

Two papers on active learning

The TLDR analysis

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TLDR versions of the two papers

Task

- Read the hand-out
- Discuss: what seems to be the main take-away from the paper
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Red groups: Meta analysis

<https://doi.org/10.1073/pnas.1319030111>

9.781, $P < 0.001$)—meaning that on average, student performance increased by just under half a SD with active learning compared with lecturing.”

“The overall mean effect size for failure rate was an odds ratio of 1.95 ($Z = 10.4$, $P < 0.001$). This odds ratio is equivalent to a risk ratio of 1.5, meaning that on average, students in traditional lecture courses are 1.5 times more likely to fail than students in courses with active learning.”

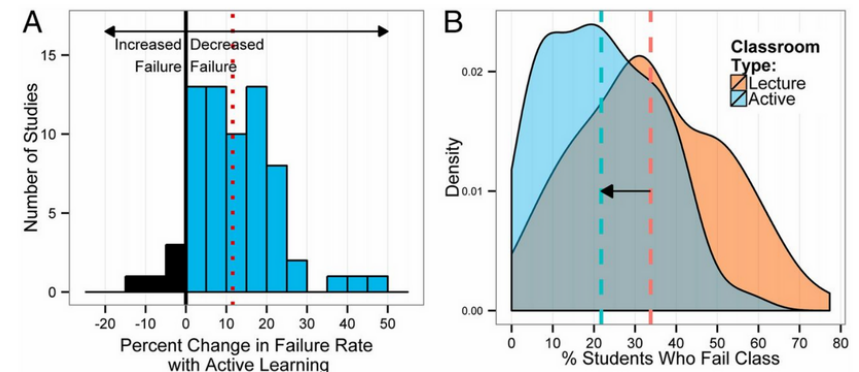


Fig. 1 Changes in failure rate. (A) Data plotted as percent change in failure rate in the same course, under active learning versus lecturing. The mean change (12%) is indicated by the dashed vertical line. (B) Kernel density plots of failure rates under active learning and under lecturing. The mean failure rates under each classroom type (21.8% and 33.8%) are shown by dashed vertical lines.

Heterogeneity analyses

Analyses indicate:

- no statistically significant variation among experiments based on the STEM

ActiveLearning

PDF document

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Blue groups: Particular study

<https://doi.org/10.1073/pnas.1821936116>

"The crucial difference between the 2 groups was whether students were told directly how to solve each problem or were asked to try to solve the problems themselves in small groups before being given the solution."

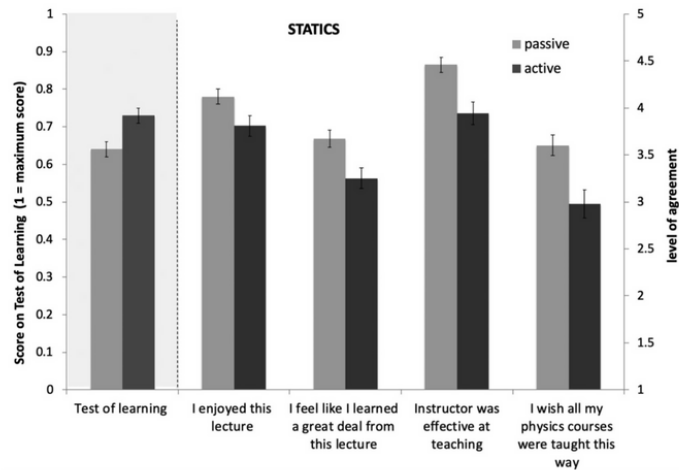


Figure 1: A comparison of performance on the TOL and FOL responses between students taught with a traditional lecture (passive) and students taught actively for the statics class. Error bars show 1 SE.

Measuring learning

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Main take-aways: Meta-analysis

* active learning reduces failure rates across STEM

* active learning works best for groups under 50 participants, but works also for bigger groups

* active learning compared to traditional learning also improves performance in exams

WG 4

- Active learning works!
- The vocabulary of science education is complex to scientists
- Small groups work better
- Geology is conflicting

Geology has only 2 studies, so the error bar is large – ANONYMOUS

Why was the outcome lower when the outcome variable was a written exam?

Main take-aways: Particular study

Students don't want to put in effort into courses that are mandatory?

From the paper we can infer the observed course was a mandatory course which was not related to the major of the students. The student reported reduced satisfaction with active learning.

Students actually need to be used to the mode of learning. – ANONYMOUS

The student have to know in advance the benefits of the active learning, otherwise they will not enjoy.

Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom

Even though students perceived the active learning course less effective than the passive learning course, it resulted in an improvement of their result.
