Capturing the Multidimensional Nature of Transfer: The Knowledge Transfer Matrix

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Abstract

This review forwards the Knowledge Transfer Matrix (KTM) as a multidimensional scheme that considers the interaction of two important aspects of transfer in academic contexts, namely the type (i.e., declarative/procedural or conceptual) and domains of knowledge (i.e., near or far). A review of 60 empirical studies of transfer found that definitions of transfer varied widely. Moreover, 37% measured the transfer of declarative or procedural knowledge and 95% were examinations of near transfer (i.e., within-subject or within-domain). When type and domain of knowledge were considered together in the KTM, 95% of the studies examined the transfer of near-conceptual or near-declarative knowledge. These data indicate that conceptions of transfer differ with regard to knowledge type and knowledge domain, and that operationalizations of transfer are often in conflict with its explicit or implied definition. A conceptual scheme like the KTM can help provide guidance for increased precision in defining and testing for transfer.

Introduction

The poor consensus in the literature on the nature of transfer has led to a lack of clarity on the construct and inconsistent findings on the relation between transfer and learning (Butterfield & Nelson, 1991; Carraher & Schliemann, 2002). Several taxonomies and heuristics have been proposed in an effort to bring clarity to the literature (e.g., Barnett & Ceci, 2002). However, by their very nature, taxonomies only consider one dimension at a time. This linear treatment of transfer does not reflect the complex, multidimensional nature of learning (Alexander, Schallert, & Reynolds, 2009).

We propose the Knowledge Transfer Matrix (KTM; Figure 1) as a multidimensional scheme that considers the interaction of two important aspects of transfer, namely the type and domains of knowledge.

Methodology

We systematically reviewed 60 studies of cognitive transfer published in core educational psychology journals between 2003 and 2009 to determine the usefulness of the KTM.

Studies were coded on the following dimensions:
- **Definitional clarity:** explicit and three types of implicit (i.e., implied conceptually, by referent, and/or by measure);
- **Type of knowledge:** declarative/procedural knowledge or conceptual knowledge;
- **Domains of knowledge:** near transfer (within subject or domain) or far transfer (across domain); and
- **Position in the Knowledge Transfer Matrix:** Near-Declarative, Near-Conceptual, Far-Declarative, or Far-Conceptual.

Inter-rater (percent agreement) exceeded 85%.

Conclusions

The data from this literature review indicate that conceptions of transfer vary widely in regard to knowledge type and knowledge domain. Moreover, within studies, the operationalization of transfer is often in conflict with its explicit or implied definition.

Due to the ubiquitous use of transfer in the educational psychology literature, what is meant by transfer must be explicitly stated, and these definitions need to align carefully to the task at hand. A conceptual scheme like the Knowledge Transfer Matrix can help provide guidance for defining and testing for transfer.