Research Tip and Primer: Using Online Quizzes: A Comprehensive Guide
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What the experts say: The best way for students to prepare for a test is to practice with the same types of questions they’ll get on the actual test. Ideally, students should use a range of assessments throughout a course to determine what they know and don’t know. These assessments are most effective when they resemble the exams used in the course (Rolfe & McPherson, 1995; Dobson, 2008).

To this end, many instructors use multiple-choice questions to offer students opportunities to practice and study. Practice questions or quizzes are typically used to encourage and enhance preparation for class time, to uncover what is and isn’t understood, and to increase exam scores. Online quizzes can serve the same purposes as in-class formative assessments—but are much easier to administer and evaluate.

One question underlying much of the research on online quizzing is will students use online study tools? And are there ways to encourage students to utilize available tools more frequently or effectively?

Usage: Several studies indicate that when offered voluntary use of online quizzes and practice questions, some students—but not all—will participate. In one study, Grabe & Sigler (2001) found that around 40% of students used the online multiple-choice questions offered to them, with the average user spending around 1.5 hours per each of three course exams. A study of first-year basic science students in two courses (Olson & McDonald, 2004) saw a participation rate of ~50%, but these students only had access to 28 questions. A similar study (Kibble, 2007) had participation rates of 52%, with those participating students completing two online quizzes.

Take Home Message: When simply given voluntary access to online study questions, between 40-52% of students will use them.

Using online study tools is also shown to increase student performance on summative exams. In a regression analysis, Grabe & Sigler (2001) found that student use of online study tools uniquely predicted the first of two exam scores but not the second. The authors propose that this may be a result of students having a better understanding of what they need to do to prepare for an exam by the time they reached the third exam. An alternative explanation is that students had exhausted the bank of questions when it came to the third exam (there were only 100 questions per chapter). Olson & McDonald’s study (2004) found that for both courses, scores on the summative exam (as well as for the course as a whole) were significantly higher for students who took the online quizzes than for those students who did not. Course feedback showed that students who took the online formative quiz felt better prepared for the summative exam. Kibble (2007) found that students who did not
use the online quizzes did significantly worse on the summative exam than those who did at least one quiz.

*Take Home Message: Use of online study questions is associated with increases in scores on summative exams.*

**Points for Participation** The availability of online quizzes may motivate some students. But as Brothen, Daniel & Finley (2004) discuss, simply having the quizzes available doesn’t mean everyone will take advantage of them.

Many research studies have explored whether or not to provide incentives for students to take online quizzes. While one hopes college students will use formative assessment tools to better understand their weaknesses and perform better on exams, many students simply won’t without extra incentives.

Kibble (2007) found that offering small amounts of course credit and introducing performance criteria to earn credit increased student participation. Indeed, offering two points of course credit for passing each quiz led to a 98% participation rate. He also found that an apparent misuse of the quizzes, where students took quizzes once and did not attempt them again and were able to score close to 100%, was a side effect of offering rewards. Students who took this approach did not show a similarly high score on the summative exams. This finding underscores the need to help students understand the potential value of the formative online quizzes, and provide guidelines for their use.

*Take Home Message: Offering course credit for taking online quizzes increased participation, but introducing performance criteria seemed to decrease the effective use of the quizzes.*

Another study looked at ways to increase completion of before-lecture reading assignments. Students were given credit (6% of the course grade) for taking quizzes based on reading material assigned each week. 68% of students completed at least 6 out of 8 quizzes. The more quizzes completed by each student, the higher the average score on course’s three summative exams, as well as the final course grade. (Johnson & Kiviniemi, 2009).

*Take Home Message: A relatively low effort technique had significant effect on performance. The number of reading quizzes a student completed predicted both exam performance and overall course grade.*

Brothen & Wambach (2001) investigated the use of online quizzes as part of the course grade. Students had to achieve a certain score (8/10 or higher) to have the score count towards the grade. *Their conclusion:* students were not using the online quizzes in the way in which they were intended. Specifically, students who spent more time on quizzes and made more attempts actually did worse the course exams. The researchers speculated that
students were spending time looking up correct answers rather than answering from their existing knowledge or using the results to hone their study efforts.

Dobson (2008) offered students 10 online quizzes—one each week that an exam was not scheduled. Each quiz was worth 1% of the total course points. Quizzes were only available as certain times. This was an attempt to encourage students to complete the quizzes ahead of the lecture. Results indicated that taking the formative online quizzes enhanced summative exam performance.

Another study investigated online quiz use with either mastery quizzes (students had to score a 7/10 or higher to receive credit) versus answering questions with no mastery level required. Points for the no-mastery quizzes were available only during an early time frame—but questions could be answered at any time after that, with no associated credit. Results indicated that:

a) Students who first received points for completing study questions later made greater use of them on a voluntary basis;
b) After initial exposure to mastery quizzes, students made less use of the online system when given voluntary access;
c) Students who were less able readers made less voluntary use of study questions than more competent readers.

The authors concluded that a small number of points should be awarded to students, but that these points should be awarded for participation and not for performance (Grabe, Flannery, & Christopherson, 2008).

**Take Home Message:** When students were given a small amount of credit for taking online quizzes, and these quizzes were presented at certain time periods, student outcomes increased. When given credit for mastery on online quizzes, students tended to use the quizzes in an inappropriate way and/or to discontinue use once the credit was earned.

**Time Limits** Several studies have investigated the issue of imposing time limits on online quizzes. Based on their 2001 findings, Brothen & Wambach (2004) looked at student performance when online quizzes had time limits. In an earlier study (summarized above) the authors had found that rather than using a prepare-gather feedback-re-study strategy, students tended to look up answers while they were taking the quiz. They called this a “quiz to learn” technique and found that students who used it had lower scores of later exams. One way to address this was to institute a time limit on the quiz, limiting the opportunity for students to look up answers. Brothen & Wambach compared students who had a 15 minute time-limit to those who completed quizzes with no limit. Students were encouraged to use the quizzes for feedback, as a way of studying for exams. Results indicated that:

a) Prior to the study there were no differences between the groups;
b) Students with time limits completed the tests faster;
c) Students with time limits had higher exam scores than non-time limit students;
d) Overall students who spent more time on quizzes did more poorly on the exams.

Dobson (2008), in the study mentioned above, also imposed 15-minute time limits on students, and found that those students did better on summative exams. Brothen, Daniel & Finley (2004) suggest that using time limits will discourage students from referring to the textbook while trying to answer questions, perhaps thinking that they know material better than they really do.

_Take Home Message: Setting time limits for online quizzes seems to help students to use these tools as formative assessments, using their own knowledge to answer questions, rather than looking up answers._

A great deal of learning at the college level comes during out-of-class study time (Grabe, Flannery, & Christopherson, 2008). Online study tools can be valuable if students use them and use them in the way in which they were intended.

**How PrepU Can help you:**

1. **Assign PrepU quizzes to your students.** These quizzes might be reading quizzes assigned to be completed before your lecture, or a diagnostic-type quiz to see what your students know. Or you may assign a review quiz for students to practice and study concepts you have already covered.

2. **Use time limits on your assigned PrepU quizzes.** A time limit can nudge students towards using PrepU to master concepts and bring to light misunderstandings. Without time limits, students may focus on simply answering the questions in a way that doesn’t lead to a lasting grasp of the material.

3. **Award points for completing the quizzes—not for getting a specific score.** By giving students a small amount of credit for completing each quiz, you are motivating them to use the system more frequently. You can even set a mastery level threshold for students for Mastery Level quizzes (so they aren’t randomly choosing “d” for every answer.) But the credit you give should be for using PrepU and completing quizzes—not for attaining a certain score.

4. **Explain the purpose of PrepU.** Share the research showing that students who complete formative, online quizzes get higher exam and course grades. Make sure your students understand why you are using PrepU—and how it benefits them specifically.

**References:**


