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Seeing Math

Interactive Video Case Studies Help Teachers Reflect on Their Practice

By Alvaro Galvis, Janet Hadingham, and Ray Rose

Nancy Ward has taught for 19 years and is all too familiar with the problems of delivering effective professional development to busy teachers. She speaks of the difficulty of finding one or two hours in an already-packed schedule for a training workshop, and the lack of follow-up that renders such experiences unproductive. "We call it the 'spray and pray' method. We bring in a trainer who gives out lots of information and when it's over we pray it takes hold. Without follow-up, teachers go back to doing the same things they did before. It's not effective in promoting change."

Nancy is leading her colleagues in an innovative experiment in teacher professional development: the Seeing Math Telecommunications Project. Her school district, the Rapid City Area Schools in South Dakota, is one of four districts across the nation that began piloting the project during the 2001-2002 school year.

Seeing Math is a pioneering effort to study the effectiveness of teacher professional development using online video case studies for elementary and middle school teachers. To develop the case studies, the Concord Consortium partnered with Teachscape, an educational service that collaborates with school districts and states to create programs of professional development supported by Internet-based multimedia resources. During the project's first two years, five courses were completed, with another four currently in development. Each focuses on a concept from the NCTM standards that is typically difficult to teach or learn, such as fractions, division with remainders, calculating the area of a triangle, or using data to make predictions.

Each case study is built around a set of short video segments documenting an experienced teacher working with students in the classroom. For seminar participants who face similar classroom situations, the videos provide a kind of "fly on the wall" perspective on another teacher's work, allowing them an opportunity to see how other teachers handle them.

Although the teachers selected for the case studies tend to be reformers, the videos are not intended as exemplary models for course participants to emulate. They present no hidden agenda or specific conclusion. Rather, the video cases are open to a variety of interpretations. The main intent is to foster a reflective attitude among the course participants, one that will inspire them to think deeply about their own teaching and perhaps even enhance their



A picture is worth a thousand words

Combining video with the case study method creates a highly useful tool for teacher professional development. It can show an entire classroom environment and how a teacher responds to typical student issues. Video conveys experiences too complex to fully describe in text alone. A

understanding of the mathematics they teach.

A key innovation of this project is the interactive design of the video case studies. Because the case studies are online, teachers can progress through the materials at their own pace. Each individual learner can stop, replay, and jump ahead in the video, or branch to a wide range of related materials such as lesson plans, typical student work, relevant standards and assessments. The experience is further enhanced when participants discuss the case and share their own experiences with other teachers and facilitators. These can take place online, in face-to-face sessions, or both, depending on the strategy chosen by the school district.

case study can present problems and issues that evoke intense discussions, greatly enriching the learning experience. The stills shown here are from *Number and Operations: Division with Remainders*, featuring Mary Beth O'Connor, a 4th grade teacher at the Gerena School in Springfield, Massachusetts.

The case discussions are moderated by local facilitators, each trained through a special netcourse developed by the Concord Consortium. A content expert at Teachscape provides online support to the facilitators whenever necessary. The facilitator helps to keep the discussion focused and promotes a sense of community. However, breaking the ice is sometimes a challenge. As the Seeing Math facilitator for her school district, Nancy Ward has worked hard to get her teachers to talk together online and not everyone participates as fully as she would like. "Joining an online discussion is like going to the refrigerator. If you find something good, you come back again." She has found that weekly face-to-face meetings help draw people into the discussion, which "then spills over into the online discussion."

In addition to the video segments of the classroom lesson, each case study contains interviews with the teacher, expert commentary on the subject matter, a copy of the teacher's lesson plan, samples of student work, and relevant information about the community. There are also links to NCTM 2000 standards, self-assessment tools and other resources. All these materials are delivered over the Internet but are also available on CD-ROM.

The project is being piloted with a total of thirteen teachers in four demographically diverse school districts across the nation. Besides Nancy's school district in South Dakota, other test sites are District of Columbia Public Schools, Hudson Public Schools in Massachusetts, and Windham Central Supervisory Union in Vermont.

According to one teacher involved in the study: "My methods have definitely been affected by participating, if for no other reason than by the time I have spent reflecting on what I am doing. I also feel for at least this short period of time I have stepped back into a thoughtful practice rather than an auto pilot practice. I have recognized what comes naturally to me and what I need to work on incorporating in a more conscious manner..."

Free Access to Seeing Math Materials through EdTech Exchange

By Ray Rose

The Concord Consortium and Teachscape believe that innovative learning materials should be made available to the widest possible audience, especially underserved communities. For this reason, we are making available one course per year free-of-charge to schools that can't afford a complete course or series of courses from Teachscape.

Trimmed-down versions of the Seeing Math case studies will be available through our non-profit subsidiary EdTech Exchange (ETX). ETX recently acquired HighWired, an Internet-based company that provides free Web communications tools to schools and teachers. Thousands of schools throughout the U.S. and abroad already rely on HighWired's Web hosting tools for their Web sites and online newspapers. Now they will have access to professional development resources including the Seeing Math courses.

Currently, the materials from a Seeing Math course provided through HighWired are the same as those available in the corresponding course offered through Teachscape. The main difference is that the HighWired version doesn't offer access to Teachscape's online community with its focused discussions moderated by a

facilitator. Using self-contained materials available on HighWired, schools can work on their own or with Teachscape's educational consulting team to design their own course, tailoring it to suit the needs of their teachers.

This year, we will offer *Pre-Algebra: Pan Balance Equations* as the first case study available on HighWired. It is based on the NCTM Algebra standard for grades 3-5, and is built around a series of video segments showing a teacher conducting a lesson on pan balance equations. The case study contains introductory materials, video segments showing six classroom teaching examples, teacher reflection, specialist commentary, lesson plans, examples of student work, and references. There is also a course guide for participants and facilitators.

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Article Links & Notes

Seeing Math Telecommunications Project - <http://seeingmath.concord.org/>

Teachscape - <http://www.teachscape.com>

NCTM - National Council of Teachers of Mathematics standards - <http://www.nctm.org/standards/>

HighWired - <http://www.highwired.org>

EdTech Exchange - <http://www.concord.org/cc-group/etx.html>

Pre-Algebra: Pan Balance Equations - <http://www.highwired.org>

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