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Jonathan Lazar
*University of Maryland Baltimore County*

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# The Effects of Training Novice Users in Developing Strategies for Cognitively Evaluating Appropriate Responses to Errors When Learning to Use the Internet

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## Introduction

As novice users learn to use a new application of computer technology, they frequently make errors (Greif & Keller, 1990; Lazonder & Meij, 1995; Norman, 1983). Systems and interfaces should be designed to minimize the chance of making an error. When errors are made, the system should maximize the user's understanding of the error, and make it easy for users to recover from the error (Bagnara & Rizzo, 1989; Booth, 1991; Lewis & Norman, 1986; Norman, 1991; Senders & Moray, 1991; Shneiderman, 1998). Even if a system is designed to follow these principles, it is virtually impossible for users, especially novice users, to avoid making errors, because novice users are especially prone to committing errors (Arnold & Roe, 1987; Carroll, 1990; Greif & Keller, 1990; Lazonder & Meij, 1995). Arnold and Roe provide a good operational definition of an error, which is "when a user's intention or goal is not attained" (Arnold & Roe, 1987, p. 204).

## Traditional Training Methodologies

Traditional training methods (also called *procedural training*) typically involve giving users a list of specific steps to follow in order to learn a task (Carroll, 1984; Wendel & Frese, 1987). Traditional methodologies for teaching novice users how to use computer applications focus on avoiding errors (Frese & Altmann, 1989). The assumption of these training methodologies is that users never make errors when performing tasks (Carroll, 1990). However, this is unrealistic, since it is virtually impossible to avoid errors when learning new tasks. (Arnold & Roe, 1987; Carroll, 1990; Greif & Keller, 1990; Lazonder & Meij, 1995). Typically, novice users make insignificant errors, but are not instructed on how to recover from these errors (Carroll, 1984; Carroll, 1990; Carroll & Mack, 1984; Lazonder & Meij, 1995). Many times, novice users are not able to recover from the error sequence (Carroll & Carrithers, 1984; Carroll & Mack, 1984).

## New Training Methodology: Error Training

In contrast, a new methodology for training novice users, called *error training*, instructs users in cognitive strategies for responding to errors, and trains users through exploration (Frese & Altmann, 1989; Frese et al., 1991). Making an error is a natural part of learning a new computer task, and error training tries to capitalize on those experiences (Frese & Altmann, 1989). Traditional training methodologies view errors as something to be avoided. In contrast, error training views errors as a new opportunity for learning (Frese & Altmann, 1989).

There is a growing body of literature on this new methodology called error training. Recent studies support error training as an alternative method of training (Dormann & Frese, 1994; Frese et al., 1991). In these studies, one group of subjects is given traditional training for a new task, while the other group of subjects is given error training. Results in both studies demonstrate that the subjects who receive error training have higher levels of competence in performing the tasks presented than the subjects who receive traditional training. How does error training work? Error training consists of two related techniques; *error management* and *exploration*.

### Error Management

The first technique of error training is *to teach users cognitive strategies for responding to errors (also called error management)* (Frese et al., 1991). Users are instructed in strategies that lower the frustration incurred when making errors (Frese et al., 1991). These strategies also help users to view errors as an opportunity for learning (Frese & Altmann, 1989; Frese et al., 1991).

### Exploration

The second technique of error training is *to encourage users to explore their task environment* (Dormann & Frese, 1994). Instead of giving users a step-by-step list of how to perform a task, a more general overview of the environment is provided (Dormann & Frese, 1994). Using this background knowledge, users explore their task environment. In doing so, users are encouraged to be active learners, which more closely models how novice users naturally tend to approach new tasks (Wendel & Frese, 1987).

## Purpose of this Dissertation

The purpose of this dissertation is to study the effects of training novice users in developing strategies for cognitively evaluating appropriate responses to errors, when learning to use the Internet. The Frese et. al., 1991, and Dormann and Frese, 1994, studies focus on training novice users in word processing and statistical software. This dissertation extends their work to the networked environment, by focusing on novice users learning to use the Internet. In switching from stand-alone computers to the networked environment, the training methodologies are modified for network-based tasks. This dissertation uses an experimental design to test the feasibility of error training in the networked environment.

### *References*

References available upon request from the author jlazar1@umbc.edu).