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Web-based tutor gives math class a new feel

by Amy Mayer | March 3, 2011

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As an eighth grade math teacher in Baltimore, Maryland, Neil Heffernan (pictured right with a student) sought a way to evaluate how well his students understood certain skills.

"I wanted to implement a mastery learning system," he says. Determined and ambitious, Heffernan created a mastery learning skill of the day. Eventually, his quest for better teaching tools lead him to a doctoral program at Carnegie Mellon University where his dissertation work involved creating an on-line tutoring program. Now an associate professor of computer science at Worcester Polytechnic Institute in Massachusetts and co-director of the Learning Sciences and Technology graduate program, Heffernan's lab produces a web-based program used by tens of thousands of students.



Sine 2003, teachers and students have been using ASSISTments (www.assistments.org) for both homework and in-class assignments. Today, the program has 68,000 "assistments," 47,000 of those created by the teachers who use them, not by academics or software developers.

What is an "assistment"?

Traditionally, math homework consisted of problems and answers. But an "assistment" adds two extra support elements. When students are stumped, they can request up to three hints. If they choose a common wrong answer, they may get a helpful message, for example that they calculated area when perimeter was requested. This feedback guides the student to the correct answer. Teachers receive detailed reports about the students--which questions they attempted, whether they needed support, how many problems they completed, etc.

"I don't know how I taught without it," says Barbara Delaney, a teacher at Bellingham Memorial Middle School in Massachusetts.

Over 63,000 students are currently registered users. For many, it's become a daily part of math class. Andrew Burnett teaches seventh grade math at Millbury Junior High School in Massachusetts. Each night after the students complete their homework using paper and pencil, they enter their answers into the appropriate assignment on ASSISTments. Immediately, the students learn whether they've gotten the right answer and before schools starts the next day, Burnett has a report on the students' work.

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"I can see immediately who has done their homework before they even set foot in the classroom."

Before ASSISTments, which he's been using since the spring of 2009, Burnett would begin class by reading the answers to the homework.

"Right at the beginning of class, I have eliminated 10 minutes of work. It's been a timesaver, for sure."

And since he knows ahead of time which problems were difficult for the students, he can hone in on those right away.

"Using ASSISTments allows me to pinpoint areas where students may not have the understanding they need," he says. "And it creates conversations between me and the students." Often the conversations begin with students claiming the computer was wrong, but ultimately those lead to Burnett helping the student understand the problem and how to get the correct answer.

Skill Builders replace Quizzes

The other area that Burnett uses ASSISTments for is in place of quizzes, which he used to develop and grade himself. Now, he uses the Skill Builders in ASSISTments, which offer the students series of related problems. When they have successfully completed three problems in a row, they can move on to the next type of question. Periodically, Burnett can have past topics reviewed. It's an ongoing way for Burnett to evaluate whether the students have mastered skills and whether they have retained what they've been taught. Again, he immediately knows who's doing well and what's causing problems for those who aren't. The students also get immediate feedback, which Burnett says helps motivate them.

Paige Tarasiak is one of Burnett's students. She says everyone likes using the computer.

"It's more interactive," she says, "instead of just sitting there and writing on a piece of paper." The instant feedback also motivates her to go back and figure out where she made mistakes.

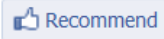

"It's good because it makes me try harder instead of giving up."

Burnett takes his students to the computer lab one day a week to work on the Skill Builders and he and Tarasiak agree that the different location and the computers both help students stay engaged in math class.

ASSISTments is available to any school district and is widely used in Massachusetts and Maine. Burnett points out that although there's a learning curve for getting started (he teaches a two-credit course for teachers), there's really no limit to what ASSISTments can do.

"It's really just a platform and you can make it what you want it to be."

Though ASSISTments is not billed as a test prep tool, Heffernan says it can help boost student performance on standardized tests. Burnett says looking at data from his first full year of using ASSISTments, "in that year I did see an improvement in my MCAS scores."

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