

Worked Examples Effect

Theory

The worked examples effect was first introduced in 1985¹⁾ suggesting positive effects of providing a learner with an **example of the problem solution** before requiring him to solve one on his own.

This suggestion is contrary to many [constructivist discovery learning](#) methods which suggest a learner should try to solve the problem by himself. [Cognitive load theory](#) on the other hand suggests that searching for the problem solution places unnecessary load on the learner's mind preventing him from learning. A worked example will remove the load of searching for a solution and enable easier acquisition of basic steps leading to the solution.

Practice

$$\begin{array}{l}
 2x^2 - 8x - 24 = 0 \\
 x = ?
 \end{array}
 \qquad
 \begin{array}{l}
 1. \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\
 x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(-24)}}{2(2)} \\
 x = \frac{8 \pm \sqrt{64 - (-192)}}{4}
 \end{array}
 \qquad
 \begin{array}{l}
 2. \quad x = \frac{8 \pm \sqrt{256}}{4} \\
 x = \frac{8 \pm 16}{4} = 2 \pm 4 \\
 x = 6, -2
 \end{array}$$

Learners should be presented with a worked example of the procedure they're expected to learn **prior to trying to solve a problem** which requires that procedure. For example, when teaching learners the formula for calculating roots of a quadratic formula, learners should first be provided with a worked example of using the formula, and then try to solve a problem on their own.

Still, it should be noted that under some conditions

- *"worked examples are no more effective, and possibly less effective, than solving problems."*²⁾

This is due to the fact that even **worked examples can be badly designed** and not follow the [principles and effects](#) of proper instructional design (especially see: [expertise reversal effect](#)).

Research status

A recent research has systematically compared usage of worked examples, example-problem pairs, problem-example pairs and problem-solving, demonstrating that

- *"example study only and example-problem pairs were more effective and efficient than problem solving only and problem-example pairs."*³⁾

¹⁾

[Sweller, John, and Graham Cooper. The Use of Worked Examples as a Substitute for Problem Solving](#)

in Learning Algebra. *Cognition and Instruction* 2: 59-89, 1985.

2)

Ward, Mark, and John Sweller. Structuring Effective Worked Examples. *Cognition and Instruction* 7: 1-39, 1990.

3)

van Gog, Tamara, Liesbeth Kester, and Fred Paas. Effects of worked examples, example-problem, and problem-example pairs on novice learning. *Contemporary Educational Psychology* 36, no. 3: 212-218, July 2011.

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