

## **Deliberate or uncontrolled practice?**

Unpublished commentary on

**Deslauriers, L., Schelew, E., & Wieman, C. Improved Learning in a Large-Enrollment Physics Class. *Science*, 332, 862-864.**

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## Deliberate or uncontrolled practice?

In their report “Improved Learning in a Large-Enrollment Physics Class” (Reports, 13 May, p. 862), L. Deslauriers et al. showed that instruction inspired by research on “deliberate practice” (DP) (1) led to better learning than traditional instruction, and conclude that their results support the DP framework. In my view, this support is much weaker than claimed, both for methodological and theoretical reasons.

Methodologically, the design of the study fails to support the conclusion that the new form of teaching is uniquely responsible for the experimental group’s better performance. While Deslauriers et al. reject any role for the Hawthorne effect, several other potentially confounding variables (demand characteristics, experimenter bias, teachers and students’ expectations, etc. (2, 3)) could plausibly account for the results, because of the lack of random allocation of participants to control and experimental groups. A second control group, using a third method of instruction, would have provided a better protection against the effect of potentially confounding variables. In addition, the intervention was short (3 hours) and the long-term effects of the novel mode of teaching are unknown.

Theoretically, the experimental group’s activities only loosely corresponded to DP activities (1). DP advocates highly structured tasks with well-defined goals aimed at improving performance. These activities should be of suitable difficulty, offer ample opportunities for repetition, provide the opportunity for corrective feedback, require full concentration and sustained effort, and be optimized for solitary training. They typically are neither motivating nor enjoyable, and must be limited to a few hours a day. An example of DP is offered by a tennis player practicing to improve her backhand technique. Several of these characteristics were simply not present in the experimental group’s activities. In particular, their activities were carried out in groups, were enjoyable, were not repetitive, and did not appear to be particularly effortful.

### References

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3. R. Rosenthal, R. L. Rosnow, *Artifacts in behavioral research* (OUP, Oxford, 2009).