COMPILATION: Modeling Instruction prepares students better for college

Date: Sun, 18 Nov 2001
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We have lots of anecdotal evidence that high school students who've had Modeling Instruction start out better in college than those who've had traditional physics courses. However, it's a bit too soon to get hard data, because most Arizona physics teachers have taken modeling workshops only in the last 3 years. Teachers say that it takes typically 3 years of implementation before they feel as though they're using Modeling Instruction adequately.

This semester we're starting to gather data at ASU to address this question. I'll keep you posted on what we find.

Here's some anecdotal evidence.

A LETTER FROM A COLLEGE STUDENT, written in fall 1996 to Jeff Hengesbach, a modeler in Phoenix: "I just wanted to let you know that although at MANY different times last year I hated you for saying 'I don't know, what do you think?' whenever I asked you a question, it really paid off in the long run. *I still remember everything we did last year and am acing my class now.* What a great way to pad that college GPA!"

JAY AND ANNA ZIMMERMAN, modelers in Milwaukee, said in 2000:
"Modeling has completely changed the way we teach and we don't ever see ourselves going back to a traditional approach. *Students have come back from college and thanked us for the approach because of the excellent preparation they received. One student's physics test average in a college course was so far above the class he is embarrassed to tell the other students."*

Anne Mayher Hall, a modeler in Pittsburgh, said in 2000:
"So many students who graduated from using modeling have returned to me saying *they remember so much from the year, so much so that most if not all who have pursued science-centered degrees have passed their calculus-based physics courses with A's or B's.*"

Modelers, please add to these anecdotes when you can.

Date: Wed, 21 Nov 2001
From: mitchell johnson <mitchjohnson@EARTHLINK.NET>

I have my own also; just this week I heard from my student at Caltech and he said that *physics is the only class that he is not having difficulty in*, and *thanks for being so tough.*

I await your results. I am sorry for those who were forced to change or quit modeling, because we know it is the only way to teach.

Date: Wed, 19 Dec 2001
From: Kathleen Andre Harper <harper.217@OSU.EDU>

From time to time on this listserv, I see the issue raised of,
"What happens to modeling students when they take college physics?" I have one anecdote relating to this, which may be of interest.

I teach the introductory physics sequence for a special program at Ohio State called the Freshman Engineering Honors Program. We use a method called ISLE (Investigative Science Learning Environment) to teach this class. This method is extremely close to modeling, probably as
close as we can get within the limitations that we have here.

A few weeks ago, as students were preparing for finals, one of the students who visited my office chatted with me a bit about various things. In the course of this conversation, he said something to the effect of, "This class is being taught the way my high school physics class was supposed to be taught." This caught my attention, so I asked him who his teacher was, and, sure enough, he mentioned a teacher who I know has been using modeling. The reason he said it was

"supposed" to be taught this way was that his teacher had to leave partway through the year, and the sub that came in didn't do such a hot job with it (at least according to him.)

What do I notice about this student? First, *he really criticized his fellow students who used a formula-centered approach to learning and problem solving. I was surprised at how strongly he voiced this opinion. Second, he performed terrifically on any measure of achievement I can think of, including exams, the FCI, the MBT, and final course grade. His incoming FCI score was very high, so he clearly learned a lot in high school and retained it.*

While this isn't strong enough to be evidence of anything all by itself, it is one small success story for modeling.

[Jane's note: Another high school modeler wrote me:

"A student came to my house last week. She is a sophomore in civil engineering and told me that the lab reports I "made" them do in the full modeling approach were well worth the effort. *The rest of the class was suffering while she breezed right through* because the format was exactly the same as the one she had had in high school**. I now have students transferring INto physics from other, less challenging, courses** instead of the other way around."
