

## No Cost or Benefit from Frequent Online Quizzes Compared to Traditional Exams

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Studies suggest increasing the number of study sessions improves long-term comprehension, but many students study only once before an exam. We attempted to modify study behavior by increasing test frequency. Although neither long-term comprehension nor study times increased, it was shown that online quizzes were as effective as in-class testing.

Students not only cram for examinations, they often report that cramming is an effective means for achieving good exam scores. Unfortunately, results from empirical studies (e.g., Rohrer & Pashler, 2007) suggest that a single study session is not optimal for long-term retention. Although the benefits of spaced studying are clear, encouraging it in the classroom is difficult. We propose that by having exams more frequently students will necessarily modify their studying behavior. For instance, students who only study once before the exam would be compelled to study twice as often if twice as many exams were given.

Introductory psychology students were tested using traditional in-class exams (e.g., four chapters' content) and using twice as many online quizzes (e.g., two chapters' content) for half of the semester each. Time limits were enforced in both testing conditions. Testing manipulation order was counterbalanced across two course sections taught by the same instructor. Two dependent measures, participant study time and comprehensive exam score, were used to gauge the effects of the testing manipulation. Participants completed a survey in which they reported the number of minutes spent studying for each exam or quiz. An independent samples t-test failed to reveal a significant difference between reported study time for online quizzed content ( $M = 129$ ,  $SD = 98$ ) and for in-class tested content ( $M = 108$ ,  $SD = 93$ );  $t(91) = 1.078$ ,  $p = .284$ . Upon completion of the course, students completed a comprehensive exam. Half of the questions tested quizzed content and half tested in-class exam content. A paired samples t-test failed to reveal a significant difference in comprehension based on whether content was assessed through online quizzes ( $M = .54$ ,  $SD = .18$ ) or in-class exams ( $M = .57$ ,  $SD = .17$ );  $t(102) = -1.52$ ,  $p = .131$ .

Laboratory based studies suggest that increasing the number of study sessions improves long-term comprehension. Our findings do not support this claim. In addition, use of more frequent assessments did not affect study time. Nevertheless, use of online quizzes did not harm student comprehension. Additionally, if students cheat online one might expect to see significantly lower final comprehension scores which we did not. Thus, if online testing is as effective as in-class testing, instructors may be able to save time (e.g., examinations do not require class time, grading may be automatic) and resources (e.g., no paper & ink costs) by replacing traditional in-class testing with online quizzes.