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Online Instruction Self-Efficacy Beliefs Among College Students Who Utilized Web-Enhanced Instruction

Carol Carter
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Carol Carter entitled "Online Instruction Self-Efficacy Beliefs Among College Students Who Utilized Web-Enhanced Instruction." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

Gregory C. Petty, Major Professor

We have read this dissertation and recommend its acceptance:

Ralph Brockett, Carroll Coakley, Robert Maddox

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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ONLINE INSTRUCTION SELF-EFFICACY BELIEFS AMONG COLLEGE STUDENTS WHO UTILIZED WEB-ENHANCED INSTRUCTION

A Dissertation
Presented for the
Doctor of Philosophy Degree
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Carol Carter
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ABSTRACT

The main purpose of the study was to investigate online instruction self-efficacy beliefs among college students and the demographic influences of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience and the use of an online learning system.

The population of approximately 1000 students enrolled at Maryville College during Fall 2003 and Spring 2004 semesters was used to conduct the study. Students were asked to complete the Tennessee Online Instruction Scale (TOIS), which consisted of items related to forty online instruction tasks and background information.

Findings revealed that online instruction self-efficacy beliefs of students were not significantly different for academic major and classification rank. However, computer experience was significant for online instruction self-efficacy beliefs. As a result, students with more computer experience developed a higher self-efficacy and those with less computer experience had lower self-efficacy beliefs. Self-efficacy beliefs were also found to be higher for students who experience more online instruction, using the Internet and an online learning system when compared to students who had less experience in online instruction, the Internet and an online learning system.

These findings have implications for instructional technologists, educators and designers who are primarily responsible for developing online instructional technology courses. Future research should consider the investigation of online

instruction self-efficacy beliefs among a diverse population reflecting various academic majors, age, and classification rank.

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CHAPTER I

Introduction

The acceleration of new technologies such as the World Wide Web has had a profound impact on society and has transformed the teaching and learning methodologies used in higher education. Traditional courses are becoming more dependent on the infusion of technology that allows students to submit papers online, converse with other students and instructors via e-mail, as well as promote interaction through online course chat-rooms and threaded discussions (Maeroff, 2003).

College students are realizing, more than ever, the importance and use of online instruction to augment their classroom experience into a media-rich environment. The use of these new technologies results in an information-based society that requires technical skills as well as knowledge of computer and instructional technologies to succeed both personally and professionally. In fact, computers and the Internet are becoming the standard tools in business, and experienced workers are also feeling the pressure to acquire new technology skills training.

In an effort to reduce costs and provide updated technology training for employees, businesses are relying on learning and instruction via the Internet. Consequently, online instruction has permeated the training curriculum of corporations and they have incorporated online technologies in their traditional courses. This trend, recognized in the business world, is also transforming higher

education as institutions gain interest in investigating how online instruction might be used to enhance teaching and learning. As Khan (1997) noted in his book titled *Web-Based Instruction*, web-based instruction is increasingly becoming the new wave of instruction found in higher education.

The new wave of online instruction is already evident in some colleges and universities. Findings from the annual 2001 Campus Computing Survey which assesses the role of computing and information technology representing two and four year colleges and universities in the United States, revealed the continued rise in use of technology to support instruction. Not only was the integration of information technology into the college curriculum rising, but a number of institutions reported on the important role of course management system (CMS), as being a core component to online instruction. More than half of all institutions surveyed reported as having established a standard CMS product for their campus (Green, 2001). As a result, institutions are increasingly finding new ways to supplement traditional classroom activities by promoting better communication among students, and by providing enriching and interactive environments. As college and universities charged fees for technology usage on campus, students have requested that these institutions provide access to computer technology, as well as they expect technology to be integrated into their college instruction. (Young, 1997).

However, assisting faculty with technology integration continues to be a major issue facing educational institutions as reported by the Campus Computing Survey. As institutions continue to struggle with technology planning, findings

also revealed that the impact and use of instructional technologies on universities will continue to increase in the future. As Duderstadt, Atkins & Van Houweling (2002) notes "The impact of information technology on the university will likely be profound, rapid, and discontinuous--just as it has been and will continue to be for the economy, our society, and our social institutions (e.g., corporations, governments, and learning institutions)" (p. 276).

The proliferation of online and web-enhanced instruction demands a new paradigm for learning, one that is less devoted to rote memorization of facts to one more dedicated to a process of inquiry and control of one's own learning. Students' use of new and innovative online instructional technologies will become a continuing process due to the expected rapid advances in computer technology. These online instructional methods will become essential catalysts within the lifelong learning process, facilitating the need to access information and thus provide an academic environment supporting inquiry, self-directed learning, self-efficacy and creativity.

Theoretical Framework of the Study

The theoretical framework for the study was primarily based on social cognitive and self-efficacy theories. Within the social learning literature, considerable attention has been given to the self-efficacy construct as an important mediating link between human cognition and behavior. Social cognitive theory and self-efficacy research (Bandura, 1986, 1997; Zimmerman, 1995) indicate that self-efficacy decisions can influence performance. As a result,

students' beliefs in their abilities to successfully perform in an online environment may directly affect their scholastic achievements and performances.

According to the social cognitive theory (SCT) proposed by Bandura (1977, 1986, 1997), human functioning is characterized by three interacting determining factors: (a) behavior, (b) personal factors, and (c) environmental factors. Bandura referred to the interaction of these three factors as the interaction triadic reciprocality model. For example, based on this model, assumptions could be made that web-enhanced and online instruction (i.e., environmental factors) might affect the cognitive perceptions (behavior) of students, in particular online instruction self-efficacy. Additionally, the demographic characteristics of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and use of an online learning system (personal factors) might affect students' online instruction self-efficacy opinions.

The self-efficacy construct derived from SCT and self-efficacy theories has been promoted as one of the solutions to the problem of improving computer literacy and adoption of new online learning technologies among college students. Specifically, the construct of self-efficacy relates to decisions individuals make about their abilities to perform a specific task or act within a given situation. Bandura (1977) states that self-efficacy affects all situations where "People approach, explore, and deal with situations within the environment with their self-efficacy" (p. 194). He theorized that individuals seek out environments that

promote high efficacy beliefs and avoid environments that foster low self-efficacy.

In numerous studies of learning motivation, self-efficacy has been identified as a significant predictor of student motivation. Self-efficacy is also predictive of academic performance and course satisfaction in traditional face-to-face classrooms (Bandura, 1997; Pajares, 1996, 2002; Zimmerman, 1995) academic performance in Mathematics (Lopez and Lent, 1992; Nielsen and Moore, 2003) and online courses, where students with a strong propensity for self-efficacy results in the positive effect on an individual's motivation in using online instruction (Miltiadou, 2000).

Bandura (1997) found that high self-efficacious students share similar characteristics such as they participate more readily, work harder, persist longer, and have fewer adverse emotional reactions when they encounter difficulties than those who doubt their capabilities. Similarly, Multon, Brown, & Lent (1991), in a meta-analytic review of 39 educational studies, found that self-efficacy beliefs were positively related to student persistence and academic performance across a variety of subject areas, experimental designs, and grade-levels. Evidence of the strong and positive influences of the self-efficacy construct is also reported in other disciplines such as career development (Ferry, Fouad & Smith, 2000) computer learning (Decker, 1996; Delcourt & Kinzie, 1993), online instruction (Loboda, 2002; Randall, 2001) and multimedia learning systems (Cheung, Li & Yee, 2003).

Although research remains limited on online instruction self-efficacy, there is evidence to support the use of the self-efficacy construct in improving students' online learning skills and as a significant predictor of future trends in computer and online instruction attitudes (Olivier & Shapiro, 1993).

Statement of the Problem

As colleges position themselves to adapt to rapid technological advances that impact both the teaching and the learning environment, little has been provided within the literature to explain online instruction self-efficacy and learner demographic characteristics of gender, classification rank, age, academic major, computer access, computer experience, online experience, Internet experiences, and the use of an online learning system. Thus, an investigation of online instruction self-efficacy beliefs and these demographic characteristics is important in providing cues as to factors that contribute to the effective use of online instruction. Students are the pivotal element in adopting and implementing new online technologies. Therefore, the investigation of the experiences and beliefs of students as they utilize online and web-enhanced instruction will be beneficial to the future design and integration of online courses.

Given the proliferation of online instruction in colleges and its usage among diverse student populations, there is a need to investigate the overall impact of online and web-enhanced instruction and the degree to which demographic characteristics such as gender, age, academic major, and computer experience, result in a high self-efficacy. An assumption has been made that computer experience might enhance students' beliefs in their abilities to accept

online and web-enhanced instruction. As a result, an improvement in a learner's online instruction self-efficacy would contribute to the successful performance in online learning courses, resulting in higher academic success.

Purpose of the Study

Studies have shown the positive impact of students' learning and widespread integration of online learning and instructional technologies within college curricula. This integration has enhanced the traditional models of teaching and learning with instructional technologies such as email, web, discussion boards, chat rooms, and multimedia, resulting in a more student-centered environment. The rapid use of technological advances and integration in higher education has placed a high premium on a learner's self-efficacy toward academic achievement (Bandura, 2001). However, despite the growing evidence of the self-efficacy concept, there is very little empirical evidence that addresses the present status of online instruction self-efficacy beliefs in relation to learners' gender, classification rank, age, academic major, computer access, computer experience, online instruction and Internet experience, and, of particular interest, their use of an online learning system.

Thus, the purpose of the study was to identify students' general perceptions of online instruction self-efficacy beliefs. Additionally, online instruction self-efficacy beliefs of students and their relation to gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and use of an online learning system, were examined by the researcher.

Research Questions

The primary research objectives of the study measured the general attitudes of online instruction among students and influences of perceived online instruction self-efficacy beliefs to students' gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and the use of an online learning system. Specifically, this research was designed to address the following research questions:

1. What are the online instruction self-efficacy beliefs among students as measured by the Tennessee Online Instruction Survey (TOIS)?
2. Do online instruction self-efficacy beliefs among students differ significantly for the demographic variables of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and use of an online learning system?

Hypotheses

Nine research hypotheses were developed to answer the second research question.

H_o1: There is no significant difference in online instruction self-efficacy beliefs with regard to gender as measured by the TOIS among students.

H_o2: There is no significant difference in online instruction self-efficacy beliefs with regard to classification rank as measured by the TOIS among students.

H_o3: There is no significant relationship between online instruction self-efficacy beliefs with regard to age as measured by the TOIS among students.

H_O4: There is no significant difference in online instruction self-efficacy beliefs with regard to academic major as measured by the TOIS among students.

H_O5: There is no significant difference in online instruction self-efficacy beliefs with regard to computer access as measured by the TOIS among students.

H_O6: There is no significant relationship between online instruction self-efficacy beliefs and extent of computer experience as measured by the TOIS among students.

H_O7: There is no significant relationship between online instruction self-efficacy beliefs and extent of online instruction learning experience as measured by the TOIS among students.

H_O8: There is no significant relationship between online instruction self-efficacy beliefs and extent of Internet experience as measured by the TOIS among students.

H_O9: There is no significant relationship between online instruction self-efficacy beliefs and extent of using an online learning system as measured by the TOIS among students.

Rationale and Need for the Study

The emergence and use of online instruction necessitates that college students become more confident in their learning abilities to perform successfully in the 21st century classroom. For example, new online and web-enhanced instructional technologies such as Blackboard may require students to direct some of their own learning. When learners view learning as helping them to be effective at something they value, these learners are much more likely to be intrinsically and positively motivated (Wlodkowski, 1985). Inherent in this underlying theme of intrinsic motivation derived from psychological theorists such as Bandura who embrace competence as a central assumption, psychologists support the idea that human beings actively strive for understanding and mastery

(Bandura, 1977). As a result, the effort to strive for understanding and mastery lends itself to learners becoming intrinsically motivated to assume responsibility when they have some control of their learning process.

Research studies have indicated that as forms of online instruction are incorporated within the classroom, self-efficacy should be considered as an important element in the design and development of an effective online course. Thus, the overall utilization of online instruction technologies could enhance students' beliefs in their abilities to take part in an online instruction, which would ultimately result in the promotion and further adoption of instructional technologies within the academic curriculum. Additionally, perceptions of online instruction self-efficacy could provide significant insights for online learning developers in understanding how to effectively design or incorporate online learning instruction into courses for a diverse student audience.

Significance of the Study

The results of the study will have potential implications for educators and instructional designers who are directly involved in designing and integrating online instruction technologies into courses. Specifically, the study will be beneficial in predicting future performance of students' behaviors who use online instruction as well as in adding the following contributions to the online instruction self-efficacy knowledge base:

1. The study will provide instructors who wish to predict further understanding of online instruction self-efficacy. By examining the demographic characteristics of gender, classification rank, age,

academic major, computer access, computer experience, online instruction experience, Internet experience, and the use of an online learning system, education institutions will be better able to develop online instruction that will serve a diverse needs of students. Additionally, findings presented in the study could assist college administrators with removing technological obstacles. The effective development of online instruction courses may encourage the innovation and expand the uses of online instructional technologies, which results in helping learners develop behaviors associated with online instruction self-efficacy.

2. The study will also add to the knowledge base of the self-efficacy construct and use of the Tennessee Online Instruction Scale. Specifically, the study will be used to clarify the meaning of online instruction self-efficacy by developing an understanding of its relationship with students' perceptions and online instruction self-efficacy beliefs and related demographic characteristics.

Limitations

1. The population of the study was limited to the students enrolled at Maryville College during Fall 2003 and Spring 2004 semesters.

2. Responses collected from participants were limited by the accuracy of the perceptions and beliefs that were reported and analyzed.

Delimitations

1. The results of the study may be generalized to the student population of Maryville College.

2. The study was delimited by the Tennessee Online Instruction Scale (TOIS) developed by Randall and Petty (Randall, 2001) and was validated and tested using a sample of 762 participants from the National Joint Apprenticeship and Training Committee (NJATC) which was found to successfully measure online instruction self-efficacy for that given population.

Definition of Terms

1. **Computer self-efficacy**: an individual's belief in their ability to perform a particular computer task (Compeau & Higgins, 1995).

2. **Online instruction**: an interactive instructional program that uses World Wide Web resources and attributes to create a meaningful learning environment. (Kahn, 1997).

3. **Online instruction self-efficacy**: self-appraisal of one's capabilities to participate in online instruction, that is to perform instructional tasks that involve collaborative and individual learning activities over the Internet and World Wide Web (Randall, 2001).

4. **Self-efficacy**: people's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with the judgments of what one can do with whatever skills one possesses (Bandura, 1986).

5. **Social cognitive theory**: theory that describes human functioning through the model of mutual interactivity of behavior, personal factors, and environmental events (Bandura, 1986).

6. **Web-enhanced instruction**: the use of course management system tools (i.e., Blackboard, WebCT) to augment the traditional face-to-face classroom.

Organization of the Study

The study consists of five chapters. The first chapter presented an introduction to the study, which included a theoretical framework, statement and

purpose of the study. Chapter 1 also stated the research questions and corresponding hypotheses, rationale, significance as well as limitations, delimitations and definition of terms found within the study.

The second chapter presents the review of literature and involves research related to the following general areas, self-efficacy, social cognitive theory, online instruction, online learning system tools, online instruction self-efficacy, computer and Internet self-efficacy. Other areas of literature presented in the second chapter includes differences in demographic characteristics related to online instruction self-efficacy, and criticisms of self-efficacy theory and self-efficacy assessment tools.

The third chapter describes the research methods used for the study and includes descriptions of the population, instrumentation, data collection procedures, research design, and research hypotheses. Chapter 4 presents data analysis and findings. The final chapter, Chapter 5 describes conclusions, implications of the study and proposes recommendations for future research.

Summary

The primary purpose of the study is to investigate online instruction self-efficacy beliefs among college students and the influences of online instruction self-efficacy to students' gender, classification rank, age, academic computer access, computer experience, Internet experience, online experience and the use of an online learning system. The study is important since it provides answers to the area of online instruction which is now becoming commonplace within

teaching and learning. The next chapter will expand on related research surrounding online instruction and self-efficacy concepts.

CHAPTER II

Review of Literature

The review of literature for the study reflects the academic knowledge base relevant to the concepts of web enhanced and online instruction self-efficacy. The foundation and evolution of self-efficacy is examined, followed by an overview of social cognitive theory, self-efficacy theory, and the four sources of self-efficacy development. Additionally, literature related to online instruction and demographic factors such as age, gender, computer experience, online experience, Internet experience, as well as the use of an online system tool, are reviewed. This chapter concludes with a brief summary of the literature review.

Foundation and Evolution of Self-Efficacy

The foundation and evolution of social cognitive theory (SCT) originated in the 1940s when a theory of social learning and imitation proposed by Miller and Dollard (1941), rejected behaviorists philosophy of associationism in favor of drive reduction principles. However, the theory proposed by Miller and Dollard failed to include the creation of novel responses or processes of delayed and nonreinforced imitations (Pajares, 2002, 2003). As a result, Bandura and Walters (1963) further expanded the theory of social learning to include observational learning and vicarious reinforcement principles.

During the 1970s Bandura was becoming aware that an important element was missing from the learning theories of that period including his own social learning theory and published a 1977 framework, entitled, *Self-efficacy: Toward a Unifying Theory of Behavioral Change*, which identified the important missing

element, self-beliefs (Pajares, 2002). In the mid 1980s, Bandura renamed his social learning theory to social cognitive theory due to his growing belief that his previous theories had expanded beyond the scope of the social learning perspective and to reject "the behaviorists' indifference to self-processes" (Pajares, 2003, p. 139). Bandura's cognitive theory which presents a vision depicting the origination of human thought, action, and the influential roles of certain processes to motivation, affect and behavior, is discussed in greater detail in the next section.

Social Cognitive Theory

Social Cognitive Theory emanated from the theory of social learning with its early foundation being laid by behavioral and social theorists. SCT describes human behavior as a model of triadic reciprocality or reciprocal determinism where three determinants, behavior, environment and personal factors mutually interact and influence each other bidirectionally (Bandura, 1977, 1986, 1989). The behavior determinant of the triadic model represents actions that are influenced by various interacting factors such as personal control and choice. In contrast, the environment determinant involves environments that are imposed, created and selected, while personal factors include cognitive, affective and biological events (Bandura, 1997).

SCT is based on the premise that behavior is primarily shaped by the three aforementioned determinants where individuals select environments in which they exist in, and those environments influence behaviors. Behavior within a specific situation is affected by environmental characteristics, which in turn is affected by

behavior. Behavior is also influenced by cognitive processes as well as personal factors which in turn affects both factors.

SCT 's influence on an individual's cognitive process suggests that the mind is an active force that shapes an individual's reality, by selectively encoding information, executing behavior based on values and expectations, and imposing structure on its own actions (Jones, 1989). It is through feedback and reciprocity, that an individual's reality is shaped by interacting with the environment and his or her cognitive process. Additionally, the knowledge of cognitive processes associated with one's development of reality, allows human functioning to be shaped and modified.

As was mentioned before, the major premise of SCT describes behavior in terms of a triadic, dynamic, and reciprocal interaction of the environment, personal factors, and behavior known as "a model of triadic reciprocality" (Bandura, 1986, p. 18). However, this reciprocal interaction does not imply that the three determinants (i.e. behavior, environment and personal factors) are of equal strength nor do they all occur simultaneously. Some determinants maybe stronger than others and their influence will change for different activities and under different situations in which the behavior occurs (Bandura, 1989, 1997).

The model of reciprocal determinism represents interacting links between different subsystems of influence and is reflected by the bidirectional (two way) interactions of person to behavior, environment to person and behavior to environment. The first bidirectional interaction of person to behavior, reflects the influence of an individual's though, affect and action. For example, an

individual's expectations, beliefs, self-perceptions, goals and intentions, provide shape and direction to behavior (Bandura, 1989). As a result, the behavior that is carried out will in turn affect an individual's thoughts and emotions.

The second bidirectional interaction of environment to person, takes place between personal characteristics and environmental influences. Within this interaction, process human expectations, beliefs and cognitive competencies are developed and modified by social influences occurring in the environment (Bandura, 1989). These social influences can express information and activate emotional reactions through such as factors as modeling, instruction and social persuasion (Bandura, 1986).

The third bidirectional interaction of the reciprocal determinism model involves the interaction between behavior and environment. An individual's behavior will change environmental conditions to which he or she is exposed, and the behavior is then altered by that environment. Individuals are both products and producers of their environment (Bandura, 1989). For example, an individual's behavior can affect the nature in which they experience the environment through the selection and creation of circumstances. As a result, based on human preferences and competencies that are learned, individuals choose whom they should interact with and which activities to participate in. Behavior also determines which of the various potential environmental influences will be present and what forms they will undertake. These environmental influences will in turn, partially determine which forms of behavior are created and activated (Bandura, 1989).

Generally, the reciprocal determinism model of SCT provides the notion where individuals possess abilities that influence their behavior, and are neither driven by inner forces nor controlled by external stimuli such as the environment. Instead, individuals perform as contributing agents to their own motivation and behavior within a framework representing reciprocally interacting factors.

Inherent in the SCT framework are expectations that form major cognitive forces that guide human behavior (Bandura, 1977). These expectations are called outcomes and self-efficacy expectations. Outcome expectations relates to the likelihood that individuals participate in behaviors that are viewed as having valued or successful outcomes than those that are considered to having unfavorable consequences. In contrast, self-efficacy or efficacy expectations involve an individual's belief about his or her ability to perform a particular behavior. An individual's choice of activities, behaviors, and persistence in performance are influenced by both expectations.

The construct of self-efficacy has evolved into a widely used behavioral concept that determines and influences human functioning. However, in an attempt to understand self-efficacy there is a need to examine its theoretical foundation and implications which are presented in the following sections.

Self-Efficacy Theory

Central to the social cognitive theory of human behavior is the concept of self-efficacy, which Bandura (1986) defines as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with

judgments of what one can do with whatever skills one possesses" (p. 391). According to the self-efficacy theory, individuals develop beliefs that influence behavior and are important to learning. Among these are choice of activities, performance and motivation to attempt a task, persistence and perseverance exerted in accomplishing the task especially when obstacles occur, the level of effort expended on the task and thought patterns and emotional reactions experienced (Bandura 1986, 1997; Pajares, 2003).

Self-efficacy is characterized as a multidimensional construct consisting of three distinct and interrelated dimensions which are magnitude, strength, and generalizability (Bandura, 1997; Ramalingam & Wiedenbeck, 1998; Compeau & Higgins, 1995). The first self-efficacy dimension called magnitude, relates to the level of task difficulty an individual believes is attainable. For example, an individual possessing a high magnitude of self-efficacy will view themselves as having the ability to accomplish difficult tasks, while individuals with a low self-efficacy magnitude view themselves as having the ability to only perform simple forms of the behavior.

The second self-efficacy dimension is strength and it relates to the level of conviction an individual has about an efficacy judgment. For example, individuals with weak self-efficacy beliefs will be frustrated more easily by obstacles relevant to their performance and will respond by reducing their perceptions of their capability. Conversely, individuals with strong self-efficacy beliefs will not view difficult tasks as deterrents, but instead will retain their sense of self-efficacy and due to continued persistence are more likely to overcome obstacles.

The third self-efficacy dimension is generalizability or generality which refers to the extent to which self-efficacy beliefs hold across specific situations. For example, an individual may believe in his or her capability of performing some behavior but only under a given set of circumstances. While other individuals may believe they can perform the given behavior under any circumstance and also perform behaviors that are somewhat different. Consequently, Torzadeh and Van Dyke (2002) suggest that the primary purpose for assessing these self-efficacy dimensions is to explore various types of questions that will best explain and predict an individual's dispositions, intentions, and actions.

Four Sources of Self-Efficacy Development

According to Pajares (2003), individuals develop and acquire information about their self-efficacy beliefs using four sources. The four sources which are presenting below consist of: (a) performance or mastery experiences, (b) vicarious experiences, (c) verbal or social persuasion and (d) physiological states.

Mastery Experiences

Performance attainments are based on mastery experiences and are considered as the most influential sources of self-efficacy information, "because they provide the most authentic evidence of whether one can muster whatever it takes to succeed" (Bandura, 1997, p. 80). The successful performance of a given task increases an individual's efficacy expectation or outcome, while tasks interpreted as failures decreases an individual's efficacy expectation. Strong efficacy outcomes are gained by successfully repeating the task. For example,

students who perform successfully on online instruction activities are likely to develop a high self-efficacy belief towards online and web-enhanced instruction and subsequently will enroll in more online courses and increase their efforts when confronted with difficulties. Conversely, students who perform poorly on online instruction activities are likely to develop a low self-efficacy belief towards online instruction and will avoid future online courses. Methods used to develop and enhance mastery experiences include repetition and performance exposure to a specific task.

Vicarious Experiences

The second source of self-efficacy information is known as vicarious learning experiences. Generally, less influence on self-efficacy beliefs tend to be exerted through vicarious experiences than direct mastery experiences (Bandura, 1997). Vicarious experiences can be developed through direct experience, as well as the observation of others successfully performing the task. Learning through the observation of others such as teachers and parents, allows an individual to develop ideas regarding the formation of new behaviors without having to perform the actual behavior (Bandura, 1977, 1986, 1989). It also enables individuals to develop and explore new behavioral patterns quickly that might not have been previously attainable due to time constraints, and limited resources. Other sources for vicarious learning such as the television and other visual media, has vastly expanded the range of models in which an individual is exposed to on a daily basis, thereby transcending the boundaries of their social environment (Bandura, 1997). Vicarious experiences not only occur through observation of

models, but also include social comparisons made with others such as peer groups or siblings. Students who observe similar peer groups perform a task, are likely to feel more efficacious since they believe they are also capable of achieving the task (Schunk, 1989, 1996). As a result, the acquisition of new behaviors, knowledge and skills through vicarious learning experiences is important in helping individuals avoid costly mistakes.

Verbal Persuasion

Verbal persuasion is the third source of self-efficacy information resulting from social or verbal information received from others. According to Zeldin and Pajares (2000) "verbal messages and social encouragement help individuals to exert the extra effort and maintain persistence required to succeed, resulting in the continued development of skills and of personal efficacy"(p. 217). As with vicarious experiences, verbal persuasion exerts less influence on self-efficacy in comparison to mastery experiences.

The use of verbal persuasion such as a positive word and encouragement from a teacher or parent, can be essential in enhancing one's self-efficacy development. Negative verbal persuasions such as indicating that one is "not university material" may weaken self-efficacy beliefs and have adverse effect on one's confidence especially if one is not resilient to endure such statements. As a result, positive verbal persuasions may allow individuals to experience an initial increase in self-efficacy beliefs. Conversely, if the individual experiences failure, self-efficacy for that activity will be weakened (Bandura, 1997).

Physiological States

Physiological states are the fourth source of information for developing self-efficacy beliefs. Physiological states include situations such as anxiety, stress, and fatigue that can affect self-efficacy development and are dominant in health related behaviors as well as athletic and physical activities. The level of physiological states can hinder or increase self-efficacy performance depending on the situation and arousal. Bandura (1997) concurs in that physiological situations that are perceived as stressful or taxing usually elicit an emotional arousal that depending on the situation might affect personal competency. For example, phobias such as fear of public speaking or flying can result in lower self-efficacy beliefs due to the high level of fear. As a result, decreasing the level of anxiety or fear associated with the particular phobia through continuous practice or personal mastery experience, increases the individual's belief that he or she possesses the necessary skills to effectively manage any given situation.

All of the above sources of efficacy information can be used in conjunction with each other to provide comprehensive interventions for enhancing self-efficacy development within the online instruction domain. In the following sections information relative to the area of the online instruction is presented along with a synopsis of other domains of efficacy such as computer and Internet self-efficacy which are instrumental in influencing a learner's self-efficacy development towards the use of online and web-enhanced instruction.

Online, Web-Based and Web-Enhanced Instruction

The World Wide Web is changing how students interact globally and, more importantly, how they communicate. There are various ways that the Internet is used in higher education, from email to online learning, thus providing more opportunities for communication and collaboration. The concept online instruction has been used interchangeably in the literature as web-based instruction, and web-enhanced instruction or learning. Online instruction has been viewed as the umbrella concept with web-based instruction and web-enhanced instruction as subcomponents. According to Dabbaugh (2000) web-based instruction consists of three main online delivery modes: (a) adjunct mode, also known as web-enhanced instruction, which combines web-based instruction with traditional classroom instruction and offers students a richer and more self-directed learning experience; (b) mixed mode where web-based instruction is fully integrated into the curriculum and one half of the course is conducted online; (c) online mode where the entire course and associated features such as discussions, assignments, and interactions are conducted online. In addition, Dabbaugh (2000) suggested that various web-based course management software packages such as WebCT, and Blackboard have been developed to augment instruction and learning and can be used to support all three instructional delivery modes.

Online Learning System Tools

Online learning or course management system tools such as Blackboard or WebCT are software packages that consists of ready-made templates that provide

instructors and students with tools to facilitate the development and organization of an online instruction and web-enhanced course. Many of these applications consist of standard tools and features such as email, file sharing, collaboration, online and discussion areas, student tracking, grade maintenance and distribution, privacy access controls, and student and instructor work areas where assignments or course-related content can be posted (Verneil & Berge, 2000).

The integration of course or learning management system tools has added a new dimension to the application of online learning by allowing students to interact in a variety of settings. As a result, the increased proliferation of these applications will necessitate the need for effective learning and the online medium of teaching and learning will likely continue in the next several years.

Advantages and Disadvantages

Web-based instruction has become increasingly popular among higher education institutions around the world (Khan, 1997). Researchers have focused on identifying various characteristics of web-based instruction with the assumption that this technology would automatically translate into effective student learning. For example, McCormack and Jones (1998) contend that online instruction is more effective, efficient, and enjoyable than traditional methods because online instruction increases participation in education, serves the diverse needs of students, provides flexibility for time and space, enhances communication between instructors and students, and facilitates learner control.

Corbett (1997) has further outlined some of the ways in which the Internet can enhance teaching and learning: (a) access to information that is not readily

available to students who use traditional methods; (b) the excitement generated through search and discovery by assisting students' in learning as well as it encourages confidence and builds self-esteem; (c) information is exchanged between students around the world via web pages, email, and newsgroups; (d) creates equal opportunities for learning.

Another area where online instruction has been cited as a major advantage to teaching and learning is through interaction where students interact with other students, faculty, and experts. Through interaction, students exchange ideas and share information, engage in group projects, and develop friendships online (Meyer, 2003). Interaction is also established online through collaborative learning where students enhance their online learning experience through teamwork and build up knowledge through feedback from peers.

When used as an instructional tool, the Internet has the potential to meet the needs of diverse students by presenting instructional materials in various formats, including a traditional linear form or, with the addition of multimedia components such as video clips, and sound, in such a way that allows students to quickly review essential content. Consequently, students are able to pursue learning in an interactive and self-directed environment.

Although online instruction, particularly the use of the Internet, has been cited as an effective instructional method for enhancing teaching and learning, critics have argued about the value of online learning, questions which "remain unresolved because of limited amount of scientific inquiry into the effectiveness of online instruction" (Bennett & Green, 2001, p. 1). Other areas of concern

pointing to the disadvantage of using the Internet in online instruction include the use of text-based communication causing a sense of isolation and misunderstanding (Herman, Ige, Duryae, McCraver, & Good, 1999) where new users or novices may abandon online courses due to accessibility problems. Students using computers on campus can often download multimedia material from the Internet very quickly and can utilize technical expertise to help solve system malfunctions. However, students using computers off campus may experience low-speed connections and the unavailability of technical expertise. So far research remains sparse in determining whether computer access has an impact on online instruction and a learner's self-efficacy beliefs in performing online instruction tasks.

Despite the aforementioned criticisms of online instruction, educational institutions continue to incorporate and utilize the Internet as a viable means of achieving success in student online learning. The greatest potential of online instruction is that instructors now have the opportunity to develop new instructional learning experiences for students, which was not attainable in earlier generations. However, what remains to be seen and will be presented in the next section is whether there is scientific evidence to support the use of online instruction and its relationship to the self-efficacy of online learners.

Research on Online Instruction Self-Efficacy

Empirical findings related specifically to online instruction appear to be relatively limited and has not kept paced with the continue proliferation and use of online instruction in higher education. However, some studies have suggested

that computer and Internet self-efficacy as well as experience using the Internet, were important factors in influencing a student's success in online instruction (Tsai & Tsai, 2003; Randall, 2001; Hill & Hannafin, 1997). For example, a study conducted by Hill and Hannafin (1997) investigated the effect of perceived orientation, perceived self-efficacy, system knowledge, and prior subject knowledge, on strategies used in conducting electronic information searches. Their findings indicated computer self-efficacy to influence learners electronic information searches. Specifically, the findings found learners' perceived self-efficacy affected both the number and types of strategies used in conducing an electronic information search. Consequently, learners with high self-efficacy exerted more strategies to their searches than those with low selfefficacy.

Levine and Donitsa-Schmidt (1998) pursued the factors that influenced computer self-efficacy and also found participants who expressed stronger computer confidence, demonstrated more positive attitudes towards computers and had higher levels of computer-related knowledge. In a recent study Wang and Newlin (2002), investigated college students' personal choices for taking web-based courses and whether their self-efficacy would predict performance in online instruction. Students who were curious about web courses were found to display higher self-efficacy and class performance than those who enrolled because of course availability.

These findings confirmed the influence of self-efficacy in predicting success in computer and online technologies. Additional research relating to self-

efficacy behaviors associated with computer use and the Internet is explored further in the following sections.

Computers and Self-Efficacy Behaviors

Self-efficacy provides a framework for understanding the behavior of individuals with regard to computer usage and acceptance or rejection of technology (Olivier & Shapiro, 1993; Schunk, 1990). The application of the self-efficacy construct to the computer technology domain known throughout the literature as computer self-efficacy, is defined as a judgment of an individual's ability to use a computer. It is not concerned with past performances but instead with judgments of what could be done in the future (Compeau & Higgins, 1995). Computer self-efficacy is also considered to be a dynamic judgment that changes with the information acquired (Gist & Mitchell, 1992).

According to Marakas, Yi and Johnson (1998), computer self-efficacy can exist at the specific computer application level as well as general computing level. They further suggested that computer self-efficacy not only influences one's belief regarding his or her ability to perform a computer task but also his or her intentions towards future computer use. Studies have also shown computer self-efficacy to be influenced by many internal and external factors such as organizational culture (Sheng, Pearson & Crosby, 2003).

Generally, researchers have confirmed that computer self-efficacy determines decisions made by individuals to accept and use computers as well as it is a good predictor of achievement in computer related tasks (Torkazdeh, Koufteros & Pflughoeft, 2003). For example, Compeau and Higgins (1995)

revealed that computer self-efficacy played an important role in shaping an individual's feelings and behavior. For example, individuals with a high computer self-efficacy experienced less anxiety, used computers more and resulted in having more enjoyment in their use than those with a low computer self-efficacy. Their study concluded that enjoyment, and anxiety levels as well as encouragement from others were significant factors in using computers. Oliver and Shapiro (1993) concur and found that individuals regarded as efficacious in using the computer will anticipate positive and challenging computer experiences. Likewise, those who view themselves as inefficacious are likely to expect negative computer experiences.

As was previously mentioned, an individual's belief in his or her ability to use a computer is considered to be an important predictor in their willingness to continue learning and using a computer in the future. This view was tested in a study conducted by Hill, Smith, and Mann, (1987) which investigated the relationship between the computer self-efficacy beliefs of students and their readiness towards using computers. They assessed a sample of 204 undergraduate students enrolled in an introductory psychology course. Findings revealed the computer self-efficacy of students as having a significant impact in learning about computers. Additionally, the behavioral intentions of students significantly predicted their actual decisions to use a computer, independent of their beliefs about the value of learning and using computer technology. Bandara (1997) concurs that "one's efficacy to master computers predicts enrollment in computer courses independently of beliefs about the instrumental benefits of knowing how

to use them" (p. 435). As a result, the findings of this study suggest that computer self-efficacy is an important factor in determining an individual's decision to use computers.

An essential feature of computer self-efficacy relates to an individual's interest and positive relationship when using and interacting with computers. In a study conducted by Zhang and Espinoza (1998), they investigated the relationships concerning computer self-efficacy, computer attitudes and perceptions of desirability to learn computer skills among undergraduate students attending a regional state university. A total of 296 students enrolled in three computer courses and one noncomputer course participated in the study. The findings confirmed previous research (Hill et al, 1987) where students' attitudes towards computers affected their confidence levels in using computers. As a result, students with a high computer self-efficacy were shown to have more desire in enrolling in computer courses than students with low computer self-efficacy. This study further suggested that computer self-efficacy was a significant predictor for students' desirability of learning computer skills.

Thus, the general consensus reported in the findings on computer self-efficacy have indicated that individuals with a high self-efficacy regarding computers were more confident and appear to perform better in using computer technology than those with a low computer self-efficacy (Hill et al, 1987; Zhang and Espinosa, 1998; Oliver and Shapiro, 1993; Compeau and Higgins, 1995; Faseyitan, Libii, & Hirschbuhl, 1996). As a result, an inference can be made in

that students with high computer self-efficacy are more likely to explore new technologies such as online and web-enhanced online instruction.

Internet and Self-Efficacy Behaviors

Self-efficacy beliefs have been shown to influence and predict behaviors relative to the success and use of computers. Likewise, beliefs in one's capabilities to perform and execute Internet-related tasks such as using a browser, can also be a potentially important factor in efforts to use online instruction. Research has confirmed that a high self-efficacy translates in more confidence in using computers (Olivier & Shapiro, 1993). This confirmation can also be applied to Internet self-efficacy behaviors where individuals with a high Internet self-efficacy promote a greater understanding and satisfaction in performing Internet-related tasks. Evidence of this is explored in a study conducted by Tsai and Tsai (2003), which examined the influences of Internet self-efficacy on information searching strategies of students enrolled in an Information Education course at a university located in Taiwan. An instrument was developed to assess students' Internet experience such as weekly usage and Internet self-efficacy behaviors and administered to eight students randomly selected from a pool of 73 college freshmen. Results indicated that those with a high Internet self-efficacy performed better at information searching strategies and learned better than those with low Internet self-efficacy in a web-based learning task.

Demographic Characteristics and Online Instruction Self-Efficacy

Although empirical research related specifically to the connection between Internet-related tasks and self-efficacy remains sparse, one can infer that students

with a high self-efficacy regarding the Internet would be also more likely to consider and be more confident using online instruction technologies. Additionally, individual differences can impact learners' computer and Internet self-efficacy beliefs and these differences are explored in the following sections.

Gender Differences

Gender differences with regard to computer self-efficacy and beliefs towards computers and the Internet represent important factors related computer self-efficacy and online instruction. Individuals who lack the required technology skills and self-efficacy could be disadvantaged in the 21st century classroom where web-enhanced technologies such as email, and online discussion boards are the norm. Historically, males have been found to have a higher affinity towards computers than females. This view is also applicable to the area of computer self-efficacy. For example, in a sample of undergraduate students, Miura (1987) found males to have significantly higher computer self-efficacy than females.

Similarly, more recent findings investigating gender differences in computer self-efficacy such as the meta-analysis study conducted by Whitley (1997) comparing US and Canadian participants, revealed that men and boys exhibited higher computer self-efficacy than women and girls with the largest difference in gender occurring in high school students. Similarly, Qutami and Abu-Jaber (1997) found within their study of 165 students enrolled in a required introductory computer course in the College of Education at Sultan Qaboos University that although there was no gender difference on the overall computer

self-efficacy score, some significant differences were noted in specific low-level computer skills in favor of males.

Some studies investigating gender differences in computer self-efficacy seem to indicate that the difference might be attributed to the perceived complexity of the task performed. For example, Busch (1995) conducted a study assessing self-efficacy beliefs relative to the degree of simplicity and complexity of tasks associated with two software applications. Findings revealed males reported higher levels of self-efficacy than females when completing complex tasks using a variety of software programs such as word processing and spreadsheet programs. In contrast, no gender differences were found in computer attitudes or self-efficacy between males and females when completing simple computer tasks. Similarly, Murphy, Coover and Owen (1989) found males demonstrating higher computer self-efficacy for advanced computer skills than females. However, there were no gender differences associated with beginning-level computer skills.

Findings reported in the literature regarding gender differences in computer self-efficacy can also extrapolate to the Internet. For example, Durndell and Haag (2002) investigated computer self-efficacy, computer anxiety, Internet attitudes and experience of 74 female and 76 male Romanian university students. The results of their study revealed significant gender differences with male students reporting higher computer self-efficacy, lower computer anxiety, more positive attitudes towards the Internet and longer use of the Internet than female students.

Age Differences

The review of literature has revealed that age, similar to gender differences is another variable that correlates to comfort with computers and online instruction. However, the evidence reported in the literature regarding the relationship between age and computer self-efficacy appears to be indirectly instead of directly related to each other (Salanova, Grau, Cifre, & Liorens, 2000).

Findings appear to indicate that younger students have been exposed to computers while older and returning students may have had limited exposure to computers, resulting in increased computer anxiety. Additionally, older students who may experience computer anxiety tend to take longer in completing online and computer tasks than younger adults. For example, Dyck and Smither (1994) found that individuals with more computer experience, are less anxious when using computers. They found this to be true for younger and older subjects. However, given similar computer experience, age does not seem to make a difference in people's comfort levels with computers.

Experience Using Computers

Computer experience or prior use of computers has been regarded as another influential factor in developing and improving computer self-efficacy beliefs. Past research has indicated the positive relationship between computer self-efficacy and experience using computers (Ertmer, Evenbeck, Cennamo, & Lehman, 1994). Recently, the positive influence of computer experience and computer self-efficacy was confirmed in a study conducted by Hassan (2003) where he investigated the general and specific computer experience on the

computer self-efficacy of 151 students enrolled in a computer information system course at a four-year public institution. Findings from his study revealed specific experience with computer programming and graphics had a significant impact on computer self-efficacy beliefs when compared to experience using spreadsheet and database applications.

The positive influence of experience and computer self-efficacy was also supported in a study conducted by Torkzadeh and Koufteros (1994) which examined the computer self-efficacy of a sample of 224 undergraduate students. Findings from this study revealed that the computer self-efficacy of students increased as a result of taking a computer training course.

Research conducted by Campbell and Williams (1990) indicated that computer self-efficacy was developed through mastery experiences, which is considered to be one of Bandura's four sources of self-efficacy development. However, they noted that experience alone did not enhance computer self-efficacy. Smith (2001) concurred that mastery experience alone did not influence computer self-efficacy and concluded in her study of 210 university students that mastery experiences had a significant correlation with vicarious learning, verbal persuasion, and affective states.

Although studies have confirmed the positive influences of computer self-efficacy and experience (Hassan, 2003; Henry & Stone, 1999; Ertmer, Evenbeck, Cennamo, & Lehman, 1994; Harrison, A. & Rainer, K. 1992), other studies have reported conflicting or mixed results. For example, Karsten and Roth (1998) investigated the relationship among computer self-efficacy, computer experience,

and computer-dependent performance of 98 undergraduate students enrolled in an introductory computer literacy course. Results suggested that although computer self-efficacy was found to have a significant impact on a computer-dependent course it was not significantly related to computer experience. Hassan (2003) suggested that the inconsistency reported in the findings might be attributed to computer experience used in most research as a single dimensional construct reflecting the amount of years of computer use or the amount of general computer experience.

Experience Using Online Instruction and the Internet

Participation in online learning requires use of online technologies and online learning system tools. These include systems such as Blackboard, WebCT, computer conferences, the Internet, and e-mail. To succeed in web-enhanced instructional courses, students should be able to use technologies to access course materials, send and retrieve e-mail, browse the Internet, and perform searches to located information.

In a study conducted by Eastin and LaRose (2000), students with prior Internet experience, outcome expectancies and Internet use were found to significantly and positively correlate to Internet self-efficacy beliefs. In contrast, students with limited or inadequate computer experiences or skills were not efficacious to participate in online learning, which can eventually lead to anxiety or stress surrounding Internet use. Consequently, the complexity and knowledge barriers associated with the Internet and online instruction adoption, as well as

comfort and satisfaction issues faced by new users may be construed as self-efficacy deficits (Eastin & Rose, 2000).

Since self-efficacy is the belief "in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3), then individuals who have little confidence in their ability to use the Internet and online instruction may be regarded as having low self-efficacy beliefs. As a result, those with low self-efficacy beliefs would be less likely to perform related online instruction behavioral tasks in the future when compared to those with high degrees of self-efficacy.

Research related to online instruction self-efficacy is examined in a study conducted by Randall (2001), using an exploratory factor analysis to create the Tennessee Online Instruction survey (TOIS) instrument in which three factors were identified. These three factors identified were Internet/technology behaviors, collaborative behaviors, and individual behaviors. Using a sample of 762 electrician instructors surveyed during conference training at their National Training Institute (NTI) in August 2001, Randall found that online instruction and Internet experience were positively related to online instruction self-efficacy beliefs.

Conversely, in a follow-up study using the TOIS survey, Loboda (2002) investigated the effect of an introductory computer course on students' online instruction self-beliefs. Her study revealed that although online instruction experience provided a significant correlation to online instruction self-efficacy, Internet experience was found not to be related to online instruction self-efficacy.

An explanation for this incongruency found between Internet experience and online instruction self-efficacy for this study may be attributed to the framework of self-efficacy theory where "self-efficacy may generalize to other situations when similarity of skills for different tasks is required. Internet experience might be a primary source for self-efficacy for Internet use. However, a different range of skills required for Internet use and online learning may have prevented related Internet self-efficacy to online instruction self-efficacy" (Loboda, 2002, p. 73).

Experience Using an Online Learning System Tool

Online instruction self-efficacy also appears to correlate when using a course or learning management tool within an online learning environment. For example, Yi and Hwang (2003) examined the variables of self-efficacy, enjoyment, and learning goal orientation in predicting the use of the Blackboard course management system. One hundred and nine students from three sections of an introductory IS course were assessed using an instrument that measured application specific self-efficacy. The questionnaire featured an 11-point Likert scale with items ranging from completely disagree to completely agree and students were asked to indicate their agreement with statements such as "I believe I have the ability to download the file from the Blackboard system to my floppy disk" (Yi and Hwang, 2003, p. 439). The findings of this study revealed self-efficacy, particularly application self-efficacy (i.e., self-efficacy related to the application, in this case Blackboard), played an important role in determining the adoption and use of a learning management system. Other variables such as

enjoyment and learning goal orientation were also found to influence the decision in the actual use of such a system.

Criticisms of Self-Efficacy Theory and Assessment Tools

Issues and criticisms surrounding self-efficacy theory seem to be centered on the construct of self-efficacy being a predictor of behavior versus a cause of behavior. Hawkins (1992) wrote that self-efficacy was more a predictor of behavior than a cause. In response to Hawkin's criticism, Bandura (1995) raised a series of counter arguments where he indicated that Hawkin's article was an "overzealous effort to refute self-efficacy theory" (p. 187). In his rebuttal to Bandura's arguments, Hawkins asserted that self-efficacy is a predictor of behavior rather than a cause of behavior and stated that "I would be pleased to support the theory rather than criticize it, if it were not for the claim of causation" (Hawkins, 1995, p. 236).

Criticisms have also been raised with regards to instruments used in assessing self-efficacy beliefs, especially adherence to specificity, which is often overlooked within educational research (Pajares, 1996). The specificity of the content relates to how closely an efficacy measure relates to the criterial tasks on which performance is measured. As a result, Bandura (1986) warned researchers in assessing the academic outcomes related to students' self-efficacy beliefs, that it is important to adhere to the theoretical guidelines regarding the specificity of self-efficacy instruments. Not adhering to self-efficacy guidelines results in "poorly defined construct, confounded relationship, ambiguous findings, and uninterpretable results" (Pajares & Miller, 1994, p. 194).

Problems have also been reported as it relates to specific instruments used in the literature to assess computer self-efficacy. For example, a self-efficacy instrument developed by Compeau and Higgins (1995) measured general computer use associated with completing a job. This instrument included a 10-point scale, where respondents were asked to rate their confidence in completing a hypothetical job using a new hypothetical software package. Two major concerns regarded the use of a hypothetical scenario for scale responses, were identified by Compeau and Higgins. First, respondents may not be capable of imagining all that is required of them in an effort to answer the questions and second, the instrument primarily measured learning self-efficacy versus using computers.

Another criticism concerned the validity of self-efficacy instruments such as the instrument developed by Hill et all (1987) which had only four items. The criticism involved the validity of the scale used as a measure of computer self-efficacy when the majority of the items relate only to the general domain of computing. Similarly, the Computer Technologies Survey which measured self-efficacy and computer use, consisted of 46 items with subscales measuring self-efficacy with regard to specific computer technologies such as word processing, email and various print functions. The criticism associated with this instrument reflected the failure to provide an overall composite score for self-efficacy but instead indicated self-efficacy levels for individual technologies. (Delcourt & Kinzie 1993). Instrument bias has also been reported as a potential flaw of self-efficacy instruments. For example, the instrument developed by Murphy, Coover

and Owen (1989) may introduce some bias since all items are positively worded on a five point Likert scale, and each item is preceded by "I feel confident".

The literature has revealed related instruments designed to measure online instruction self-efficacy. For example, instruments such as the Online Technologies Self-Efficacy Scale (Miltiadou, 2000), and the Internet Self-Efficacy Scale (Torkzadeh & Van Dyke, 2001) have been developed and used in measuring a learner's self-efficacy in online learning and instruction. Although these instruments relate to the domains of Internet use and online technologies, they do not measure the content and context specificity related to online instruction, hence the need and development of the TOIS instrument by Randall (2001) which addresses this issue.

Despite the debate surrounding the criticisms of self-efficacy theory and its assessment used in instruments, the construct continues to be widely supported and validated within the literature as an important and related predictor of behavior when using computers or the Internet.

Summary of Literature Review

The review of related research and literature offered an overview of pertinent research related to online instruction and self-efficacy. The research suggested that the domain of social cognitive theory and self-efficacy beliefs necessitates exploration, especially given the increase of online learning in higher education. Specifically, the concept of self-efficacy as proposed by Bandura (1997) postulates that individuals who believe in their capabilities to accomplish a given task perform better, and have an influence on choice of activities, and are

more persistent. As a result, these self-efficacy beliefs have significant implications for instructors who design and integrate technology into their courses as these beliefs are important in helping to predict and understand online instruction acceptance and use among students. As the literature has demonstrated experience in using computers and Internet were found to significantly correlate to higher self-efficacy beliefs. Thus, in order to continue the facilitation regarding the implementation of instructional technologies in higher education, more research needs to be conducted to investigate self-efficacy and online instruction in order to meet the growing needs of the online student learner.

CHAPTER III

Methodology

The purpose of the study was to examine online instruction self-efficacy among college students and the demographic variables of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and the use of an online learning system. The study utilized a quantitative approach to compare significant differences that might exist between online instruction self-efficacy beliefs among student learners and their demographic characteristics. This chapter provides a synopsis of information related to the research procedures used for conducting this study such as the population, instrumentation dependent and independent variables, data collection, research design and analysis and research hypotheses.

Population

The population of the study consisted of the total number of undergraduate students enrolled at Maryville College during Fall 2003 and Spring 2004 semesters. The population of approximately 1000 students was used to conduct the study. The population consisted of students who were introduced and used web-enhanced instruction such as their instructor's website. Web-enhanced courses were created using Blackboard which is an online learning system tool. Students were from diverse disciplines such as humanities, natural and social sciences, education, behavioral science, fine arts and mathematics/computer science. Permission to conduct this study was granted from the Executive Director of Research for Maryville College (see Appendix A) and the University

of Tennessee's Office of Research, respectively. The survey was administered to the student population attending the college during the period of Fall 2003 and Spring 2004.

Instrumentation

Within the literature review it was revealed that there were some self-reporting instruments utilized to study computer and Internet self-efficacy. For example, there were a number of surveys developed to measure self-efficacy in the specific domain of computer use. The literature also revealed instruments designed to measure related online instruction self-efficacy. For example, instruments such as the Online Technologies Self-Efficacy Scale (Miltiadou, 2000), and the Internet Self-Efficacy Scale (Torkzadeh & Van Dyke, 2001) have been developed and used in measuring a learner's self-efficacy related online learning and instruction.

Despite the plethora of instruments cited within the review of literature that were used to measure computer and related online instruction self-efficacy beliefs and while each of these instruments are reported to be of some value to the measurement of computer and online instruction self-efficacy, there are limitations in which reliability problems may exist because the instruments were comprised of too few specific items relative to online instruction and may not be valid in the current context of this research to measure online instruction self-efficacy. As a result, the instrument chosen to measure students' online self-efficacy beliefs was the Tennessee Online Instruction Scale (TOIS) developed by Fredrick Randall and Gregory Petty (see Appendix E).

The TOIS was developed to measure online instruction self-efficacy beliefs and was administered to a sample of 762 electrician instructors from the National Joint Apprenticeship Training Committee (NJATC) attending the annual National Training Institute (NTI) held in August 2001 (Randall, 2001). The instrument was validated using a two phased pilot test. The first phase of pilot testing consisted of a panel of experts who reviewed the instrument for face validity and item clarity. The second phase involved using university students to test for item clarity and reliability. The TOIS achieved overall reliability coefficient of .98 for all 40 survey items. As a result, the TOIS instrument had a highly consistent and "sufficient internal reliability" (Randall, 2001, p. 82).

The TOIS survey consisted of two sections: (1) a list of 40 survey items and (2) background information. The first section of the TOIS instrument comprised of 40 statements used for gathering information about an individual's belief in participating in online courses. The online instruction self-efficacy statements include for example, "If participating in an online course, I believe I could complete a project with other course participants" or "If participating in an online course, I believe I could evaluate the quality of information found on a website". These statements were categorized using three main online instruction self-efficacy behavioral tasks derived after a factor analysis procedure was conducted: (1) Internet/technology behaviors (2) collaborative behaviors, and (3) individual behaviors. The TOIS instrument uses a 7-point Likert scale ranging from *Never* (1) to *Always* (7), with 1 = Never, 2 = Almost Never, 3 = Seldom, 4 = Sometimes, and 5 = Usually, 6 = Almost Always, and 7 = Always.

Section Two of the TOIS consists of background questions about students' demographic information. Consent was given to convert the original paper-based format of the TOIS survey to html format, which was then placed on the web. Additionally, consent was given to modify Section Two, which is the background information of the TOIS survey to reflect the demographic characteristics for this research. The background information items included questions about gender, classification rank, age, academic major, access to computers, computer experience, online instruction experience, Internet experience, and the use of an online learning system. Additionally, participants were asked to provide their email addresses for the chance to register to receive a $40.00 cash prize. Ten participants were randomly selected and awarded cash prizes for completing the survey. Email addresses were used solely for the purposes of notifying the winners for the cash prizes.

Data Collection

An email message endorsed by the Executive Director for Research and the Executive Director of Instructional Technology for Maryville College explaining the purpose and significance of the survey, assuring confidentiality, and encouraging participation was sent to the entire selected student population during the Fall 2003 semester (see Appendix B). The email message also contained a link which participants followed to complete the online TOIS survey. A week after the first email message was sent containing the online survey, a follow-up message (see Appendix C) stating the importance of completing the survey was emailed to respondents. The first and second electronic mailings of

the survey yielded a total of 68 (7%) and 106 (11%) responses, respectively. Due to the low response rate of the previous two attempts at collecting participant responses, it was decided that a final follow-up email message would be necessary to obtain the ideal 20% response rate. The low response rate may be attributed to the fact that part of the research was conducted during the students' exam period. As a result, a final follow-up email message was sent in the Spring 2004 semester to encourage final completion of the online survey to those students who had not responded. The final message containing a link to the TOIS survey was also posted on the Blackboard online course management learning system (see Appendix D). A total of 281 students, approximately 70% female and 30% male, responded to the TOIS survey. Five surveys were not used due to incomplete responses resulting in 276 usable responses and a response rate of 28%. Additionally, students were asked to provide their email addresses only for the purpose of notifying winners of the $40.00 cash prize. Ten students were randomly chosen and were awarded the $40.00 cash prize.

Once the participants completed the survey, the data results were automatically stored on the University of Tennessee, Knoxville's web server and analyzed using the Statistical Program for Social Sciences (SPSS).

Research Design and Data Analysis

According to Merriam (1988), choosing the research design "is determined by how the problem is shaped, by the questions it raises, and by the type of end product desired" (p. 6). Specifically, the data analysis provided answers to the two main research questions of this study: (1) What are the online

instruction self-efficacy beliefs among students as measured by the Tennessee Online Instruction Survey (TOIS)? and (2) Do online instruction self-efficacy beliefs differ significantly for the demographic variables of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience and use of an online learning system?

The Statistical Program for Social Sciences (SPSS) software was connected to the results of the online survey and was used to perform the statistical analysis. A factor analysis procedure was used for the study to identify dimensions for online instruction self-efficacy beliefs for this population and to provide answers to the first research question. The use of this technique allows the reduction of a number of variables by grouping variables that are moderately or highly correlated with one another into identifiable factors (Fraenkel & Wallen, 2003).

The 40 items of the TOIS instrument were factor analyzed using an orthogonal rotation with a varimax procedure to delineate the underlying three factors which were Internet/technology behaviors, collaborative behaviors, and individual behaviors, associated with this sample of learners' online instruction self-efficacy beliefs. Additionally, a criterion for factor loading was derived in which only items with factor loading greater than 0.3 would be included in each factor grouping.

The demographic variables which included gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and the use of an online learning system were

analyzed using descriptive statistics such as means, standard deviation, and frequencies. Additionally, descriptive statistics were also used in order to categorize the background information and to reveal students' perceptions of their online instruction self-efficacy beliefs.

Parametric statistics were used to provide answers to the second research question. These statistical procedures included the multivariate analysis of variance (MANOVA) tested at a .05 significance level used to test differences found between online instruction self efficacy beliefs and the demographic variables of gender, classification rank, academic major and computer experience. Huck, Cormier, & Bounds (1974) indicated that MANOVA is a useful statistical procedure used to investigate the correlation between dependent variables and to compare multiple factors within a study. Additionally, MANOVA is the best test used for testing the differences among groups relative to the dependent variables.

Additionally, the univariate analysis of variance (ANOVA), and Tukey Honestly Significant Difference (HSD) post-hoc tests were employed when significant differences were found in the MANOVAs. The Pearson R correlation was also utilized in the study to test the relationship between online instruction self-efficacy beliefs and the demographic variables of age, computer experience, online instruction experience, Internet experience and the use of an online learning system.

Independent Variables

The independent variables were gender, classification rank, age, academic major, computer access, computer experience, Internet experience, online

experience and the use of an online learning system and instructor website. Gender variable consisted of two categories: (1) male (2) female. Classification rank variable contained four categories which were: (1) freshman (2) sophomore (3) junior (4) senior. Academic major variable had 7 categories: (1) humanities (2) natural sciences (3) behavioral science (4) social science (5) education (6) fine arts (7) mathematics/computer science. Computer access variable contained 5 categories: (1) computer lab on campus (2) at work (3) dormitory or residence hall (4) at home (5) other. The variables, computer experience, online instruction experience, Internet experience and the use of an online learning system, asked respondents to select their experiences for each of these variables ranging from "very low" to "very high".

Dependent Variables

The dependent variables for this study consisted of the three exploratory factors measured by TOIS. These are Internet/technology behaviors, collaborative behaviors, and individual behaviors scores of the online instruction self-efficacy instrument.

Research Hypotheses

Utilizing data collected from the population of undergraduate students, the following nine research hypotheses were addressed to provide answers to the second research question:

H_o1: There is no significant difference in online instruction self-efficacy beliefs with regard to gender as measured by the TOIS among students.

H_O2: There is no significant difference in online instruction self-efficacy beliefs with regard to classification rank as measured by the TOIS among students.

H_O3: There is no significant relationship between online instruction self-efficacy beliefs with regard to age as measured by the TOIS among students.

H_O4: There is no significant difference in online instruction self-efficacy beliefs with regard to academic major as measured by the TOIS among students.

H_O5: There is no significant difference in online instruction self-efficacy beliefs with regard to computer access as measured by the TOIS among students.

H_O6: There is no significant relationship between online instruction self-efficacy beliefs and extent of computer experience as measured by the TOIS among students.

H_O7: There is no significant relationship between online instruction self-efficacy beliefs and extent of online instruction learning experience as measured by the TOIS among students.

H_O8: There is no significant relationship between online instruction self-efficacy beliefs and extent of Internet experience as measured by the TOIS among students.

H_O9: There is no significant relationship between online instruction self-efficacy beliefs and extent of using an online learning system as measured by the TOIS among students.

Summary

The primary purpose of the research was to utilize the TOIS instrument in assessing online instruction self-efficacy beliefs among undergraduate students and the demographic variables of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience and the use of an online learning system. This chapter presented the research methodology, which included information relating to the

population, instrumentation dependent and independent variables, data collection, research design and analysis and research hypotheses used to meet the purposes of this study.

CHAPTER IV

Findings

The purpose of the study was to investigate online instruction self-efficacy beliefs among undergraduate students and the demographic variables of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience and use of an online learning system experience. Other findings presented in this chapter are the results of the factor analysis and reliability of survey items, MANOVA, ANOVA, and correlation analyses of demographic variables and corresponding post-hoc tests. Finally, this chapter provides a summary of findings and discussion of the nine research hypotheses.

Descriptive Statistics for Demographic Variables

The demographics for the research were participants' gender, classification rank, age, academic major, computer access, computer experience, Internet experience, online instruction experience and the use of an online learning system.

Gender, Rank and Age Demographics

Participants for this research were predominantly female. Of the 276 survey respondents, 192 (70%) reported as females, compared to 83 (30%) males as shown in Table 1. With respect to the variable classification rank, the overwhelming majority 93 reported as being freshmen (34%), with 55 sophomores (20%), 58 juniors (21%) and 69 seniors (25%), as reported in Table 2. The average age reported by respondents was 21 years (see Table 3).

Table 1
Frequency Scores for Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	83	30.1	30.2	30.2
	Female	192	69.6	69.8	100.0
	Total	275	99.6	100.0	
Missing	System	1	.4		
Total		276	100.0		

Table 2
Frequency Scores for Classification Rank

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Freshman	93	33.7	33.8	33.8
	Sophomore	55	19.9	20.0	53.8
	Junior	58	21.0	21.1	74.9
	Senior	69	25.0	25.1	100.0
	Total	275	99.6	100.0	
Missing	System	1	.4		
Total		276	100.0		

Table 3
Frequency Scores for Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		8	2.9	2.9	2.9
	17	2	.7	.7	3.6
	18	55	19.9	19.9	23.6
	19	54	19.6	19.6	43.1
	20	49	17.8	17.8	60.9
	21	51	18.5	18.5	79.3
	22	32	11.6	11.6	90.9
	23	5	1.8	1.8	92.8
	24	1	.4	.4	93.1
	25	4	1.4	1.4	94.6
	26	1	.4	.4	94.9
	27	2	.7	.7	95.7
	28	1	.4	.4	96.0
	30	1	.4	.4	96.4
	31	1	.4	.4	96.7
	33	3	1.1	1.1	97.8
	34	1	.4	.4	98.2
	35	3	1.1	1.1	99.3
	43	1	.4	.4	99.6
	46	1	.4	.4	100.0
	Total	276	100.0	100.0	

Academic Major Demographics

The academic major variable consisted of majors such as humanities, natural sciences, social sciences, education, behavioral science, fine arts, mathematics/computer science. Results revealed that the majority of respondents (23%) who submitted survey responses were from the social sciences as shown in Table 4. Additionally, for this variable the second and third highest number of survey responses were from 46 students with majors classified as education (16.7%) and 45 students with behavioral science majors (16.3%), respectively. The remaining responses came from students with other majors: 37 humanities majors (13.4%), 34 mathematics/computer science majors (13.4%), and 33 natural science majors (12.0%). The lowest responses to the survey were from 10 students with fine arts majors (3.6%).

Table 4
Frequency Scores for Academic Major

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Humanities	37	13.4	13.8	13.8
	Natural Sciences	33	12.0	12.3	26.1
	Social Sciences	63	22.8	23.5	49.6
	Education	46	16.7	17.2	66.8
	Behavioral Science	45	16.3	16.8	83.6
	Fine Arts	10	3.6	3.7	87.3
	Mathematics/ Computer Science	34	12.3	12.7	100.0
	Total	268	97.1	100.0	
Missing	System	8	2.9		
Total		276	100.0		

Computer Access Demographics

For the computer access variable, students were asked to select the locations where they used a computer. The location options specified on the survey, were: (1) computer lab on campus; (2) dormitory or residence hall; (3) at work; (4) at home; and (5) Other, please specify. More than half of the respondents, 147 students (53.3%), cited frequently accessing the computer through their dormitory or residential hall, followed by 77 students (27.9%) who reported using the computer at home (see Table 5). Forty-three students (15.6%) cited using the computer lab on campus with only 2 students indicating that they accessed the computer from work.

Computer Experience Demographics

The next demographic variable measured by the TOIS instrument was computer experience, which consisted of a variety of computer experiences and was distributed along a scale representing "very low" to "very high" scores.

Table 5
Frequency Scores for Computer Access

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer Lab on campus	43	15.6	15.6	15.6
	Dormitory or Residence Hall	147	53.3	53.5	69.1
	At Work	2	.7	.7	69.8
	At Home	77	27.9	28.0	97.8
	Other	6	2.2	2.2	100.0
	Total	275	99.6	100.0	
Missing	System	1	.4		
Total		276	100.0		

The majority of respondents (29.7%) revealed as having a higher than average computer experience. Seventy respondents (25.4%) reported having average computer experience followed closely by 68 respondents (24.6%) who had high computer experience. Forty-seven participants (17.0%) had very high computer experiences while 6 respondents (2.2%) cited their experiences as being lower than average and only 2 students responded as having low computer experience, respectively. Frequency scores for computer experience are reported in Table 6.

Online Learning Instruction Experience Demographics

Students were asked to rate their learning experience with online instruction from a scale representing "very low" to "very high" scores. In this context learning experience refers to a student's knowledge and understanding in using online instruction. An overwhelming majority rated their learning

Table 6
Frequency Scores for Computer Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low	2	.7	.7	.7
	Lower than average	6	2.2	2.2	2.9
	Average	70	25.4	25.5	28.4
	Higher than average	82	29.7	29.8	58.2
	High	68	24.6	24.7	82.9
	Very High	47	17.0	17.1	100.0
	Total	275	99.6	100.0	
Missing	System	1	.4		
Total		276	100.0		

experience with online instruction as having average or "normal" experience with online instruction. For this demographic variable, an equal number of respondents reported having either very low or low online instruction experience. Specifically, 34 respondents (12.3%) reported lower than average experience, 112 respondents (40.6%) had average experience, 43 respondents (15.6%) had higher than average, 21 respondents (7.6%) had high experience and 17 respondents (6.2%) had very high experience, with online instruction. Only 1 person did not respond to this item (see Table 7).

Internet Experience Demographics

When respondents were asked about their experience in using the Internet, the majority, 71 respondents (25.7%), indicated that they had high experience followed closely by 69 respondents (25.0%) who had average experience as

Table 7
Frequency Scores for Online Instruction Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	24	8.7	8.7	8.7
	Low	24	8.7	8.7	17.5
	Lower than average	34	12.3	12.4	29.8
	Average	112	40.6	40.7	70.5
	Higher than average	43	15.6	15.6	86.2
	High	21	7.6	7.6	93.8
	Very High	17	6.2	6.2	100.0
	Total	275	99.6	100.0	
Missing	System	1	.4		
Total		276	100.0		

shown in Table 8. Additionally, for this demographic variable, 64 respondents (23.2%) and 63 respondents (22.8%) reported having higher than average and very high Internet experience, respectively. Only 1 respondent each reported as having low to very low Internet experience. Three respondents (1.1%) did not respond to this item.

Using an Online Learning System Demographics

The final demographic variable assessed by TOIS involved the extent of using an online learning system such as Blackboard and instructor's website. The overall responses were positively skewed towards respondents having average, higher than average, and high experience in using an online learning system. The majority, 72 respondents (26.1%), reported having average experience in using an online learning system, while 67 respondents (24.3%) and 64 respondents

Table 8
Frequency Scores for Internet Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	1	.4	.4	.4
	Low	1	.4	.4	.7
	Lower than average	4	1.4	1.5	2.2
	Average	69	25.0	25.3	27.5
	Higher than average	64	23.2	23.4	50.9
	High	71	25.7	26.0	76.9
	Very High	63	22.8	23.1	100.0
	Total	273	98.9	100.0	
Missing	System	3	1.1		
Total		276	100.0		

(23.2%) reported having higher than average and high experiences, respectively. Forty three respondents (15.6%) cited having very high experiences in using an online learning system. Relatively few respondents indicated having very low to lower than average experiences in using an online learning system. Specifically, 4 respondents (1.4%) reported very low experience, 9 respondents (3.3%) reported low experience, and 13 respondents (4.7%) reported lower than average experience. Frequency scores for experience using an online learning system are reported in Table 9.

Findings for Research Question One

***Research Question One**: What are the online instruction beliefs among students as measured by the Tennessee Online Instruction Survey (TOIS)?*

To answer the first research question, descriptive statistics shown in the preceding sections that includes frequencies and percentages, were employed to

Table 9
Frequency Scores for Using an Online Learning System

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	4	1.4	1.5	1.5
	Low	9	3.3	3.3	4.8
	Lower than average	13	4.7	4.8	9.6
	Average	72	26.1	26.5	36.0
	Higher than average	67	24.3	24.6	60.7
	High	64	23.2	23.5	84.2
	Very High	43	15.6	15.8	100.0
	Total	272	98.6	100.0	
Missing	System	4	1.4		
Total		276	100.0		

analyze the research data. Additionally, a factor analysis procedure was employed to explore how the items would be grouped for this student sample and is presented in the next section.

Factor Analysis Results

An exploratory factor analysis with Varimax Rotation was conducted using all 40 items of the TOIS survey employing a rotated component matrix. Items were placed in a three-factor matrix model and examined for any variances, unnecessary and/or double loading on items. Items that did not make the established .30 rule as well as those not considered useful were also excluded. As a result, 7 items (items 14, 4, 20, 26, 39, 31 and 1) were not used, thus reducing the number of survey items from 40 to 33.

The remaining items were then reexamined and placed in a final rotated factor matrix as shown in Table 10. Based on this matrix and the respondents' interpretation of survey questions, it was revealed that the heading Online Learning was more representative of the items examined for factor 2 and as a result was added as a heading in addition to Collaborative. Factor 1 heading remained the same as Internet/Technology Behaviors. However, based on the survey items that were loaded, the Personal heading more nearly reflected the items chosen than the heading Individual. As a result, the heading for factor 3 was renamed to Personal instead of Individual. Thus the three factors used for describing a student's online learning self-efficacy behaviors for this research were categorized as follows: a) 9 items related to Factor 1: Internet/Technology;

Table 10
Final Factor Analysis with Reduced Items

Item	Factors		
	1	2	3
8. Use an Internet browser	.752		
6. Find my way (navigate) around websites	.672		
21. Save a document from the Internet	.665		
10. View an attachment from an incoming email message	.658		
36. Attach a file to an email message	.647		
12. Download and install software for my Internet browser that is needed for the course	.611		
25. Find information on a website that offered a keyword search feature	.610		
27. Use email to communicate effectively with my instructor	.607		
16. Follow standard online etiquette guidelines	.516		
28. Participate in a live online discussion in which course participants discuss a topic at the same time		.769	
22. Address disagreements between course participants online		.742	
24. Participate in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants		.728	
2. Take an online test on course subject matter		.665	
13. Learn from information presented in an audio format		.651	
9. Critique my instructor's performance in teaching the subject matter online		.647	
23. Keep appointments to meet other course participants online for scheduled events		.617	
11. Use email to communicate effectively with other course participants		.593	
5. Learn from information presented in a video format		.590	
29. Organize and lead a course project involving other participants		.563	
17. Keep myself on task			.778
38. Plan and manage my own learning needs			.723
7. Prioritize my own course activity workload			.700
33. Give myself enough time to complete assignments			.698
34. Develop a relationship with another course participant			.654
3. Stay involved with the course without face-to-face interaction with other course participants			.636
30. Stay involved with the course without face-to-face interaction with the instructor			.625
18. Learn from reading information presented on a computer screen			.606
32. Understand what other people are trying to convey in their writing			.579
19. Assess my progress in a course			.562
37. Understand a concept from reviewing materials presented on several different websites			.555
15. Making sense of ambiguous information			.535
35. Give constructive feedback to other course participants			.533
40. Express my opinion on controversial subject matters			.397

b) 10 items related to Factor 2: Collaborative/Online Learning; and c) 14 items related to Personal.

Reliability of the TOIS Survey Instrument

Cronbach's reliability coefficient alpha was used to test the reliability of all 40 items of the TOIS survey instrument. Overall scores for online instruction self-efficacy instrument including items from 1 to 40, revealed a Cronbach alpha of .968. After the factor analysis procedure was conducted, reliability was also tested on the remaining 33 items, which resulted in a score of .961. Cronbach reliability coefficient alpha was also used to test the reliability for the three behavioral factors, which resulted in the following scores: Internet (.909), Collaborative/Online Learning (.921) and Personal (.928). In comparison the behavioral factors tested within the Randall study revealed the following Cronbach reliability coefficients: Internet (.964), Collaborative (.942) and Individual (.895). The reliability information for reduced survey items is summarized in Table 11. Since all Cronbach alphas were above .8, one can conclude that the TOIS instrument is reliable.

Findings for Research Question Two ($H_0$1 – $H_0$9)

***Research Question Two**: Do online instruction self-efficacy beliefs among students differ significantly for the demographic variables of gender, classification rank, age, academic major, computer experience, online learning instruction experience, Internet experience and use of an online learning system?*

Nine null hypotheses were developed to provide answers to the second research question. Hypotheses 1, 2, 4, and 5 all utilized the multivariate analysis of variance (MANOVA) and Hypotheses 3, 6-9 used Pearson correlation analysis

Table 11
Reliability Test Based on Factor Analysis of Survey Items

Item Groups	Number of Survey Items Included	Cronbach Alpha
Factor 1: Internet/Technology Behaviors	9 total survey items	.909
Factor 2: Collaborative/Online Learning Behaviors	10 total survey items	.921
Factor 3: Personal Behaviors	14 total survey items	.928

statistical procedures. The MANOVA test was conducted to investigate differences within the demographic variables and online instruction self-efficacy beliefs among students. The MANOVA test examined gender, classification rank, academic major, and computer access. Pearson correlation tested age, the extent of computer experience, online instruction, Internet experience, and experience using an online learning system relative to the three online instruction self-efficacy behavioral factors, Internet, collaborative/online learning and personal. The research study also employed univariate analysis of variance (ANOVA) and Tukey Honestly Significant Difference (HSD) post-hoc tests whenever significant differences were found in the MANOVAs. Each research hypothesis is addressed in the following sections.

***H_o1**: There is no significant difference in online instruction self-efficacy beliefs with regard to gender as measured by the TOIS among students.*

Hypothesis $H_0$1 stated that there was no significant difference between online instruction self-efficacy beliefs and the demographic variable of gender. Table 12 represents the mean scores for all three factors. To test this research

Table 12
Gender Means for Self-Efficacy Factors

Dependent Variable	Gender	Mean	Std. Error
Internet	Male	5.801	.098
	Female	5.953	.064
Collaborative/Online Learning	Male	5.100	.122
	Female	5.281	.080
Personal	Male	5.370	.100
	Female	5.251	.066

hypothesis, a MANOVA was used in order to accept or reject this null hypothesis. The results of the MANOVA were (Wilks' Lambda=.956, F (3, 271)=4.20, p=.006). As a result of the MANOVA findings, individual ANOVAs were run as shown in Table 13. The overall findings revealed contradictory results of a significant MANOVA, but none of the individual ANOVAs were significant. Due to contradictory results and that if a difference was detected it would be too small to be important, the null hypothesis was accepted. As a result, it was concluded that no significant differences were evident.

***H_O2**: There is no significant difference in online instruction self-efficacy beliefs with regard to classification rank as measured by the TOIS among students.*

Hypothesis H_O2 stated that there was no significant difference between online instruction self-efficacy beliefs and the demographic variable of classification rank. For the Maryville College educational system, students were classified as either freshman, sophomore, junior, or senior. To test this hypothesis the MANOVA (Wilks' Lambda=.961, F (9, 655)=1.207, p=.287) revealed that no

Table 13
ANOVA Test for Gender and SelfEfficacy Factors

Self-Efficacy Factors	Type III Sum of Squares	df	F	Significance
Internet	1.334	1	1.686	.195
Collaborative/ Online Learning	1.911	1	1.536	.216
Personal	.823	1	.985	.322

significant differences existed among online instruction beliefs for either freshman, sophomore, junior, or senior students. Therefore, the null hypothesis was accepted.

***H_o3**: There is no significant relationship between online instruction self-efficacy beliefs with regard to age as measured by the TOIS among students.*

Hypothesis $H_0$3 stated that there is no significant relationship between the online instruction self-efficacy beliefs and the demographic variable of age. To test this null hypothesis, the Pearson correlation analysis was used. Since the variable age was used in the context of testing a relationship between the dependent variable (i.e. the TOIS factors, Internet, collaborative/online learning and personal), it was determined that it would be more appropriate to use correlation than MANOVA and ANOVA procedures. The analysis revealed that age was positively correlated with Internet behaviors (r =.133, p=.029). Age was also positively correlated with personal behaviors (r =.123, p=.044) at the 0.5 2-tailed significance level. No significant relationship was found between age and collaborative/online learning behaviors. Thus, the null hypothesis was rejected as the findings demonstrated that a significant correlation existed between age and Internet and personal behaviors as depicted in Table 14. As age increases,

Table 14
Correlation for Age and Self-Efficacy Factors

Self-Efficacy Factors	Correlation	Significance
Internet	.133	.029
Collaborative/ Online Learning	.106	.083
Personal	.123	.044

Internet and personal behaviors tend to increase. As a result, an older student will tend to have more Internet and personal self-efficacy skills than collaborative/online learning behavioral skills.

***H_O4**: There is no significant difference in online instruction self-efficacy beliefs with regard to academic major as measured by the TOIS among students.*

Hypothesis $H_0$4 stated that there was no significant difference between online instruction self-efficacy beliefs and the demographic variable of academic major. At Maryville College, students decide on an academic major from the following disciplines: humanities, natural sciences, social sciences, education, behavioral science, fine arts, and mathematics/computer science. Hypothesis $H_0$4 was tested using the MANOVA (Wilks' Lambda=.921, F (18, 733) =1.195, p=.258), which revealed that no significant differences existed among online instruction beliefs for students with varying academic majors. Thus, the null hypothesis was accepted.

***H_O5**: There is no significant difference in online instruction self-efficacy beliefs with regard to computer access as measured by the TOIS among students.*

Hypothesis $H_0$5 stated that there was no significant difference between online instruction self-efficacy beliefs and the demographic variable of computer access. To test this hypothesis the MANOVA was utilized. Since significant

differences were found in the MANOVA test an ANOVA was then conducted to assess individual differences among the three behavioral factors, Internet, collaborative/online learning and personal. Finally, the Tukey post-hoc test was then used to further assess differences between Internet and personal factors.

The MANOVA (Wilks' Lambda=.924, F (6, 524)=3.51, p=.002) revealed that significant differences existed where students access or used a computer. The overall findings further revealed that the highest usage for accessing the computer was through a student's dormitory or residence hall. Since significant differences were found, an ANOVA was conducted to test for individual differences within the three factors. As shown in Table 15, the findings from the ANOVA revealed significant differences with Internet (p=.002) and personal factors (p=.010) but no significant difference with collaborative/online learning behavior (p=.207). Thus, the null hypothesis was rejected.

Tukey post-hoc test was then conducted to further test for any individual differences within Internet and personal factors. Table 16 represents mean scores for Internet and Personal for accessing computers from either the computer lab on campus, the dormitory/residence hall, and at home.

Table 15
ANOVA Test for Computer Access and Self-Efficacy Factors

Dependent Variables	Type III Sum of Squares	df	F	Significance
Internet	10.026	2	6.535	.002
Collaborative/ Online Learning	3.956	2	1.584	.207
Personal	7.770	2	4.707	.010

Table 16
Tukey HSD for Computer Access and Internet and Personal Self-Efficacy Behaviors

Computer Access	Internet (Means)	Personal (Means)
Computer Lab on campus	5.47	5.03
Dormitory or Residence Hall	5.92	5.22
At Home	6.06	5.52

Multiple comparisons among students accessing computers who have either Internet or personal self-efficacy skills were also conducted as shown in Table 17. For example, there were significant differences for students with Internet behaviors who used a computer lab on campus to access computers when compared to those students accessing computers from the dormitory or residence hall (p=.010).

Likewise there was a significant difference between students who accessed the computer lab on campus to those who accessed from home (p=.001). However, no differences were found when comparing students who used computers from their dormitory or residence hall and those who used computers at home (p=.465). The overall means suggest that students who used computer labs on campus is significantly lower than those accessing computers from home or dormitory.

Table 17 also revealed that there were significant differences between students with personal self-efficacy behaviors who used computer labs on campus when compared to those who accessed computers from their homes (p=.012). Similarly, marginally significant differences were also cited with students who used computers from their dormitory/residence hall in comparison to those who

Table 17
Tukey HSD Multiple Comparisons for Internet and Personal Self-Efficacy Behaviors for Computer Access

Dependent Variable	Accessing Computers	Sig.
Internet	Computer lab compared to Dormitory or Residence Hall	.010
	Computer lab compared to At Home	.001
	Dormitory or Residence Hall compared to At Home	.465
Personal	Computer lab compared to Dormitory or Residence Hall	.429
	Computer lab compared to At Home	.012
	Dormitory or Residence Hall compared to At Home	.051

used computers from home (p=.051). No differences were found when comparing students who used computers from the labs on campus to those who used computers at their dormitory/residence hall (p=.465). The means also indicate that students who used computer labs on campus are significantly lower than those accessing computers from home and the dormitory or residence hall.

In the following sections, findings for the remaining hypotheses will be analyzed. In consultation with the statistical advisor, it was determined that the Pearson correlation procedure should be used to answer the research hypotheses $H_0$6- $H_0$9 that stated that no significant relationship existed between online instruction self-efficacy and the demographic variables of computer experience, online instruction learning experience, Internet experience, and experience using an online learning system. The Pearson correlation analysis was determined as more appropriate in observing whether and how the demographic variables

correlate with online instruction self-efficacy beliefs among students. The Pearson results and findings including the p-values for the research hypotheses $H_0$6 - $H_0$9 are examined in the next section.

$H_0$6. *There is no significant relationship between online instruction self-efficacy beliefs and extent of computer experience as measured by the TOIS among students.*

Hypothesis $H_0$6 stated that there was no significant relationship between online instruction self-efficacy beliefs and extent of computer experience. Table 18 presents the Spearman's rho findings tested at the .05 2-tailed significance level which indicated that computer experience positively correlated with all three behavioral factors: Internet (r=.479, p=<.001), collaborative/online learning (r=.329, p=<.001), and personal (r=.387, p=<.001). As a result, as a student's computer experience increases, all three self-efficacy factors, Internet, collaborative/online learning and personal self-efficacy increase. Thus, the null hypothesis was rejected.

$H_0$7. *There is no significant relationship between online instruction self-efficacy beliefs and extent of online learning instruction experience as measured by the TOIS among students.*

Hypothesis $H_0$7 stated that there was no significant relationship between online instruction self-efficacy beliefs and extent of online learning instruction

Table 18
Correlation for Computer Experience and Self-Efficacy Factors

Self-Efficacy Factors	Correlation	Significance
Internet	.479	<.001
Collaborative/ Online Learning	.329	<.001
Personal	.387	<.001

experience. The Spearman's rho findings tested at the .05 2-tailed significance level and presented in Table 19 indicated that online learning instruction experience positively correlated with all three behavioral factors: Internet (r=.184, p=.002), collaborative/online learning (r=.204, p=.001), and personal (r=.363, p=<.001). As a result, the findings also indicated that as a student's online learning instruction experience increases, all three self-efficacy factors, Internet, collaborative/online learning, and personal self-efficacy, increase. Thus, the null hypothesis was rejected.

H_o8. *There is no significant relationship between online instruction self-efficacy beliefs and extent of Internet experience as measured by the TOIS among students.*

Hypothesis $H_0$8 stated that there was no significant relationship between online instruction self-efficacy beliefs and extent of Internet experience. The Spearman's rho findings shown in Table 20 tested at the .05 2-tailed significance level indicated that Internet experience positively correlated with all three behavioral factors: Internet (r=.457, p=<.001), collaborative/online learning (r=.326, p=<.001), and personal (r=.370, p=<.001). Therefore, as evident in the preceding hypotheses, it was also found that as a student's Internet experience increases, all three self-efficacy factors, Internet, collaborative/online learning,

Table 19
Correlation for Online Instruction and Self-Efficacy Factors

Self-Efficacy Factors	Correlation	Significance
Internet	.184	.002
Collaborative/ Online Learning	.204	.001
Personal	.363	<.001

Table 20
Correlation for Internet Experience and Self-Efficacy Factors

Self-Efficacy Factors	Correlation	Significance
Internet	.457	<.001
Collaborative/ Online Learning	.326	<.001
Personal	.370	<.001

and personal self-efficacy, increase. The null hypothesis was rejected.

H_O9. *There is no significant relationship between online instruction self-efficacy beliefs and extent of using an online learning system as measured by the TOIS among students.*

Hypothesis $H_0$9 stated that there was no significant relationship between online instruction self-efficacy beliefs and extent of using an online learning system. The Spearman's rho findings shown in Table 21 tested at the .05 2-tailed significance level indicated that the use of an online learning system positively correlated with all three behavioral factors: Internet (r=.363, p=<.001), collaborative/online learning (r=.322, p=<.001), and personal (r=.392, p=<.001). As experience using an online learning system experience increases, all three self-efficacy factors, Internet, collaborative/online learning, and personal self-efficacy, increase. Thus, the null hypothesis was rejected.

In general, similar relationships were found to exist with hypotheses 6-9 in that all experiences relative to computer, online instruction, the Internet, and use of an online learning system positively correlated with the three self-efficacy factors. An average of the four experiences (i.e., computer, online instruction, Internet, and use of an online learning system) was computed and then a measure of the overall experience was established.

Table 21
Correlation for Using an Online Learning System and Self-Efficacy Factors

Self-Efficacy Factors	Correlation	Significance
Internet	.363	<.001
Collaborative/ Online Learning	.326	<.001
Personal	.392	<.001

Table 22
Correlation of Overall Experience and Self-Efficacy Factors

Self-Efficacy Factors	Correlation	Significance
Internet	.406	<.001
Collaborative/ Online Learning	.321	<.001
Personal	.467	<.001

The overall experience was then correlated to the three factors as represented in Table 22 which displays the Spearman's rho findings tested at the .05 2-tailed significance level. Experience was positively correlated with all three behavioral factors: Internet (r=.406, p=<.001), collaborative/online learning (r=.321, p=<.001), and personal (r=.467, p=<.001). The relationships of overall experience and the three factors are also displayed as scatter plot diagrams in Appendix F. These diagrams show that as overall experience increases all online instruction self-efficacy factors increase.

Summary

The findings chapter described results pertaining to the two research questions. Participants' demographic background, specifically the distribution of the demographic variables using frequency and percentage scores, and a factor analysis was used to answer research question one. The descriptive statistics revealed the majority of respondents as freshmen females with an average age of

21 years and classified as social sciences majors. Most students accessed their computers via dormitories and residential halls and reported having higher than average experience with computers, the Internet, and using an online learning system. Most students also reported having average experience with online learning instruction.

The factor analysis was conducted to identify three factors named Internet, collaborative/online learning, and personal used in describing students' online learning self-efficacy. The findings also confirmed the reliability of the 40 items as well as the reduced item model measured by the TOIS instrument.

Results from the null hypotheses testing described in Chapter 4 revealed that online instruction self-efficacy beliefs among students were not significantly different for gender, and classification rank variables. However, computer experience was found to be significantly different among students' online instruction self-efficacy beliefs. As a result, students with more computer experience developed a higher self-efficacy and those with less computer experience had lower self-efficacy beliefs. Self-efficacy beliefs were also found to be higher for participants who experience more online instruction, using the Internet, and an online learning system when compared to participants who had less experience in online instruction, the Internet and using an online learning system.

Conclusions for the study are presented in two main sections in Chapter 5 and represent findings based on the factor analysis of the TOIS instrument and

demographic characteristics of students. Chapter 5 also presents implications and recommendations associated with online instruction and self-efficacy beliefs.

CHAPTER V

Conclusions, Implications and Recommendations

The primary goal of the study was to investigate online instruction self-efficacy beliefs and through the use of the factor analysis procedure to determine whether the three online instruction self-efficacy behavioral factors (i.e. Internet, collaborative and individual) found in Randall's (2001) study remained valid for this population. An additional goal was to investigate whether the demographic characteristics of gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and the use of an online learning system influenced the population sample of Maryville College students. This chapter also provides an analysis of conclusions, implications, and recommendations for this research study.

Conclusions

Conclusions for the study are presented in two main sections, which include findings based on the factor analysis of the TOIS instrument and demographic characteristics of students.

Factor Analysis of TOIS Survey

A factor analysis was first employed to explore how survey items were grouped to reflect the responses submitted by the population and to explore whether the three online instruction self-efficacy behavioral factors would be similarly grouped when compared to the research design examining the online instruction self-efficacy beliefs of 762 electrician instructors from the National Joint Apprenticeship and Training (NJATC) (Randall, 2001). The findings

revealed that the factors were similarly grouped except for the addition of online learning to factor 2, which made logical sense since the population was more exposed to online instruction and its associated technologies.

Not surprising also is the recurring theme of all three behavioral factors, Internet, collaborative/online learning, and personal, which interrelate and are typically used to perform online instruction tasks whether through the use of an online learning system and an instructor's website. Unless a course is primarily self-directed (that is, conducted without any support or guidance from an instructor) then all three factors will continue to remain an integral component for successful online learning experiences.

Demographic Characteristics of Students

Students involved in the study were 276 undergraduates enrolled at Maryville College during the Fall 2003 and Spring 2004 semesters. The demographic variables assessed were gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience and use of an online learning system. Overall, the majority of the demographic variables assessed revealed important findings with the exception of gender, which resulted in conflicting interpretations possible due to the population sample. A possible assumption for this conflict might be attributed to the relatively low number of males that responded when compared to females. This imbalanced provides inadequate comparisons for gender. Similar gender inequities were also discovered in other research findings (Loboda, 2002; Randall, 2001). As a result, since no significant differences were found regarding gender

further research with equal samples would prove beneficial in supporting whether gender influences a student's online instruction self-efficacy beliefs.

Classification rank, age, and academic major were also not found to significantly influence online instruction self-efficacy beliefs. It is possible that the variable age was representative of a homogenous population where the majority of the students were freshmen with an average age of 21 years. Quite surprisingly, students majoring in mathematics/computer science, were found not to influence online instruction self-efficacy beliefs. Typically, students majoring in math and science tend to use and perform better with computers and online learning technologies. An explanation of this might be attributed to the fact that self-efficacy items found in the TOIS instrument were primarily reflective of online instruction self-efficacy tasks and not geared towards confidence or beliefs in mathematical ability or behaviors. Another assumption attributing to the low response for students with mathematics/computer science majors might be inferred that the dominant instruction of the educational institution sampled might be predominantly geared towards a liberal arts curriculum. Perhaps this could be explored further in populations where a variety of majors, classification rank and age exist.

Another demographic variable, computer access, was reported as significantly important as it was found that the majority of students accessed or used computers from their dormitory or residence hall. This significance is supported in the literature that as higher education becomes more wired for the

21st century, institutions are finding creative methods to lure and keep students by providing Internet access within their dormitories.

A reasons for high usage of accessing the computer through the dormitory or residence hall can also be attributed to technology fees being included within regular school fees. As a result, the majority of students using the Internet were accessing from their dormitory or residence hall to make use of this service provided by the institution. Conversely, those exhibiting personal behaviors skills tend to use computers provided at home as is customary since personal behavioral skills reflect individual or self-directed actions.

Findings reported in Chapter 4 revealed that computer experience, online instruction, Internet experience, and using an online learning system were highly correlated with not only one but all three online instruction self-efficacy beliefs. As was expected, higher usage of online learning instruction and use of an online learning system such as Blackboard resulted in higher self-efficacy levels. This validates other empirical studies, which attest to self-efficacy as being an important role in using an online learning system (Yi & Hwang, 2003). Additionally, this high level expectancy of self-efficacy development can be attributed to mastery of experiences where increased practice and mastery with an online learning system tool can result in a high self-efficacy. (Bandura, 1997).

As previously mentioned, students' level of online instruction experience was highly correlated with the three self-efficacy beliefs. Specifically, online instruction experience was cited as being about average, with some of the responses skewed towards the higher than average, high and very high

experiences ranges. However, lower than average responses were reported and one may assume that some students may have interpreted this item to mean that their online experience may not translate as being an online instruction. This assumption may be based on the interpretation of students in that they felt that online instruction learning tasks were not completely within an online environment where all courses are taken via the Internet which might explain the reason for the lower than average online learning instruction experience reported by some of the respondents.

Generally, students with high online instruction, Internet, and use of an online learning system scored high on Internet, collaborative/online learning, and personal behaviors. Experience using the Internet translated to higher self-efficacy beliefs for the Internet behavioral factor, which supports self-efficacy theory and the mastery of experiences (Bandura, 1997). The importance of mastery of experiences can also be applied to the relationship between the use of an online learning system and the three online instruction self-efficacy factors, Internet, collaborative/online learning and personal.

Online learning systems such as Blackboard are augmented with an instructor's course and utilize all three online instruction self-efficacy factors. These factors can be employed in a variety of instruction methods that allow a student's self-efficacy to increase while using an online learning system. For example, Internet and technological behaviors are utilized because students access a course online via the Internet, collaborative behaviors are enhanced by means of a chat or discussion room, and personal factors are displayed when students have

to peruse course materials on their own and after normal school hours. This interpretation adds validity and supports the self-efficacy theoretical framework as well as to contribute to the interpretation of the hypothetical constructs proposed in the previous chapters.

Implications

The primary findings of the study are applicable to institutions of higher learning and corporations who are designated with providing an online instruction presence. Additionally, these findings have implications for instructional technologists, educators, and designers who are primarily responsible for developing online instructional technology courses. Also it provides an added contribution to the theoretical research and practice areas of online instruction, web-enhanced instruction, and self-efficacy research.

1. The study contributed to the growing knowledge base for the concepts of online instruction and self-efficacy. The study also provided significant confirmations in that students' mastery of the Internet and other technologies results in higher confidence in their online instruction capabilities. As a result, consideration should be taken to provide students and teachers with the necessary tools and training towards the continuous use and development of online instruction technologies.
2. The study has implications for the design and development of web-enhanced courses and, as such, considerations should be taken to develop courses and provide training that compensate and utilize

higher online instruction self-efficacy. This will ensure successful mastery of competencies and performance in online learning. For example, the study revealed that as overall experience increases all three online instruction self-efficacy, Internet, collaborative/online learning and personal factors increase. Thus, experience is a predicting factor for success in these self-efficacy factors and should be considered as an important factor to ensure confidence and successful outcomes for online learners.

3. The study provides implications for educational administrators regarding how computers are accessed. Responses revealed that students primarily used computers through their dormitory and residence halls. Thus, providing high tech facilities on campus could help improve student's confidence in participating in online instruction.
4. Findings for the research provided additional contributions to online instruction efficacy concept and use of an online learning system. The acquired knowledge surrounding these concepts will assist instructors and instructional technologists in developing effective online instruction that integrates online learning system technologies.
5. The influence of online self-efficacy behaviors on demographic characteristics will also provide online designers with the necessary information to design and develop coursework that caters to the

diverse needs and attitudes of students who participate in online instruction such as web-enhanced courses.

Recommendations

The research provided several explanations regarding online instruction self-efficacy beliefs and their influence on the demographic characteristics of undergraduate students. Unexplained answers to this research would prove useful for future research studies, which are recommended below:

1. The study provided improvements to the online instruction inquiry; however, future research is necessary to examine populations who are primarily educated in an online university environment, where courses, and instruction are exclusively taken via the Internet. It would be interesting to compare and contrast online instruction self-efficacy differences in traditional university versus an online institution.
2. One weakness of the study was the homogeneity of population in relation to age because most of the respondents were below 23 years of age. Further research would prove beneficial in examining populations with diverse academic majors, classification ranks and varying age ranges. For example, providing a study that included graduate or professional students who are normally 25 years and above. Additionally, due to the inequity of the gender variable where female respondents more than doubled male respondents, future research with equal numbers having Internet, online instruction, and using an online learning system experiences would prove useful in

examining whether a significant difference with the gender variable exists in relation to online instruction self-efficacy beliefs.

3. Information regarding the use of an online learning system such as Blackboard, was introduced in this research. Further research would be beneficial in assessing the relationship of online instruction self-efficacy beliefs to the performance of online learning system instructional tasks. It would be interesting to investigate which of the three online instruction self-efficacy factors would dominate individual tasks.
4. Future research could prove useful in examining the relationship of online learning style to the other sources of online instruction self-efficacy development such as vicarious learning experiences, verbal Future research persuasion, and physiological states proposed in the self-efficacy theory (Bandura, 1997). For example, it would be interesting to know whether verbal persuasion from a mentor or teacher greatly influences the learning style of an individual.

Summary

The research study was developed to assess online instruction self-efficacy beliefs and to examine influences related to a student's demographic characteristic. The results of the study proved that overall experience was a dominant predictor for higher self-efficacy beliefs in Internet, collaborative/online learning, and personal behaviors.

The overall research development involved the online instruction self-efficacy beliefs of 276 undergraduate students enrolled at Maryville College. To assess online instruction self-efficacy beliefs of students, an online version of the Tennessee Online Instruction Survey (TOIS) survey was distributed during the Fall 2003 and Spring 2004 semesters. Demographic characteristics, which included gender, classification rank, age, academic major, computer access, computer experience, online instruction experience, Internet experience, and use of an online learning system, were also assessed.

It was found that for the population of this study, were primarily females majoring in social sciences and 21 years old. Results also revealed a strong relationship of online instruction self-efficacy beliefs among computer experience, online instruction experience, Internet experience and experience using an online learning system. Overall findings indicated that as a student's experience increases when using computers, online instruction, and an online learning system, the three online instruction self-efficacy factors (Internet, collaborative/online learning, and personal) increase.

Additionally, based on the findings and conclusions, recommendations for future research proposed included a comparative analysis of online instruction self-efficacy beliefs with students from a traditional university versus an online university. Other recommendations proposed for future research included using a diverse population reflecting gender equity, a broader age range, classification ranks and academic majors. Another proposal for future research, include

investigating the relationship between the learning style of students using an online learning system and their online instruction self-efficacy beliefs.

Finally the main purpose of the research inquiry was to provide solutions beneficial to online learning practitioners responsible for developing online learning instruction. The study also provides additional contributions to the theoretical knowledge base specific to online learning and instruction as well as the self-efficacy construct.

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Appendices

Appendix A
Permission Letter

Maryville COLLEGE

Vice President and
Dean of the College

October 3, 2003

Dr. Gregory Petty
c/o Ms. Elaine Whitehead
University of Tennessee
Education, Administration and Policy Studies
A325 Claxton Addition
1126 Volunteer Blvd.
Knoxville, Tennessee 37996-1000

Dear Ms. Carter:

I am writing to inform you that permission has been granted for you to conduct your doctoral research at Maryville College. I understand that you will work with our Department of Instructional Technology in gathering responses related to your study which will investigate the role of age, gender, computer access, academic major, computer, and internet experiences on online instruction self-efficacy beliefs among college students.

Please let me know if there are any questions and I look forward to learning the results.

Sincerely,

Dr. Craig
Associate Dean, Director of Institutional Research

502 E. Lamar Alexander Parkway, Maryville, Tennessee 37804-5907
Voice 865.981.8278 Fax 865.981.8136 www.maryvillecollege.edu

Appendix B
Student Participant Email Letter

Subject: Maryville College/UTK Online Instruction Survey - Register to Win $40.00
Dear Maryville College Student:

We are endorsing the research described below and conducted by Carol Carter, Ph.D. student at the University of Tennessee. We find that this research will be valuable to the college, especially in its efforts to improve the use of technology in teaching and learning. We urge you to complete the survey described below in a timely fashion. It will only take a few minutes. Many thanks.

Dr. Mardi Craig
Associate Dean

Karen Wentz
Executive Director, Instructional Technology Initiative (Title III)

****

Dear Maryville College Student

I am a graduate student at the University of Tennessee, Knoxville and in collaboration with the Department of Instructional Technology at Maryville College, I am conducting a survey to gather your attitudes related to online instruction. As a Maryville College student you are in a unique position to provide information that can assist us in enhancing the use of web-enhanced and online instruction within the classroom. We have attached below a link to the Tennessee Online Instruction Survey (TOIS), which will gather your attitudes towards web-enhanced instruction and beliefs regarding your ability to participate in an online course. Approximately 10 minutes of your time will be needed to complete this survey and all answers will remain confidential.

CONSENT

Completion of this inventory acknowledges your understanding that these data will be used for research purposes only and will be kept completely confidential. If you have questions at any time about the study or the procedures, you may contact the researcher, Carol Carter, at The University of Tennessee, 865-974-2216 or cacarter@utk.edu.

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

Thank you

Carol Carter
Project Director

Click here to begin the Tennessee Online Instruction Survey and register for the chance to win $40.00 cash

Appendix C
Student Participant Follow-Up Email Letter

Subject: Reminder-Maryville College/UTK Online Instruction Survey - Register to Win $40.00

Dear Maryville College Student:

A few days ago you received a request from Carol Carter, Ph.D student at the University of Tennessee requesting your participation in the online instruction research described below. We have endorsed the research and would like to thank the students who have participated in the survey. If you haven't had the chance to participate, we urge you to complete the survey, which will only take a few minutes. Your feedback is very valuable and will help the college by providing information relevant to the use of technology in teaching and learning. Thank you.

Dr. Mardi Craig
Associate Dean

Karen Wentz
Executive Director, Instructional Technology Initiative (Title III)

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Dear Maryville College Student

Recently, you received a request urging your participation in the Tennessee Online Instruction Survey (TOIS) used for gathering your attitudes related to the use of web-enhanced and online instruction within the classroom. My thanks to the students that have completed the survey. For students who haven't had the chance to complete this survey, please take a few minutes to complete the survey located at http://surveys.utk.edu/tois/index.htm or by clicking on the link below. Remember you can register for a chance to win $40.00 and the survey will only take about 10 minutes to complete. Your participation and feedback are very important to the success of this research and information gathered will remain confidential.

CONSENT

Completion of this inventory acknowledges your understanding that these data will be used for research purposes only and will be kept completely confidential. If you have questions at any time about the study or the procedures, you may contact the researcher, Carol Carter, at The University of Tennessee, 865-974-2216 or cacarter@utk.edu.

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

Thank you
Carol Carter, Project Director

Click here to begin the Tennessee Online Instruction Survey and register for the chance to win $40.00 cash

Appendix D
Final Student Participant Follow-up Email Letter

Subject: Final Opportunity - Maryville College/UTK Online Instruction Survey - Register to Win $40.00

Dear Maryville College Student:

A few months ago you received a request from Carol Carter, a PhD student at the University of Tennessee, requesting your participation in the Tennessee Online Instruction Survey (TOIS). We would like to thank the students who have completed and submitted responses to the survey. If you haven't had the chance to complete the survey, we strongly urge you to submit your responses, which will only take a few minutes. We have endorsed this research. Your feedback is very important and it will assist the college by providing information relevant to the integration of technology in teaching and learning.

Thank you.

Dr. Mardi Craig , Associate Dean

Karen Wentz
Executive Director, Instructional Technology Initiative (Title III)
****

Dear Maryville College Student

My thanks to the students who have completed and participated in the Tennessee Online Instruction Survey (TOIS). For students who haven't had the chance to complete this survey this is a final opportunity for you to submit your responses and to register for a chance to win $40.00 cash. The Tennessee Online Instruction Survey (TOIS) is located at http://surveys.utk.edu/tois/index.htm or by clicking on the link below. Remember this survey will only take 10 minutes to complete. Your responses are important to the success of this research and in assessing your beliefs and perceptions regarding web-enhanced and online instruction in the classroom.

Consent

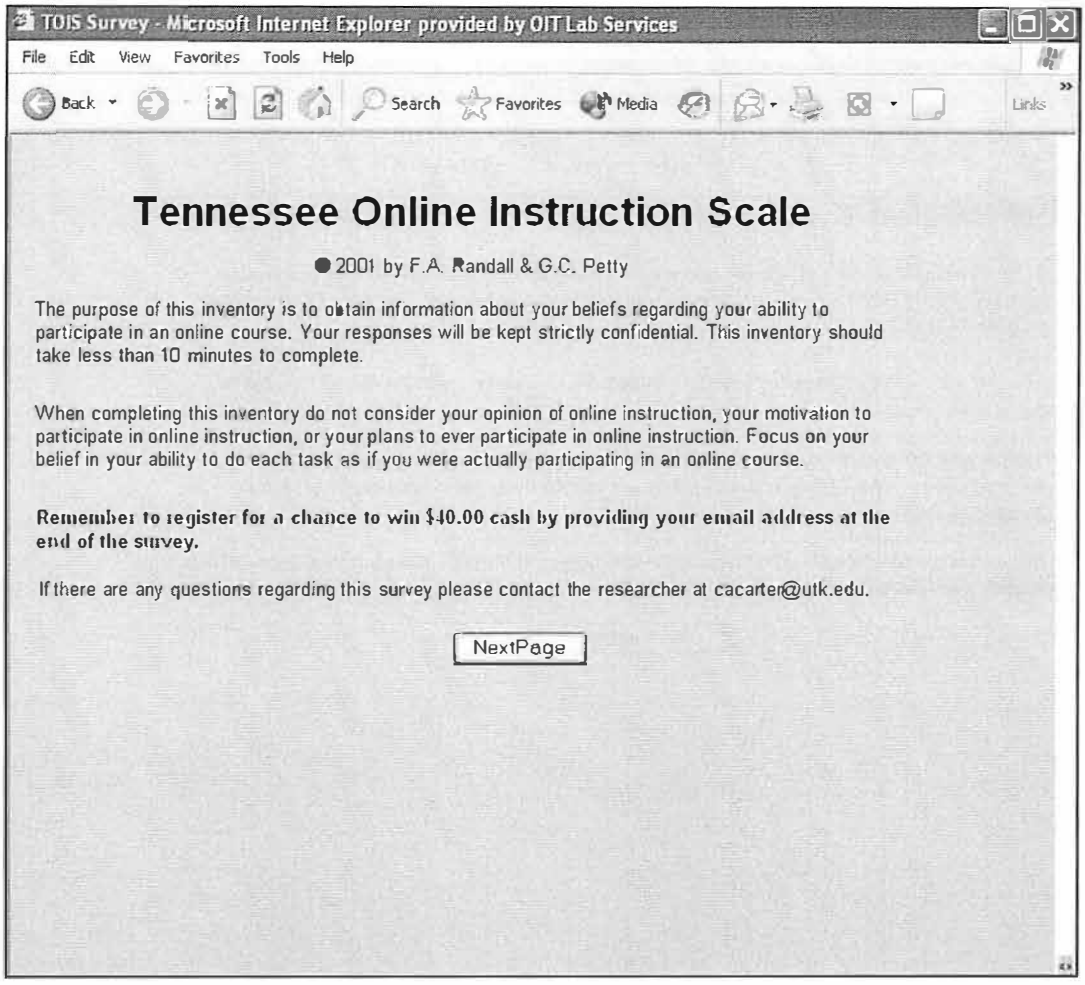
Completion of this inventory acknowledges your understanding that these data will be used for research purposes only and will be kept completely confidential. If you have questions at any time about the study or the procedures, you may contact the researcher, Carol Carter, at The University of Tennessee, 865-974-2216 or cacarter@utk.edu.

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

Thank you,
Carol Carter, Project Director

Click here to begin the Tennessee Online Instruction Survey and register for the chance to win $40.00 cash

Appendix E
Tennessee Online Instruction Scale


TOIS Survey - Microsoft Internet Explorer provided by OIT Lab Services
File Edit View Favorites Tools Help
Back Search Favorites Media Links
Tennessee Online Instruction Scale
© 2001 by F.A. Randall & G.C. Petty
The purpose of this inventory is to obtain information about your beliefs regarding your ability to participate in an online course. Your responses will be kept strictly confidential. This inventory should take less than 10 minutes to complete.
When completing this inventory do not consider your opinion of online instruction, your motivation to participate in online instruction, or your plans to ever participate in online instruction. Focus on your belief in your ability to do each task as if you were actually participating in an online course.
Remember to register for a chance to win $40.00 cash by providing your email address at the end of the survey.
If there are any questions regarding this survey please contact the researcher at cacarter@utk.edu.
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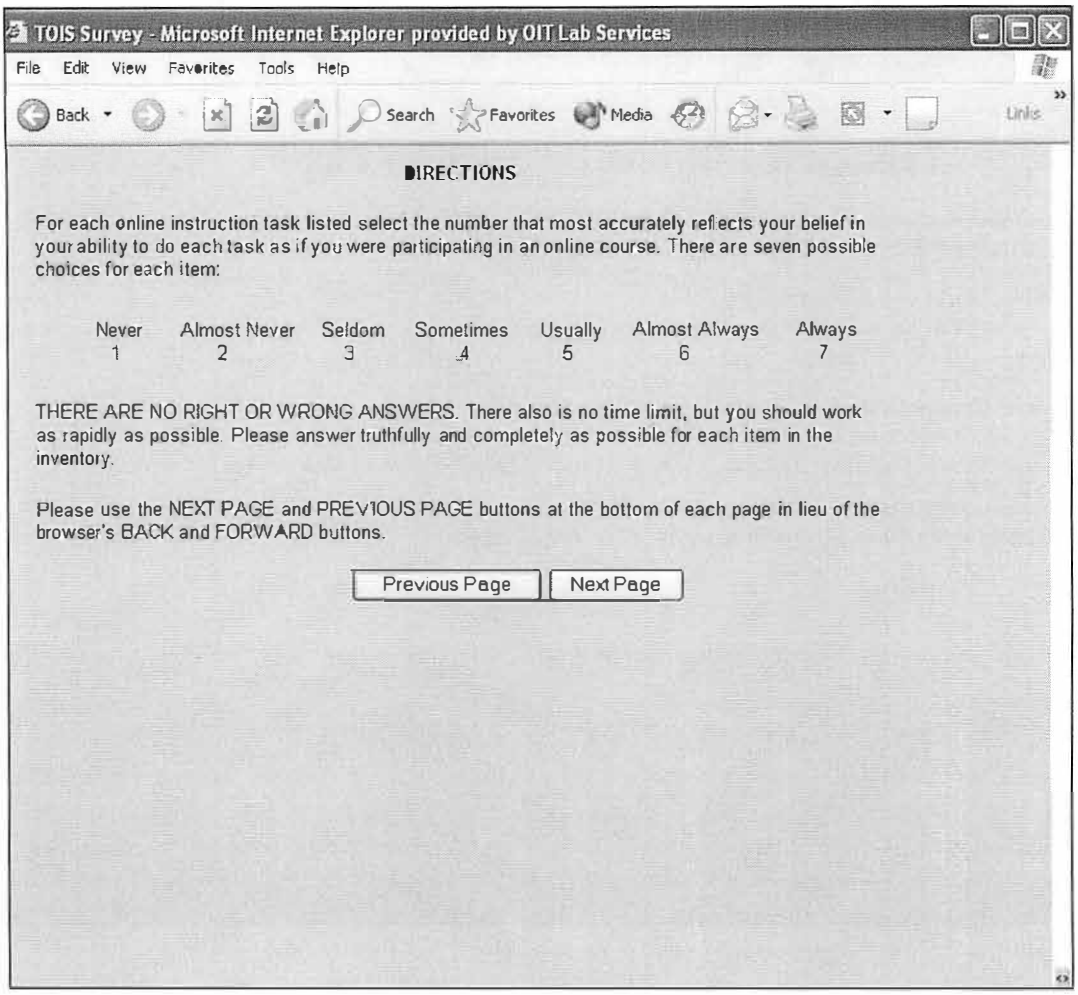
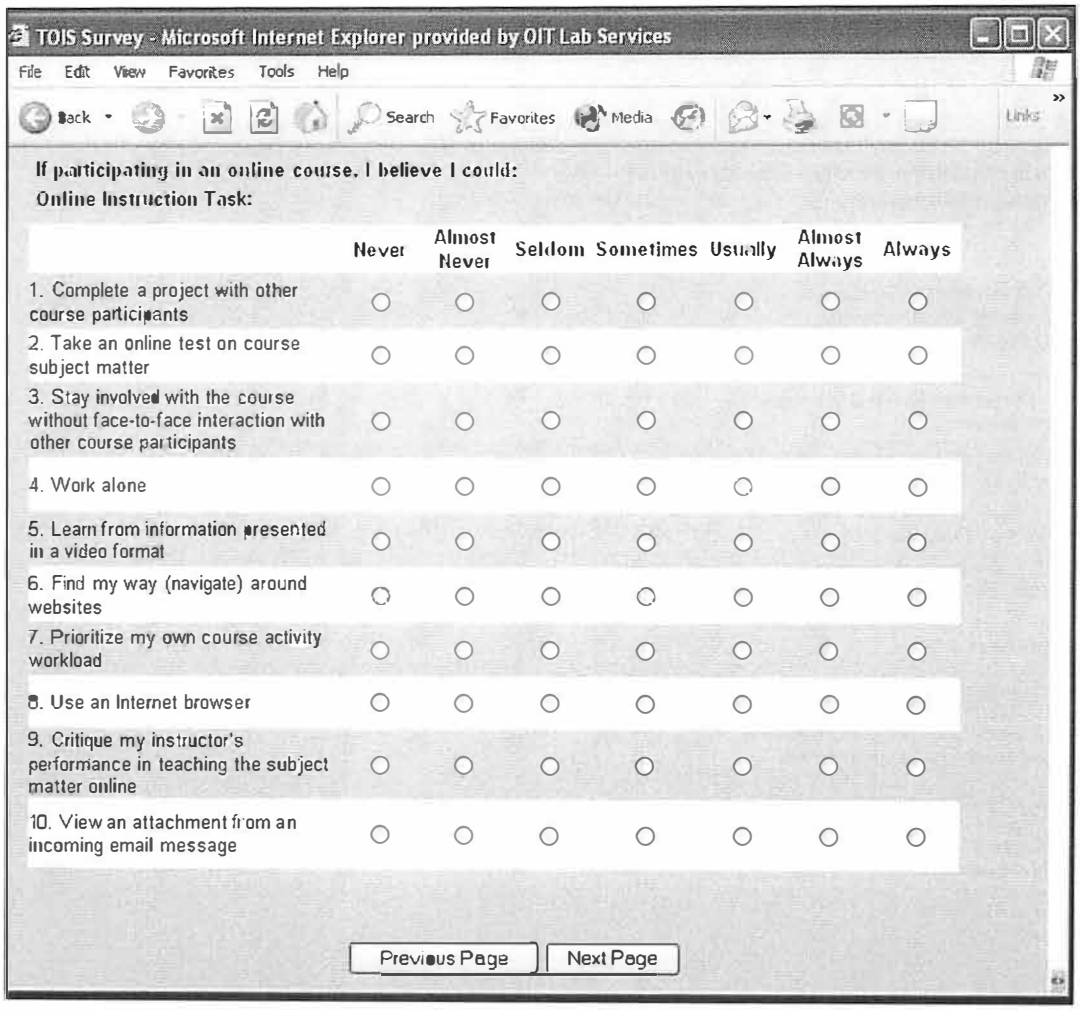

TOIS Survey - Microsoft Internet Explorer provided by OIT Lab Services
File Edit View Favorites Tools Help
Back Search Favorites Media
DIRECTIONS
For each online instruction task listed select the number that most accurately reflects your belief in your ability to do each task as if you were participating in an online course. There are seven possible choices for each item:
Never 1
Almost Never 2
Seldom 3
Sometimes 4
Usually 5
Almost Always 6
Always 7
THERE ARE NO RIGHT OR WRONG ANSWERS. There also is no time limit, but you should work as rapidly as possible. Please answer truthfully and completely as possible for each item in the inventory.
Please use the NEXT PAGE and PREVIOUS PAGE buttons at the bottom of each page in lieu of the browser's BACK and FORWARD buttons.
Previous Page
Next Page


TOIS Survey - Microsoft Internet Explorer provided by OIT Lab Services
File Edit View Favorites Tools Help
Back Search Favorites Media Links
If participating in an online course, I believe I could:
Online Instruction Task:
Never
Almost Never
Seldom
Sometimes
Usually
Almost Always
Always
1. Complete a project with other course participants
2. Take an online test on course subject matter
3. Stay involved with the course without face-to-face interaction with other course participants
4. Work alone
5. Learn from information presented in a video format
6. Find my way (navigate) around websites
7. Prioritize my own course activity workload
8. Use an Internet browser
9. Critique my instructor's performance in teaching the subject matter online
10. View an attachment from an incoming email message
Previous Page
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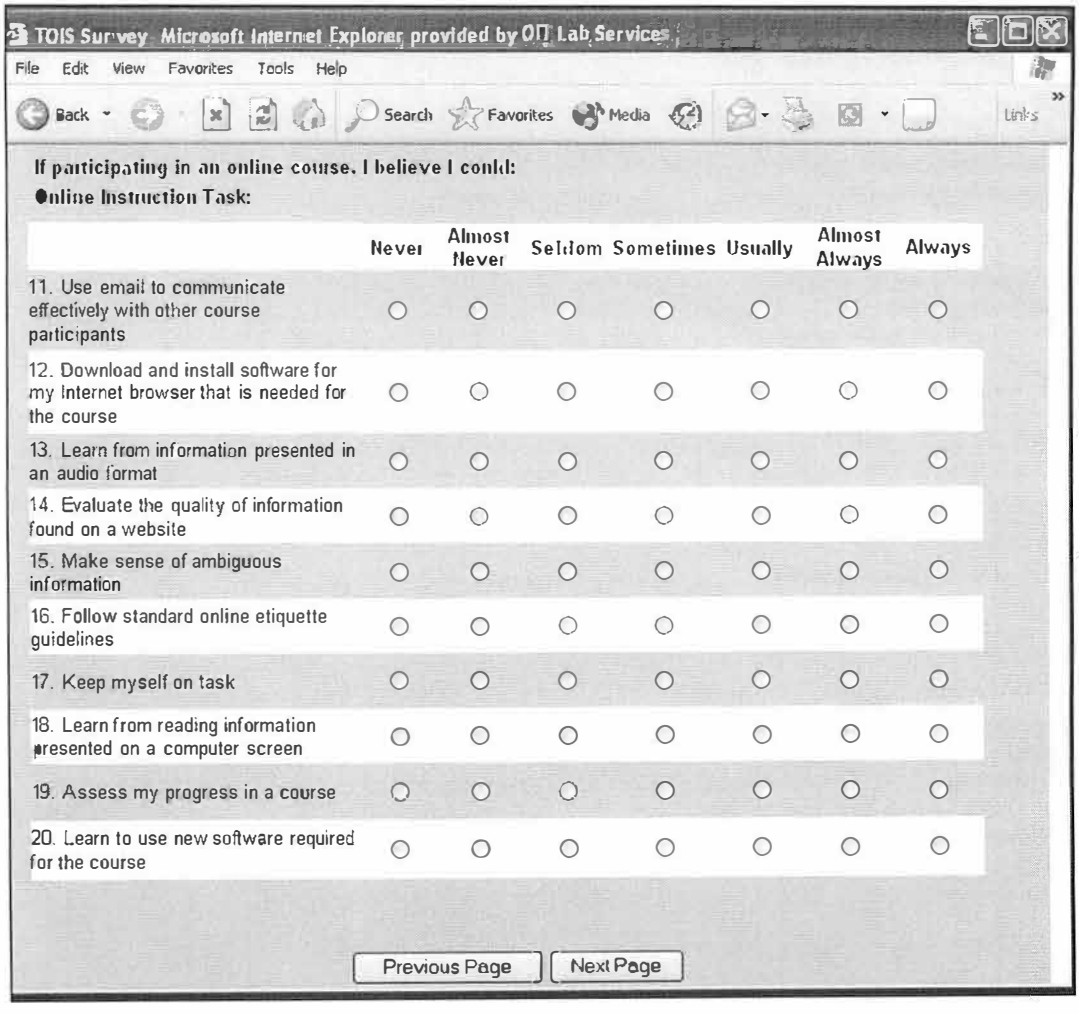
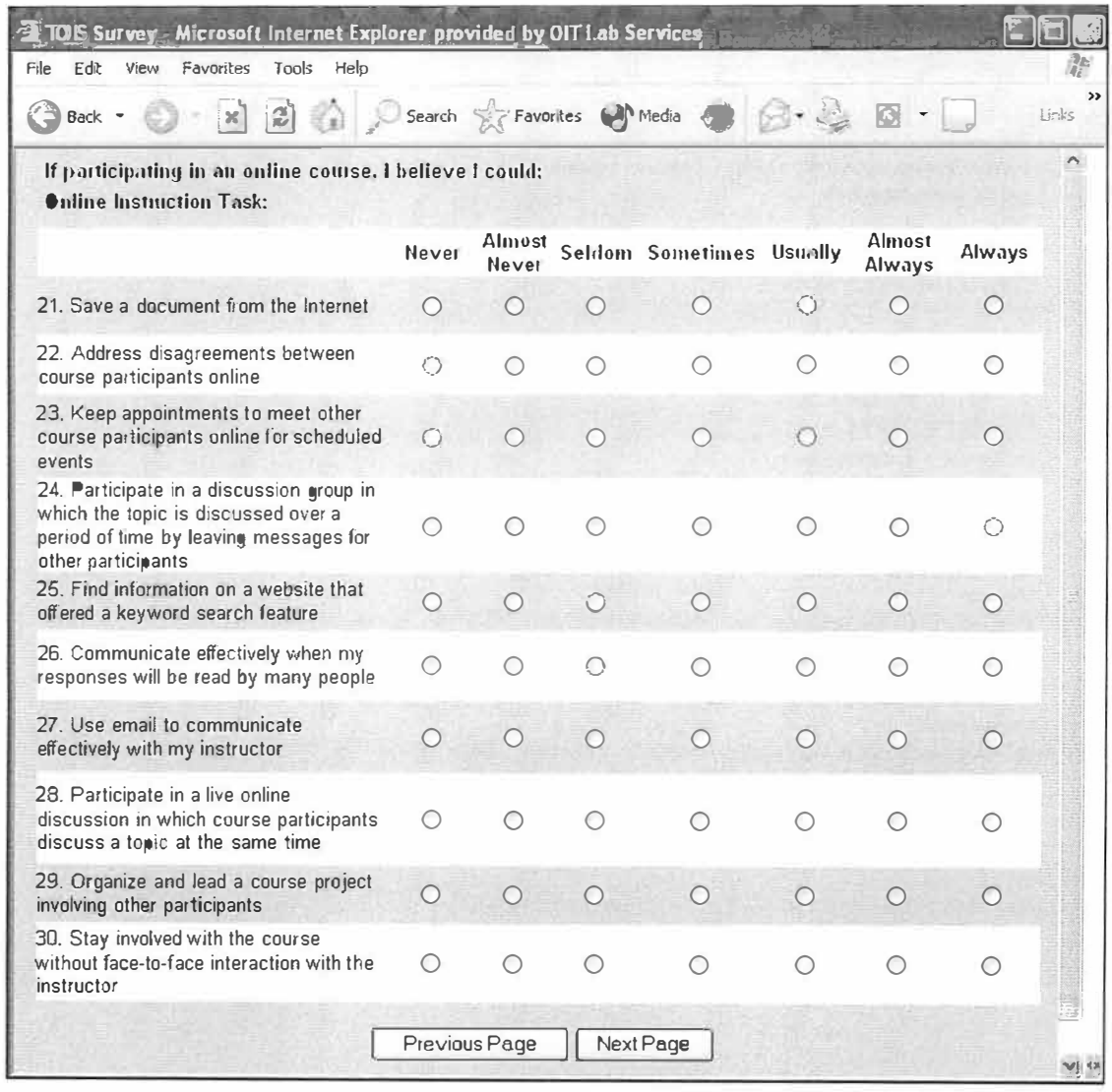

TOIS Survey Microsoft Internet Explorer provided by OIT Lab Services
File Edit View Favorites Tools Help
Back Search Favorites Media Links
If participating in an online course, I believe I could:
Online Instruction Task:
Never
Almost Never
Seldom
Sometimes
Usually
Almost Always
Always
11. Use email to communicate effectively with other course participants
12. Download and install software for my Internet browser that is needed for the course
13. Learn from information presented in an audio format
14. Evaluate the quality of information found on a website
15. Make sense of ambiguous information
16. Follow standard online etiquette guidelines
17. Keep myself on task
18. Learn from reading information presented on a computer screen
19. Assess my progress in a course
20. Learn to use new software required for the course
Previous Page
Next Page


TOIS Survey - Microsoft Internet Explorer provided by OIT Lab Services
File Edit View Favorites Tools Help
Back Search Favorites Media Links
If participating in an online course, I believe I could:
Online Instruction Task:
Never
Almost Never
Seldom
Sometimes
Usually
Almost Always
Always
21. Save a document from the Internet
22. Address disagreements between course participants online
23. Keep appointments to meet other course participants online for scheduled events
24. Participate in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants
25. Find information on a website that offered a keyword search feature
26. Communicate effectively when my responses will be read by many people
27. Use email to communicate effectively with my instructor
28. Participate in a live online discussion in which course participants discuss a topic at the same time
29. Organize and lead a course project involving other participants
30. Stay involved with the course without face-to-face interaction with the instructor
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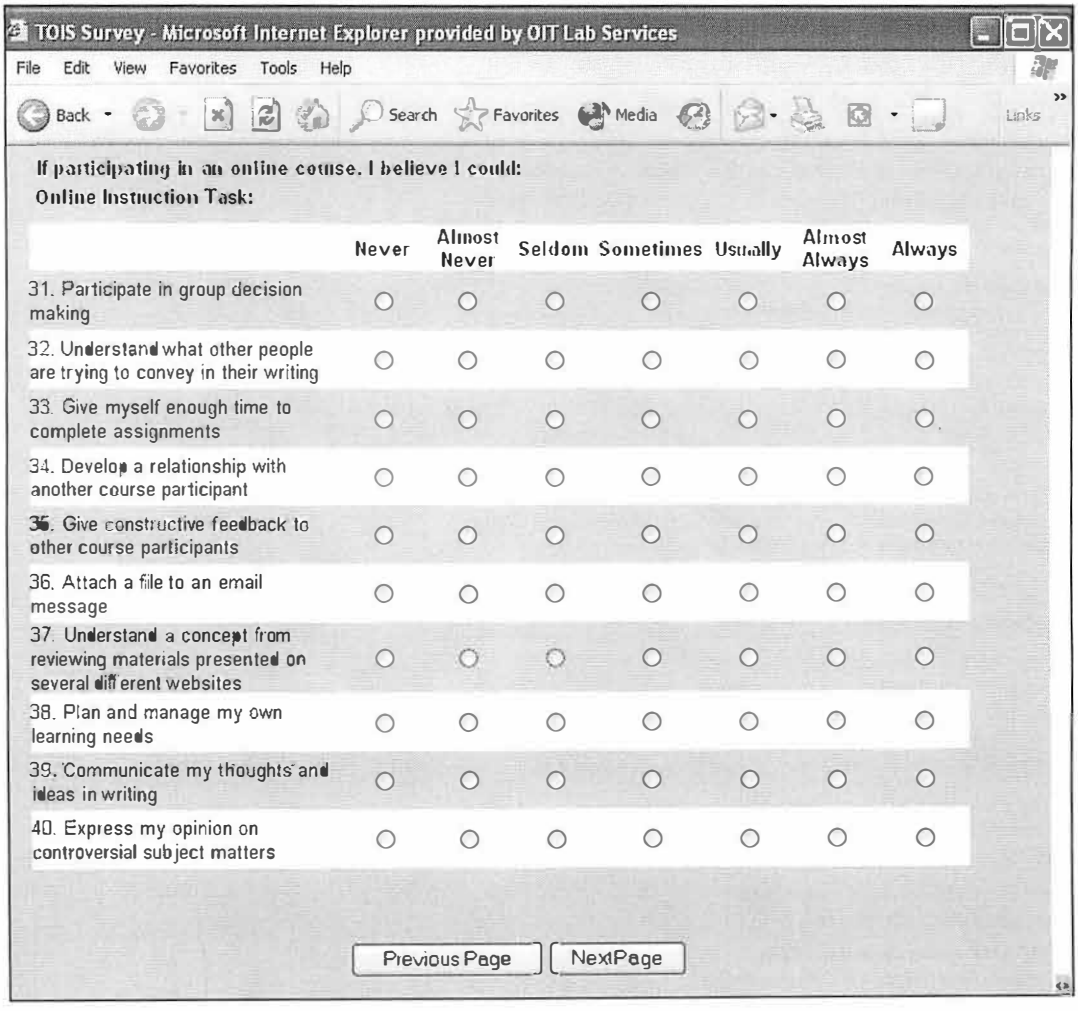
TOIS Survey - Microsoft Internet Explorer provided by OIT Lab Services
File Edit View Favorites Tools Help
Back Search Favorites Media Links
If participating in an online course, I believe I could:
Online Instruction Task:
Never
Almost Never
Seldom
Sometimes
Usually
Almost Always
Always
31. Participate in group decision making
32. Understand what other people are trying to convey in their writing
33. Give myself enough time to complete assignments
34. Develop a relationship with another course participant
35. Give constructive feedback to other course participants
36. Attach a file to an email message
37. Understand a concept from reviewing materials presented on several different websites
38. Plan and manage my own learning needs
39. Communicate my thoughts and ideas in writing
40. Express my opinion on controversial subject matters
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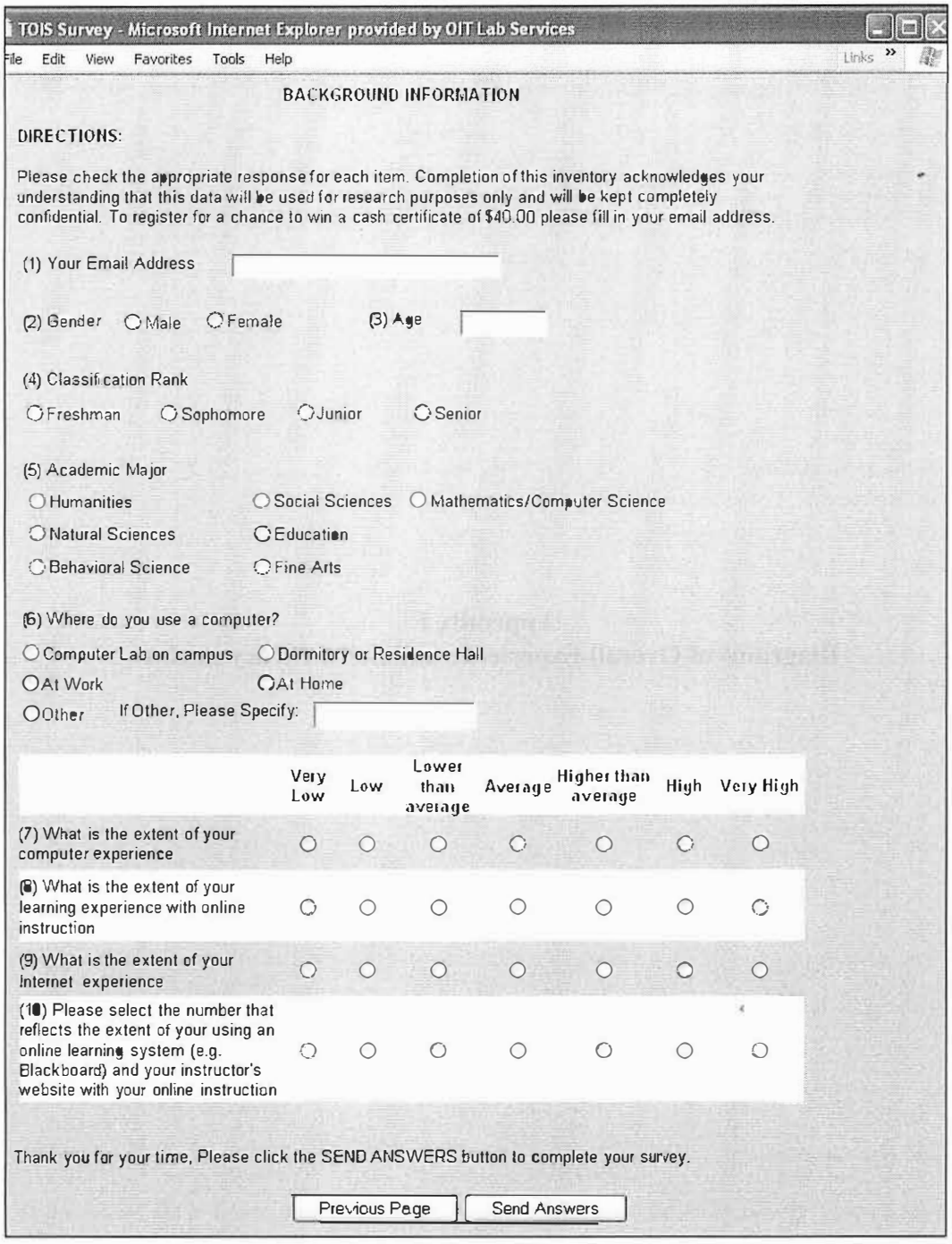

TOIS Survey - Microsoft Internet Explorer provided by OIT Lab Services

File Edit View Favorites Tools Help Links

BACKGROUND INFORMATION

DIRECTIONS:

Please check the appropriate response for each item. Completion of this inventory acknowledges your understanding that this data will be used for research purposes only and will be kept completely confidential. To register for a chance to win a cash certificate of $40.00 please fill in your email address.

(1) Your Email Address

(2) Gender ○ Male ○ Female (3) Age

(4) Classification Rank

○ Freshman ○ Sophomore ○ Junior ○ Senior

(5) Academic Major

○ Humanities ○ Social Sciences ○ Mathematics/Computer Science
○ Natural Sciences ○ Education
○ Behavioral Science ○ Fine Arts

(6) Where do you use a computer?

○ Computer Lab on campus ○ Dormitory or Residence Hall
○ At Work ○ At Home
○ Other If Other, Please Specify:

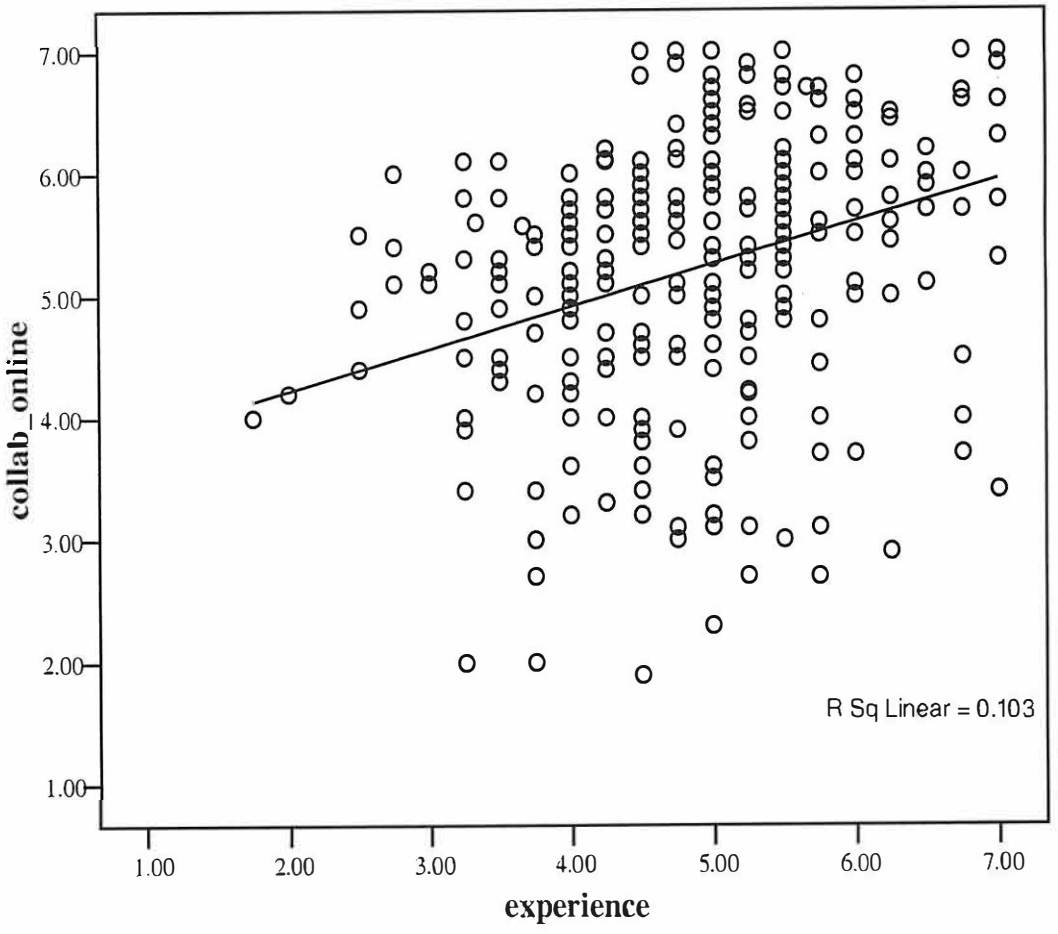
	Very Low	Low	Lower than average	Average	Higher than average	High	Very High
(7) What is the extent of your computer experience	○	○	○	○	○	○	○
(8) What is the extent of your learning experience with online instruction	○	○	○	○	○	○	○
(9) What is the extent of your Internet experience	○	○	○	○	○	○	○
(10) Please select the number that reflects the extent of your using an online learning system (e.g. Blackboard) and your instructor's website with your online instruction	○	○	○	○	○	○	○

Thank you for your time, Please click the SEND ANSWERS button to complete your survey.

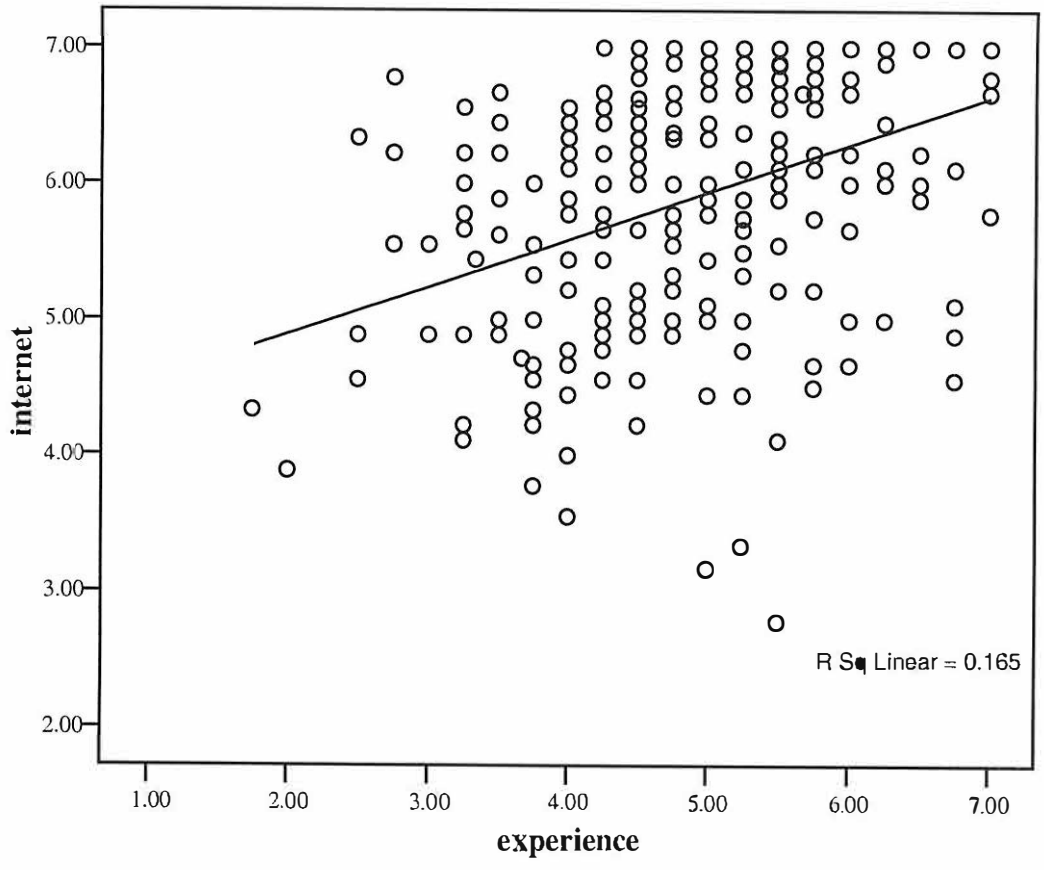
Previous Page Send Answers

Appendix F
Diagrams of Overall Experience and Self-Efficacy Factors

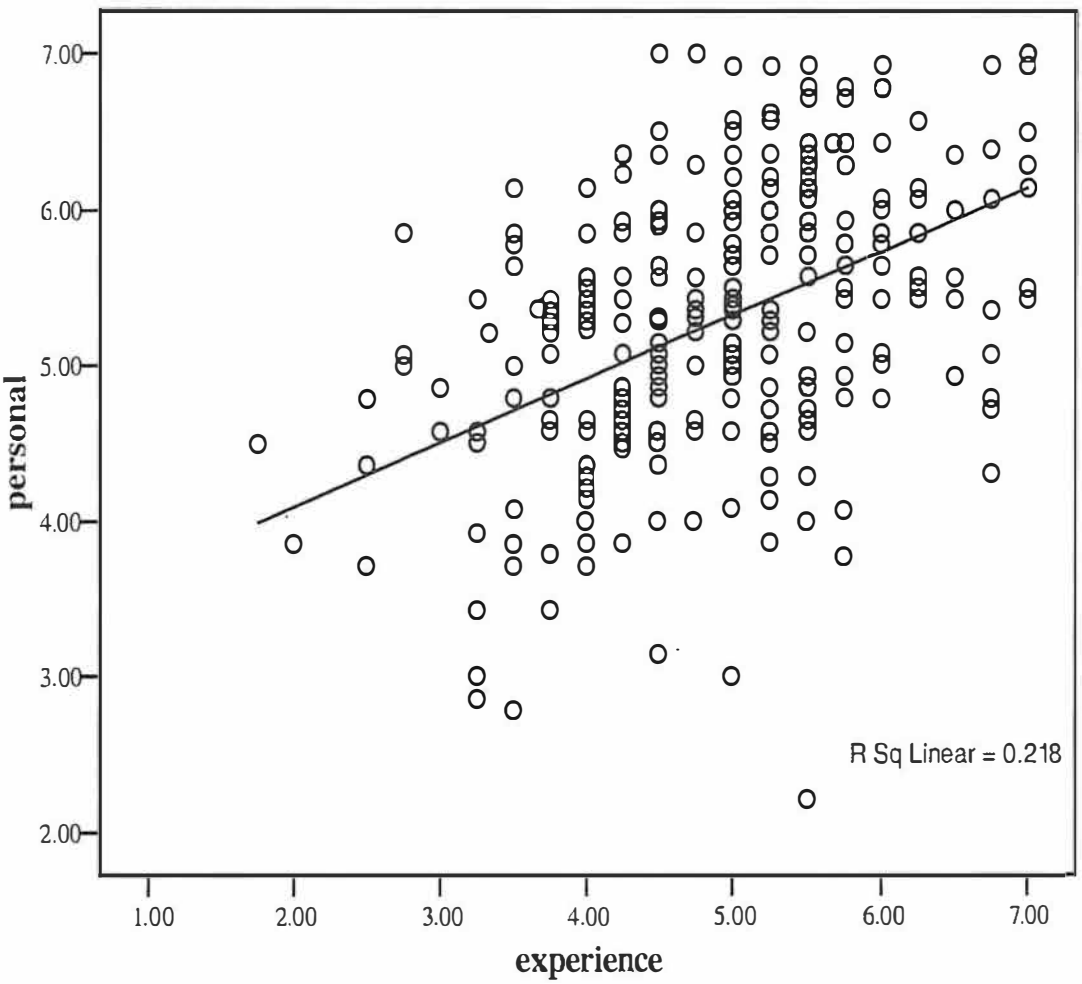
Overall Experience and Collaborative/Online Learning Self-Efficacy



Overall Experience and Internet Self-Efficacy



Overall Experience and Personal Self-Efficacy



VITA

Carol Carter has had a variety of experiences in the professional and educational areas of multimedia, instructional technology and ecommerce environments. She was awarded the Bachelor of Science degree in Business Administration with a major in Marketing and a Master of Science degree in Human Resource Development with an emphasis in Computer Information Systems at Western Carolina University. She has worked in higher education, providing assistance to employees and faculty with instructional technology integration and training as well as in business, developing elearning and web-based applications. She received the Doctor of Philosophy degree in May 2004 with a major in Human Ecology, specializing in Human Resource Development and cognate areas in Instructional Technology, Information Science, Management and Graphic Design.

Carol continues to work in business as a lead consultant by providing strategy and direction for the design of corporate and transactional websites. Her professional pursuits include attending and presenting at international conferences, as well as publishing articles related to online instruction, ecommerce, and information architecture.