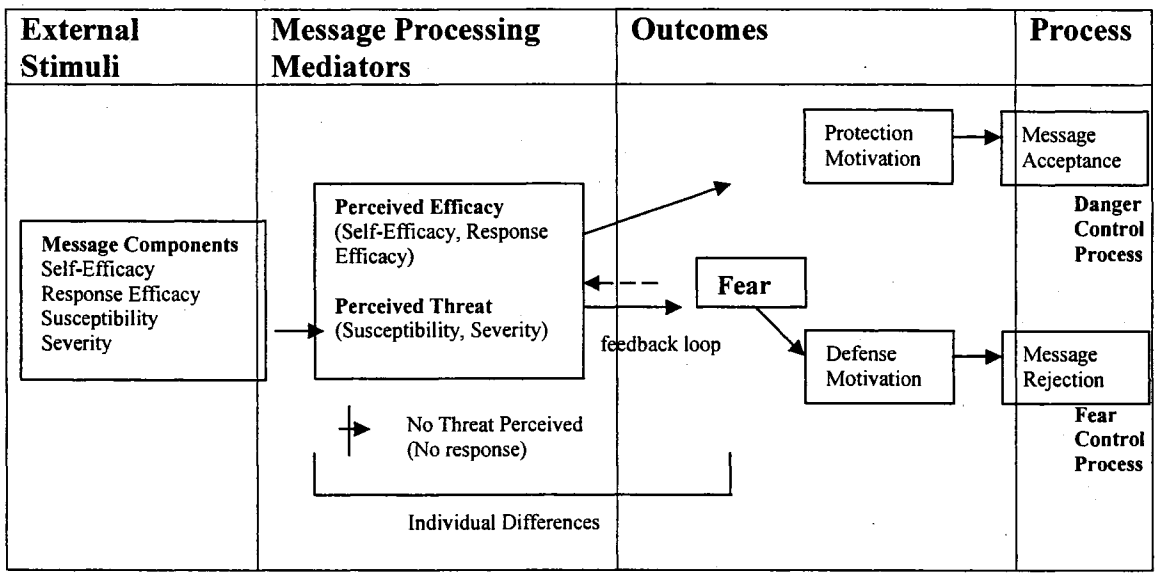

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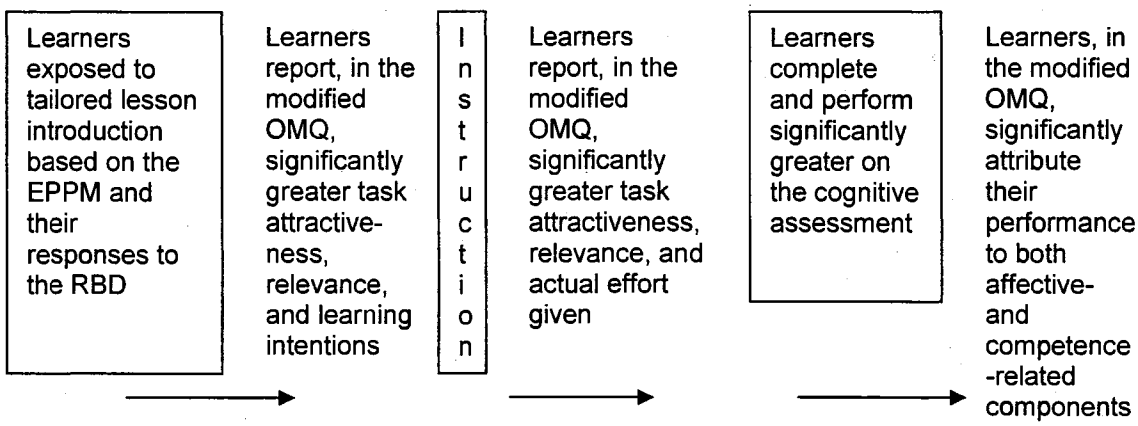

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tutorial about website evaluation located on Xavier University's library website (n.d.). The cognitive assessment was the existing 18-item, multiple-choice quiz found after the online tutorial. The next chapter will explain how each of these study components were implemented and how their results were assessed.

Summary

As stated in the description of the conceptual model, a review of existing research reveals connections between interest, motivation, and learning; tailoring as a motivational message design technique and behavioral construct tailoring as a means of improving learner-characteristic message design. While much of the literature offers conclusive results of these concepts, little or no research exists to show how these concepts could be collapsed into an instructional design technique that stimulates and sustains situational interest in a task as a means of generating motivation and improving cognitive performance. Thus, studying the impact of a behavioral construct-tailored lesson introduction on motivation, cognitive performance, and performance attributions should add new knowledge to the fields of educational technology, communications, and learning.

CHAPTER 3

METHODOLOGY

Introduction

In this study, participants were asked to complete a variety of assessments. These assessments included a risk assessment, a cognitive assessment, and a three-part motivation survey. Prior to this study, a formative evaluation was conducted. The purpose of the evaluation was to construct an audience profile and to identify beliefs to change, reinforce, and introduce related to a given threat. This data was utilized to construct three different tailored lesson introductions. These introductions are described in the Instrumentation section below. Details on the formative evaluation can be found in Appendix A.

Participants

Participants were voluntarily recruited from a pool of College of Education majors enrolled in multiple sections of an educational technology course at a Midwest university during the Fall semester of 2006. This population was specifically chosen for two main reasons. First, as young adults, college students are living on their own for the first time and may be independently responsible for their health and well-being. Many will turn to the internet as a source of information. According to a 2002 study of 743 undergraduate students, 74% used the internet to locate health information (Escoffery,

Miner, Adame, Butler, McCormick, & Mendell, 2005). As avid, accessible, and able seekers of online health information, they are a population worthy of the lesson's intended outcome. The second reason for choosing this population was that as education majors, these students must learn how to locate, evaluate, and use information as part of their program's goals. Because evaluating information is already one of their major's program goals, learning how to evaluate websites naturally fit into their coursework.

Six undergraduate sections were selected for treatment and control. Selection of these six classes was based on the fact that lesson topic was part of the existing curriculum, the willingness of instructors to allow time for the intervention, and the availability of computers in the classrooms in which these classes took place. Classes were given equal numbers of directions packets for both the experimental and control groups. A between-subjects approach was used to randomly sort participants into groups simply by alternating directions packets as they were distributed to participants. The tailored lesson introduction to which the experimental group participants were exposed to depended on their responses to the Risk Behavior Diagnosis Scale (RBD) (Witte, Cameron, McKeon, & Berkowitz, 1996) completed before the lesson.

Research Design

This study examined the effects of a tailored lesson introduction on motivation and cognitive achievement. The design of this study blended experimental research with classroom-based research. A controlled trial was used to compare an experimental group to a control group. The experimental group was exposed to a tailored lesson introduction

prior to beginning the lesson. The control group was only exposed to the existing, standard (non-tailored) introduction prior to beginning the lesson. The purpose of the control group is to check for the effects that a tailored introduction has on motivation and cognitive achievement. The design, in standard notation, is depicted in Table 1.

Table 1

Research Design

R	Control	O_A		O_B	Instruction	O_C	O_D	O_E
	Treatment	O_A	I	O_B	Instruction	O_C	O_D	O_E

O_A Risk Behavior Diagnosis
O_B Motivation Survey Part 1
I Tailored lesson introduction
O_C Motivation Survey Part 2
O_D Cognitive assessment
O_E Motivation Survey Part 3

Materials

Materials used in this study served instructional, intervention, or assessment purposes. These materials included one risk assessment (whose results determined which of three tailored lesson introductions experimental group participants were exposed to), a three-part motivation survey, four web pages (each containing one of three tailored lesson introductions or a direct link to the existing lesson introduction), an online tutorial, and an a cognitive assessment that follows the online tutorial. Each of these items, beginning with the assessment tools, is described in the next section.

Assessment Materials

Three assessments was conducted during the course of the experiment (see Table 2). The assessment instruments are as follows: the Risk Behavior Diagnosis (RBD) Scale (Witte, Cameron, McKeon, & Berkowitz, 1996), a modified version of the three-part, Online Motivation Questionnaire (OMQ) (Boekaerts, 2002), and the existing Xu.Tutor Evaluating Websites quiz (Xavier University, n.d.).

Table 2

Assessment Materials Summary

Instrument	Risk Behavior Diagnosis Scale	Motivation Questionnaire Part 1	Xu.tutor Evaluating Websites Quiz	Motivation Questionnaire Part 2	Motivation Questionnaire Part 3
Type of data gathered	Quantitative:12 Likert-scale responses	Quantitative: 10 Likert-scale responses	Quantitative: 18 questions, m/c and t/f	Quantitative: 10 Likert-scale responses	Quantitative: 7 Likert-scale responses
Type of scores produced	One numeric score.	Subscore totals for learning intention, task attractiveness, and relevancy	Total score	Subscores for effort, task attractiveness, and relevancy	Single item indicators grouped into two categories

The Risk Behavior Diagnosis Scale (O_A)

The Risk Behavior Diagnosis (RBD) Scale (Witte et al., 1996) is a 12-item assessment, theoretically grounded in Witte's (1994) extended parallel process model (EPPM). The scale is used to identify an individual's risk perceptions about a threat and

management processing state. As described in Chapter 2, the RBD's "fill-in-the-blank" design allows an educator to plug in any threat and recommended response. For this study, a formative evaluation was conducted to identify perceptions, in an audience similar to the participants in the dissertation study, about the risks associated with not learning how to evaluate websites (see Appendix A for details about this formative evaluation). Each item in the RBD is based on a 7-point scale ranging from "1-strongly disagree" to "7-strongly agree." An individual's overall score is determined by subtracting the added sum of their threat responses from the added sum of their efficacy responses. This overall score is referred to as the critical value. Because one's threat and efficacy perceptions vary from one situation to the next, so, too, do critical values. The critical value is an important value that determines which type of threat message (danger-control, fear-control, or low threat) an educator should give a learner.

Reliability. A reliability test conducted on the Risk Behavior Diagnosis Scale (RBD) constructed for and used in this dissertation's study revealed that Cronbach's alpha was .752.

Motivation Survey (O_B, O_C, and O_E)

A modified version of Boekaerts (2002) Online Motivation Questionnaire (OMQ) was used to measure the impact of a tailored lesson introduction on student motivation before and after the lesson, as well as after cognitive assessment scores were revealed. Before the lesson, students' motivation was measured via responses to questions separated into three different subscales: task attractiveness, task relevancy, and intention

to learn. Similarly, after the lesson, students' motivation was based on their responses to questions about task attractiveness, task relevancy, and effort given (see Appendix D). Questions about emotional state were removed because they were not relevant to this study's hypothesis. Questions about efficacy and expectations were removed because they are asked in the RBD Scale. All questions were reworded so that responses could be answered on a "Strongly Agree" to "Strongly Disagree," 5-point Likert scale.

After cognitive assessment scores were revealed, students completed the third part of the survey. This part required students to attribute their performance to the affect- and competence-related components of the task. Two new attributions were added to the original OMQ: "information was important" and "wanted to learn for my own use." These were added because one of the major tenets of tailoring is that it leads to increased perceptions of relevancy (Strecher & Kreuter, 1999). Since relevancy was discussed earlier in terms of its relationship to interest and motivation, it was important to include assessment for it. In addition to the two new attributions, this third part of the survey was modified, like parts one and two, so that responses could be answered on "Strongly Agree" to "Strongly Disagree," 5-point, Likert scale.

Reliability. Even though existing studies of reliability have been conducted with the OMQ, Cronbach's alpha was conducted on all three parts of the new Motivation Survey. This analysis was done to accommodate the changes in content and the restructuring of response choices to a Likert-scale format as well as to determine the internal consistency reliability with this specific population. Cronbach's alpha for Motivation Surveys Part 1 and Part 2 were found to be .870 and .880, respectively.

Motivation Survey Part 3 was broken into two subscales for analysis. Affect-related attributions ("in the mood," "is appealing," "was important," "for my own use," and "doing my best") and competence-related attributions ("easy," "good at this type of task," "knew the best way to go about learning," and "already know a lot about") were assessed separately. Cronbach's alpha was determined to be .857 for the affective-related performance attributions and .809 for the competence–related performance attributions. The variable, "was lucky," was removed from the survey and the final analysis because of its inverse effect on reliability scores. When "was lucky" was included, the alpha for the competence subscale dropped to .661.

Quiz (O_D)

An 18-item, objective, mixed-response (true/false and multiple-choice questions) quiz was administered immediately after the intervention (see Appendix E). To preserve the integrity of the assessment, the same quiz questions that appeared at the end of the existing online tutorial were used to assess cognitive learning. Participants in both the experimental and control groups read and recorded their answers online. A final score was self- reported on the motivation survey.

Instruction and Intervention Materials

Instruction (X)

"Instruction" was a tutorial made available through Xavier University, Cincinnati, Ohio. Both the experimental and control groups completed the same tutorial. The purpose of Xu.Tutor (n.d.) is to help students improve their research skills. The tutorial, entitled "Evaluating Websites," http://www.xu.edu/library/xututor/evaluating/index.cfm, walks users through the process of locating reliable and relevant internet resources (see Figure 3).

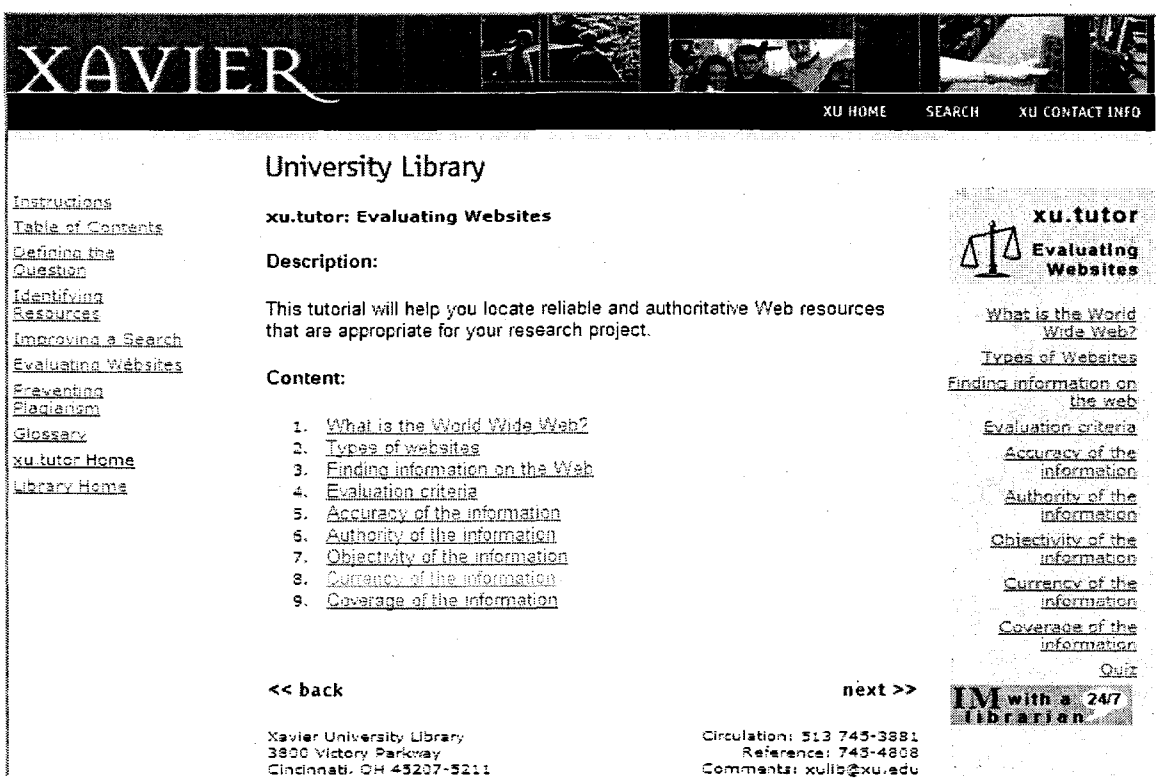

Figure 3. Xu.Tutor Website.

Intervention (I)

The control group linked to the tutorial via a webpage that only has a link. The experimental group linked to the tutorial via a webpage that contained one of three tailored lesson introductions. The tailored lesson introduction an individual was exposed was based on that individual's previous responses to the RBD Scale. Introductions were designed to address the three processing states depicted in the extended parallel process model (EPPM) (Witte, 1994): fear-control, danger-control, and low/no threat. A description of these states and their corresponding lesson introductions follows (see Appendix A for details about how the introductions were developed).

Introduction I – Fear-Control Processing Introduction I was meant to address individuals with a negative RBD critical value, indicating dominance of fear-control processing (see Figure 4). The message focused on increasing the individual's perception of self-efficacy and response efficacy toward the recommended response. It also eliminated the barrier to take action by providing the participant with the opportunity to learn the suggested response: building website evaluation skills.

Introduction II – Danger-Control Processing. Introduction II addressed individuals with a positive RBD critical value, indicating dominance of danger-control processing (see Figure 5). These individuals have efficacy perceptions high enough to counteract their threat perceptions, but need to be motivated to continue practicing self-protection. They also need to be reminded about the severity of the threat.

Although the internet is a seemingly endless source of health information, it can also be a landmine. According to one researcher, less than 45% of medical websites are reliable. Unknowingly buying into a poor quality website could lead to some pretty scary outcomes! For example . . . you find a website about the weird rash you keep getting and it says it's no big deal. You breathe a sigh of relief but in actuality, you are in the late stages of a super serious disease. A couple of situations like these could not only lead to emotional distress, but also loss of health! Are you confident that you can recognize the 55% of medical websites that are unreliable?

You need to protect yourself and now is the time to start doing it. This quick tutorial will show you how to distinguish the difference between high and low quality websites, thus making you a wiser *and* healthier consumer.

Figure 4. Introduction I – Danger-control Processing.

Although the internet is a seemingly endless source of health information, it's not always a goldmine. According to one researcher, less than 45% of medical websites are reliable. This means that you could be looking up info on the funky rash you keep getting or the new nutrition supplement you've been taking to lose weight and only every other website is going to be accurate.

Right here, right now, you can quickly learn how to distinguish the difference between a high quality and low quality website. This simple tutorial will introduce you to basic website evaluation criteria and help you build the skills to make you a wise *and* healthier consumer.

Figure 5. Introduction II – Fear-control Processing.

Introduction III – Low Threat Perception. Introduction III addressed individuals with a low RBD critical value, indicating a low threat processing state (see Figure 6). These individuals need to be convinced of the seriousness of the threat and they need to

develop a greater sense of susceptibility. This can be accomplished by alluding to the susceptibility of someone like him or her.

Although the internet is a seemingly endless source of health information, it can also be a landmine. According to one researcher, less than 45% of medical websites are reliable. This means that you could be researching nutrition supplements for your dad or looking up info about the weird rash you keep getting and only every other site is going to be accurate. What if you bought your dad one of the supplements advertised and an ingredient the website *forgot* to list interferes with his blood pressure medication? Or the website you found about your rash says it's "nothing," when in fact it's life-threatening? Are you absolutely confident that you can recognize the 55% of medical websites that are unreliable?

If you are going to use the internet to look up health information, you've got to protect yourself. The following tutorial will quickly introduce you to website evaluation criteria that will make you make you a wiser *and* healthier, more efficient consumer.

Figure 6. Introduction III – Low Threat Perception.

Standard Introduction - Individuals in the control group were not exposed to a tailored lesson introduction but instead passed onto the standard introduction via a web page with a link (see Figure 7). Both the experimental and control groups were exposed to the standard introduction preceding the tutorial. This introduction stated, "This tutorial will help you locate reliable and authoritative Web resources that are appropriate for your research project."

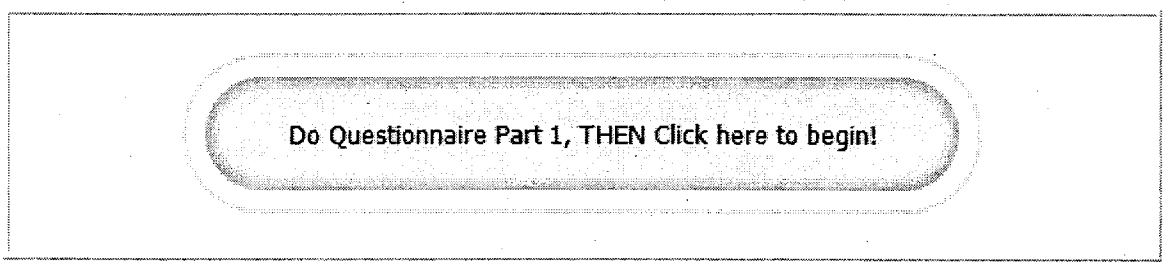

Figure 7. Standard Introduction.

Variables

Independent Variables

The independent variables for this study are the presence or absence of a tailored lesson introduction.

Dependent Variables

1. Self-reported task attraction and task relevance (measured both before and after the tutorial, via Parts 1 and 2 of the modified OMQ).
2. Self-reported learning intentions and effort given (measured before and after the tutorial, respectively, via Parts 1 and 2 of the modified OMQ).
3. Cognitive assessment score (measured via the XU.Tutor Evaluating Websites quiz).
4. Affect- and competence-related performance attributions (measured after scores were revealed, via Part 3 of the modified OMQ).

Procedures

The researcher met with the dissertation committee faculty members to determine which courses would be best for the intervention. It was determined that undergraduate educational technology courses would be the best courses to implement the experiment because website evaluation was already part of those courses' objectives. Additionally, individuals taking these undergraduate educational technology courses were not educational technology majors, but rather education majors, thus reducing some of the pro-educational technology bias.

The researcher emailed all instructors teaching the selected courses. Five of the six instructors agreed to participate. The researcher spoke (via email or in person) with each of these instructors about the goals of the study. Each instructor was given a set of directions (see Appendix F) as well as equal numbers of experimental and control group direction packets, which included a consent form (see Appendix G).

Instructors distributed packets on a day of their own choosing during the months of October and November. These packets were alternately stacked to automatically randomize participant assignment into experimental and control groups. Students were given the opportunity to complete the activity in class as part of regularly scheduled instruction or on their own time. Students who completed the packets were awarded extra credit points by their instructors. Completed packets were then returned to the researcher. See Table 3 for a summary of the events.

Table 3

Summary of Procedures

Event	Control	Experimental
1. Researcher contacts participating instructors of selected undergraduate educational technology courses to discuss goals of the study.	All	All
2. Researcher delivers directions and packets to instructors.	All	All
3. Instructors distribute packets to their classes.	All	All
4. Students complete surveys and tutorial according to written directions.	All	All
5. Instructors return complete packets to researcher	N/A	N/A

Data Analysis

Ninety-eight surveys were analyzed to determine the effects of a tailored lesson introduction on motivation and cognitive performance. Table 4 summarizes the research questions, instruments, and statistical tests used in this study. The data were analyzed using SPSS software.

To answer Research Question 1 about the effect of a tailored lesson on student motivation, data from part one of the motivation survey was analyzed. This survey was administered to all participants. Control group and experimental groups gave their perceptions about task attractiveness and relevancy, as well as their learning intentions

and effort given. Independent samples *t*-tests were used to test for significant differences in motivation between experimental and control groups.

To answer Research Question 2 about change in motivation from pre- to postinstruction, data from the first and second parts of a three-part motivation survey were analyzed. Experimental and control groups both reported perceptions about task attractiveness and relevancy, as well as learning intentions and actual effort, before and after instruction. A repeated-measures ANOVA was used to test for significant differences in changes in motivation from pre- to postinstruction between experimental and control groups.

To answer Research Question 3 about the effect of a tailored lesson on cognitive performance, scores from an online quiz were analyzed. This cognitive assessment was administered to all participants. Control and experimental groups answered all 18 questions on the assessment and reported their final scores. An independent samples *t*-test was used to test for significant differences in cognitive performance between experimental and control groups.

To answer research question four about the effect of a tailored lesson on performance attributions, data from the third part of a three-part motivation survey were analyzed. This survey was administered to all participants. Control and experimental groups attributed their cognitive performance to various affect- and competence-related components. Two Independent samples *t*-tests were used to test for significant differences between these two groups with regards to these components.

Table 4

Statistical Analysis Summary

Research Questions	**Instrumentation**	**Statistical Test**
1. Is there a statistically significant difference between the standard lesson introduction control group (C) and the tailored lesson introduction experimental group (E) on initial student motivation, as measured by self-reported task attractiveness, perceived task relevance, and learning intention prior to instruction (O_A)?	Motivation Survey Part 1	Independent samples *t*-test
2. Is there a statistically significant difference between the standard lesson introduction control group (C) and the tailored lesson introduction experimental group (E) on motivation from preinstruction to postinstruction, as measured by self-reported task attractiveness, relevance, and effort (O_B and O_C)?	Motivation Survey Part 2	Repeated measures ANOVA
3. Is there a statistically significant difference between the standard introduction control group (C) and the tailored lesson introduction experimental group (E) on cognitive performance, as measured by a postinstruction, cognitive assessment (O_D)?	Cognitive skills assessment	Independent samples *t*-test
4. Is there a statistically significant difference between the standard lesson introduction control group (C) and the tailored lesson introduction experimental group (E) on both affect-related and competence-related performance attributions (O_E)?	Motivation Survey Part 3	Independent samples *t*-test

Summary

In this chapter, the methodology of the experiment was described. Participants were identified as education majors at a Midwestern university taking courses in

educational technology. The independent variable was identified as the presence or absence of a tailored lesson introduction. The dependent variables were identified as student motivation, change in motivation, cognitive performance, and performance attributions. Three assessment tools were described: the Risk Behavior Diagnosis (RBD) Scale, a motivation survey, and an online quiz. The RBD Scale was used to determine which tailored introduction experimental group participants were exposed to. The motivation survey and online quiz were used to assess the dependent variables. The next chapter describes the results of these analyses.

CHAPTER 4

RESULTS

Introduction

The purpose of this study was to positively affect situation-specific motivation and, consequently cognitive achievement via a tailored lesson introduction. A second purpose was to use technology efficiently to incorporate instructional design and communications principles into the context of a lesson. The research questions examined to achieve these purposes were as follows:

1. Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on initial student motivation, as measured by self-reported task attractiveness, perceived task relevance, and learning intention prior to instruction?
2. Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on motivation from preinstruction to postinstruction, as measured by self-reported task attractiveness, relevance, and effort?
3. Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on cognitive performance, as measured by a postinstruction, cognitive assessment?

4. Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on both affect- and competence-related performance attributions?

The answers to these questions and the significance of the results are described in this chapter.

Review of Research Methods Used

The design of this study blended experimental research with classroom-based research. A controlled trial was conducted to compare an experimental group to a control group. The experimental group was exposed to a tailored lesson prior to beginning the lesson. The control group was only exposed to the existing, standard (non-tailored) introduction as a means of controlling for the effects of an introduction, tailored or standard, on motivation and cognitive achievement.

Three assessments were conducted during the course of the experiment. The assessment instruments were as follows: The Risk Behavior Diagnosis Scale developed by Witte et al. (1996), a modified version of the three-part, Online Motivation developed by Boekaerts (2002), and the XuTutor's Evaluating Websites quiz (Xavier University, 2006).

Test of Assumptions

To conduct the analysis for Research Questions 1, 3, and 4, independent-measures I-tests were conducted. The goal of an independent-measures study is to evaluate the

mean difference between two populations or two conditions. In the case of this study, the conditions are exposure or non-exposure to a tailored lesson introduction prior to beginning an online tutorial. Assumptions underlying the independent-measures *t*-test formula include:

1. The observations within each sample must be independent.
2. The two populations from which the samples are selected must be normally distributed.
3. The two populations from which the samples are selected must have equal variances (Gravetter & Wallnau, 1999, p. 252).

With regards to the first assumption, the observations within each group were independent of one another. With regards to the second assumption, normality, histograms were constructed using SPSS. The histograms were scrutinized and determined to conform to the unimodal and symmetric requirements of a normal distribution. As for the third assumption, homogeneity of variances, the Levene's test was conducted and found to be non-significant for all variables except for "for my own use" (Motivation Survey Part 1). To accommodate for the lack of homogeneity, the "equal variances not assumed" results were used for this variable.

To conduct the analysis for Research Question 2, a repeated-measures test was used. The repeated-measures test differs from the independent-measures test in that only one sample is used (or in the case of this study, one condition) and measurements are repeated for the same sample in each treatment. Assumptions underlying the repeated-measures *t*-test formula include:

1. The observations must be independent within the treatment. Within the treatment, the scores are obtained from separate individuals and are independent of one another.
2. The population distribution of scores must be normally distributed (Gravetter & Wallnau, 1999, p. 273).
3. There is the assumption of sphericity.

With regards to the first assumption, the observations with each sample were independent. With regards to the second assumption, according to Gravetter and Wallnau (1999, p. 273), the validity of a *t*-test may be compromised with small samples; when samples are large (n>30), however, this assumption is robust to violations of normality due to the central limit theorem. With regards to the last assumption, Mauchly's test of sphericity was conducted and found to be not significant.

Demographic Summary

The participants were recruited from a pool of college students majoring in education at a Midwestern university. The study was conducted during the Fall semester of 2006. Ninety-eight students participated in the study. Eight-nine students (91%) were female, eight were male (8%), and one (1%) did not complete the demographic data. Ninety-one percent of the participants were under the age of 28, eighty percent were under the age of 23. The remaining participants' ages ranged up through 52 years of age.

Data Analysis

The results of this study will be discussed systematically beginning with Research Question 1 and concluding with Research Question 4. Research Questions 1, 3, and 4 compared dependent variables to one independent variable, exposure or non-exposure to a tailored lesson introduction. Research Question 2 compared pre- and postinstruction motivation scores to each other, but not with regards to an independent variable. To reduce the possibility of a Type I error, the Bonferroni correction was applied to the original alpha, which was set to .05. The corrected alpha for each research question is reported in that question's discussion.

Research Questions

Research Question 1

Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on initial student motivation, as measured by self-reported task attractiveness, perceived task relevance, and learning intention prior to instruction?

Research Question 1 examined the effects of a tailored lesson introduction on student motivation prior to instruction. Boekaerts (2002) states that task appraisals given prior to instruction are useful because they explain variances in learning intention, emotional state, and reported effort better than domain-specific measures based on the perception of local conditions. In this study, differences in self-reported task

attractiveness, perceived task relevance, and learning intention were measured for those students who were exposed to a tailored lesson introduction and those who were only exposed to the existing, standard lesson introduction before completing an online tutorial about website evaluation. The following hypothesis was suggested:

H_1: There is a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on initial student motivation, as measured by self-reported task attractiveness, perceived task relevance, and learning intention prior to instruction.

To answer Research Question 1, data in three different subscales were analyzed for differences in initial student motivation. These subscales included task attractiveness (ATTR1), task relevancy (RLV1), and intention to learn (EFFT1). An independent-measures t-test was used to determine the effects of the treatment on motivation by comparing mean subscale scores of the control group (N=50) to mean subscale scores of the experimental group (N=48). After a Bonferroni correction was applied, alpha was determined to be .0167 (α/n = .05/3, with 3 being the number of subscales in this test).

An analysis of results shows that the experimental group reported significantly higher levels of motivation than the control group for the subscale "task attractiveness" (p = .001; d = .737) (see Table 5). The mean "task attractiveness" rating was 3.23 (SD= .799) for the experimental group and 2.64 (SD= .898) for the control group (see Table 6). A closer examination of both Tables 5 and 6 also reveals a positive trend toward higher levels of motivation, as reported by the experimental group, for the subscale "task relevancy" ($p < .05$; d = .450).

Table 5

Effects of Treatment on Preinstruction Motivation

		t	df	p	MD	SE	95% Confidence Interval	
							Lower	Upper
Attraction ▪ In the mood ▪ Enthusiastic ▪ Appealing	Equal variances assumed	3.425	96	.001	.589	.172	.248	.931
Relevance ▪ Useful ▪ Personally relevant ▪ Helpful	Equal variances assumed	2.121	96	.036	.358	.169	.022	.692
Learning Intention ▪ Devote attention ▪ Intention/ Effort ▪ Put time into ▪ Goal is to learn	Equal variances assumed	1.506	96	.135	.284	.189	-.090	.658

In considering the hypothesis, it appears that the tailored lesson introductions had an effect on motivation. There was a significant difference between the experimental and control groups on the motivation subcomponent "task attractiveness" and there was a positive trend for the motivation subcomponent "task relevancy." There was no significant difference noted for the subcomponent "intention to learn/effort given."

Table 6

Preinstruction Mean Motivation Scores

Motivation subscale	Message Type	Mean	SD	SE
Attraction ▪ In the mood ▪ Enthusiastic ▪ Appealing	Tailored	3.229	.799	.115
	Standard	2.640	.898	.127
Relevance ▪ Useful ▪ Personally relevant ▪ Helpful	Tailored	3.937	.795	.115
	Standard	3.580	.870	.123
Effort ▪ Devote attention ▪ Intention/ Effort ▪ Put time into ▪ Goal is to learn	Tailored	3.474	.848	.122
	Standard	3.190	1.008	.143

With regards to attractiveness and relevance, even though it was not a hypothesis in this study, it should be noted that the correlations between "task attractiveness" with "learning intention," as well as "task relevance" with "learning intention," were significant ($p < .001$). Such results indicate a direct relationship between perceptions about a task and one's commitment to a task. As task attraction and relevance increased, so, too, did self-reported learning intentions.

Research Question 2

Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on motivation from preinstruction to postinstruction, as measured by self-reported task attractiveness, relevance, and effort?

Research Question 2 examined the effects of a tailored lesson introduction on change in student motivation from pre- to postinstruction. According to Boekaerts (2002), the purpose of postinstruction appraisals is to obtain learners' perceptions of their given effort. These appraisals, when compared to preinstruction appraisals, can be used to identify changes in motivation over the course of instruction. In this study, preinstruction appraisals were compared to postinstruction appraisals which were administered after instruction but before the cognitive assessment. Data were analyzed, with and without the interaction effect of the lesson introduction, for changes in the motivation subscales "task attractiveness," "task relevancy," and "intention to learn/effort" given,. The following hypothesis was suggested:

H_2: There is a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on motivation from preinstruction to postinstruction, as measured by self-reported task attractiveness, relevance, and effort.

To answer Research Question 2, data were analyzed, with and without the interaction effect of the lesson introduction, to identify a change in learner motivation

from preinstruction to postinstruction. To conduct these analyses, a repeated-measures ANOVA was used. After a Bonferroni correction, alpha was determined to be .0167 (α/n = .05/3, with 3 being the number of subscales in this assessment).

In analyzing the data, with the interaction effect of the lesson introduction, from preinstruction to postinstruction, there were no significant differences in learner motivation (Table 7). In analyzing the data without the interaction effect of the lesson introduction, however, a significant difference was noted for both "task attractiveness" (p = .000; d = .30) and "task relevancy" (p = .014; d = .00). A positive trend was also noted for "learning intention/effort given" (p < .10; d = .01). These last two findings indicate that some other factor had an effect on motivation.

Table 7

Interaction of Message Type with Motivation

Motivation subscale	Interaction	Type III SS	df	MS	F	p
Attractiveness	With	.053	1	.053	.315	.576
	Without	2.738	1	2.738	16.287	.000
Relevancy	With	.003	1	.003	.009	.924
	Without	1.882	1	1.882	6.207	.014
Effort	With	.006	1	.006	.528	.469
	Without	.0320	1	.032	3.037	.085

A closer examination of motivation appraisal mean scores reveals whether the changes from pre- to postinstruction were positive or negative (see Table 8). As noted above, however, there were no significant changes in any of the motivation subscales, from pre- to postinstruction, with the interaction effect of the lesson introduction.

Although not hypothesized, there are two additional findings from this research question's data collection. First, a closer examination of the data, reveals a significant correlation between preinstruction "task attractiveness" and postinstruction "effort given" ($p = .000$). This strong finding indicates that learning materials, initially perceived to be attractive may lead a learner to put forth greater effort. Second, a trend was noted between postinstruction "task attractiveness" with gender ($p < .10$). Men were more likely to rate the task to be more attractive than women. This could be a finding worth additional research, particularly because the ratio of men to women was low in this study

Table 8

Pre- and Postinstruction Mean Motivation Scores

Subscale	Event	Message Type	M	SD
Attraction ▪ In the mood ▪ Enthusiastic ▪ Appealing	Pre-appraisal	Tailored	3.234	.807
		Standard	2.653	.902
	Post-appraisal	Tailored	3.440	.820
		Standard	2.925	.851
Relevancy ▪ Useful ▪ Personally relevant ▪ Helpful	Pre-appraisal	Tailored	3.938	.795
		Standard	3.580	.870
	Post-appraisal	Tailored	3.938	.795
		Standard	3.580	.870
Effort ▪ Devote attention ▪ Intention/ Effort ▪ Put time into ▪ Goal is to learn	Pre-appraisal	Tailored	3.474	.848
		Standard	3.190	1.008
	Post-appraisal	Tailored	3.510	.815
		Standard	3.205	1.031

Research Question 3

Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on cognitive performance, as measured by a postinstruction, cognitive assessment?

Research Question 3 examined the effects of a tailored lesson introduction on cognitive performance. Differences in quiz scores were measured for those students who were exposed to a tailored lesson introduction and those who were only exposed to the existing, standard lesson introduction. The following hypothesis was suggested:

H_3: There is a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on cognitive performance, as measured by a postinstruction, cognitive assessment.

To answer Research Question 3, data were analyzed for differences in cognitive performance. An independent-measures *t*-test was used to determine the effects of the treatment on cognitive performance by comparing mean scores of the control group to the mean scores of the experimental group. The mean quiz score for the experimental group (N=48) was 15.47 (SD=1.743) and 14.73 (SD=2.368) for the control group (N=50) (see Table 9). There was a trend towards higher scores for those exposed to the tailored lesson introduction, but not significantly ($p < .10$; $d = .424$).

Table 9

Mean Cognitive Assessment Scores

Assessment	Message Type	Mean	SD	SE
Cognitive Assessment Score	Tailored	15.47	1.743	.254
	Standard	14.73	2.368	.342

Research Question 4

Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on both affect-related and competence-related performance attributions?

Research Question 4 examined the effects of a tailored lesson introduction on students' performance attributions. Differences in performance attributions were measured for those students who were exposed to a tailored lesson introduction and those who were only exposed to the existing, standard lesson introduction. This assessment was conducted after cognitive assessment scores were revealed. The following hypothesis was suggested:

H_4: There is a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on performance attributions.

To answer Research Question 4, data was analyzed for differences in two performance attribution subscales: affect- and competence-related. An independent-measures *t*-test was used to determine the effects of the treatment by comparing the mean scores of the control group to the mean scores of the experimental group. Mean scores and standard deviations were assessed for all nine variables, for both the experimental group (N=47) and control group (N=49). After a Bonferroni correction was applied, alpha was determined to be .025 (α/n = .05/2, with 2 being the number of subscales in this test). Table 10 reports these details.

Table 10

Mean Performance Attribution Scores

Attribution Category	Message Type	M	SD	SE
Affect-related ▪ Thought it was appealing ▪ In the mood to do it ▪ Did my best ▪ Information was important ▪ Wanted to learn for my own use	Tailored	3.617	.813	.119
	Standard	3.310	.795	.114
Competence-related ▪ Found it to be easy ▪ Good at this type of task ▪ Already knew a lot about this task ▪ Knew the best way to learn it	Tailored	3.755	.698	.103
	Standard	3.475	.729	.104

An analysis of results showed that there was not a significant difference between experimental and control groups with regards to performance attributions. There was, however, a positive trend toward participants in the experimental group rating both affect- and competence-related performance attributions higher than those in the control group ($p < .10$; $d = .402$). See Table 11.

Not a hypothesis, but worthy of note, was the strength of the relationship between cognitive performance scores and performance attributions. To examine the relationship, scatterplots were constructed. Positive relationships were observed between quiz scores and affect- and competence-related attributions. A statistical analysis of the data revealed a significant relationship between quiz scores and the affective-related attribution, "did

my best," (p=.015). A positive trend for the experimental group was also observed for the entire affect-related performance attribution category ($p < .10$; $d = .38$). This category includes "did my best," "thought it was appealing," "in the mood to do it," "information was important," and "wanted to learn for my own use." It is possible, then, that cognitive performance relates to the affect-related components of a task.

Table 11

Performance Attributions

Attribution Category	t	df	p	MD	SE	95% Confidence Interval	
						Lower	Upper
Affect-related ▪ Thought it was appealing ▪ In the mood to do it ▪ Did my best ▪ Information was important ▪ Wanted to learn for own use	1.870	94	.065	.307	.164	-.019	.632
Competence-related ▪ Found it to be easy ▪ Good at this type of task ▪ Already knew a lot about task ▪ Knew the best way to learn it	1.926	94	.057	.281	.146	-.009	.570

Summary

Earlier it was noted that tailoring is a way to initiate interest, persuade, and motivate learners to learn new concepts and eventually adopt new behavior skills. This study investigated motivation to learn (prior to and after instruction), cognitive performance, and affect- and competence-related performance attributions. Findings indicated that those exposed to a tailored lesson introduction reported significantly greater motivation than the control group for the subscale "task attractiveness" prior to instruction. Considering the interaction effect of the lesson introduction on motivation from pre- to postinstruction, however, there was no significant change. When the interaction effect was removed, the analyses did reveal a significant change for both "task attractiveness" and "task relevancy." This finding indicates that some other factor had an effect on motivation over the course of instruction.

As for cognitive performance, there was a positive trend toward higher quiz scores for those in the experimental group ($p < .10$). With regards to performance attributions, results showed that the experimental group rated affect- and competence-related components higher than control group did, but not significantly. And finally, although not hypothesized to be an outcome, a significant relationship was found to exist between quiz scores and the affective-related performance attribution, "did my best" (p=.015). A relationship between the entire affect-related performance attribution category and quiz scores was also observed for ($p < .10$). A discussion about these

findings, the study's delimitations and limitations, implications of the results, and suggestions for the future research are described in the next chapter.

CHAPTER 5

DISCUSSION

Introduction

Chapter 5 provides a summary of the results from the study and an interpretation and discussion of the results as they relate to the current literature. The chapter concludes with delimitations and limitations of the study, implications of the findings, and recommendations for future research.

Interpretation and Discussion

While tailoring has proven to be a means of motivating audiences to adopt a suggested health behavior (Dijkstra, 2005; Onema, Brug, & Lechner, 2001; Rimer, Halabi, Sugg-Skinner, Lipkus, Strigo, Kaplan, & Samsa, 2002), there are fewer examples of how it can be used as a message design technique to motivate individuals to learn. Similarly, there are fewer examples, aside from Anand and Ross (1987) and Rimer et al. (2002), of tailoring studied as a message design technique to improve cognitive performance. And finally, while tailoring has been shown to increase relevancy of learning materials (Dijkstra, 2005; Onema et al., 2001) and confidence in performing a task (Dijkstra, 2005), more research is needed to explore how tailoring relates to affect- and competence-related performance attributions. This dissertation's experiment

addressed these shortcomings in research and investigated the impact of a tailored lesson introduction on learner motivation, cognitive performance, and affect- and competence-related performance attributions. The following section describes the results of this study in light of these three areas and how they connect to the current literature.

Research Question 1

The intention of Research Question 1 was to study the effects of a tailored lesson introduction on student motivation. Specifically, the objective was to determine if a lesson introduction, motivationally adapted to include content based on a behavioral construct model and tailored, based on the responses to a risk assessment, could lead to higher, self-reported levels of task attractiveness, task relevance, and learning intentions.

Results showed that the experimental group reported significantly higher levels of motivation than the control group for the "task attractiveness" subscale. In other words, the presence of a tailored lesson introduction led learners to perceive a suggested task to be more attractive even before they started. The "task attractiveness" subscale is made up of the components: "in the mood," "enthusiastic," and "appealing." There was also a trend towards higher levels of motivation for the subscale "task relevancy" ($p < .05$). These results are similar to some of those found by Onema et al. (2001) and Dijkstra (2005), both cited in Chapter 2. Onema et al. (2001) found that tailored nutrition education software was more appreciated ($p < .01$) by participants and rated more relevant ($p < .01$) than non-tailored software. Likewise, Dijkstra (2005), in his study of smoking-cessation materials, noted a trend towards higher interest ratings from study participants

exposed to the tailored learning materials versus those receiving the non-tailored materials. Also, participants exposed to tailored materials were more likely to report quitting smoking than those who were not. So by motivationally adapting a lesson via tailoring, the learners, to some extent, became more motivated to perform the suggested task.

If tailoring can be regarded as a motivationally-adaptive (Keller & Song, 2001), message design technique, then the results to Research Question 1 can also be compared to the results of Visser, Plomp, Arimault, and Kuiper's (2002) and Keller and Song (2001). Visser et al. (2002), as cited in Chapter 2 – Motivation, noted significantly higher "relevance" and "satisfaction" course ratings from learners in a distance education course receiving letters motivationally adapted to include ARCS model of motivation (Keller, 1983) components. Similarly, Keller and Song (2001), also cited in Chapter 2, noted significantly higher "relevance" ratings from participants exposed to motivationally-adaptive instructional materials. These two studies, as well as Onema et al. (2001) and Dijkstra (2005), demonstrate that motivationally-adaptive elements, like the behavioral construct tailored lesson introduction used in this study, enhance the attractiveness, satisfaction and relevance of instruction and its accompanying learning materials.

With regards to attractiveness and relevance, the correlations between "task attractiveness" and "learning intention," as well as "task relevance" and "learning intention," were found to be significant ($p < .001$). This indicates a direct relationship between perceptions about a task and commitment to a task. As task attraction and relevance increased, so, too, did learning intentions. These findings are similar to those

noted by Boekaerts (2002), Schiefele and Csikszentmihalyi (1994), and Stephenson, Benoit, and Tschida (2001). In a secondary education, math homework study, Boekaerts (2002) found a significant relationship between students' appraisals of a learning task and their commitment to perform that task. Optimistic task appraisals occurred when learners considered the task to be attractive, relevant and/or important, or when they were confident about task performance; pessimistic appraisals occurred when students considered a learning task to have little value or when they were unconfident about task performance. While learners' levels of competence were not studied in this experiment, it would be easy to add a confidence/competence subscale to the existing motivation survey in future research.

As for Schiefele and Csikszentmihalyi, in their 1994 study of 208 freshmen and sophomores taking the PSAT, they found that learner interest was a predictor of motivation. In other words, the more positive learners rate instruction, the greater the commitment to extend effort towards a task. The links, in this current study, between task attractiveness and relevancy with learning intentions re-confirm Schiefele and Csikszentmihalyi's (1994) findings.

In summary, the answer to Research Question 1, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on initial student motivation, as measured by self-reported task attractiveness, perceived task relevance, and learning intention prior to instruction," to some extent is "yes." Tailored lesson introductions led to a significant increase in the motivation subscale "task attractiveness" and a trend towards increased

relevancy. Additionally, a significant relationship between task attractiveness and relevancy with learning intentions was noted, indicating that attractive, relevant learning materials can improve initial learning intentions.

Results from this component of the experiment add to the existing literature in at least two ways. First, because content of the tailored lesson introductions was based on a risk message processing model, this experiment also adds to the existing literature on fear appeals first studied in the propaganda research conducted by Hovland, Janis, and Kelley during World War II (Petty, Barden, & Wheeler, 2002). By instilling a health threat into the content of the lesson introductions, learners were given a reason to attend to instruction. And second, this experiment adds to the existing literature on motivation and interest by demonstrating that an attractive, relevant lesson introduction, tailored to learners' existing task perceptions, can arouse curiosity, stimulate interest, and consequently, motivate learners to form a strong commitment to learn. These two additions to literature, then, indicate that the effects of tailoring on motivation warrant additional research.

Research Question 2

The intention of Research Question 2 was to study the effects of a tailored lesson introduction on change in student motivation from pre- to postinstruction. Specifically, the objective was to determine if a lesson introduction, motivationally adapted to include content based on a behavioral construct model and tailored based on responses to a risk

assessment, could elicit a sustained improvement in self-reported task attractiveness, task relevance, and learning intention/effort given.

In analyzing the data, with the interaction effect of the lesson introduction on learner motivation, from preinstruction to postinstruction, there were no significant differences. This means that the tailored lesson introduction did not elicit a change in motivation from pre- to postinstruction. In other words, motivational levels stayed consistent. In many regards, this is a desirable outcome in that the tailored lesson introduction may have sustained initial levels of motivation, possibly making it a new research finding. Tailoring and its ability to stimulate motivation has previously been studied; tailoring and its ability to sustain motivation has not.

An analysis of the data without the interaction effect of the lesson introduction, revealed a significant difference for both "task attractiveness" and "task relevancy." A change, though not significant, was also noted for "learning intention/effort given" ($p <$ .10). These findings indicate that some other factor (inherent to the task, the learner, the environment, etc.) had an effect on motivation. These findings also confirm Boekaerts (2002) belief that in order to truly assess the quality and impact of instruction, motivation should be measured at various points throughout instruction. In her study conducted with elementary school students, Boekaerts (2002) observed that over the course of instruction, the change in learning intention significantly varied with the change in task appraisal. Had motivation not been measured at multiple times in this study, the change in motivation would not have been found. Future studies could investigate the reasons

why motivational levels may have changed and the best points during instruction at which to measure motivation.

Although not hypothesized, there are at least two additional findings worth mentioning. First, a closer examination of the data reveals a significant correlation between preinstruction "task attractiveness" and postinstruction "effort given" ($p = .000$). Such a finding should act as a reminder to educators and instructional designers that the attractiveness of learning materials does make a difference in learners' effort. Because the correlation exists between preinstruction perceptions of task attractiveness and postinstruction reported effort, this finding also tells educators and instructional designers that first impressions do make a difference. Additional research into this concept is warranted. A second finding worthy of note was the trend found between postinstruction "task attractiveness" and gender ($p < .10$). Men were more likely to rate the task to be more attractive than women. This finding is worth additional research, particularly because the ratio of men to women was low in this study (8:89). It is also worth additional research because, as Alexander, Kulikowich, and Jetton (1994) indicate in their literature review of 66 knowledge and interest studies, few researchers investigated, or at least failed to mention, gender as a mediating factor for interest.

In summary, the answer to Research Question 2, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on motivation from preinstruction to postinstruction, as measured by self-reported task attractiveness, relevance, and effort?" to some extent, like in Research Question 1, is "no." This finding, however, may actually

be a desirable outcome because it points to sustained motivation. Significant changes in motivation, on the other hand, were noted for "task attractiveness" and "task relevancy" when the interaction effect of the tailored lesson introduction was removed. This finding indicates that some other factor affected learner motivation over the course of instruction. It is suggested that the reasons for this finding could be extrapolated in future research along with research into measuring motivation at more or at different points of instruction. And finally, because a strong link was found between preinstruction task attractiveness with postinstruction self-reported effort, educators and instructional designers should consider the attractiveness of a learning task when delivering instruction.

Research Question 3

The intention of Research Question 3 was to study the effects of a tailored lesson introduction on cognitive performance. Specifically, the objective was to determine if a tailored lesson introduction, motivationally adapted to include content based on a behavioral construct model and tailored based on responses to a risk assessment, had an effect on postinstruction quiz scores.

While the tailored lesson introductions may have led to significantly higher subscales of motivation, it did not lead to significantly higher cognitive performance, as represented by quiz scores. The tailoring conducted in this study, then, was unable to elicit the outcomes found by Rimer, Halabi, Sugg-Skinner, Lipkus, Strigo, Kaplan, and Samsa (2002) and Anand and Ross (1987). In each of those studies, researchers noticed a

significant difference in knowledge/cognitive achievement between those exposed and those not exposed to tailored learning materials. The difference in cognitive performance for this study was not significant, but a positive trend was observed. Mean quiz scores for the experimental group (M=15.47) were higher than for the control group (M=15.43; p = .097). This trend warrants additional research into tailoring as a means to improve cognitive performance.

The lack of a significant impact on cognitive performance may be attributed to more than one reason. One reason could be related to a potentially poor, cognitive assessment. The assessment in this studied could not be checked for reliability because learners only reported their final scores. Future studies involving the impact of tailoring on cognitive performance or other learning outcomes should use an assessment that has been tested for reliability. (This issue is discussed further in the Limitations section.) Another reason for the lack of a significant impact on cognitive performance might be because there wasn't enough tailoring or because a better behavioral construct could have been used. In this experiment, only the lesson introduction was tailored and that tailoring was based on a risk message processing model. Future studies could study the impact of tailoring on cognitive performance when multiple components of a lesson are tailored to the learner or when a different behavioral construct is used.

In summary, the answer to Research Question 3, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on cognitive performance, as measured by a postinstruction, cognitive assessment?" is "not significantly," but there was a trend

towards improved performance. This finding implies that motivationally-adaptive learning materials could have a positive impact on learning outcomes, making it a research area worth additional investigation.

Research Question 4

The intention of Research Question 4 was to study the effects of a tailored lesson introduction on students' performance attributions. Specifically, the objective was to determine if a tailored lesson introduction, motivationally adapted to include content based on a behavioral construct model and tailored based on responses to a risk assessment, had an impact on affect- and competence-related performance attributions.

Results did not indicate a significant difference between experimental and control groups, but there was a trend towards higher experimental group ratings for both affective and competence-related performance attributions ($p < .10$). Affective-related components include finding the task appealing, in the mood to do it, feeling that the information was important, and finding the information useful. Competence-related components include finding it easy, knowing the best way to go about the task, and being good at this type of task. So, in other words, learners exposed to the tailored lesson introduction were not only more likely find the task appealing, important, and relevant; but, they also felt good about it and felt competent in completing it. If, according to Weiner (1986), attributions have the ability to affect future task appraisals and performance self-concept, improving performance attributions, as done in this study, is a desirable outcome. It is also important to note that finding the task to be relevant and

feeling efficacious about completing it were the desired outcomes of the threat/suggested-response message imbedded into the introduction. As described in the Intervention Materials section of Chapter 3, the goal of a threat/suggested-response message based on the extended parallel process model (Witte, 1994) is to move individuals to a state of danger-control processing (perceiving a threat to be severe and relevant and to feeling efficacious about the suggested response.) So even though it was not a hypothesis, it appears that the tailored lesson introductions did have an effect on individuals' perception about a threat and its recommended response.

Not a tested hypothesis, but found to be an outcome, was the relationship between quiz scores and performance attributions. A statistical analysis of the data revealed that the relationship between quiz scores and the affective-related attribution, "did my best," was significant (p=.015). A positive trend was also observed for the entire affect-related performance attribution category ($p < .10$). It is possible, then, that cognitive performance does relate to the affect-related components of a task, a finding that concurs with Boekaerts (2002). What would have to be further investigated, however, is if one's cognitive performance leads to higher affect-related performance attributions or if higher affect-related feelings about a task lead to greater cognitive performance. Implications of this finding, as well as the others described above, are described in the next section.

In summary, the answer to Research Question 4, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on both affect- and competence-related performance attributions?" is "not significantly," but there was a positive trend. Those

exposed to the tailored lesson introduction were more inclined to attribute their performance to both the affect- and competence-related components of the learning task, making this an outcome worth reinvestigating. Also, because there was a significant relationship between cognitive performance and the attribution "did my best," future studies could investigate if one's cognitive performance leads to that attribution or if one simply attributes their performance to doing their "best" when they score well.

Implications of the Research Findings

Results from this study indicated that learners exposed to the tailored lesson introductions, were more motivated on some subscales. They were also more likely, although not significantly, to attribute their performance to both the affect-related components of the lesson, and their own competence. Additionally, relevancy of the lesson was found to correlate with learning intentions and actual effort given. With regards to cognitive performance, even though there was not a significant difference between the experimental and control groups, there was a trend towards higher quiz scores ($p < .10$). This positive trend, however, as well as the other findings described above, justifies additional research into the effects of tailoring on motivation, cognitive performance, and performance attributions. Suggestions for future research are found later in this chapter, but first, implications for instructional designers, educators, and researchers with regards to the findings are described below.

First, finding that tailoring does lead to increased levels of motivation, particularly with regards to task attractiveness and task relevancy, supports earlier

findings noted by other researchers such as Onema et al. (2001) and Dijkstra (2005). Onema et al. (2001) had found that tailored nutrition education software was more appreciated and rated more relevant by study participants. This finding, along with the this study, supports Strecher and Kreuter's (1999) premise that tailoring eliminates superfluous information and the information that remains is more personally relevant. Superfluous information was eliminated in this study by asking participants, via a risk assessment, what their perceptions were about the lesson's topic. So rather than the introductions being designed for a general audience, the introduction was able to zone in on the specific perceptions of the target audience, thus making it more relevant.

Relevancy may also have made the materials more interesting. Dijkstra (2005) found a trend towards higher interest ratings from study participants exposed to tailored learning materials compared to those exposed to non-tailored learning materials. This is because injecting a personal, emotional element into otherwise purely intellectual or procedural material stimulates learners' interest (Keller, 1983). In this study, tailoring was used to inject a personal element, but the basis for the tailoring was also emotional. Learners were introduced to the lesson's topic by way of exposing them to a personal health threat. Learning the skill taught in the lesson was suggested as the best way to avoid that threat. In this regard, the threat and suggested response were hoped to function like the fear appeals found in propaganda research conducted by Hovland, Janis, and Kelley during World War II (Petty, Barden, & Wheeler, 2002). Although the emphasis of this study was not fear appeals, the use of a tailored fear appeal to generate motivation to learn could be worth additional research.

Because findings indicated that tailoring was associated with greater motivation, in terms of task relevancy and task attractiveness, as well as a trend towards improved cognitive performance, instructional designers and educators should consider its use when designing courses, lessons, software, and other instructional material. Also, knowing that a tailored lesson introduction alone was sufficient enough to elicit such results tells instructional designers and educators that they might not have to go to extremes to personalize instruction. Using an assessment tool, like the one used in this study, can help an instructional designer or educator quickly tailor a lesson or unit based on learners' shared experiences. Thus, instructional designers and educators should strive to tailor instruction and learning materials, even a little bit, as a means of motivating learners and improving learning outcomes. In doing so, the maximum potential of well-planned instruction is more likely to be achieved.

Before instructional designers or educators set out to tailor all of instruction, two factors need to be kept in mind. First, more tailoring does not always lead to better results and tailoring. As found by Keller and Song (2001) and cited in Chapter 2, motivationally saturated materials may not be as effective as motivationally adaptive materials. In other words, there is a point where if the added motivational components require a learner to process a lot more information, the outcomes could be similar to or less than standardized materials. Although the amount of tailoring done in this study was only enough to minimally satisfy the behavioral construct, Witte's (1994) extended parallel process model (EPPM), future research into this concern could be conducted.

A second factor to keep in mind when tailoring is that using an incorrect or mismatched behavioral construct could lead to insignificant results. In this study, although there are other behavioral construct models that could have been selected, the EPPM (Witte, 1994) was specifically chosen because it directly addresses the emotional elements injected into the introduction, a threat and a suggested response. To ensure that the most desirable motivation and learning outcomes are achieved, researchers and theorists might want to explore the use other behavioral constructs for specific types of learning or topics of instruction

The key implication to be taken from this study, however, is that learners are unique from one another and that tailoring affords instructional designers and educators a tool to cater to those unique qualities. Tailoring, in this study, not only improved learner motivation, but also showed potential to improve cognitive performance. The next section looks at some of the delimitations and limitations that may have affected the findings and the ability to generalize results to other populations and situations.

Delimitations and Limitations

The delimitations and limitations in this study will be described in terms of generalization and then reliability, respectively.

This study was intended to generalize to a similar learner population. Generalization, however, could be hindered with regards to the homogeneity of the sample, the interaction effect of testing, the interaction effect of selection bias, and the reactive effects of experimental arrangements (Hawthorne effect). While the latter three

delimitations are more difficult to eliminate in an experimental study, further studies would increase the generalization to a more diverse population and to more subject areas.

With regards to reliability, this researcher had two concerns: the absence of a control for participants' goal-orientation and the absence of a reliability test for the cognitive assessment. As cited in Chapter 1, there are two kinds of goal orientation, performance and learning goal (Smith & Ragan, 2004). Performance goal orientation relates to recognition; learning goal orientation relates to "an internalized intention to learn" (Smith & Ragan, 2004, p. 3). This means that performance-goal learners may have been less motivated, even when exposed to a tailored introduction; and learning-goal learners may have been more motivated, even if not exposed to a tailored introduction. Goal-orientation was neither controlled for nor assessed in this study. Future studies could investigate the impact of this phenomenon.

As for the cognitive assessment tool, because learners only reported final quiz scores, a reliability test could not be done. Reliability could have been assessed if learners had reported their responses to each of the questions. The reason for not administering a modified version of the online quiz, (i.e. one that could have been tested for reliability) was to preserve for the original style, flow, and structure of the existing lesson. Future studies should use a cognitive assessment whose reliability can be assessed.

Recommendations for Future Research

Blending theories of learning, communications, and behavioral constructs offers limitless opportunities for new research. In this study, College of Education majors were

exposed to a tailored lesson introduction prior to beginning an online tutorial about website evaluation. The content of the introductions was based on a behavioral construct model; the tailoring was based on the results of a risk assessment. Results indicated higher levels motivation, a trend toward increased cognitive performance, and a trend toward greater affect- and competence-related performance attributions for those exposed to the tailored lesson. Based on this methodology and the results depicted above, this section lists and describes recommendations for future research, in addition to those mentioned in the discussion of results. Recommendations are grouped into categories: design methodology, theory, and hypothetical elaborations.

Design Methodology

There are many design modifications to the experiment conducted in this dissertation that could be accomplished and researched in future studies. These include, but are not limited to:

1. Tailoring as foundation for message design – In this study, the content of a lesson introduction was based on the learners' unique perceptions. More specifically, the lesson introduction was based on learners' perceptions about specific components of a behavioral construct model. Future research into tailoring as an instructional message design technique should be investigated.
2. Tailoring other parts of instruction – In this study, the lesson introduction was the only component of the lesson that was tailored. Future studies could

investigate the impact of tailoring other or more sections of a lesson. Future studies could also investigate the impact of tailoring on entire units of instruction.

3. Degree of tailoring – In this study, the tailoring was based on the results of a 10-item risk assessment. Future studies could investigate the use of multiple assessments or assessments that included more factors.
4. General vs. behavioral construct tailoring – In this study, a behavioral construct was used to provide structure and give purpose to the lesson introductions. Future studies could investigate the differences in outcomes when comparing generally tailored materials (i.e., name, gender, ethnicity, etc.) to behavioral construct tailored materials.
5. Means of collecting tailoring data – In this study, a risk assessment was used to gather personal characteristics/perceptions. Future studies could investigate the use of other kinds of assessment tools. Future studies could also investigate using technology to record and assess individual characteristics.
6. Format – In this study, an online tutorial was motivationally adapted to include an online tailored lesson introduction. Future studies could investigate outcomes of tailoring when used with other types of media including print, software, digital textbooks, audiovisuals, and others.
7. Audience – In this study, college students enrolled in a required course were selected as the target audience. Future studies could investigate tailoring with

other populations based on other demographic factors including age, gender, level of education, and others.

8. Content – In this study, the lesson topic was website evaluation skills; the purpose was to learn a skill to prevent a health threat. Future studies could investigate the impact of tailoring in other subject areas or on other outcomes.
9. Cognitive assessment tools – In this study, an existing online tutorial was used to measure cognitive performance. Future studies could investigate the reliability of this assessment tool or the use of other cognitive assessments.
10. Motivation assessment tools – In this study, a modified version of an existing survey was used to collect data about motivation. Future studies could investigate the impact of tailoring on motivation using a different assessment tool.
11. Measuring the impact of different tailored messages – In this study, the impact of three tailored messages, collectively, was studied. Future studies could investigate the impact of each tailored message on motivation.

Theory

There are many theoretical modifications to research questions in this dissertation that could be accomplished and researched in future studies. These include, but are not limited to:

1. Behavioral constructs – In this study, a risk message processing model served as the behavioral construct upon which the tailoring was built. Future studies

could investigate the use of other behavioral constructs upon which to base tailored instruction.

2. Types and levels of learning – In this study, the impact of tailoring on cognitive performance was one of the researched hypotheses. Future studies could investigate the impact tailoring on different types of learning (such as cognitive vs. affective vs. psychomotor) or different levels of learning (such as fact-based, comprehension, synthesis, analysis, and evaluation).
3. Impact on other learning constructs – In this study, the impact of tailoring on motivation was the primary focus. Future studies could investigate the impact of tailoring on other cognitive or affective constructs related to learning.
4. Mediating factors – In this study, mediating factors such as mood, comfort level with technology, and prior knowledge were not studied or controlled. Future studies could investigate the impact of mediating factors such as these on results.
5. ARCS model of motivation – In this study, the ARCS model was often mentioned for its insight into motivation, particularly the first component, attention. Future studies could seek relationships between ARCS components and behavioral construct tailored messages.

Hypothetical Elaborations

There are many new hypotheses that could be generated based on the results of this dissertation's experiment. These include, but are not limited to:

1. Motivation assessment frequency and checkpoints– In this study, motivation was measured before the lesson (but after exposure to the introductions), after the lesson, and after cognitive scores were revealed. Future studies could measure motivation more often and/or at different checkpoints.
2. Source of decrease in task relevance – In this study, though not hypothesized, a decrease in relevancy was noted for both the experimental and control groups. Future studies could investigate the source of this decrease.
3. Relationship between task attractiveness/task relevance with learning intentions/effort given – In this study, though not hypothesized, a relationship was found to exist between the motivation subscale components task attractiveness/task relevance and learning intentions/effort given. Future studies could further investigate the relationship between "task attraction" and "task relevance" with "learning intentions" and "effort given."
4. Relationship between performance attributions and cognitive performance – In this study, though not hypothesized, a relationship was found to exist between performance attributions and cognitive performance. Future studies could investigate this relationship.
5. Relationship between task attraction and effort given – In this study, though not hypothesized, a significant relationship was observed between preinstruction "task attractiveness" and postinstruction "effort given." Future studies could further investigate the relationship between task attractiveness and learner effort.

6. Relationship between a health threat and performing a suggested response – In this study, though not hypothesized, it appears that the tailored lesson introductions, based on a risk message processing model, did have an affect on individuals' perception about a threat and its recommended response. Future studies should continue to investigate the use of this model when developing tailored messages.
7. Relationship between gender and task attractiveness – In this study, though not hypothesized, a trend towards greater postinstruction task attraction and gender was found. Males were found to rate the task more attractive after instruction. This gender discrepancy warrants further investigation. Further investigation is also warranted because there was a low male-to-female ratio in this study.

These research suggestions are only a sampling of the studies that could be conducted, based on this dissertation's experiment. The concept of tailored education falls right into the growing trend towards personalization (a term referring to the delivery of personalized information such as weather, sports, health, traffic, and other areas via technology). The recent 2007 Horizon Report, "a research-orientated effort that seeks to identify and describe emerging technologies likely to have a large impact on teaching, learning, or creative expression within higher education" (New Media Consortium, 2007, 3), discusses this concept in terms of user-created content. User-created content refers to content where the learner is no longer just an audience but also a participant in the

instructional design. When combined with the growing trend towards miniaturization (a term referring to continual shrinkage of technological dimensions including size, weight, and processing time), tailoring could prove to be a powerful force.

A personalization and miniaturization combination of particular interest to this researcher is the concept of tailored, digital textbooks. Textbooks, now available in a hand-held digital format, could be tailored in a variety of ways (including photos, examples cited, design layout, learning-style approach, etc.). In doing so, learners may become more motivated to read and use textbooks as a personal, instructional resource, thus increasing the possibility of improved learning outcomes. Combinations, such as this, and the research areas cited above, indicate there are many opportunities to investigate the concept of tailoring in education.

Summary of the Existing Literature and Conclusions

Summary of the Existing Literature

A review of the existing literature revealed connections between motivation, interest, and learning; message tailoring and elaboration; and the use of behavioral constructs to improve the quality of tailored messages. While much of the literature offered insight into these concepts and relationships unto themselves, little or no research existed to show how these concepts could be collapsed into a purposeful, instructional message that generates motivation, leads to higher levels of cognitive performance, and fosters greater affect- and competence-related performance attributions. This conclusion

briefly revisits each of these concepts and relationships, while painting a picture of their collaborative union within the context of this study.

Although early studies of motivation related to employee performance and motivation in the workplace (Porter & Lawler, 1968; Vroom, 1964), research on motivation eventually shifted to include learners in the classroom. To motivate learners, Keller (1983) indicated that learning should strive to arouse curiosity, to connect instruction to important needs and motives, to develop confidence and a sense of control over success, and to provide a combination of extrinsic and intrinsic rewards that are compatible with the learner's anticipations. These strategies came to be collectively known as the ARCS model of motivation (Keller, 1983).

The ARCS model of motivation has proven to be a useful instructional design tool from both a motivationally and cognitive achievement standpoint. Keller and Song (2001) and Visser, Plomp, Arimault, and Kuiper (2002), for example, both noted increased perceptions of relevancy, as well cognitive performance when ARCS components were imbedded into instruction. The ARCS component of particular emphasis in this study was "arousing curiosity" (i.e., interest).

"Interest," according to Hidi (1990), "is central in determining how we select and persist in processing certain types of information in preference to others" (p. 549). Early studies found a direct link between interest and cognitive performance (Asher, Hymel, & Wigfield, 1978; Estes and Vaughn, 1973; Renninger & Wozniak, 1985). In this regard, interest is an important mental resource for learning. To generate interest, Keller (1983) suggests using anecdotes or other devices that inject a personal, emotional element into

otherwise purely intellectual or procedural material. When done in the immediate context of instruction, these personal, emotional elements stimulate a learner's situational interest (Linnenbrink & Pintrich, 2002). In this dissertation's study, for example, a threat and a suggested solution were declared within the context of the lesson introduction injected an emotional element. Tailoring the introduction to the individual learner, as was done in the experiment, made that element personal.

According to Petty and Cacioppo (1981) elaboration likelihood model (ELM) personally relevant information is more likely to lead to thoughtful processing of that information, i.e. elaboration process. When information is tailored and thoughtfully processed, it will be more useful than non-tailored information in helping someone make a desired behavioral change (Strecher & Kreuter, 1999). If learning can be regarded as a desirable behavior change, than tailoring becomes a motivational strategy.

Although tailoring can be an important tool in the motivation toolbox, without identifying the correct behavioral and psychosocial issues involved, the desired outcome may not result (Kreuter, Farrell, Olevitch, & Brennan, 2000). Behavioral construct tailoring, however, offers a solution. Behavioral construct tailoring is when a message designer uses established behavior-construct theories to form the structural content of a message. According to Kreuter, Oswald, Bull, and Clark (2000), the key to behavioral construct tailoring, however, is finding the most appropriate behavioral construct model to produce a desired outcome. Because the content of the lesson introduction in this study was a threat and its suggested response, the Extended parallel process model (Witte, 1994), a risk message processing model, was identified as a compatible choice.

Conclusions

Results of this dissertation's experiment indicated higher levels of motivation, a trend toward increased cognitive performance, and a trend toward greater affect- and competence-related performance attributions for those exposed to the tailored lesson. The most valuable outcome of this study, however, is the confirmation that tailoring is a personalization technique that can be applied to motivate students to learn. And by motivating students to learn, they may, in the end, learn more. Results from this experiment validate that a tailored lesson introduction did elicit some of the study's hypothesized outcomes, as well as other nonhypothesized motivation and learning outcomes. More importantly, the outcomes of this experiment point to areas to consider in future research. What follows is a summary of this study's findings and suggestions for the future.

The answer to Research Question 1, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on initial student motivation, as measured by self-reported task attractiveness, perceived task relevance, and learning intention prior to instruction," to some extent, was "yes." Tailored lesson introductions led to a significant increase in the motivation subscale "task attractiveness" and a trend towards increased relevancy. Additionally, a significant relationship between task attractiveness and relevancy with learning intentions was noted, indicating that attractive, relevant learning materials can improve initial learning intentions. A similar link was found between

preinstruction task attractiveness and postinstruction reported effort given. Educators and instructional designers seeking to build motivation into learning and instruction should consider behavioral construct tailoring. Instructional theorists could assist educators by helping them select appropriate behavioral construct models and corresponding audience assessments.

The answer to Research Question 2, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on motivation from preinstruction to postinstruction, as measured by self-reported task attractiveness, relevance, and effort?" to some extent, like in Research Question 1, was "no." This finding, however, was recognized to be a desirable outcome because it might point to sustained motivation. Significant changes in motivation were noted for "task attractiveness" and "task relevancy" when the interaction effect of the tailored lesson introduction was removed. This finding indicated that some other factor affected learner motivation over the course of instruction. Reasons for this finding could be extrapolated in future research along with research into measuring motivation at more or at different points of instruction. In doing so, researchers could simultaneously investigate the possibility that tailoring leads to sustained motivation.

The answer to Research Question 3, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on cognitive performance, as measured by a postinstruction, cognitive assessment?" was "not significantly," but there was a trend towards improved performance. This finding implies that motivationally-adaptive

learning materials could have a positive impact on learning outcomes, making it a research area worth additional investigation.

The answer to Research Question 4, "Is there a statistically significant difference between the standard lesson introduction control group and the tailored lesson introduction experimental group on both affect- and competence-related performance attributions?" was "not significantly," but there was a positive trend. Those exposed to the tailored lesson introduction were more inclined to attribute their performance to the affective- and competence-related components of the learning task. The trend makes this an outcome worth reinvestigating, particularly because performance attributions towards a task may affect future appraisals of a similar task.

The key finding to be taken from this study is that learners are unique from one another and that tailoring affords instructional designers and educators a tool to address those unique qualities. Tailoring, in this study, not only improved aspects of learner motivation, but also indicated a potential to improve cognitive performance. Because findings indicated that tailoring was associated with greater motivation, in terms of task relevancy and task attractiveness, as well as a trend towards improved cognitive performance, instructional designers and educators should consider its use when designing courses, lessons, software, and other instructional material. Also, knowing that a tailored lesson introduction, alone, was sufficient enough to elicit such results tells instructional designers and educators that they might not have to go to extremes to personalize instruction. Using an assessment tool, like the one used in this study, can help an instructional designer or educator quickly tailor a lesson or unit based on

learners' shared experiences. Thus, instructional designers and educators should strive to tailor instruction and learning materials, even a little bit, to motivate learners and improve learning outcomes. Instructional theorists can help them identify the best approach to take. In doing so, the maximum potential of well-planned instruction is more likely to be achieved. So while the time, effort, or resources it takes to tailor education could first appear as costly, the results of this dissertation indicate that the benefits may be well worth those costs, especially considering the increased needs for learners to attend and to learn from a wide variety of vital messages.

BIBLIOGRAPHY

Ainley, M., Hidi, S., & Berndorf, D. (April, 1999). *The role of situational and individual interest in the cognitive and affective aspects of learning.* Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Ajzen, I. (1992). Persuasive communication theory is social psychology. In M.J. Manfredo (Ed.), *Influencing human behavior: Theory and applications in recreation, tourism, and natural resource management* (pp. 1-28). Champaign, IL: Sagamore Publishing, Inc.

Alexander, P.A., Kulikowich, J.M., & Jetton, T.L. (1994). The role of subject-matter knowledge and interest in the processing of linear and nonlinear texts. *Review of Educational Research, 64,* 201-252.

Anand, P.G. & Ross, S.M. (1987). Using computer-assisted instruction to personalize arithmetic materials for elementary school children. *Journal of Education Psychology*, 79, 72-78.

Anderson, J.R., Greeno, J.G., Reder, L.M., & Simon, H.A. (1997). Perspectives on learning, thinking, and activity. *Educational Researcher,* 29, 4, 11-13.

Anderson, J.R., Reder, L.M., & Simon, H.A. (1997). Rejoiner: Situative versus cognitive perspectives: Form versus substance. *Educational Researcher,* 26, 1, 18-21.

Asher, S.R., Hymel, S., & Wigfield, A. (1978). Influence of topic interest on children's reading comprehension. *Journal of Reading Behavior*, 10, 35-47.

Association of College and Research Libraries (2000.) Information literacy competency standards for higher education. Retrieved April 30, 2006, from http://www.ala.org/ala/acrl/acrlstandards/informationliteracycompetency.htm

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review* 84, 2, 191-215

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health*, 13, 623-649.

Baranowski, T., Perry, C.L., & Parcel, G.S. (2002). How individuals, environments, and health behavior interact: social cognitive theory. In K. Glanz, B.K. Rimer, and F.M. Lewis (Eds.), *Health behavior and health education: theory, research, and practice,* (pp. 165-184). San Francisco, CA: Jossey-Bass.

Berlyne, D. E. (1965). Motivational problems raised by exploratory and epistemic behavior. In S. Koch (Ed.), *Psychology: A study of science (*pp. 284–364). New York: McGraw Hill.

Boekaerts, M. (1992). The adaptable learning process: Initiating and maintaining behavourial change. *Journal of Applied Psychology: An International Review*, 41, 377-397.

Boekaerts, M. (1996). Self-regulated learning at the junction of cognition and motivation. *European Psychologist*, 1, 2, 100-112.

Boekaerts, M. (2002). The online-motivation questionnaire: a self-report instrument to assess students' context sensitivity. In P. Pintrich and M.L. Maehr (Eds.), *New directions in measures and methods* (pp. 77-120). Oxford, UK: Elsevier Science, Ltd.

Boekaerts, M., Otten, R. & Voeten, M.J.M. (2003). Examination performance: Are student's causal attributions school-subject specific? *Anxiety, Stress and Coping*, 16, 3, 331-342.

Brophy, J. (1999). Research on motivation in education: past, present, and future. In T. Urdan (Ed.), *The role of context: Advances in motivation and achievement* (pp. 1-44). Stamford, CT: Jai Press, Inc.

Brug, J., Onema, A., & Campbell, M. (2003). Past, present, and future of computer-tailored nutrition education. *American Journal of Clinical Nutrition*, 77 (suppl.), 1028S-1034S.

Campbell, M.K., Honess-Morreale, L., Farrell, D., Carbone, E., & Brasure, M. (1999). A tailored multi-media nutrition education pilot program for low-income women receiving food assistance. *Health Education Research*, 14(2), 257-267.

Crombach, M.J, Boekaerts, M., & Voeten, M.J.M. (2003). Online measurement of appraisals of students faced with curricular tasks. *Educational and Psychological Measurement*; 63, 96-111.

Dassow, P. (2005). Setting educational priorities for women's preventive health: Measuring beliefs about screening across disease states. *Journal of Women's Health*, 14 (4), 324-3300.

Deci, E.L, Eghari, H., Patrick, B.C., & Leone, D.R. (1994). Facilitating internalization: the self-determination theory perspective. *Journal of Personality*, 62, 1, 119-142.

Deci, E.L. & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

Deci, E.L. & Ryan, R.M. (1991). A motivational approach to self: Integration in personality. In R.A. Dienstbier (Ed.) *Nebraska symposium on motivation 1990.* (pp. 237-288). Lincoln, NE: University of Nebraska Press.

Dewey, J. (1900). Psychology and social practice. *The Psychological Review,* 7, 105-124.

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education.* New York: Macmillan.

Dijkstra, A. (2005, February 8). Working mechanisms of computer-tailored health education: evidence from smoking cessation. *Health Education Research Advance Access*. Retrieved April 24, 2005, from http://heroupjournals.org/cgi/content/abstract/cyh014v1

Eccles, J., Wigfield, A., Harold, R.D., & Blumenfield, P. (1993). Age and gender differences in children's self- and task-perception. *Child Development.* 64, 3, 830-847.

Escoffery, C., Miner, K.R., Adame, D.D., Butler, S., McCormick, L., & Mendell, E. (2005). Internet use for health information among college students. *Journal of American College Health,* 53, 4, 183-188.

Estes, T. H. & Vaughn, J.L. (1973). Reading interest comprehension: Implications. *Reading Teacher*, 27, 149-153.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Fox, S. & Fallows, D. (2003). *Internet health resources*. Washington, D.C.: Pew Internet and American Life Project.

Fox, S. & Rainie, L. (2002). *Vital decisions: How internet users decide what information to trust when they or their loved ones are sick.* Washington, D.C.: Pew Internet and American Life Project.

Gabrielle, D. (2003). *The effects of technology-mediated instructional strategies on motivation, performance, and self-directed learning.* Unpublished doctoral dissertation, Florida State University.

Gagne, R.M. (1970). *The conditions of learning.* New York: Holt, Rinehart, and Winston, Inc.

Gagne, R.M. (1977). *The conditions of learning* (2nd ed.). New York: Holt, Rinehart, and Winston, Inc.

Garcia, T. & Pintrich, P.R. (1995, April 18-22). Assessing student's motivation and learning strategies: The motivated strategies for learning questionnaire. Paper presented at the 1995 Annual Meeting of American Educational Research Association. Retrieved June 28, 2005 from EDRS.

Garner, R., Alexander, P.A., Gillingham, M.G., Kulikowich, J.M. & Brown, R. (1991). Interest and learning from text. *American Educational Research Journal*, 28, 643-659.

Gore, T.D. & Bracken, C.C. (2005). Testing the theoretical design of a health message: Examining the major tenets of the extended parallel process model. *Health Education and Health Behavior*, 32, 1, 27-41.

Gravetter, F.J. & Wallnau, L.B. (1999). *Essentials of statistics for the behavioral sciences* (3rd. ed.). Pacific Grove, CA: Brooks/Cole Publishing Company.

Green, L. W. and Kreuter, M. W. (1991). *Health promotion planning: An educational and environmental approach.* Mountainview, CA: Mayfield Publishing Co.

Greene, B.A., & Miller, R.B. (1996). Influences on course performance: Goals, perceived ability, and self-regulation. *Contemporary Educational Psychology, 21,* 181-192.

Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational Research*, 60, 549-571.

Hidi, S., & Anderson, V. (1992). Situational interest and its impact on reading and expository writing. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), The role of interest in learning and development (pp. 215-238). Hillsdale, NJ: Lawrence Erlbaum Associates.

Holtgrave, D. R., Tinsley, B.J. & Kay, L. S. (1995). Encouraging risk reduction: a decision-making approach to message design. In E. Maibach and R.L. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 24-40). Thousand Oaks, CA: Sage Publications.

Joseph, C.L., Peterson, E., Havstad, S. Johnson, C.C., Hoerauf, S., Stringer, S.M., Gibson-Scipio, W., Ownby, D.R., Elston-Lafata, J., Pallonen, U., Strecher, V. (2007, February 8). A web-based, tailored asthma management program for urban, African-American high schools students. *American Journal of Respiratory Critical Care Medicine.* Article 17290041 Retrieved February 22, 2007, from Entrez PubMed database.

Keller, J.M. (1983) Motivational design of instruction. In C.M. Reigeluth (Ed.), *Instructional-design theories and models: An overview of their current status* (pp. 383-434). Hillsdale, NJ: Lawrence Erlbaum Associates.

Keller, J.M. (1987). Development and use of the ARCS model of motivational design. *Journal of Instructional Development*, 10, 3, 2-10.

Keller, J.M. & Burkman, E. (1993). Motivation principles. In M. Fleming and W.H. Levie (Eds.), *Instructional message design: Principles from the behavioral and cognitive sciences* (pp. 3-53). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Keller, J.M. & Song, S.H. (2001). Effectiveness of motivationally adaptive computer-assisted instruction on the dynamic aspects of motivation. *Educational Technology Research and Development*, 49, 2, 1042-1629.

Krapp, A., Hidi, S., & Renninger, K.A. (1992). Interest, learning, and development. In K. A. Rennniger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development.* (pp. 3-25). Hillsdale, NJ: Erlbaum.

Kreuter, M., Farrell, D., Olevitch, L. & Brennan, L. (2000). *Tailoring health messages: Customizing communication with computer technology.* Mahweh, NJ: Lawrence Erlbaum Associates, Inc.

Kreuter, M.W., Oswald, D.L., Bull, F.C., & Clark, E.M. (2000). Are health education materials always more effective than non-tailored materials? *Health Education Research*, 15(3), 305-315.

Kreuter, M.W. & Wray, R.J. (2003). Tailored and targeted health communication: strategies for enhancing information relevance. *American Journal of Health Behavior*, 27, S227-S232.

Linnenbrink, E.A. & Pintrich, P.R. (2002). Motivation as an enabler for academic success. *Psychology Review*, 31(3), 313-327.

Maw, W. H. & Maw, E.W. (1968). Self-appraisal of curiosity. *Journal of Educational Research,* 61, 462-468.

McBride, C.M, Bastian, L.A., Halabi, S., Fish, L., Lipkus, I.M., Bosworth, H.B., Rimer, B.K., & Siegler, I.C. (2002). A tailored intervention to aid decision-making about hormone replacement therapy. *American Journal of Public Health,* 92, 1112-1114.

Mitchell, M. (1993). Situational interest: Its multifaceted structure in the secondary school mathematics classroom. *Journal of Educational Psychology*, 85, 3, 424-436.

Morrison, K. (2005). Motivating women and mean to take protective action against rape: Examining direct and indirect persuasive fear appeals. *Health Communication*, 18, 3, 237-256.

New Media Consortium. (2007). *The Horizon Report – 2007.* Retrieved March 15, 2007, from the New Media Consortium web site: http://www.nmc.org/pdf/2007_Horizon_Report.pdf

Office of Disease Prevention and Health Promotion. (2000). Health communication. In *Healthy People 2001: Volume I* (Chapter 11). Washington, D.C: U.S. Department of Health and Human Services. Retrieved July 25, 2005 from http://www.healthypeople.gov/Document/tableofcontents.htm#volume1

Oenema, A., Brug, J. & Lechner, L. (2001). Web-based tailored nutrition education: results of a randomized controlled trial. *Health Education Research*, 16, 647-660.

Petty, R.E. and Cacioppo, J.T. (1981). Epilog: A general framework for understanding attitude change processes. In Petty & Cacioppo (Eds.), *Attitudes and persuasion: Classic and contemporary approaches*, (pp. 255-269). Dubuque, IA: William C. Brown Company.

Petty, R.E., Barden, J., & Wheeler, S.C. (2002). The elaboration likelihood model of persuasion. In R.J. Clemente, R.A. Crosby, and M.C. Kegler (Eds.), *Emerging theories in health promotion practice and research* (pp. 71-99). San Francisco, CA: Jossey-Bass.

Petty, R.E., Heesecker, M., & Hughes, J.N. (1997). The elaboration likelihood model: Implications for the practice of school psychology. *Journal of School Psychology*, 35, 2, 107-136.

Petty, R. E., Priester, J. R., & Wegener, D. T. (1994). Cognitive processes in attitude change. In R. S. Wyer & T. K. Srull (Eds.), *Handbook of social cognition* (pp. 69-142). Hillsdale, NJ: Erlbaum.

Porter, L.W. & Lawler, E.E. (1968). *Managerial attitudes and performance*. Homewood, IL: Irwin-Dorsey.

Prochaska, J. & DiClemente, C. (1983). Stages of and process of self-change of smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390-395.

Reeve, J.M., Jang, H., Hardre, P., & Omura, M. (2002). Providing a rationale in an autonomy-supportive way as a strategy to motivate others during an uninteresting activity. *Motivation and Emotion,* 26, 3, 183-207.

Reigeluth, C. M. (1983). Instructional design: What is it and why is it? In C. M. Reigeluth (Ed.), *Instructional-design theories and models: An overview of their current status* (pp. 3-36). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Reiser, R.A. & Dempsey, J.V. (2007). *Trends and issues in instructional design (*2nd ed.*)*. Upper Saddle River, NJ: Pearson Education, Inc.

Renninger, K.A., Hidi, S. & Krapp, A. (1992). *The role of interest in learning and development.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Renninger, K.A. & Wozniak, R.H. (1985). Effect of interest on attentional shift, recognition, and recall in young children. *Developmental Psychology,* 21, 624-632.

Research Unit for Cybermedicine & E-health, Department of Clinical Social Medicine, University of Heidelberg. (2003, September 19). *Database of Adverse Events Related to the Internet (DAERI).* Retrieved July 25, 2005, from http://www.medcertain.org/daeri/

Rimer, B.K., Halabi, S., Sugg-Skinner, C., Lipkus, I.M., Strigo, T.S., Kaplan, E.B., & Samsa, G.P. (2002). Effects of a mammography decision-making intervention at 12 and 24 months. *American Journal of Preventive Medicine,* 22, 4, 247-257.

Schiefele, U. (1992).The effect of topic interest on different indicators of text comprehension. In K.A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 183-212). Hillsdale, NJ: Lawrence Erlbaum Associates.

Schiefele, U. (1999). Interest and learning from text. *Scientific Studies of Reading*, 3, 3, 25-279.

Schiefele, U. & Csikszentmihalyi, M. (1994). Interest and quality of experience in the classrooms. *European Journal of Psychology*, 9, 3, 251-269.

Seegers, G. & Boekaerts, M. (1993). Task motivation and mathematics achievement in actual task situations. *Learning and Instruction*, 3, 133-150.

Seels, B. B. & Richey, R. C. (1994). *Instructional technology: the definition and domains of the field.* Washington, D.C: Association for Educational Communications and Technology.

Sivacek, J. & Crano, W.D. (1982). Vested interest as a moderator of attitude-behavior consistency. *Journal of Personality and Social Psychology*, 43, 210-221

Skinner, B. F. (1947). Superstition in the pigeon. *Journal of Experimental Psychology,* 38, 168-172.

Smith, P.L., & Ragan, T.J. (2004). Web Chapter 3: Promoting interest and motivation in learning. *Instructional Design.* (pp. 1-23). Hoboken, NJ: Wiley, John & Sons, Incorporated.

Stephenson, M.T., Benoit, W.L., & Tschida, D.A. (2001). Testing the mediating role of cognitive responses in the elaboration likelihood model. *Communication Studies,* 52, 4, 324-337.

Sternberg, R. J. (n.d). Professional web page. Retrieved February 17, 2007, from Yale University Web site: http://www.yale.edu/pace/teammembers/personalpages/bob.html

Sternberg, R.J., Torff, B., & Grigorenko, E.L. (1998). Teaching triarchly improves school achievement. *Journal of Educational Psychology,* 90, 3, 374-384.

Strecher, V.J. & Kreuter, M. W. (1999). Health risk appraisal from a behavioral perspective: Present and future. In G. C. Hyner, K. W. Peterson, J.W. Travis, J. E. Dewey, J. J. Forester, & E. M. Framer (Eds.), *Society of prospective medicine handbook of health assessment tools* (pp. 75-82). Pittsburgh, PA: The Society of Prospective Medicine.

Thorndike, E.L. (1935). *Adult interests.* New York: Macmillan

Visser, L., Plomp, T., Arimault, R., & Kuiper, W. (2002). Motivating students at a distance: The case of an international audience. *Educational Technology Research & Development,* 50, 2, 94-110.

Vroom, V.H. (1964). *Work and motivation.* New York, NY: John Wiley and Sons.

Weiner, B. (1986). *An attributional theory of motivation and emotion.* NY: Springer,

Weinstein, N. D. & Sandman, P. M. (1992). Testing four competing theories of health-protective behavior. *Health Behavior Psychology*, 12, 324-333.

Witte, K. (1994). Fear-control and danger-control: A test of the extended parallel process model (EPPM). *Communication Monographs*, 61, 113-134.

Witte, K. (1995) Fishing for success: using the persuasive health message framework to generate effective campaign messages. In Maibach, E. & Parrott, R. (Eds.), *Designing Health Messages: Approaches from communication theory and public health practice* (pp. 145-164). Thousand Oaks, CA: Sage Publications.

Witte, K. (1998). The perception of risk messages regarding electromagnetic fields: Extending the extended parallel process model to an unknown risk. *Health Communication,* 10, 3, 247-259.

Witte, K. & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education and Behavior*, 27, 5, 591-615.

Witte, K., Cameron, K. A., McKeon, J. & Berkowitz, J. (1996). Predicting risk behaviors: Development and validation of a diagnostic scale. *Journal of Health Communication*, 1, 317-341.

Witte, K., Meyer, G, & Martell, D. (2001). *Effective health risk messages: A step-by-step guide*. Thousand Oaks, CA: Sage Publications.

Xavier University. (n.d.) Xu.tutor: Evaluating websites. Retrieved January 2, 2006, from the Xavier University web site: http://www.xu.edu/library/xututor/evaluating/world_wide_web.cfm.

APPENDIX A

FORMATIVE EVALUATION

Formative Evaluation

The purpose of the formative evaluation was to construct an audience profile and to identify beliefs to change, reinforce, and introduce in the context of tailored lesson introductions. These tailored lesson introductions would later serve as the treatment condition in the dissertation study. The goal of this researcher in utilizing tailored lesson introductions was to stimulate interest. According to Mitchell (1993), by catching and holding a learner's interest, he or she is more inclined to attend to an instructional event and acquire the knowledge therein.

Because the desired outcome of the instructional event was learning a skill to prevent a health threat, this researcher chose to use Witte's (1995) persuasive health message (PHM) framework to structure the evaluation. The PHM (see Figure A1) is rooted in three different persuasion theories: Fishbein and Ajzen's (1975) theory of reasoned action, Petty and Cacioppo's (1981) elaboration likelihood model (ELM), and Witte's extended parallel process model (1994). To best use the PHM framework, Witte, Meyer, and Martell (2001) suggest a three-step process:

1) Determining the goals and objectives of the message.

2) Determining salient beliefs, salient referents, beliefs about recommended responses, and source preferences.

3) Developing the health risk message.

Each of the three steps and how they were applied in this formative evaluation are described in the following pages.

Persuasive Health Message Framework
(Witte, 1995)

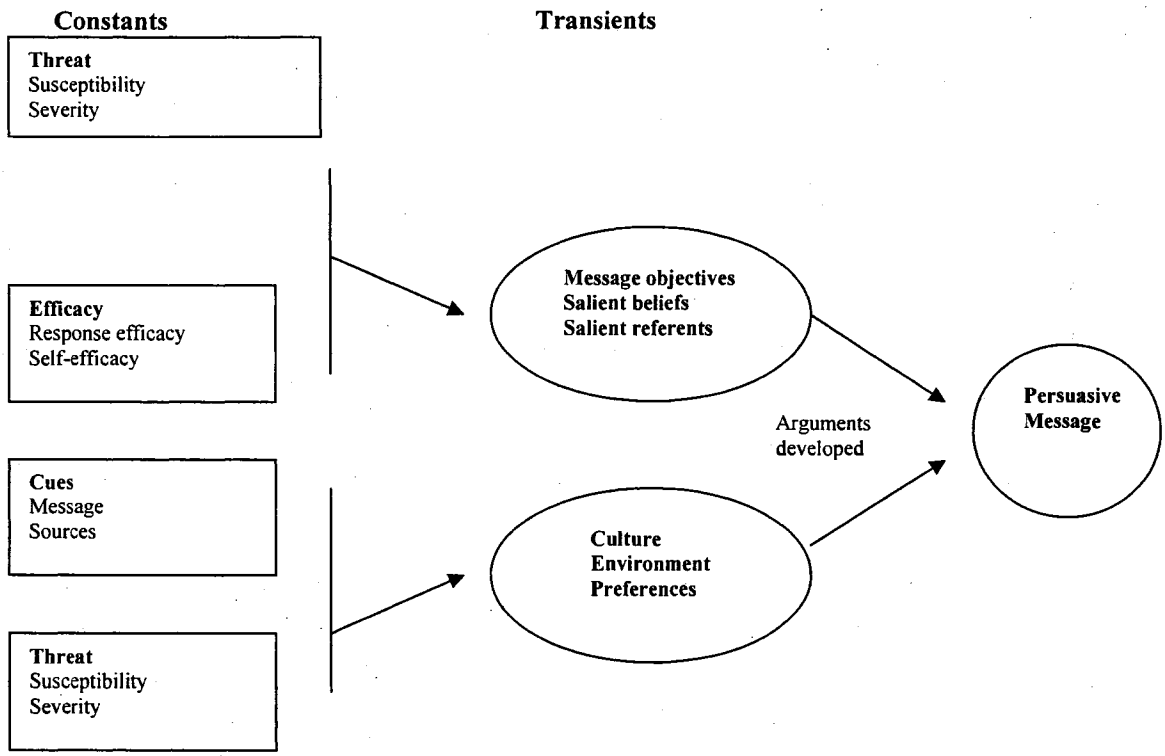

Figure A1: Persuasive Health Message Framework.

Step One: Determine Goals and Objectives

Goals

The goal of the instructional event is to empower learners with the skills to avoid the adverse health effects of using poor-quality or mismatched health internet information. According to the Database of Adverse Events Related to the Internet, a project initiated by the Research Unit for Cybermedicine & E-health at the University of Heidelberg (2003, September 19), improper use of health information or use of poor health information found on the internet may lead to adverse health outcomes. These outcomes may include, but are not limited to, any of the following:

- Being harmed (psychologically or physically) by misinformation on the internet
- Seeing a physician too late because of Internet research or an internet diagnosis
- Misdiagnosis of oneself or having received a wrong diagnosis on the Internet
- Recurrent or needless consultation with one's physician due to internet searches
- Ordering of drugs/products which have been harmful for one's health

While an instructional event can teach learners about these threats and how to avoid them, they must also be motivated to take action. Stimulating motivation to take action, then, becomes one of the primary objectives.

Objectives

According to Witte et al. (2001), to illicit a sufficient level of motivation, a persuasive health message must move learners towards the danger-control processing

state. In this study, someone in the danger-control processing state would be able to recognize his/her own susceptibility to and the severity of the threat --adverse health outcomes from not recognizing and using poor-quality health information. He or she would also feel – learning how to evaluate websites.

The danger-control processing state is one of the three persuasive health message outcomes according to the extended parallel process model (EPPM). The EPPM (see Figure 1) suggests that health messages initiate two different cognitive appraisals, and based on the appraisals, one of three outcomes results: no response, danger-control response, or fear-control response (Witte et al., 2001). The first cognitive appraisal is the threat. The second cognitive appraisal is efficacy. People first consider whether the threat is relevant (i.e., whether or not they are susceptible to the threat) and whether the threat is severe. If the threat is deemed irrelevant or not severe, the information is not processed any further and that individual will not respond (low threat processing state). In contrast, if people consider the threat to be relevant or severe, they become fearful and motivated to act. It is at this point that the second cognitive appraisal, efficacy, occurs.

Efficacy refers to the effectiveness, feasibility, and ease with which a recommended response averts a threat. Once the individual perceives the threat to be high, if he/she also perceives that the recommended response can be performed *and* that the recommended response will work, then that individual becomes motivated to control the danger (Witte, 1994). If, on the other hand, they feel that the recommended response will not control the threat or that he/she cannot perform the recommended response, that individual will move into fear-control processing state.

Some learners will already be functioning in a danger-control state. Others, however, will be on the verge (low threat/no response) or the complete opposite end (fear-control) of the spectrum. Separate messages need to be designed for learners in each of these three groups in order to motivate the proper response.

Step Two: Determining Salient Beliefs, Salient Referents, and Message Preferences

Before designing a message to target someone functioning in a specific threat response state, this researcher needed to identify the target audience's salient beliefs, salient referents, and message preferences (Witte et al., 2001). Salient beliefs, according to the PHM, are beliefs about susceptibility, severity, response efficacy, self-efficacy, and barriers. Salient referents, on the other hand, are the people who have an influence on the target audience's opinion of the recommended response. And finally, message preferences are factors about the delivery of the message such as source and type. Source components may include credibility, similarity to the receiver, and overall attractiveness. Type components include factors such as the organization of the message and the method of appeal (humorous, logical, emotional, etc.).

To better understand the salient beliefs, salient referents, and message preferences of the target audience, college students, this researcher survey 38 students in one of her classes at the university where the dissertation would take place. Of them, 92% were under the age of 27. Twenty-five were female and thirteen were male. Twenty-nine students were undergraduates, three were graduates, and six were at student-at-large.

Survey results indicated that the most common health topics students looked up on the internet concerned nutrition, weight loss, exercise, or a specific health condition or illness. With regards to the threat of adverse health effects of unrecognized, poor health information, results indicated that perceptions about susceptibility and severity were low (2.73 and 2.66, respectively, on a 7-point scale). With regards to the effectiveness of the recommended response (learning how to evaluate website), results indicated that beliefs about response efficacy and self-efficacy were higher (4.95 and 5.9, respectively, on a 7-point scale). This would indicate that students need to be made more aware about the severity and susceptibility to the threat, but would be good candidates to learn how to avoid it.

As for barriers and benefits of the recommended response, the top barriers included time and laziness. The top benefits included improved research techniques, greater confidence in information found, and the prevention of the adverse effects of misinformation or mismatched information. Parents and teachers were cited as the primary salient referents.

As for the message components type and source, students indicated that would pay more attention to a realistic, emotional, or scary message over an entertaining or research-based message. Questions related to credibility and relevancy were not asked because it was already known that students would be learning how to evaluate websites from a credible source and that tailored introductions were going to be designed to address someone like them.

Step Three: Developing the Health Risk Message

The context of each tailored lesson introduction was based on the three threat states identified by Witte et al. (2001): danger-control, fear-control, and low/no response. The purpose of the introductions was to move learners to the danger-control processing state or to motivate them to remain in that state if they were already there. Only learners in the experimental group were exposed to a tailored introduction. Which introduction a learner was exposed to was based on their response to a risk assessment known as the Risk Behavior Diagnosis Scale (Witte, Cameron, McKeon, & Berkowitz, 1996). Details about this assessment are explained in the dissertation. The three lesson introductions that were developed and their underlying purposes are described below.

Experimental Group Lesson Introductions

Introduction I addresses individuals in the fear-control processing state (see Figure A2). The message focuses on increasing the individual's response and self-efficacy toward the recommended response. It also eliminates the barriers to take action by providing an opportunity to learn the suggested response: building website evaluation skills.

Introduction II addresses individuals in the danger-control processing state (see Figure A3). These individuals have high enough efficacy to counteract their threat perceptions, but need continued motivation to practice self-protection and reminders about the severity of the threat.

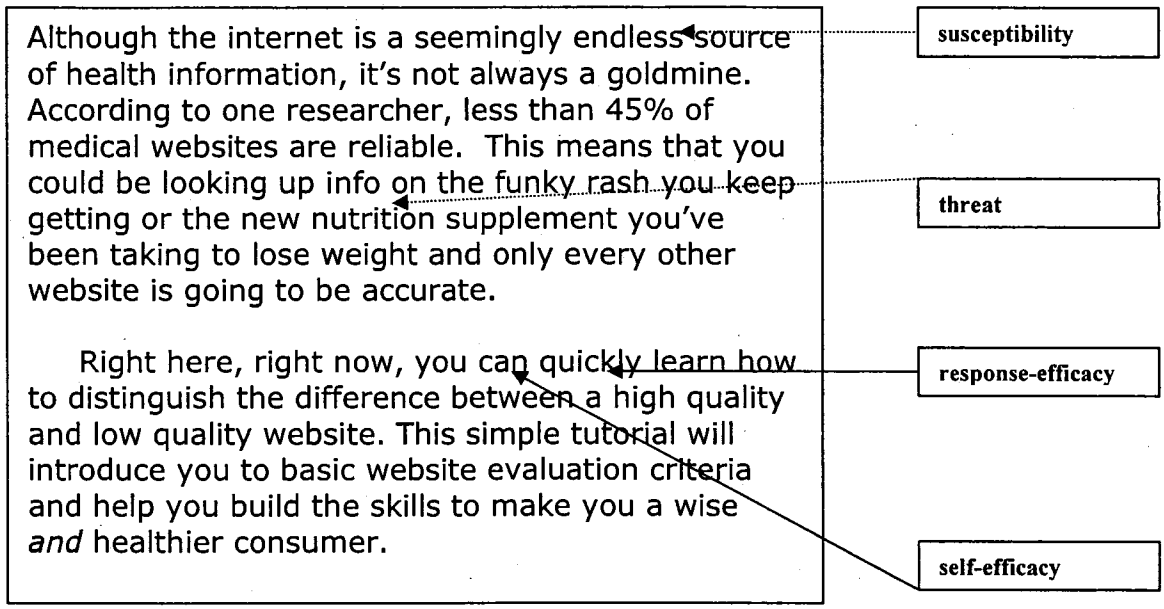

Figure A2: Introduction I.

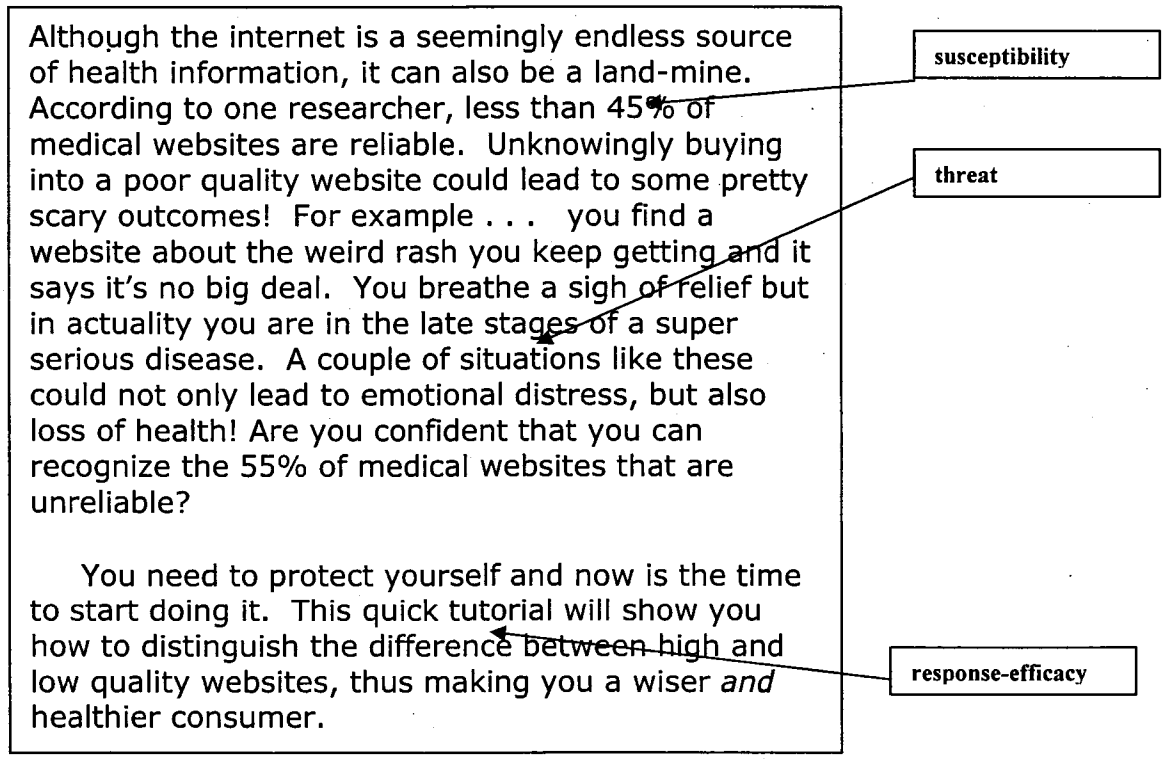

Figure A3: Introduction II.

Introduction III addresses individuals who have low threat perceptions and may or may not perceive the threat to be severe (see Figure A4). These individuals need to be convinced of the seriousness of the threat as well as to increase their perceptions of susceptibility, primarily by alluding to the susceptibility of someone like them.

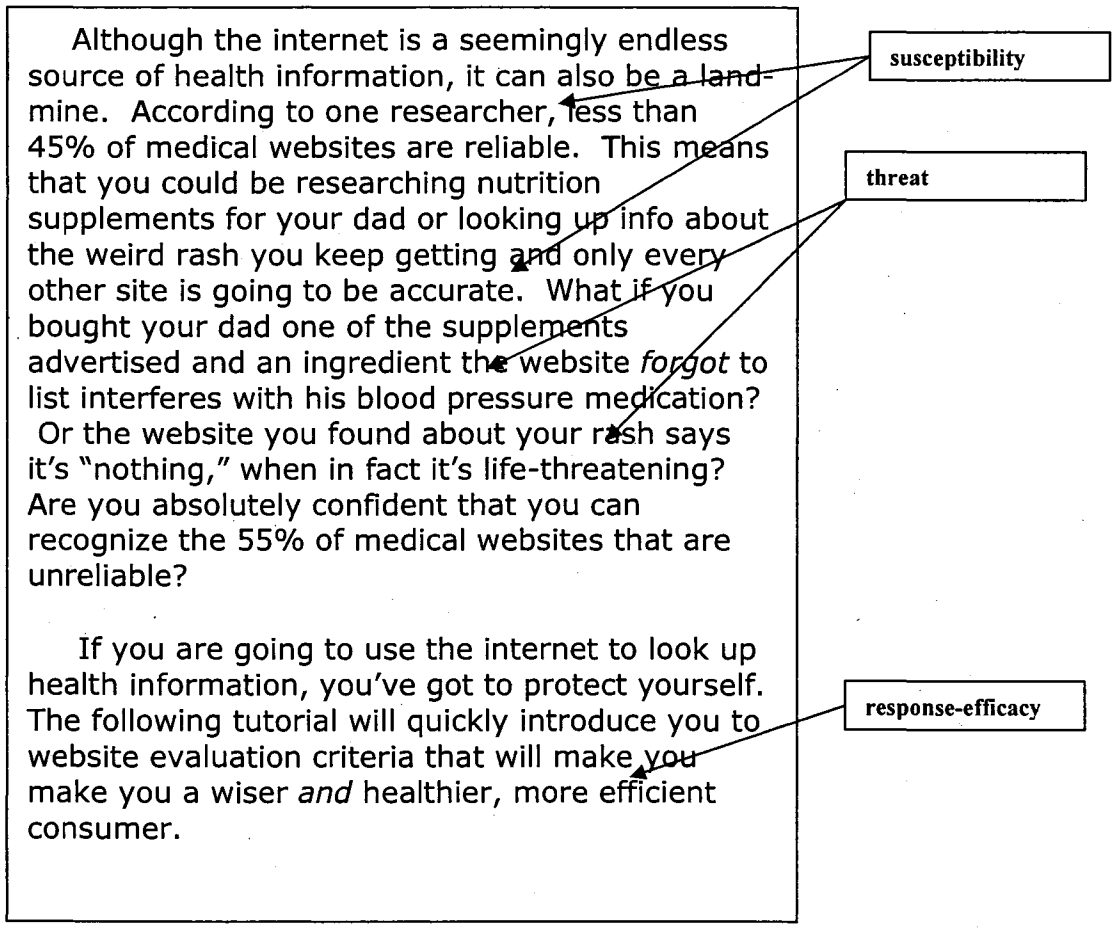

Figure A4: Introduction III.

APPENDIX B

RISK BEHAVIOR DIAGNOSIS SCALE

Define Threat:_____
Define Recommended Response:_____

Efficacy	Strongly Disagree				Strongly Agree
RE 1. [Recommended response] is effective in preventing [health threat]:	1	2	3	4	5
RE 2. [Recommended response] works in preventing [health threat]:	1	2	3	4	5
RE 3. If I [do recommended response], I am less likely to get [health threat]:	1	2	3	4	5
SE 4. I am able to [do recommended response] to prevent getting [health threat]:	1	2	3	4	5
SE 5. I have the [resources] to [do recommended response] to prevent [health threat]:	1	2	3	4	5
SE 6. I can easily [do recommended response] to prevent [health threat]:	1	2	3	4	5
	∑Efficacy____				

Threat	Strongly Disagree				Strongly Agree
SEV 7. I believe that [health threat] is severe:	1	2	3	4	5
SEV 8. I believe that [health threat] has serious negative consequences:	1	2	3	4	5
SEV 9. I believe that [health threat] is extremely harmful]:	1	2	3	4	5
SUSC 10. It is likely that I will get [health threat]:	1	2	3	4	5
SUSC 11. I am at risk for getting [health threat]:	1	2	3	4	5
SUSC 12. It is possible that I will get [health threat]:	1	2	3	4	5
	∑Threat____				

APPENDIX C

RBD SCALE – WEBSITE EVALUATION

Survey

	Strongly Disagree				Strongly Agree
1. Learning website evaluation criteria is an effective way to prevent someone from not recognizing and then using poor quality health information found on the internet.	1	2	3	4	5
2. Learning website evaluation criteria would work to keep someone from not recognizing and then using poor quality health information found on the internet.	1	2	3	4	5
3. If I learned website evaluation criteria, I would be less likely to not recognize and then use poor quality health information found on the internet.	1	2	3	4	5
4. If given the opportunity, I would be able to learn how to evaluate websites.	1	2	3	4	5
5. I have the time to learn how to evaluate websites.	1	2	3	4	5
6. I could easily learn how to evaluate websites.	1	2	3	4	5
	Strongly Disagree				Strongly Agree
7. I believe that not recognizing and then using poor quality health information from the internet could be dangerous.	1	2	3	4	5
8. I believe that not recognizing and then using poor quality health information from the internet could have negative outcomes.	1	2	3	4	5
9. I believe that not recognizing and then using poor quality health information from the internet could be extremely harmful.	1	2	3	4	5
10. It is likely that I would not recognize and then use poor quality health information from the internet.	1	2	3	4	5
11. I am at risk for not recognizing and then using poor quality health information on the internet.	1	2	3	4	5
12. It is possible that I might not recognize and then use poor quality health information from the internet.	1	2	3	4	5

APPENDIX D

MOTIVATION QUESTIONNAIRE

Questionnaire Part 1

	Strongly Disagree				Strongly Agree
1. I am in the mood to learning how to evaluate websites{task attractiveness}	1	2	3	4	5
2. I am interested in learning how to evaluate websites {task attractiveness}	1	2	3	4	5
3. Learning how to evaluate websites is intriguing. {task attractiveness}	1	2	3	4	5
4. Learning how to evaluate websites is useful to me {relevance}	1	2	3	4	5
5. Learning how to evaluate websites is personally relevant to me {relevance}	1	2	3	4	5
6. Learning how to evaluate websites is helpful to me {relevance}	1	2	3	4	5
7. I plan to devote attention to learning how to evaluate websites {learning intention/effort}	1	2	3	4	5
8. I intend to put effort into learning how to evaluate websites {learning intention/effort}	1	2	3	4	5
9. I will put time into learning how to evaluate websites {learning intention/effort}	1	2	3	4	5
10. My goal is to learn how to evaluate websites{learning intention/effort}	1	2	3	4	5

Questionnaire Part 2

	Strongly Disagree				Strongly Agree
1. I was in the mood to learn how to evaluate websites {task attraction}	1	2	3	4	5
2. I was interested in learning how to evaluate websites. {task attraction}	1	2	3	4	5
3. Learning how to evaluate websites was intriguing {task attraction}	1	2	3	4	5
4. Learning how to evaluate websites was useful to me {relevance}	1	2	3	4	5
5. Learning how to evaluate websites was personally relevant to me {relevance}	1	2	3	4	5
6. Learning how to evaluate websites was helpful to me {relevance}	1	2	3	4	5
7. I devoted attention to learning how to evaluate websites. {learning intention/effort}	1	2	3	4	5
8. I put effort into learning how to evaluate websites. {learning intention/effort}	1	2	3	4	5
9. I put time into learning how to evaluate websites. {learning intention/effort}	1	2	3	4	5
10. My goal was to learn how to evaluate websites. {learning intention/effort}	1	2	3	4	5

Questionnaire Part 3

With regards to my performance and the tutorial . . .

		Strongly Disagree				Strongly Agree
Affect-Related	a) I thought it was appealing	1	2	3	4	5
	b) I was in the mood to do it	1	2	3	4	5
	c) I did my best	1	2	3	4	5
	d) I thought that the information was important	1	2	3	4	5
	e) I wanted to learn the information for my own use	1	2	3	4	5
Competence-Related	f) I was lucky	1	2	3	4	5
	g) I found it to be easy	1	2	3	4	5
	h) I am good at this type of task	1	2	3	4	5
	i) I already know a lot about website evaluation criteria	1	2	3	4	5
	j) I knew the best way to go about learning it	1	2	3	4	5

APPENDIX E

COGNITIVE ASSESSMENT

Cognitive Assessment

The cognitive assessment questions that appear on the next page are the questions that appear on the Xu.Tutor website. Students read the questions and record their responses on the screen by clicking on the correct response. Their score is shown after they have completed all questions.

1. Most of the material published on the internet has not gone through the editorial process.
   a. True
   b. False

2. Information on the web is not permanent.
   a. True
   b. False

3-8. Which is the correct domain for this type of website?
{The responses for Questions 3-8 are as follows}:
   a. gov
   b. edu
   c. org
   d. com
   e. mil
   f. net

9. What are the most common ways of getting to a website?
   a. Typing a known internet address in your browser
   b. Using a subject directory
   c. Using a search engine
   d. All of the above

10. What is NOT an attribute of a subject directory?
   a. They rely on computer robots/that find web pages
   b. They are organized by human reviewers under subject categories
   c. They add reviews/comments to included web pages
   d. They collect links to different web pages and organize them by subject

11. What is NOT an attribute of a search engine?
   a. They rely on computer robots/ programs that find web pages
   b. They are organized by human reviewers under subject categories
   c. They generate irrelevant hits on a massive scale
   d. They create full-text databases of discovered web pages

12. Click below on the criteria b to evaluate websites.
   a. Accuracy
   b. Authority
   c. Objectivity
   d. Currency
   e. Coverage
   f. All of the above

13. Click below on the criteria best used to determine accuracy
   a. Are there mistakes on the website?
   b. Are there links to reputable sites on the same topic?
   c. Is the website well organized?
   d. Does the website have a bibliography?
   e. All of the above

14. Click below on the criteria best used to determine the authority of a website.
   a. Can you find information about the author?
   b. Is the affiliation of the author clear?
   c. All of the above

15. The Euthanasia.com website and the Assisted Suicide.org websites showed information that was clear and unbiased.
   a. True
   b. False

16. Click below on the criteria which applied about the currency of the CNN website that you viewed.
   a. The update time and date was clearly visible
   b. The update time and date was current
   c. There were no broken links on the page
   d. All of the above

17. When you viewed the Arms Control and International Security website what criteria did NOT apply to the currency of this site?
   a. The update time and date was clearly visible
   b. The update time and date was current
   c. There were no broken links on the page

18. What are the criteria to look for relating to the coverage of information found on a website?
   a. Does the information provide full coverage on a topic?
   b. Is the information aimed at the appropriate level for your research?
   c. Is the information available in a suitable format for you?
   d. All of the above

APPENDIX F

INSTRUCTOR DIRECTION

Instructor Directions

Materials
15 Control packets
15 Experimental packets
30 Consent forms

Please try to distribute equal numbers of experimental and control packets to balance the results. The only difference between the two groups' packets is Step 3, which changes the way they link to the tutorial. The experimental group links thru a web page with a tailored lesson introduction. The control group simply links to the tutorial.

Please tell the students:

- that the activity will take between 30-50 minutes
- that they should work independently
- that they need to sign the consent form but will turn that into you separately from the direction/response packet to protect their privacy
- that they may email me if they have questions or comments (my email address is on the consent form)

When you recollect the surveys, it doesn't matter if you mix the control and experimental packets (I will be able to tell which is which by the content of the second page). Please collect the signed consent forms separately to protect their privacy.

Please call or email (jen_banas@yahoo.com) if you have any questions.

Thank you so much!

APPENDIX G

PARTICIPANT DIRECTIONS AND CONSENT FORM

Participant Directions

The participant directions that appear on the following pages are for both the experimental and control groups. The only variation in directions between the two groups occurs in Step 3. Step 3 directs control group participants to the standard lesson introduction and experimental group participants to the experimental lesson introduction. This variation is labeled next to Step 3 in this appendix but not in the actual directions distributed in the study.

Directions

Today you will be completing an online tutorial and a short series of surveys. All information will be kept confidential. Your name should not appear on any of the documents to preserve this element of confidentiality.

Please be sure to complete all 6 steps on the following pages.

Step 1. Complete the survey on the next page.

Survey

	Strongly Disagree				Strongly Agree
1. Learning website evaluation criteria is an effective way to prevent someone from not recognizing and then using poor quality health information found on the internet.	1	2	3	4	5
2. Learning website evaluation criteria would work to keep someone from not recognizing and then using poor quality health information found on the internet.	1	2	3	4	5
3. If I learned website evaluation criteria, I would be less likely to not recognize and then use poor quality health information found on the internet.	1	2	3	4	5
4. If given the opportunity, I would be able to learn how to evaluate websites.	1	2	3	4	5
5. I have the time to learn how to evaluate websites.	1	2	3	4	5
6. I could easily learn how to evaluate websites.	1	2	3	4	5

Top 1/2 Score ___

	Strongly Disagree				Strongly Agree
7. I believe that not recognizing and then using poor quality health information from the internet could be dangerous.	1	2	3	4	5
8. I believe that not recognizing and then using poor quality health information from the internet could have negative outcomes.	1	2	3	4	5
9. I believe that not recognizing and then using poor quality health information from the internet could be extremely harmful.	1	2	3	4	5
10. It is likely that I would not recognize and then use poor quality health information from the internet.	1	2	3	4	5
11. I am at risk for not recognizing and then using poor quality health information on the internet.	1	2	3	4	5
12. It is possible that I might not recognize and then use poor quality health information from the internet.	1	2	3	4	5

Bottom ½ score: _____

Step 2.
Record your scores from the survey on the last page here:

Top ½ score: ____

Bottom ½ score: _____

Step 3. [CONTROL]
Go to www.bluechalk.us/Intros/I5.htm and follow the directions found there before proceeding to Step 4

Step 3. [EXPERIMENTAL]
- If your top score is bigger, go to www.bluechalk.us/Intros/I1.htm and follow the directions found there before proceeding to Step 4
- If your bottom score is bigger, go to www.bluechalk.us/Intros/I2.htm and follow the directions found there before proceeding to Step 4.
- If your top and bottom scores are the same, go to www.bluechalk.us/Intros/I3.htm and follow the directions found there before proceeding to Step 4.

Step 4. After you have followed the directions on blue Screen 2 complete the survey below.

Questionnaire Part 1	Strongly Disagree				Strongly Agree
1. I am in the mood to learn how to evaluate websites.	1	2	3	4	5
2. I am enthusiastic about learning how to evaluate websites.	1	2	3	4	5
3. Learning how to evaluate websites is appealing	1	2	3	4	5
4. Learning how to evaluate websites will be useful to me.	1	2	3	4	5
5. Learning how to evaluate websites will be personally relevant.	1	2	3	4	5
6. Learning how to evaluate websites will be helpful to me.	1	2	3	4	5
7. I plan to devote attention to learning how to evaluate websites	1	2	3	4	5
8. I intend to put effort into learning how to evaluate websites.	1	2	3	4	5
9. I will put time into learning how to evaluate websites.	1	2	3	4	5
10. My goal is to learn how to evaluate websites.	1	2	3	4	5

Step 5. After you have completed Step 4, begin the tutorial. Click the green button on Screen 2. Do all nine sections of the tutorial but ***do not*** do the tutorial Quiz until you completed Questionnaire 2 below.

Questionnaire Part 2	Strongly Disagree				Strongly Agree
1. I was in the mood to learn how to evaluate websites.	1	2	3	4	5
2. I was enthusiastic about learning how to evaluate websites	1	2	3	4	5
3. Learning about website evaluation was appealing	1	2	3	4	5
4. Learning about website evaluation was useful to me	1	2	3	4	5
5. Learning about website evaluation was personally relevant.	1	2	3	4	5
6. Learning about website evaluation was helpful to me	1	2	3	4	5
7. I devoted attention to learning how to evaluate websites	1	2	3	4	5
8. I put effort into learning how to evaluate websites	1	2	3	4	5
9. I put time into learning how to evaluate websites	1	2	3	4	5
10. My goal was to learn how to evaluate websites.	1	2	3	4	5

Step 6.

After completing the tutorial, you may begin the Quiz located on the tutorial website.

Record your Quiz score here: _____

Step 6.

With regards to my performance and the tutorial . . .

	Strongly Disagree				Strongly Agree
a) I thought it was appealing	1	2	3	4	5
b) I was in the mood to do it	1	2	3	4	5
c) I did my best	1	2	3	4	5
d) I thought that the information was important	1	2	3	4	5
e) I wanted to learn the information for my own use	1	2	3	4	5
f) I was lucky	1	2	3	4	5
g) I found it to be easy	1	2	3	4	5
h) I am good at this type of task	1	2	3	4	5
i) I already know a lot about website evaluation criteria	1	2	3	4	5
j) I knew the best way to go about learning it	1	2	3	4	5

Thank you so much for taking the time to complete this activity. Not only have you helped me with my dissertation, but you helped support research about improving the quality of student learning experiences.

Human Subject Consent Form

Northern Illinois University Informed Consent Statement

I am requesting your participation as a subject in my research during the months of September/October 2006. The dissertation seeks to identify both the cognitive and affective outcomes of an instructional design technique. Results from this study will be used to improve the quality of online tutorials, textbooks, and other learning media. The topic of this experiment's lesson is website evaluation. This lesson will be taught in the form of an online tutorial located on the Xavier University library website.

The instruments used to collect data will include a short series of questionnaires and a cognitive assessment. The first questionnaire is about using the internet to locate health information. All together, the questionnaires, the cognitive assessment, and the tutorial should take approximately 30-50 minutes to complete.

The information from the questionnaires/assessments will be kept confidential. Your name will not be associated with any of the materials; rather, a coded number system will be utilized. All records will be safely stored in a secure cabinet and no one will have access to this information except the researcher. No reference will be made in any written reports that could link you to the study. Only aggregate results will be reported. By signing this form, you agree to allow the researchers to compile your responses with those given by you and your classmates and reported in an aggregated form. In all cases, your identity will be concealed, and I will keep all data confidential.

My investigation should not present any risks to you, but some of your time is required. Additionally, you may voluntarily elect to explore the other features of the Xavier University's website. These features have not been evaluated for content by this researcher. In return for your participation, you will have the opportunity to reflect on your experiences as a consumer of health information on the internet and to talk with the researcher about the instructional design techniques used in this study.

You are free to ask me any questions at any time. If you experience adverse feelings/effects as a result of your participation, please contact me immediately. If you have questions about your rights as a subject, contact the office for the Office of Research Compliance, The Graduate School, Northern Illinois University, DeKalb, IL 60115, (815) 753-8588. You will be given a copy of this form to keep. Your participation is voluntary, and you are free to withdraw from the study at any time. If you decide to participate, you are free to discontinue participation at any time. If you do withdraw prior to the completion of the study, your data will only be used with your permission. After you have read and understood the above, your signature below authorizes your participation in the proposed study.

signature_____ date_____

Investigator: Jennifer Banas
email: jen_banas@yahoo.com

APPENDIX H

LESSON TOPIC JUSTIFICATION

Justification of Intervention Topic

In today's wired society, more and more Americans are seeking medical advice choose online health resources over a visit to an actual health professional. Between November 2000 and March 2002, the number of American adults adopting this new health behavior increased from 52 million to 73 million (Fox & Rainie., 2002). According to the Pew Internet and American Life Project, online health seekers research topics ranging from prescription drugs to smoking cessation to weight control (Fox & Fallows, 2003). They use the internet to look up information about a particular doctor, a specific health condition, alternative or experimental treatments, and sensitive health topics that are difficult to talk about. While the Internet offers an endless supply of health advice to those who seek it, no government authority is responsible for the evaluation and regulation of information found, leaving online health seekers to their own self-defense.

The risk associated with consumers' use of poor quality health information has led the Office of Disease Prevention and Health Promotion to establish health communication as one of its primary goals for the Healthy People 2010 initiative (2000). Guidelines for evaluating the accuracy and currency of health information websites have been established by reputable organizations such as the American Medical Association, the Health on the Net Foundation, and the National Network of Libraries of Medicine, but most consumers do not know about the guidelines or choose not to use them. In fact, 75% of online health seekers rely only on common sense or a casual protocol to validate information (Fox et al., 2002). Much like one must learn about fitness, nutrition or stress

management skills for positive health outcomes, online health seekers need to learn health information literacy skills to reduce their risk for negative health outcomes.