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Ramifications of quiz format on retention and online studying

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**Introduction**

University courses are increasingly being consumed or augmented by online resources. Although these resources are available, their utility needs to be empirically verified to ensure quality learning outcomes. We investigated the impact of required online quizzes on retention and student use of voluntary online quizzes.

**Question 1: Does online quizizing lead to improved retention?**

Previous research suggests that repeated testing of content can lead to more effective retention of information (e.g., Coulter-Kern, Fogle, & Sibert, 2010; Roediger & Karpicke, 2006). Perhaps students engaging in extra online quizizing can obtain similar results. Current findings are inconclusive (e.g., Roediger, Putnam & Smith, 2011).

**Question 2: Will students complete voluntary online quizzes? Under what conditions?**

To investigate this question we tracked how often students voluntarily took online quizzes. Our goal was to see if minimal “encouragement” – requiring some in-class and online quizzes, telling students about testing effects, providing online quizzes for each chapter – would lead to regular voluntary use of online quizzes.

**Method**

- Students from three sections of Introductory Psychology (N = 135) were assigned to take an online quiz, in-class quiz, or no quiz for chapters in each unit. Assignment to quiz type per chapter was counterbalanced across sections (see Table 1).
- Online quizzes were available for all chapters, but only assigned quizzes were required for credit.
- All quizzes were open book and limited to 10 minutes.

**Results**

**Outcomes Associated with Required Quizzing (All sections)**

Students missed more online quizzes (87) than in-class quizzes (33), (t(134) = 5.79, p < .001). Students scored lower on online quizzes (M = 82%) than in-class quizzes (M = 89%), (F(1,68) = 42.9, p < .001). This was true even when missed quizzes (zeros) were excluded.

Retention was measured by calculating unit sub-scores for each chapter. Quiz type had a small effect on retention, (F(2,266) = 6.93, p = .001).

- Performance was higher for content associated with required in-class quizzes (M = .74, SE = .01) compared to content associated with no required quiz (M = .71, SE = .01; p = .003).
- Performance was numerically, but not statistically, higher for content associated with required online quizzes (M = .73, SE = .01) compared to content associated with no quiz (p = .08).

**Outcomes Associated with Voluntary Online Quizzing (Section 1 only)**

Twenty-eight (of 47) students took at least one voluntary online quiz. Those taking 4+ quizzes earned higher exam scores [(F(2,64) = 5.50, p = .007) and final course grades [(F(2,64) = 6.62, p = .003] than other students.

**Discussion**

**Does online quizizing lead to improved retention?**

Required multiple choice quizizing, whether in-class or online, appears to lead to minor increases in retention over conditions where no quizizing is required. These data contribute to a growing body of evidence suggesting that adoption of online quizizing does not undermine student comprehension of course material (e.g., Daniel & Broida, 2004) and may improve it.

**Will students complete voluntary online quizzes? Under what conditions?**

Students did not take full advantage of online quizizing opportunities. For example, 40% of students in one class never took a voluntary quiz. Therefore, the relatively passive approach used to encourage student self-testing had limited effectiveness.

Nevertheless, there appear to be benefits for students who do complete voluntary quizizing. Specifically, students who took four or more voluntary quizzes outperformed other students on exams and in final course grades.

Overall, students were more likely to take voluntary online quizizing when the content was associated with a required in-class quiz. The data suggest that these quizzes were initially used to prepare for in-class quizzes, but that strategy quickly shifted to quizizing being used to prepare for unit exams.

This preliminary work highlights the fact that in order to implement effective online content, it may be necessary to better understand student motives and incentives.

**References**


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