

MODELS OF INNOVATION & BEST PRACTICES IN TEACHING & LEARNING AT UND

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USING ON-LINE QUIZZES TO ENCOURAGE STUDENTS TO READ THEIR TEXTBOOK

I. TEACHING AND LEARNING STRATEGY

I use weekly on-line content quizzes administered through Blackboard both to encourage and to reward students for reading the assigned reading from the course textbook. In my course, Biology 332 *General Ecology*, students take weekly on-line quizzes on material that has NOT yet been covered in class. To be able to answer these questions students must keep up with the assigned reading in the text-book. Indeed, since the material has not been covered in class the students can only answer the questions if they have kept up with their reading.

There is a content quiz every week and they are available for the students to take when it fits their schedule over a three to four day period. All content quizzes are announced in class and announcements are posted on Blackboard. Students have an unlimited amount of time to take the quiz but can only take the quiz once. Quizzes consisted of seven to fifteen multiple-choice questions.

To prepare students for the content quizzes, they are described in the syllabus and discussed during the first class meeting. I stress to them that the content quizzes cover material from their assigned readings BEFORE the material is covered in class, that the quizzes are only available for a three to four day window of time and after that they won't be able to take the quiz and that they will have to take the quizzes through Blackboard. I then provided the opportunity for students to ask questions about the content quizzes.

To support the students taking the quizzes throughout the semester I post the schedule of assigned readings on Blackboard and in the syllabus. This gives students a clear idea of what they should be reading and, hence, what will be covered on each content quiz. Since my assigned readings are full chapters, of which some information may be less important, I also post reading questions that help students see what they should be learning from the assigned reading.

The content quiz questions are all multiple-choice and based directly on the assigned reading in the textbook. The content quiz questions focus on basic knowledge (*sensu* Bloom 1956) such as definitions, simple ideas, and basic relationships. Typical questions ask students to choose the appropriate definition for a key term in the chapter, choose the best description of an important idea in the chapter, choose the correct relationship between two basic terms or put a sequence of events in the correct order.

Since the quizzes are offered on-line no class time is used. Additionally, the on-line quizzes are machine graded allowing for instant feed-back. I've set up Blackboard to provide the students with the number of questions correct at the end of the quiz and I then post the correct answers later. Though instant feedback would be beneficial to the students I want to avoid answers being shared with students who have yet to take the quiz. To encourage students to take the content quizzes seriously they are worth a portion of the grade (I have varied this between 10 and 15% of the course grade).

II. DEVELOPMENT OF THIS STRATEGY

BIOL 332 *General Ecology* is a large, lecture based course required of all Biology majors. In many ways it is like an upper level survey course, in that this is the first course in Ecology that students will take after the Biology introductory sequence. For many students this is the only Ecology course that they take, since 90-95% of the Biology majors in the course at any one time are hoping to go into a medical or allied health profession. Due to these circumstances *General Ecology* needs to cover a large amount of material.

When I first started teaching *General Ecology* this situation was problematic for two reasons. 1) I wanted to have the course address higher-level understanding (Bissel & Lemmons 2006, Zohar et al 2006) and use active learning approaches (Ebert-May et al 1997). Adopting these pedagogical approaches leaves less time for covering material in lecture. 2) Due to the amount of material covered, students were asked to read a fair amount from the text book (1-2 chapters per week). Left to schedule their own reading many would read after class instead of before, eventually would fall behind and never catch up with the reading. Such a pattern has been reported in other large, introductory classes (Physics – Podolefsky & Finkelstein 2006, Psychology – Clump et al 2004). In *General Ecology*, as more and more students fell behind in their reading more and more students were less and less prepared for class and therefore less and less able to meaningfully participate in active learning activities or engage higher level learning in the course. I was finding that my pedagogical goals were being undercut by my students approach to assigned readings.

I needed a way to encourage timely student reading and preparation for lecture. At the same time, I was interested in using Blackboard for conducting quizzes outside of class time. This led me to the idea of a content quiz – a weekly, electronic quiz that asks questions about basic facts and definitions from the assigned reading for the upcoming week. The content quizzes would address a number of my concerns stemming from students not keeping up with the assigned reading. First, the weekly quizzes would break up the task of reading the textbook into smaller, weekly goals (1 or 2 chapters read before doing the quiz) – which can help motivate college students (Davis 1993). Second, the students are motivated to read carefully as they know they will be assessed on how well they learned the content in the chapter. Third, since the quizzes are graded by the Blackboard software I had continual feedback on what material the students had learned from their reading and what they had misunderstood. This meant I could focus any lecturing I did in class on those topics the students needed me to clarify and not waste time on material most of the class had grasped from the readings. This freed up class time for active learning activities and discussions that used higher order thinking.

Finally, I needed to motivate students to take the quizzes. I reasoned that students tended to expect some sort of grade for the “important” things in a class so I made the quizzes worth a small part of the course grade (10-15%). So if a student kept up with their reading, read well and carefully and did well on the quiz then they could be rewarded with a good grade in that portion of the course grade.

III. INTENDED STUDENT LEARNING OUTCOMES AND ASSESSMENT

The primary learning outcome I was hoping for from the content quizzes was for students to learn course content from the assigned reading. As the content quizzes were graded in Blackboard I had instant feedback on how well the students had learned the content from the assigned readings. Students generally learned content successfully from the assigned readings – for most questions >85% of students would chose the correct answer. For those questions that students did not do well on I could use the

feedback from Blackboard to focus classroom time on correcting misunderstandings or clarifying confusions.

The secondary goal of using the content quizzes was to teach students how to keep up with reading. I am convinced that content quizzes encouraged timely student reading because many, many students commented on the quizzes in their student course evaluations, often expressing how the quizzes helped them keep up with the assigned reading. Furthermore, students identified the content quizzes as helpful during a mid-term, second party course evaluation the year that content quizzes were first implemented. I have followed up on this with a number of anonymous Blackboard surveys asking students specifically to provide feedback on content quizzes. Students were generally enthusiastic about the quizzes, identified them as being helpful with keeping up with reading assignments, and suggested they should be offered in subsequent years.

Another secondary goal was to free up more class time for active learning and higher-order thinking. This has been the case since I initiated the content quizzes. By lecturing only on topics that the class did not do well on in the content quiz for that week I have more time for the active learning that I have been incorporating into *General Ecology*. Since the addition of the content quizzes I have been able to increase the amount of active learning exercises by about 20%.

An unexpected benefit of adding content quizzes to *General Ecology* is they provide a new avenue for assessment of student learning. I can use some of the questions that were poorly done on the content quizzes on the regular in-class exams to assess student learning in a pre-test, post-test design. This has proven valuable for considering the impact of the more active learning approaches that I have brought into the classroom.

IV. BROADER APPLICABILITY

I believe this could be a very robust approach to encouraging student reading and preparation for class. Furthermore, modern pedagogical best practices often require class time that was traditionally devoted to transmitting facts and hence the learning of content is shifted to students outside of class. Content quizzes seem to be a way to ensure that the facts are acquired before class or if not acquired can be addressed in a focused, efficient way in class.

Content quizzes are quite flexible as the level of question can be adjusted to the level of student (freshman vs. graduate) or the goals of the instructor (basic facts vs. synthesis). I think this robustness of the strategy makes content quizzes potentially useful in different classes across the university. As long as an instructor can write a weekly quiz of appropriate multiple choice questions for the course level and goals and administer it over Blackboard the content quiz tool should be adaptable to that particular course.

There were two main challenges that I faced that those considering adopting content quizzes should be aware of. First, they work best if conducted in a course delivery system like Blackboard that allows for asynchronous test taking and machine grading of student answers. This allows students to take the quizzes outside of class and for the instructor to receive timely feedback from the quizzes. This will require both the instructor and the students to get comfortable giving or taking, respectively, on-line quizzes. Furthermore, you should have a back-up system for students that start the quiz but have an issue with Blackboard (lost internet connection etc.) that can cause the quiz to lock-up through no fault

of the student. I simply provided a paper version of the quiz to students and asked them to return it by the next class. In my experience there were usually no more than 1 or 2 occurrences per quiz. Second, the content quizzes require multiple choice questions which can be difficult to write well (Walvoord & Anderson 1998). My suggestions would be to leave plenty of time to write questions based off the assigned reading, avoid using multiple choice questions provided by the textbook publisher as they tend to be poorly written and focus on minutia instead of important content and revisit your questions continually to see how they can be improved. Over time I have developed a pool of well written multiple choice questions from which I construct my content quizzes.

Despite these concerns, I have found using content quizzes to be a highly successful way to encourage student reading and preparation for class thus freeing up more class time for active-learning exercises.

V. LITERATURE CITED

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