



Video

FULL DETAILS AND TRANSCRIPT

## Using Quizzes to Boost Achievement

Mark McDaniel, Ph.D. • March 2008

Topic: How to Organize Your Teaching  
Practice: Spacing Learning Over Time

### Highlights

- Quizzes can be seen as tools for learning, not just assessment.
- Quizzes have a significant effect on retention of material.
- In many courses there is a lot of factual material to be learned; quizzing can help facilitate this.
- Quizzing can be fun for students and is relatively easy to implement.

### About the Interviewee

Mark McDaniel is a Professor of Psychology at Washington University in St. Louis, with a joint appointment in Education. He received his Ph.D. from University of Colorado in 1980. His research is in the general area of human learning and memory, with an emphasis on prospective memory, encoding and retrieval processes in episodic memory and applications to educational contexts. His educationally relevant research includes a series of studies on elaborative study techniques and enhancing learning through testing (repeated retrieval), with much of this latter work being conducted in actual college and middle school classrooms. This research is

being sponsored by the Institute of Educational Sciences and the James S. McDonnell Foundation.

McDaniel has served as Associate Editor of the *Journal of Experimental Psychology: Learning, Memory, and Cognition* and as president of the Rocky Mountain Psychological Association and is a fellow of Divisions 3 and 20 of the American Psychological Association. He has published over 170 journal articles, book chapters, and edited books on human learning and memory, and is the co-author, with Gilles Einstein, of two recent books: *Memory Fitness: A Guide for Successful Aging* (Yale University Press, 2004) and *Prospective Memory: An Overview and Synthesis of an Emerging Field* (Sage Press, 2007).

## Full Transcript

I'm Mark McDaniel, Professor of Psychology and Education at Washington University in St. Louis. Typically in the educational setting we've been taught to think of quizzes and tests as ways to evaluate the student or ways to assign grades to the student, as the term that we use is summative assessments. But we know from the basic memory research, from research that I have done and other people here at Washington University and other locations, that when you have to retrieve information from memory it produces potent, potent advantages to further retention of the information.

So now let's translate this to the educational situation. When we give tests to students, we're requiring them to retrieve information. So, essentially a quiz or a test is an opportunity to practice retrieving information. Looked at from that perspective, we could think of using quizzes as learning devices, not as necessarily summative assessments. That is we might think about giving quizzes frequently in the classroom in low-stakes settings. By that I mean quizzes are worth very little toward the final grade, or they are worth nothing at all; they are just given as exercises for the students. And in those situations we believe that given the retrieval practice that the student gets from the quizzes, also given the information the student gets about what they know and don't know, those things combined promote a very effective learning device.

And we have had the opportunity, thanks to sponsorship from the department of education, to go into a middle school and implement quizzing programs in middle school science classes, middle school English classes and middle school social studies classes.

The findings in our middle school science classes with using quizzes are very, very exciting. So for example these middle school kids go over genetics, they go over anatomy, they go over evolution and we find that the information that's quizzed is then retained at about a 90 percent level at least—92 percent, 93 percent level—whereas on exams, information that hasn't been quizzed is remembered at about a 75 percent to 80 percent level. So retention of these core science concepts is dramatically improved through the use of simple little quizzes in the classrooms. Now I might also add that these quizzes are very palatable to the children in the middle school we're working in because we are implementing the quizzes with so called clicker systems. These are interactive remote systems, each kid has their own clicker, and the quiz is presented on a board in front of the classroom, and for every question each kid clicks in their answer. And

if the teacher so desires, each student can see the responses for the class as a whole, and they can so in a sense have fun at this. It becomes a game to see how they are doing relative to the class, how they are doing relative to what they did on the previous quiz, and it's a game-like atmosphere in as much as the student isn't taking a test that they then have to hand in to the teacher. There is nothing as far as the student is concerned that's recorded. They're just responding to this quiz exercise. So the students love these quizzes. In fact, on days when they don't have quizzes, they say to the teacher when can we do our clicker quizzes. So these things turn out to be a fun part of the classroom, and in addition they have superb pedagogical value because the kids are learning from this quizzing.

In many, many courses—from middle school to high school to college—there is a wealth of information that these kids have to learn. It's a tremendous amount of information; it grows every year. And so, it is the case that though we want students to be able to reason with and understand and be curious about information, we also have a core set of facts that they have to learn, and quizzing is a tremendous way to help students commit to memory these core sets of facts that they need to learn.

There are a number of ways you can implement quizzing in the classrooms. One way is the traditional paper and pencil test, so you can simply present small quizzes to students at the end of the class or beginning of the class—whatever the preference is—and have students take 5 to 6 minutes on answering those quizzes. You can subscribe to websites that essentially quiz through games. And teachers can, at these websites, input the content of the material that they think is core to their lessons, and then these quiz sites take the material and manifest the material as hangman games or concentration games—that is matching games where you turn over one square, you have to remember what was on that square and match it with a related item on another square—and other kinds of games.

Another thing is that quizzing does not require extensive curriculum reform. Every teacher—no matter what their philosophy is, no matter how they like to teach the course—can introduce quizzing into the classroom with minimal effort and minimal disruption to the ordinary curriculum, and they can do so—and by doing so they can achieve big gains. So in summary, quizzing is more than just re-presentation in the material. It has effects because it promotes retrieval, practices retrieval, allows students to know what they don't know so they can further direct study efficiently, get students more involved in the learning process.