IDEA GROUP PUBLISHING

701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

ITB9998

Chapter XVI

An Overview of Acquiring Cognitive Skills While Receiving Spreadsheet Training

S.E. Kruck, James Madison University, USA

John J. Maher, Pamplin College of Business, USA

Reza Barkhi, Virginia Tech, USA

ABSTRACT

It is well documented that electronic spreadsheet models utilized in many professions to enhance decision-making frequently contain errors that have negative effects on the ultimate quality of decisions. Limited research has been published that systematically identifies potential reasons for the causes of these errors, and what procedures can be taken to minimize or eliminate them. Our research provides initial evidence concerning this problem area by investigating how several important cognitive skills are affected by formalized spreadsheet training. Results indicate that one cognitive skill, logical reasoning, significantly increases after a six-week training period.

This chapter appears in the book, *Advanced Topics in End User Computing, Volume 3,* edited by M. Adam Mahmood.

INTRODUCTION

Cognitive skills play a critical role in how individuals perform their tasks in today's knowledge-based economy. Employers have identified competent spreadsheet skills as one of the most beneficial, fundamental computer literacy skills a worker can possess following word processing skills (see Davis & Leitch, 1988; O'Leary, 1989; Coy & O'Grady, 1992; Heagy & Gallum, 1994; Davis, 1997; AAA, 2000). However, it has been well documented that spreadsheet models developed by end users contain surprisingly high error rates (e.g., Brown & Gould, 1987; Davis & Ikin, 1987; Cragg & King, 1993; Janvrin & Morrison, 1996; Panko & Halverson, 1996; Panko & Havlerson, 1997; Panko & Sprague, 1998). Spreadsheet errors can have a dramatic effect on the performance and decision process of end users.

We develop a framework and report the results of empirical tests that suggest spreadsheet training will influence four cognitive skills, namely logical reasoning, spatial visualization ability, mnemonic skill, and sequencing ability, and that these cognitive skills will influence the errors in spreadsheet models.

LITERATURE REVIEW

Cognitive Skills

Figure 1 illustrates a framework that suggests spreadsheet training influences cognitive skills, namely logical reasoning, spatial visualization, mnemonic skill, and sequencing skill of end users that will subsequently influence the error rate in spreadsheet models developed by the end users. Cognitive skills are related to how individuals acquire, store, retrieve, and utilize knowledge. Different types of cognitive skills are necessary to complete different tasks. When end users develop spreadsheet models, they are highly engaged in problem solving, planning, and perceptual-motor functions. The demand on their working memory is high,

Figure 1: A Framework for Cognitive Skills, Spreadsheet Training, and Errors