

# Study shows quizzes improve academic performance

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About a year ago, a conversation during a faculty meeting piqued Marcus Crede's interest. A senior faculty member in Iowa State University's Department of Psychology said that he believed frequent quizzes help students better grasp classroom material. Crede, an associate professor of psychology, was skeptical that something as simple as a quiz could positively impact students' academic

performance. He decided to dig deeper and conduct a meta-analytic study of existing research to see if there was any merit to the claim. What he discovered truly surprised him.

"I have a long history of trying to understand the variables that contribute to learning and performance in the classroom," Crede said. "For me, this study is part of a larger effort to understand what works and what doesn't work. It turned out to be a much more interesting paper than I thought it was going to be. I was surprised."

## **The study**

Crede teamed up with psychology graduate [student](#) Lukas Sotola, who took the lead on much of the research. They analyzed data from previously published studies that examined 52 classes with almost 8,000 students, primarily college-level courses, to determine if frequent quizzes improved the students' academic performance. Laboratory settings were excluded from the study because Crede and Sotola wanted to observe whether similar studies from labs would apply to general classrooms. They defined quizzes as low-stakes assessments of learned material that occurred at least once a week.

Crede emphasizes that this study did not involve true experiments, where some students were randomly assigned quiz conditions and others were not.

"As soon as we don't have random assignments, we can't be 100% certain that the difference is really do to the quizzes. It could be something else."

Nevertheless, the results suggest there may be a strong link between frequent quizzing and student success.

The study's results are detailed in the paper, "Regarding Class Quizzes: A Meta-analytic Synthesis of Studies on the Relationship Between Frequent Low-stakes Testing and Class Performance," published last month in the journal *Educational Psychology Review*.

## **A few surprises**

Crede and Sotola discovered that when students are quizzed over class material at least once a week, they tend to perform better on midterm and final exams compared to students who did not take quizzes. They also found that students who took frequent quizzes were less likely to fail the class, especially if they were struggling with the course content.

"I was surprised the effect of quizzes was relatively strong," Crede said. "I was skeptical. I didn't think this would have much of an effect. The other surprising thing was how much quizzes helped reduce failure rates in classes. The odds of passing a class went through the roof where instructors used this."

Even if quizzes only modestly impact students' ability to pass a class, Sotola said this tool should be part of an instructor's teaching curriculum.

"A modest effect can have a large impact over the course of many years," Sotola said. "If quizzes improve performance and lead to even a slightly lower percentage of students failing their classes, then that will presumably have positive effects on graduation and drop-out rates down the road, which will save students and institutions time and money."

Crede noted that students who struggle the most in a class seem to benefit the greatest from frequent quizzes. This is a profound finding, he said, especially since implementing short quizzes into course curriculum is a relatively simple task.

"In many universities, including Iowa State, there's often concern about drop-out rates and failure rates, and so the fact that we can apparently do so much with so little effort is really encouraging for us," Crede said.

In addition to quiz frequency, another factor that seemed to positively impact students' performance was immediate feedback from instructors. Also, Crede and Sotola said quizzes that required students to answer with written responses proved more beneficial to their understanding of class material compared to multiple-choice questions, though their pool of data for this particular aspect of the study was small.

"You have to be cautious about the amount of data we have, but multiple-choice questions seem to be a little less effective than what we call a constructive-response question, when you actually have to come up with the answer yourself," Crede said. "It's about recognizing the right answer and actually remembering what the right answer is."

Crede acknowledges that asking teachers to grade written quizzes daily or weekly may discourage some from implementing them in their classes. Instead, he recommends instructors utilize online quizzes that can be automatically graded by a course management system, such as Canvas.

Crede and Sotola said some quiz attributes proved insignificant in their study, including whether the tests were pop quizzes versus planned, or if they were online or on paper. No matter how they are delivered, Crede and Sotola agree that their study shows frequent quizzes with immediate instructor feedback help students, especially those who are having difficulties, succeed in the classroom.

"The impact on struggling students was really remarkable," Crede said. "Again, we only have data on about 1,000 students, but it's really quite dramatic. If it's even remotely in that neighborhood, this is something we

should all be doing."

**More information:** Lukas K. Sotola et al, Regarding Class Quizzes: a Meta-analytic Synthesis of Studies on the Relationship Between Frequent Low-Stakes Testing and Class Performance, *Educational Psychology Review* (2020). [DOI: 10.1007/s10648-020-09563-9](https://doi.org/10.1007/s10648-020-09563-9)

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