

Online Quizzing Leads to Better Exam Performance for Material That Was Tested Using Recall Quiz Items

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Background:

Tests assess students' knowledge of course-related material. Tests can, however, serve another important function. They can promote better learning and long-term retention and diminish the forgetting of previously learned material (McDaniel, Roediger, & McDermott, 2007; Roediger & Karpicke, 2006). Roediger and Karpicke (2006) suggested that "testing not only measures knowledge, but also changes it, often greatly improving retention of the tested knowledge" (p. 181). This well-documented effect is referred to as the "testing effect."

Although testing (we'll refer to this as "quizzing") of course content using multiple-choice items can promote retention of the tested content, there is evidence that giving students retrieval quizzes promotes better retention of quizzed material than quizzes that rely on recognition (multiple-choice quizzes).

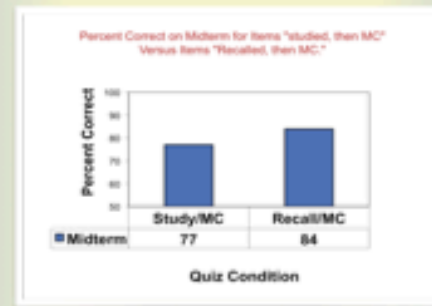
However, there is a practical problem. Although teachers may see the value of giving quizzes prior to a major exam, many of them, especially teachers with large enrollment classes, are not willing to give retrieval-based quizzes because of the time required to score them. Multiple-choice quiz items are easy to score.

Prediction:

Students will perform better on exam items that were quizzed using a recall/multiple choice format than on items for which they were given the correct answer and then immediately received a multiple-choice question on that item.

Participants:

Participants were undergraduate students enrolled in a large enrollment (circa 150) general education course on Science and the Nature of Stress. The course had weekly lecture and lab meetings.



Procedure:

- Students completed weekly online quizzes from the beginning of the semester up to the midterm exam.
- **Study Items** (control): students viewed a quiz item that included the correct answer. They then answered a multiple-choice question that appeared immediately after. Students received the answer to a question and then were immediately given a multiple-choice item as a check of whether they attended to the answer.
- **Recall Items** (quizzed): students viewed a quiz item. They then tried to recall the answer which they typed in a designated space. Then, they immediately were asked a multiple-choice question for which they were to select the best answer.
- There were 12 questions on each quiz, 6 questions of each type.
- Students received 1 point for each correct response on the multiple-choice items for the recall/MC questions, and .17 credit for correct responses on the study/MC questions.

Method:

Procedure continued:

- Students received feedback on their multiple-choice quiz performance after a quiz was "closed."
- On the midterm exam, there were multiple-choice questions that had been included as study items or as recall items on quiz days. The exam questions were similar to items on the quiz but were worded in a different manner.

Results and Discussion:

- The results are shown in the figure. Students performed significantly better on items on the midterm exam questions that covered material for which there was a recall/multiple choice item on a quiz (84% correct) than for material that had been presented on a quiz as a study/multiple-choice item (77%). This finding has been replicated in a separate offering of this course.
- Teachers may be persuaded of the benefits of using quizzes as a way to promote better learning and retention of course material. However, when they learn that retrieval quizzes (such as those that require recall or other types of retrieval) produce better results than recognition-based quizzes (such as multiple-choice quizzes), they often are not able and/or willing to administer retrieval quizzes because of the time involved in scoring them.
- Our method allows teachers to take advantage of the benefits that accrue from using recall quiz items, without the problems associated with scoring such items. In our procedure, the only items that are scored on the quizzes are the multiple-choice items.

Suggested Readings

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