Abstract Submitted
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How to improve essential skills in introductory physics through brief, spaced, online practice.[1] ANDREW HECKLER, Ohio State University, BRENDON MIKULA, Indiana State University — We developed and implemented a set of online "essential skills" tasks to help students achieve and retain a core level of mastery and fluency in basic skills necessary for their coursework. The task design is based on our research on student understanding and difficulties as well as three well-established cognitive principles: 1) spaced practice, to promote retention, 2) interleaved practice, to promote the ability to recognize when the learned skill is needed, and 3) mastery practice mastery practice, to promote a base level of performance. We report on training on a variety of skills with vector math. Students spent a relatively small amount of time, 10-20 minutes in practice each week, answering relevant questions online until a mastery level was achieved. Results indicate significant and often dramatic gains, often with average gains of over one standard deviation. Notably, these large gains are retained at least several months after the final practice session, including for less-prepared students.

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