DOI: 10.1080/01443411003659960

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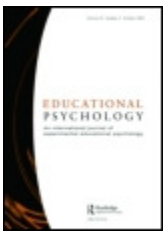
Educational Psychology
Vol. 30, Issue. 3, 2010 pp. 369-357

Educational Psychology: An International Journal of Experimental Educational Psychology

Volume 30, Issue 3, 2010



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pages 349-367

Publishing models and article dates explained

- Received: 30 Sep 2009
- Accepted: 28 Jan 2010
- Published online: 26 Apr 2010

Abstract

This study compared the effects of worked example and problem-solving approaches in individual or group work settings on learning to solve geometry problems. One hundred and one seventh graders from Indonesia were randomly allocated to four experimental groups using a 2 (problem-solving vs. worked examples) × 2 (individual vs. group study) design. Performance measures on numeric and reasoning abilities using both similar and transfer tasks were collected. The results indicated a significant superiority of the worked example approach in both the individual and group work settings. Supporting data revealed that students could understand the material more easily using worked examples than when solving problems. The experiment provided evidence that the advantage of using worked examples over solving problems extends to a group work context.

Keywords

- cognitive load theory,
- worked examples,
- group work

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Educational Psychology
Vol. 30, No. 3, May 2010, 349–367

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Worked example effects in individual and group work settings

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(*Received 30 September 2009; final version received 28 January 2010*)

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Keywords: cognitive load theory; worked examples; group work

Introduction

Solving problems is a major activity when studying mathematics. Nevertheless, despite the popularity of problem-solving as a teaching and learning device, there are both theoretical and empirical grounds for suggesting that students, particularly novices in the domain, learn more by studying worked examples than by solving problems (Kalyuga, Ayres, Chandler, & Sweller, 2003). Cognitive load theory, for example, argues that solving conventional problems imposes a heavy, extraneous cognitive load that interferes with learning. Detailed theoretical reasons for this argument are provided below.

Empirically, there is considerable evidence for the superiority of worked examples to problem-solving in various domains for novice learners (for some examples of this 'worked example' effect in mathematics see: Carroll, 1994; Mwangi & Sweller, 1998; Paas, 1992; Paas & Van Merrienboer, 1994; Sweller & Cooper, 1985; Tarmizi & Sweller, 1988; Ward & Sweller, 1990). In contrast, problem-solving has been found to be superior to worked examples only when learners have significant expertise (prior knowledge) in the domain (see Kalyuga, Chandler, Sweller, & Tuovinen, 2001; Kalyuga et al., 2003).

Most research that has compared studying worked examples with solving problems has studied learners dealing with problems on an individual basis (see Atkinson, Derry, Renkl, & Wortham, 2000; Sweller, 1999). It can be hypothesised that whereas

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ISSN 0144-3410 print/ISSN 1469-5820 online

DOI: 10.1080/01443411003659960
http://www.informaworld.com

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Details

- **Citation information:** Web of Science ®
- **Received:** 30 Sep 2009
- **Accepted:** 28 Jan 2010
- **Published online:** 26 Apr 2010

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