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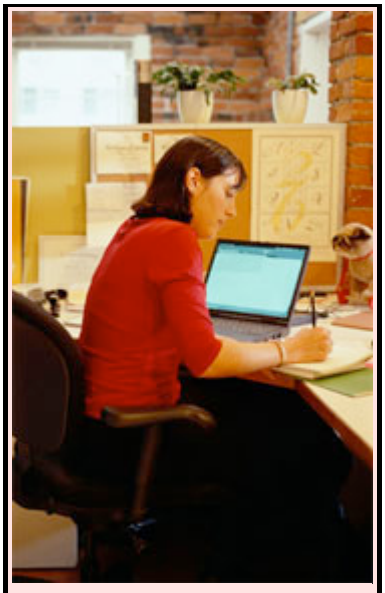
Teachers envisage the science textbooks of the future

Toss out the old backbreaker - it's time for video games.

Jacqueline Ruttimann

Toxic chemicals leak into a lake and only you — a doctor, environmental scientist or government official — can stop it. Think this is just a game? Actually, it's a science lesson.



Are computers edging textbooks out of the classroom?

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Taking some cues from computer experts, educators are considering what science textbooks should look like a decade from now. And it looks like the cumbersome tomes that generations of students have had to lug around might soon be getting a high-tech upgrade.

Some teachers have already thrown out the old books.

"The last time I used textbooks was five years ago," says Paul Bierman, a geology professor at the University of Vermont in Burlington. He helped organize a recent workshop in Washington, DC, sponsored by the National Science Foundation, on the future of the printed science textbook.

Instead of traditional books for his classes, Bierman relies instead on computer simulations, demonstrations and other interactive projects. One such project includes looking at archived online photos of historic Vermont landscapes over the past 200 years, in order to observe and convey the process of landscape change.

Surf's up

Teachers like Bierman are ditching books for several reasons. Because

textbooks take so long to be printed, they can be outdated before they even reach the classroom. And studies have shown that passive activities, such as reading, are not the most effective way for every student to learn. An influential 2000 report from the National Academy of Sciences, called "How People Learn", emphasized enquiry-based learning — in which students learn by going wherever their curiosity takes them, and the teachers serve as facilitators of the learning process.

The Internet lends itself to this type of learning, as students can acquire as little or as much information as they want. Students, however, are not the Internet's only users.

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>
> Paul Bierman, University of Vermont

"We found that teachers were surfing the Web to find the best lessons for their class," says Angelica Stacy, a chemistry professor at the University of California at Berkeley. At the recent workshop, Stacy displayed prototypes for digitized textbooks — essentially computer programs that use Web-linked, embedded illustrations to reinforce main concepts. One of her prototypes showed a periodic table of the elements, with explosive smoke billowing from the sides where the most reactive elements lie.

iTextbook

Representatives from Google and Microsoft argued that virtually all books could end up on the Internet, where people could read the specially displayed downloads on a variety of devices, including cell phones and laptops. Eventually, Bierman says, the traditional science textbook may morph into a smaller authoritative guide to assist in Web-based learning.

Russell Pimmel, a program director for engineering at the US National Science Foundation, says that publishing companies will have to learn to adapt to this new model, just as the music industry had to adapt with the advent of downloadable music. "The textbook is right around the corner," he says.

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Top