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Assessing knowledge structure in accounting education: an application of Pathfinder Associative Networks

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Abstract

Knowledge structure, or the way in which individuals organize knowledge, is a separate and distinct learning outcome. Extensive prior research supports the contention that knowledge structure is a primary determinant of expertise in any professional field. Assessments of structural development can provide instructors and students with unique feedback regarding progress toward the development of appropriate knowledge structure and the effectiveness of training, yet such assessments are seldom employed in accounting education. This paper presents a structural assessment technique, Pathfinder, which is easily implemented in an instructional setting to measure the development of students' structural knowledge. This paper describes Pathfinder and presents results from two studies conducted to evaluate the appropriateness of employing Pathfinder in accounting education. Results indicate that Pathfinder measures of structural assessment improved in response to instruction in accounting and pre-instructional differences in knowledge of accounting influenced the post-instructional quality of knowledge structure. Most importantly, data produced by Pathfinder enhanced the prediction of performance-related outcomes relevant to professional practice, beyond that provided by more traditional measures of student learning. Finally, knowledge structure measures were positively associated with domain-specific self-efficacy. Combined, these results confirm the convergent, discriminant and predictive validity of the measure and demonstrate that structural assessment can provide valuable feedback regarding instructional effectiveness.

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Keywords: Pathfinder; Knowledge structure; Classroom assessment technique; Structural assessment

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1. Introduction

Current thinking in cognitive science suggests that both the quantity and organization of knowledge stored in memory are important to learning and performance (Kraiger, Ford, & Salas, 1993). First introduced to the accounting literature by Weber (1980), the concept of *knowledge structure* is based on the premise that people organize information into patterns that reflect relationships among concepts and the features that define them.

A number of researchers have discussed the significance of knowledge structure to accountant expertise (Bedard & Graham, 1994; Nelson, Libby, & Bonner, 1995; Vera-Muñoz, 1998; Waller & Felix, 1984). Empirical studies show that accurate or high quality knowledge structures facilitate the identification and encoding of relevant information, the retrieval of applicable knowledge from long-term memory, and the activation of appropriate problem-solving strategies in the performance of accounting tasks (Choo, 1996; Libby, 1985). Performance advantages notwithstanding, superior knowledge structures also have the benefit of enhancing subsequent learning and retention (Bonner, Libby, & Nelson, 1997; Maletta, Anderson, & Angelini, 1999).

Conceptual and practical distinctions between knowledge structure and other types of knowledge presuppose different strategies of assessment. Although structural assessment (SA) methods for evaluating an individual's knowledge structure are widely used in studies of accountant expertise (Choo & Curtis, 2000), SA has not been adopted as a mainstream classroom learning assessment technique. For example, recent reviews of assessment in accounting education exclude any discussion of SA techniques (Apostolou, Watson, Hassell, & Webber, 2001; Harwood & Cohen, 1999). This omission may be due, in part, to a general lack of familiarity with and understanding of SA approaches.

This paper describes the application and value of a commercially available SA tool, Pathfinder Associative Networks,¹ which is easy to use and requires relatively little development time. We illustrate the use of Pathfinder with two classroom samples, and present data from these samples to support the convergent, discriminant and predictive validity of the tool for classroom use. The paper concludes with specific recommendations for incorporating SA as a tool in the “portfolio of classroom assessment techniques” (Harwood & Cohen, 1999) designed to improve student learning.

2. Assessing knowledge structure

According to Kraiger et al. (1993), the development of expert knowledge structure approximates a sequence of stages in which the acquisition of lower forms of knowledge serves as a foundation and prerequisite to higher forms. *Declarative*

¹ Pathfinder Associative Networks is available from Interlink, Inc. 3352 E. Canyon Dr., Gilbert, AZ 85297, USA (contact <http://interlinkinc@yahoo.com>).

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