

# A contingency model of computer and Internet self-efficacy

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## Abstract

Information system researchers have recently devoted considerable attention to the concept of computer self-efficacy in order to understand computer user behavior and system use. This article reports on the development and examination of a contingency model of computer and Internet self-efficacy. User attitude and computer anxiety were assumed to influence the development of computer and Internet self-efficacy. Measures of user attitude, computer anxiety, computer self-efficacy, and Internet self-efficacy were used in a university environment to collect 347 responses at both the beginning and end of an introductory computer course. Results suggested that training significantly improved computer and Internet self-efficacy. Respondents with ‘favorable’ attitudes toward computers improved their self-efficacy significantly more than respondents with ‘unfavorable’ attitudes. Respondents with ‘low’ computer anxiety improved their self-efficacy significantly more than respondents with ‘high’ computer anxiety. The interaction effect between attitude and anxiety was significant for computer self-efficacy scores but not for Internet self-efficacy scores. The implications of these findings are discussed.

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## 1. Introduction

The ultimate question about information technology effectiveness relates to its impact on the individual and organizations. The effective use of an IS is influenced by not only system design features but also by the user’s ability to use the system effectively in making decisions, plan work, service customers, or control events. Self-efficacy reflects the belief that individuals have about their ability to use systems effectively. Research studies suggest that the higher the induced level of self-efficacy, the greater is performance

achievement [1]. Individuals with high self-efficacy work harder and longer than individuals with low self-efficacy [44].

Computer self-efficacy is defined as an individual’s belief regarding their ability to use a computer [10]. Research suggests that it plays a significant role in an individual’s decision to use computers and how comfortable users are in learning skills related to effective use [26,32]. MIS researchers have, in recent years, devoted much effort in studying computer user training, user attitude, and computer anxiety as they relate to computer self-efficacy. Marakas et al. provided a comprehensive review of related literature and the path that research on computer self-efficacy has traveled.

Although computer self-efficacy constructs have been the subject of research studies, contingency models that examined the influencing effect of user attitude and computer anxiety on computer self-efficacy

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have not been considered. User attitude and computer anxiety are important variables and are expected to influence the outcome of self-efficacy development efforts [27,39]. Improving our understanding about influence on training programs should help in making better decisions regarding technology implementation, acceptance, and use.

In our study, the pattern of change in computer and Internet self-efficacy was examined as individuals learned about computers and interacted with them. Survey responses were collected from 347 students at the beginning and end of an introductory computer course. Data were analyzed to examine the relationship between training and self-efficacy and how this relationship was influenced by user attitude and computer anxiety. Our specific goals were to examine the relationships between training and (a) computer self-efficacy, (b) Internet self-efficacy, (c) computer self-efficacy controlling for user attitude, (d) Internet self-efficacy controlling for user attitude, (e) computer self-efficacy controlling for computer anxiety, (f) Internet self-efficacy controlling for computer anxiety, (g) computer self-efficacy controlling for the interaction effect between attitude and anxiety, and (h) Internet self-efficacy controlling for the interaction effect between attitude and anxiety.

## 2. Self-efficacy construct

Research on self-efficacy concept has a long tradition in social sciences with notable works by Bandura [2,4,5], Schunk [36,37], Gist [14,15], and others. Self-efficacy arises from the gradual acquisition of complex cognitive, social, linguistic and/or physical skills through experience [3]. It is expected to affect task effort, persistence, expressed interest, and the level of goal difficulty selected for performance. Individuals appear to evaluate information about their abilities and then regulate their choices and efforts accordingly. The strength of their conviction in their own effectiveness is likely to influence whether they will try to cope with a given situation. Individuals with high efficacy expectations have a greater chance of success in a given task [30].

Self-efficacy is a dynamic construct that changes as new information and experiences are acquired. It is generally described as having three components: magnitude—the levels of task difficulty that people believe they can attain; strength—their conviction about its magnitude; and generality—the degree to which the expectation is generalized across situations. The purpose in evaluating these components is to discover

the type of questions that will best explain and predict a person's dispositions, intentions, and actions.

Schunk described how self-efficacy influenced academic learning processes. At the start of an activity, students hold differing beliefs about their ability to acquire knowledge, perform skills, master the material, etc. Initial self-efficacy varies as a function of aptitude (such as abilities and attitudes) and prior experience. Such personal factors as goal setting and information processing, along with situational factors, such as rewards and teacher feedback, affect students while they are learning. From these, students derive cues signaling how well they are learning, which they use to assess efficacy for further learning. Motivation is enhanced if students perceive that they are making progress in learning. In turn, as students work on tasks and become more skillful, they maintain a sense of self-efficacy for performing well.

Thus training improves self-efficacy and individual differences moderate the outcome of this training: indeed computer training may be more effective for people who have a positive attitude toward computers and no computer anxiety. This suggests a contingency model of self-efficacy where individual differences influence learning outcomes.

## 3. Research model and hypotheses

In our contingency model, user attitude and computer anxiety were the conditional variables that moderated the outcome of computer training. Here, we measured training outcome in terms of pattern of change in computer and Internet self-efficacy as trainees went through a semester long computer course. Part (a) in Fig. 1 shows our assumed moderating effect of computer anxiety and user attitude on computer and Internet self-efficacy. Part (b) shows the assumed moderating effect of the interaction between computer anxiety and user attitude on computer and Internet self-efficacy.

Research studies in cognitive modeling, behavioral modeling, and self-management suggest that training programs enhance self-efficacy [12,13,16]. MIS research has focused on computer self-efficacy as a special case of general self-efficacy. MIS researchers, similarly, have illustrated the importance of training for computer self-efficacy. Training is also suggested to enhance Internet self-efficacy, considered an extension of computer self-efficacy construct in the domain of World Wide Web [31]. Thus we proposed:

**Hypothesis 1.** Computer training improves computer self-efficacy.

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