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Ng, Bing Hiong; Yeung, Alexander Seeshing

Fostering analogical transfer: the multiple components approach to algebra word problem solving in a chemistry context.

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Summary: Holyoak and Koh (1987) and Holyoak (1984) propose four critical tasks for analogical transfer to occur in problem solving. A study was conducted to test this hypothesis by comparing a multiple components (MC) approach against worked examples (WE) in helping students to solve algebra word problems in chemistry classes. The MC approach incorporated multiple components (symbolic equations, symbols, categorization, hint) in the source, or target, or both, to address the four analogical tasks. Different combinations of the components were tested in a series of four experiments. Symbolic equations (main component) fostered a mental construction of the problem in its solution mode. Categorization enabled an identification of the problem category. A hint in the target directed the learners to the source problem. The interaction between these components facilitated the mapping of the symbolic equations in the source onto the target, resulting in the superiority of the MC approach in fostering analogical transfer. Neither the main component alone nor the main component plus one sub-component was sufficient for analogical transfer. Hence for analogical transfer to occur, at least the main component (symbolic equations) and two sub-components (categorization and hint) are required. However, symbols may not have additional effects for transfer to occur.

Classification: D50 F90 M60

Keywords: problem solving; classification; word problems; equations; algebra; task analysis; comparative analysis; educational psychology

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