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THE NATION

Getting Through to Students Faster -- With a Remote

By P.J. Huffstutter, Times Staff Writer

GRAYSLAKE, Ill. — As College of Lake County biology professor Mark Coykendall described the importance of metabolism and cellular energy, he noticed the class was growing restless and bored.

To make sure the students were paying attention, Coykendall walked over to his computer and typed in a few commands. A multiple-choice question popped up on a screen behind the lectern: "Synthesizing complex molecules from simpler ones is called ..." All conversation stopped. The 42 students inside the lecture hall reached for slim, sapphire-colored remote-control devices. They pointed them at the screen and, as if flipping through TV channels, selected an answer.

Less than a minute later, a graphic flashed on the screen showing that all but four correctly chose "A: Anabolism."

"At least none of you picked the made-up word," Coykendall said with a grin. "This really needs to be clear in your minds before next week's exam. Let's go over it one more time."

In an effort to find better ways to teach students who have grown up in the Digital Age, higher education instructors and schoolteachers say they are frequently turning to high-tech tools such as wireless personal response systems.

Better known as clickers, the devices help educators quickly figure out whether students are staying focused and learning the material.

Some teachers use the technology as a means of keeping track of attendance. Others rely on it to ask impromptu questions in a classroom or spring a pop quiz.

Though industry watchers say there is limited comprehensive research that tracks student performance using clickers, some instructors say they've seen a marked improvement in their own classrooms.

"The key for me is the immediate feedback," said Coykendall, who began testing clickers in his classroom two years ago. "If you just lecture and ask if they understand, they'll nod

their heads — even if they're lost. This way, if I ask them a question, I know right away if I need to slow down or keep going."

The system is relatively easy to use. Each student has a unique identifying number, which is programmed into the clicker.

When a student presses a button, the clicker sends a signal to a small electronic receiver mounted on a wall near the front of a classroom or lecture hall. The receiver is connected to a nearby computer, which tallies each answer and tracks the results.

"At first, students were complaining that they felt like Big Brother was watching them," said Eric Mazur, a physics professor at Harvard University and longtime advocate of such tools. "But over time, they adapted. It went from a cool thing to a real tool with practical applications."

The high-tech industry has transformed the educational system, with innovations such as student-run book swap websites, laptops used for note-taking and Internet videoconferencing bridging the miles between teachers and students living in remote areas.

Engineers and instructors have been tapping into electronics to make the classroom more interactive for decades. In the 1960s, students at Cornell University used doorbells that were attached to their desks to answer questions, said Mazur, who wrote "Peer Instruction: A User's Manual."

"As the cost of wireless technology has fallen, it's easier for schools to pay for clickers," Mazur said.

Nearly 800 schools use clickers made by eInstruction Corp., a firm based in Denton, Texas. Company officials said 1.5 million of their clickers are in use on elementary, secondary and college campuses.

A rival manufacturer, Maryland-based GTCO CalComp, said it has sold more than 500,000 of its InterWrite PRS to schools since 1999.

Some campuses provide the clickers to students for free, while others require students to pay for the devices and the code to make it work. The tab can run from \$5 to nearly \$50.

"It can get a little expensive, if you have to use it for more than a class or two," said sophomore Daisy Lee, 19, who is taking Coykendall's biology course. "But I like it. It forces me to come to class, because we use the clicker to sign into the attendance sheet. With my books and notes and cellphone, it's just one more thing you have to bring to class."