

# The Doer Effect

The Doer Effect is the learning science principle that proves students who do practice questions while reading new content have higher learning gains than those who only read.

## FROM THE RESEARCH

The Doer Effect has been the focus of both academic and industry research. Studies of interactive courseware from Carnegie Mellon University's Open Learning Initiative showed that students who did more interactive activities had a learning benefit approximately six times that of reading text and three times that of watching video.<sup>1</sup> This study confirmed what most people understand: doing practice is good for learning.

However, researchers at Carnegie Mellon University (CMU) were able to show this relationship was not coincidental; doing caused learning.<sup>2</sup> Causal results are critical for educational research because we should know with a high degree of certainty that the learning methods presented to students will be effective for their learning.



## REPLICATING THE DOER EFFECT

VitalSource has replicated these findings in our Acrobatiq courseware platform, which was developed for our college and university partners. In a recent research study,<sup>3</sup> we analyzed data from courseware being used at a major four-year public university. The analysis showed a correlation between the amount of practice students did and their summative quiz scores. The more practice students did, the better their learning outcomes were.

## EXAMPLE OF LEARN BY DOING IN ACROBATIQ


### Learn by Doing

Like prokaryotes, eukaryotic cells have a plasma membrane (Figure 4.9), a(n)  bilayer with embedded proteins that separates the internal contents of the cell from its surrounding environment.

Check Answer

Many metabolic reactions, including protein synthesis, take place in the .

Check Answer

 A darkly staining area within the nucleus called the \_\_\_\_\_ (plural = nucleoli) aggregates the ribosomal \_\_\_\_\_ with associated proteins to assemble the ribosomal subunits that are then transported out through the pores in the nuclear envelope to the \_\_\_\_\_.

VitalSource also partnered with a major online institution to analyze courseware engagement data and final exam scores. **Results replicated the same causal relationship found at CMU—that doing practice causes learning.**<sup>4,5</sup> Replicating causal results is just as important as identifying them, as this increases confidence in the Doer Effect research.

By finding that doing practice causes learning using different courseware at a different institution, the Doer Effect results become increasingly generalized, providing more evidence that our Doer Effect findings are applicable across a range of real-world situations. Also, identifying the impact of the Doer Effect on a final exam shows that the effects of doing practice increase learning gains even when the assessment takes place long after the initial learning.

Through years of research, we have replicated the causal relationship that Learn by Doing and the Doer Effect have on learning. As online education continues to evolve and accelerate, research-based approaches like this pave the way to create learning experiences that help students succeed.

<sup>1</sup> Koedinger, K., Kim, J., Jia, J., McLaughlin, E., & Bier, N. (2015). Learning is not a spectator sport: Doing is better than watching for learning from a MOOC. *Learning at Scale*, pp. 111–120. Vancouver, Canada. <http://dx.doi.org/10.1145/2724660.2724681>

<sup>2</sup> Koedinger, K., McLaughlin, E., Jia, J., & Bier, N. (2016). Is the doer effect a causal relationship? How can we tell and why it's important. *Learning Analytics and Knowledge*. Edinburgh, United Kingdom. <http://dx.doi.org/10.1145/2883851.2883957>

<sup>3</sup> Van Campenhout, R., Jerome, B., & Johnson, B. G. (2020). The impact of adaptive activities in Acrobatiq courseware: Investigating the efficacy of formative adaptive activities on learning estimates and summative assessment scores. In: Sottolare R., Schwarz J. (eds) *Adaptive Instructional Systems*. HCII 2020. LNCS, vol 12214. Springer. pp 543–554. [https://doi.org/10.1007/978-3-030-50788-6\\_40](https://doi.org/10.1007/978-3-030-50788-6_40)

<sup>4</sup> Olsen, J., & Johnson, B.G. (2019). Deeper collaborations: a finding that may have gone unnoticed. *Presentation at the IMS Global Learning Impact Leadership Institute*, San Diego, CA

<sup>5</sup> Olsen, J., Van Campenhout, R., & Johnson, B.G. (2021). The Doer Effect: Replicating findings that doing causes learning. *Learning Analytics and Knowledge*

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