

*"I learned so much by watching myself teach.
I think teachers should be required to videotape themselves, even
though it's uncomfortable at first."
— Kristin, an 8th-grade teacher*

A lesson in teaching, starring you

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When teachers work toward the goal of using evidence of student

learning to improve teaching, they typically use test scores, student work, portfolios, and a variety of formative assessments. Videotapes of teaching are another valuable form of evidence. Research has shown that analysis of videotaped teaching cases is effective in promoting teacher learning (Finn, 2002; Roth & Chen, 2007; Sherin & van Es, 2005) because of its ability to help teachers



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notice and recall evidence not easily captured in other data sources. In this article, we share an example of professional learning in which teachers use video to support their professional learning. Our research suggests that teachers who use videotaped records are more likely to make instructional decisions based on evidence.

PROBLEM-BASED LEARNING

The Problem-Based Learning Project for Teachers (McConnell, Eberhardt, et al., 2008) is a National Science Foundation-funded program at Michigan State University that is developing and studying a model of science teacher professional development that promotes teachers' use of evidence in revisions they make to their practice. Participants use problem-based learning as an analytic strategy for understanding and solving real-world problems. Problem-based learning provides a systematic approach that allows learners to identify what they know or need to know, then develop hypotheses and carry out research about solutions

as they construct new ideas about the problem (Delisle, 1997).

A key principle guiding the design of the Problem-Based Learning Project is to position teachers as reflective practitioners (National Research Council, 1996) who examine a variety of data about the impact of their practice on student learning. Participating teachers meet in a summer workshop to learn science content, plan science units based on relevant standards, and identify issues related to their unit for study and analysis during the following academic year. These questions and the teach-

ers' hypotheses about the impact of specific strategies guide research about their practice. Examples of the types of questions teachers developed include:

- Which formative assessment strategies help me identify misconceptions?
 - How can I use productive questions to help students develop independence as learners?
 - Can student journals improve students' retention of concepts?
 - What is the most effective strategy for grouping students during lab activities?
- (Stanaway, Parker, McConnell, & Eberhardt, 2008).

Data collected as part of their research includes videotaped records of activities from the classroom.

During the school year, participants implement their units and analyze evidence of student learning. Only a few of the participants have had prior experience with video as a tool for professional development, so a team of experienced teachers and teacher educators provide support for this new form of learning. The summer workshop includes practice in using video camcorders to capture evidence in the classroom and iMovie video editing software to review tapes and compile segments that address

their research questions. Teachers also practice analyzing video cases using one of four "lenses" (content, assessment, student interactions, and instructional decisions) that help them focus on evidence related to their research questions.

When teachers analyze videos of their own teaching, they identify the lens that best fits their question and analyze the clips using a series of teacher-developed questions that direct their attention to relevant events. For instance, a teacher interested in structuring student interactions that engage all her students would use a video camcorder with an external boom microphone to record group interactions during a lab. As she reviews the tape, she would record her observations and inferences about the level of participation, as well as the nature of the interactions within student teams. Teachers are provided analysis guides, organizational tools, and iMovie tutorials to use as they view the tapes of their science units. These tools are included in a Participant Guide for Teacher Research (Problem-Based Learning Project for Teachers, 2007).

After her initial analysis, she would share selected clips with a learning community of four to six project participants. These groups

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meet monthly to collaboratively analyze evidence relating to the issues they identified during the summer workshop. With help from a project facilitator, the learning community then uses the teacher's lens to discuss the clips, identifies learning issues related to the hypotheses, searches for literature about the issues, and synthesizes a new hypothesis about a strategy for promoting group work that could be implemented in an upcoming science lesson.

THE IMPACT OF VIDEO-BASED REFLECTION

Our research supports the use of videotaped records. In the first year of the project, half of the participants in each group were asked to use videos to support analysis of their dilemmas. The other half used student work and test scores as the basis of their analysis.

Comparison of the two groups included pre- and post-assessments using the Science Teaching Efficacy Beliefs Instrument survey (Riggs & Enochs, 1990). The teachers who used video showed a significantly greater increase in their science teaching efficacy than those who did not use videos. In order to identify how the use of video may have led to this difference, group presentations were analyzed to look for patterns in how teachers' reflections differed if they used videotaped records (Rosaen, Lundeberg, Cooper, & Kauer, 2006).

Teachers who used video based a significantly larger proportion of their analytical reflections on evidence, including samples of student work, test scores, and videotaped records. Teachers who did not use videos based their reflections on evidence less than half as often as those who used video, basing most of their reflections on subjective feelings, inferences, or memories (McConnell, Lundeberg, et al., 2008).

Project participants have also said

that using videotaped records to support practice has led to changes in their teaching practice. These changes include increased use of formative assessment strategies, student journals, and portfolios. Tina, a 6th-grade teacher, discovered that students use their journals and notes more often when the lesson includes design activities that allow students to test, revise, and retest their plans, such as building a roller coaster to understand force and motion. After revising her unit, she found that her students were better able to retain and use the science concepts from the roller coaster activity in other contexts.

A CLASSROOM EXAMPLE

Kristin is an 8th-grade science teacher in a small rural district in Michigan. She has been teaching science for six years, and her principal regards her as an exemplary teacher. In her second year with the Problem-Based Learning Project, she developed a unit about cellular respiration. Her teaching dilemma focused on helping students apply their knowledge to real-world situations.

In the presentation to her learning community, Kristin focused on one group of four girls in the class. The group had earned an A on the assignment, answering questions thoroughly and accurately applying the science concepts to the problem. When Kristin checked on the group, all four members were able to answer questions. She was confident they were discussing the assignment. However, her analysis of the video showed that all four members of the group were working alone, only functioning as a group when the teacher was near. She shared a clip that showed the girls turning away from each other and individually writing answers the moment Kristin walked away from the group.

Later test scores confirmed that two of the girls were not able to

explain how cellular respiration related to the body's need for energy. Only by viewing a videotape of the activity did Kristin notice the lack of collaboration in the group. As Kristin stated in her presentation to the group, "I never would have seen what the groups were doing without the video. I was just too busy teaching to see it." Kristin has since implemented team-building activities to help her students learn the different roles they play within groups. She has also implemented a variety of assessment instruments to encourage individual accountability for learning content. Finally, she developed new group tasks that are more complex, requiring more teamwork to complete successfully.

During interviews and focus group discussions, many of the teachers revealed that they were fearful about appearing in a video that was being critiqued by others, but said that reviewing the videos allowed them to observe their teaching from a new point of view, like "having a mirror placed in my face" (Lundeberg, Koehler, Zhang, McConnell, & Eberhardt, 2008). They were able to "see things that you don't notice when you are teaching the lesson." One veteran 5th-grade teacher has learned to use video as a primary source of data for improving her practice: "Thinking about the things I chose to ask, the sequence in which I asked them, the student responses, and how I responded to students, picking that apart is hard to do after the fact unless you have the video."

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Another participant wrote, "Wow! I saw so much when I viewed my tape. I found this to be the most powerful assessment."

IMPLICATIONS FOR PROFESSIONAL LEARNING

Steps that can encourage teachers to create and use videotaped records include ensuring that videos will be used for teacher learning, not for teacher evaluation. We also learned that teachers need support in learning how to analyze their own videos, in the form of sample questions to consider in their analysis and a chance to practice the analytical process on videotaped cases of other teachers.

School districts can support teachers' use of video by providing access to equipment and training in the use of video cameras and simple editing software. Our experience suggests that most teachers can learn to use video technology quickly when there is a need to know how to operate the equipment. District leaders can also provide support by creating time and opportunities for teachers to analyze evidence in collaborative learning communities.

In our efforts to help teachers adjust and refine their practice, we need to encourage the use of all relevant sources of data. Videotapes of classroom practice can give teachers a new window to important evidence of

learning that they may otherwise never see.

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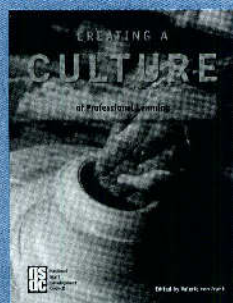
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