



TEACHING *for* UNDERSTANDING: A GUIDE *to* VIDEO RESOURCES

National Education Association Research Department

Judith W. Segal
Elizabeth J. Demarest
Andrea I. Prejean



**TEACHING *for* UNDERSTANDING:
A GUIDE *to* VIDEO RESOURCES**

National Education Association Research Department

Table of Contents



The National Education Association is the nation's largest professional employee organization, representing 2.7 million elementary and secondary teachers, higher education faculty, education support professionals, school administrators, retired educators, and students preparing to become teachers.

Copies of this publication may be purchased from the NEA Professional Library Distribution Center, P.O. Box 404846, Atlanta, GA 30384-4846. Telephone 1-800-229-4200 for price information or go to the NEA Professional Library Web site at <http://www.nea.org/books>.

Reproduction: No part of this publication may be reproduced in any form without permission from NEA Research, except by NEA-affiliated associations and NEA members. Any reproduction of this material must contain the usual credit line and copyright notice. Address communications to Editor, NEA Research, 1201 16th Street, N.W., Washington, D.C. 20036-3290.

Published August 2006

Copyright © 2006 by the National Education Association

All Rights Reserved



Introduction

What the Guide Is	1
What the Guide Is Not	1
How the Guide Is Organized	1

Section I: Overview of Types and Uses

Standards-based Instruction Videos	3
Research-based Instruction Videos	8
International Comparisons Videos	13
Locally Made and Used Videos	16

Section II: Things to Keep in Mind

How Can Video Help Improve Teaching Practice?	21
What Types of Support Do Practitioners Need to Use Video Effectively?	22

Section III: Resources and Research

Sources of Video Materials	25
Works Cited and Other Research	31

Introduction



Today's educator is under great pressure to advance student learning and achievement. Closing achievement gaps is a high priority. Across America, educators seek ways and means to improve classroom instruction.

This Guide is designed to increase awareness among teachers, teacher educators, and administrators about a promising tool for improving classroom instruction: video. Video resources and supporting materials are helping to promote more effective teaching for understanding.

The term “teaching for understanding” describes the kind of teaching needed to attain the more ambitious goals for student achievement emerging from research and envisioned by current professional standards (Cohen et al. 1993). In order to teach for greater student understanding and higher achievement, teachers must teach with understanding of best professional practice.

What is “best” practice for particular teachers in diverse school contexts must be thoughtfully determined by those teachers, drawing upon their own experience, standards of professional practice, available research, and research-based tools for instructional improvement.

Since the 1980s, videos have been a tool used in teacher education to study candidates' teaching and look at good models of innovation (Brophy 2004). The popularity of teacher professional communities, both within schools and in more extensive networks, opens new possibilities for using video in continuing teacher professional development. Administrators, especially principals who hire and evaluate teachers, can use video to better understand effective teaching.

Not only have the contexts of video's potential use expanded, but the quantity of materials designed to promote instructional improvement continues to expand while the quality improves. Recent products are likely to be multimedia packages, including video with explanatory text and other analytical supports. Classroom teachers, teacher educators, and administrators are often not aware of these resources and how they might be used effectively.

How did we select our video examples?

We drew upon the major nonprofit producers—including public television, university research centers, and regional laboratories—whose work has generally been funded by the government or by one or more foundations. Some videos can be downloaded for free while others can be purchased from their producers. Many commercial for-profit producers also exist, but these are beyond the scope of this publication.

WHAT THE GUIDE IS

This Guide is intended to provide readers with a general overview of some of the major types of video resources currently available and of how educators are using video technology as a professional development tool for improving classroom instruction. It also provides a brief listing of both video sources and resources for further research. The materials discussed in the Guide have been screened for content by the authors, but they have not been formally evaluated by NEA. *No organizational endorsement or criticism is implied by any product's inclusion or exclusion.*

WHAT THE GUIDE IS NOT

While video is often used in classrooms as a teaching tool to enhance course content, videos of that type are beyond the scope of this Guide. Even within the categories of videos included, this publication is by no means an exhaustive or complete listing. This Guide is intended only as a starting point. While the authors consider the videos described to be representative of the current “state of the art,” this publication is not an evaluation of video material.

HOW THE GUIDE IS ORGANIZED

This Guide contains three sections.

Section I, Overview of Types and Uses, is organized into four subsections, each describing a type of video material that might be used to improve instruction. Vignettes in one-page boxes illustrate examples of video used in educational contexts.

Section II, Things to Keep in Mind, includes two subsections. One summarizes research on potential benefits of video for improving instruction. The other suggests certain supports that teachers need in order to make effective use of video as a professional development tool.

Section III, Resources and Research, provides information about how to obtain the video materials discussed as well as a bibliography of both cited and other research studies.



Section I: Overview of Types and Uses



There are many ways the wide array of available video materials might be classified. This Guide identifies four categories that mesh with important kinds of improvement initiatives in which many schools are engaged.

- ▶ Standards-based instruction videos enable viewers to see examples of teaching that are consistent with national and state content standards.
- ▶ Research-based instruction videos help viewers understand current theories about knowledge, learning, and teaching and their implications for improving instruction.
- ▶ International comparisons videos enable viewers to compare teaching practices in the United States with practices in other countries.
- ▶ Locally made and used videos help teachers study and critique their own and others' instruction.

The discussion of each category more fully explains each type of video, contains illustrative examples of currently available video resources, and suggests what can be learned from them.

STANDARDS-BASED INSTRUCTION VIDEOS

One type of video currently available seeks to help teachers learn to teach in ways that are consistent with national and state standards. Over the past 20 years, the United States has engaged in a national school reform movement focused on enabling all children to achieve high standards. Professional education associations and other organizations have developed national standards across subject areas. These standards have, in turn, influenced the development of state standards. Some state standards are similar to national standards; others are not.

Throughout these two decades of evolving standards, the national organizations and states involved in developing them—often working with teachers, educational researchers, policy-makers, and the general public—have synthesized accumulated knowledge about learning and teaching and drawn upon the professional experience of teachers. Professional standards have

generated new ideas in the education community about what “effective teaching” means and about what’s involved in enabling students to meet higher standards.

Various organizations have played important roles in producing video materials that illustrate standards-based instruction. Key players have included public television organizations and various educational research and development groups. The videos in this category attempt to advance standards-based instruction by providing concrete illustrations of what it looks like in classrooms. They emphasize extended scenes of teaching in actual classrooms and are usually accompanied by supplementary materials that structure and extend the viewing experience. Some of the professional associations involved in developing standards have also produced standards-based video materials.

Over time, new technologies have become available for storing both video and textual materials. Earlier products consisted of videos available in VHS format combined with supplementary print materials. More recent products involve multimedia technology. These consist of videos combined with supplementary images and texts, all of which are available in a digital format suitable for use on a multimedia computer. The multimedia materials are available as CD-ROMs or DVDs. Sometimes they can also be downloaded over the Internet.

Professional standards at national and state levels generated new definitions of “effective teaching.”

Multimedia technology offers new capabilities that are helpful in enabling viewers to work with videos depicting classroom instruction. In particular, this technology makes it possible to see images and text on the same screen and to browse back and forth between different images and different texts. This in turn can make it easier for viewers to understand how ideas discussed in the text are connected to student and teacher activities depicted in the videos (Tharp 2002).

Annenberg Foundation

One organization that has made a substantial contribution to developing standards-based instruction videos is Annenberg Foundation. As part of its mandate, Annenberg seeks to use media and telecommunications to advance teaching excellence. Consistent with this, Annenberg has produced a range of VHS videotapes for use in K–12 teacher professional development. These are organized by both academic discipline (reading, math, science, art, English literature, and social studies) and education level (primary, upper-elementary, middle, and high schools). Collectively, Annenberg’s videos seek to provide extended, concrete illustrations of what standards-based teaching looks like in different curriculum areas at different grade levels and to help teachers learn how to incorporate such practices into their instruction.

Annenberg’s professional development materials come in two formats—video libraries and video workshops. The libraries combine extended footage of teaching and learning in individual classrooms with on-screen reflections from teachers about practice and technique. The video library packages contain printed guides with advice on how to use them. The video workshops do include some classroom vignettes, but focus more on explaining critical ideas about teaching and learning.

One Annenberg video library is *Science K–6: Investigating Classrooms*. Because national and most state science standards emphasize inquiry methods, this library’s programs provide extensive classroom vignettes of how experienced science teachers incorporate opportunities for genuine inquiry into classroom instruction. They depict how such teachers go about creating learning environments that support student inquiry, how they organize small groups for

cooperative learning, and how they draw out and interpret what their students are thinking and learning. A companion guidebook offers guidelines for teachers and facilitators on how to work with these videos.

Video workshops differ from video libraries both in the nature of the information they provide and in their format. While the libraries are

organized by classroom—each video in the set focuses on a different teacher working in a different classroom—the workshops are organized topically—each video focuses on a critical instructional issue in a particular content area. In social studies, for example, there is a video workshop for K–5 teachers called *Social Studies in Action*, which focuses

on such issues as the importance of including primary source materials in instruction and on connecting social studies instruction to life beyond the classroom. Another video workshop, *Teaching Geography*, highlights important topics that should be addressed in secondary school geography and explains how teachers can use inquiry as a method for helping students explore them. Thus, the workshops are designed to enable teachers to introduce specific kinds of new standards-based content or teaching approaches in their classrooms.

Annenberg video workshops begin with onscreen lectures or discussions by experts who summarize research findings. In this sense, they resemble university level courses. But they differ from typical university courses because they incorporate clips borrowed from the video libraries to illustrate the practices discussed. As a result, Annenberg video workshops intertwine standards-based goals, theories of learning and teaching, and actual teaching vignettes. They not only illustrate effective practices, but help viewers become aware of the nature of the research and theory supporting their application.



One Annenberg video shows science teachers incorporating opportunities for genuine inquiry into classroom instruction. Here students observe and measure changes in plants.

When selecting teachers for inclusion, Annenberg sought those who demonstrated success year after year helping students learn the content addressed. The teachers depicted work in classrooms serving different populations—including mainstream students, students from diverse socioeconomic and ethnic backgrounds, special needs students, and second language learners. Each teacher is shown using strategies tailored to the needs of particular students. By including teachers working in diverse educational settings, Annenberg videos enable viewers to focus on teaching in a similar setting and compare different instructional approaches across settings.

Annenberg video workshops can be applied toward academic credit. Viewers can register with Colorado State University to submit assignments and receive graduate credit. Alternatively, teacher study groups can register with the Annenberg Channel to receive a certificate of completion that may be helpful in obtaining credit for inservice training from their school district and/or credit for teacher recertification from their state. The video workshops are designed for use by either individuals or groups, especially teacher professional communities and school improvement teams. Teachers working on their own can ask Annenberg to put them in touch with others working with the same materials to participate in online discussions.

Over the years, Annenberg has sought to improve its materials by conducting formative evaluations. In the process, teachers have provided valuable feedback and reactions. The box at the bottom of this page outlines some lessons learned about both the general role of video in teacher professional development and how to make it more useful.

Annenberg videos cover the core curriculum. Other sources have more math and science videos.

PBS' TeacherSource

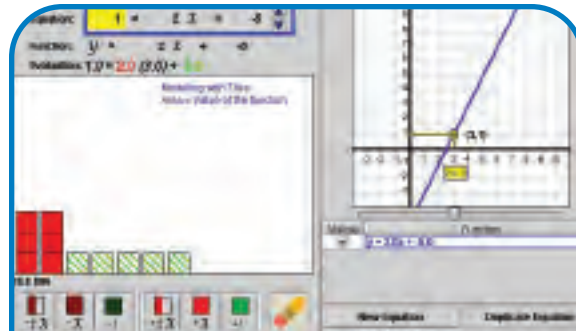
A public television resource for professional development videos is the Public Broadcasting Service (PBS), a non-profit organization owned and operated by the nation's public television stations. With support from the U.S. Department of Education, PBS has engaged in a variety of education projects designed to provide professional development support to K–12 teachers. PBS' TeacherSource, the most relevant project for our purposes, offers a variety of videos.

What are some lessons learned from using Annenberg videos?

- Observing colleagues in practice is valuable, but such opportunities don't happen frequently.
- Video illuminates classroom dynamics not normally visible. When teachers work with students in small groups, they often can't see what's happening beyond the group they're focused on. Video provides a wider perspective.
- Different teachers come to viewing experiences with different needs. Some, who may have recently completed formal coursework on teaching methods, just want to see examples of what these methods look like in practice. Others appreciate the opportunity to listen to explanations from experts about underlying theory and research.
- Many teachers report that they learn more from video when they combine viewing with reflection among peers.
- Many teachers report that they learn more from video when it's supported by materials that productively structure their viewing experience.
- Working through a complete set of taped and printed materials requires an extensive time commitment. Teachers like watching videos of excellent practice, but don't always feel able to view an entire library or workshop.

Like Annenberg's videos, TeacherSource depicts teachers instructing students in actual school settings throughout the United States. However, in contrast to Annenberg, TeacherSource offers complete lesson plans viewers can adapt for use in their own classrooms. In that sense, TeacherSource videos reflect yet another strategy for improving instruction—helping teachers focus on and improve the lessons they teach.

The PBS Mathline video series shows teachers how to incorporate content and strategies consistent with standards developed by the National Council of Teachers of Mathematics (NCTM) into their lessons. The Mathline videos include a broad range of lessons for use at different educational levels, including elementary, middle, and high school. A similar series, Scienceline, is also available, but it isn't as extensive as the math offerings. It focuses on grades K–5 and emphasizes teaching science through inquiry.



Many video products contain materials that help teachers incorporate content and strategies consistent with national standards into their lesson plans and classroom activities.

They focused on identifying good teachers who have developed standards-based lessons other teachers might be able to use or adapt. Like Annenberg, PBS purposefully depicts teachers working among different student populations.

In developing Mathline and Scienceline, PBS videotaped a full lesson in the classroom of each selected teacher. The original lesson included

footage both of the teacher working with students and of the teacher explaining instructional goals and methods directly to the viewer. The footage was edited and condensed to produce a 20-minute video for inclusion in the final package. During this process, certain parts of each lesson were omitted. For example, in each video one doesn't see

many examples of students' wrong answers or off-task behaviors. Although one does see a successfully implemented lesson, one doesn't see a teacher dealing with problems as they arise.

Concord Consortium's *Seeing Math Project*

Educational research-and-development organizations have also played an important role in developing standards-based videos. For example, the Concord Consortium, with support from the U.S. Department of Education, is developing a set of materials called *Seeing Math*. Interactive multimedia case studies explore how elementary and middle school math teachers meet the challenge of teaching in ways that are consistent with the NCTM standards.

Its case studies are available as stand-alone materials and through Web-based professional development courses that can be augmented by face-to-face discussion among participants located at the same site. The materials are available either over the Internet or on CD-ROM. The project has also developed a software tool known as the Video Paper Builder that enables users to create and share multimedia case studies of their own instruction.

PBS didn't use celebrities, but teachers who have developed standards-based lessons.

To accompany its videos, PBS has developed detailed guides that offer teachers step-by-step assistance in adapting the lessons for use in their own classrooms. A typical guide for a PBS Mathline lesson explains the lesson's objectives, outlines the lesson and its rationale, describes the required materials, delineates teacher and student procedures for successful implementation, discusses problems students may encounter and how to handle them, helps students extend their understanding with supplementary activities, and recommends further reading.

Selecting teachers, PBS didn't go after celebrities.

The *Seeing Math* project uses a different approach to helping teachers learn standards-based teaching. The Annenberg and PBS projects emphasize models of excellent instruction for teachers to adapt in their classrooms. *Seeing Math* emphasizes analyzing efforts by case study teachers to teach difficult math content to students. By helping viewers learn to conduct effective analyses of instruction, *Seeing Math* provides tools that will enable them to become more reflective about practice.

Case study materials help viewers analyze the videos by exploring on screen the nature of the challenges students face in understanding content, what the teacher is doing to foster understanding, and what student remarks and classroom work

indicate about their level of understanding. Each case study is deliberately left open to a variety of interpretations about how to best teach the content, and viewers are encouraged to draw their own conclusions (Galvis et al. 2002).

To date, the *Seeing Math* project has developed eleven multimedia case studies for elementary and middle school math teachers. Each focuses on specific math content aligned with NCTM standards that is widely recognized as difficult to teach, such as fractions, division with remainders, calculating the area of a triangle, and using data to make predictions. Each is built around a set of short video segments documenting an experienced teacher working with students. Many of these teachers are using instructional materials and techniques that are new to them and exploring effective ways of doing so. The case studies offer viewers a window into the development of teacher expertise, including the problems teachers face in teaching standards-based content, the mistakes they make, and the solutions they eventually reach.

The videos are accompanied by comprehensive sets of supplementary materials that help viewers

look carefully at how teaching and learning occur in the case study classrooms. They help viewers understand the context of a case and the activities in which students are engaged. They also help viewers understand content, pedagogy, and language-related issues associated with a case. In addition to video segments depicting student-teacher interactions, each case study contains interviews with the teacher, expert

commentary on the subject matter taught, a copy of the teacher's lesson plan, samples of student work, relevant information about the community, and suggested questions and activities to help viewers reflect. There are also links to the NCTM 2000 standards, self-assessment tools, and other resources.

Because the case stud-

ies are online, users can progress through the materials at their own pace. They can stop, replay, and jump ahead or access the supplementary materials at any point. Although these resources can be used individually, *Seeing Math*



A Concord Consortium project uses interactive, multimedia case studies to explore and analyze how teachers convey difficult content in their classrooms.

Comprehensive sets of supplementary materials help viewers understand context.

staff believe the user's experience is enhanced when they have an opportunity to discuss with others both the on-screen teaching episodes and their own teaching experiences. For this reason, one way the case studies are made available is through online professional development courses moderated by local facilitators.

To date, several school districts have agreed to participate in pilot tests of the *Seeing Math* case studies. In these instances, the case study materials have been used as the basis for on-site professional development courses. *Seeing Math* staff have been studying these efforts in order to

better understand the conditions required for school districts to conduct effective courses and the outcomes that occur when they do. Information about outcomes has been collected from teachers at pilot test sites. Many teachers report changes in their teaching practices and attribute them to the materials, most notably the adoption of new strategies and techniques for questioning students (Gadzuk 2003).

The *Seeing Math* project has also developed materials for use at the secondary school level.



Advances in research on learning and teaching can significantly improve students' ability to understand complex subject matter and apply their understanding to new situations.

These are available as online courses for teachers of grades seven through twelve that focus on key topics in algebra. Like the elementary materials, the courses for secondary teachers also include video case studies, opportunities for participants to engage in facilitated online discussions, and opportunities to work with computer-based interactive software that makes difficult mathematics concepts easier to understand.

RESEARCH-BASED INSTRUCTION VIDEOS

The main emphasis of the videos in this section is on helping practitioners understand how new insights emerging from research on teaching and learning can be used to improve practice. There is considerable overlap between this and the previous category because national and most state standards draw upon such research. However, because the videos in this section use research rather than standards as their principal reference point, it may not always be possible to link the

ideas discussed with a particular standard. University research centers and regional laboratories, as well as the kinds of concerns already discussed, have produced research-oriented teaching videos.

Over the past 30 years, there have been major advances in our understanding of learning and teaching. The authors of *How People Learn: Brain, Mind, Experience, and School* (Bransford et al. 1999) synthesized this research and argued that a new science of learning has begun to emerge. The findings provide knowledge that can be used to significantly improve students' abilities to understand complex subject matter and transfer their understanding to new problems and settings. The authors argue that such advances underscore the importance of rethinking what is taught through formal education at the K–12 levels, how it is taught, and how learning is assessed.

Collectively, the videos discussed in this section explore research on a variety of topics, including: the intuitive knowledge children bring to instruction, effective reading instruction, and effective instruction for students from diverse ethnic and linguistic backgrounds. Videos on other topics pertaining to teaching and learning are listed in Section III, beginning on page 25, under Sources of Video Materials.

Intuitive Knowledge

In addition to the standards-based videos already discussed, Annenberg has produced many that are research-based. One set, *A Private Universe*, consists of an introductory video along with two sets of video workshops, one in mathematics and one in science. Collectively, these seek to help teachers understand the role of intuitive knowledge in influencing classroom learning.

Recent research confirms that students typically complete their formal education at the elementary and secondary levels having acquired only a very superficial understanding of the content taught. While they can pass school tests, they can't draw on their knowledge to explain related phenomena experienced in everyday life (Gardner 1991).

We also know students acquire intuitive ideas from everyday experiences about concepts taught in school. Everyday experiences can have a powerful effect on what students are able to

learn from classroom instruction. Sometimes intuitive ideas from everyday experiences are accurate and can serve as building blocks for further learning. Other times such ideas are inaccurate and need to be challenged for students to achieve a correct understanding of the topic in question (Donovan et al. 1999).

The *Private Universe* videos discuss the influence of intuitive knowledge on classroom learning. An introductory video, suitable for professional educators or the general public, highlights the issue. The more in-depth *Private Universe Project in Mathematics* enables viewers to follow the development of a group of students from grades one through twelve, students who participated in a longitudinal research project on mathematical thinking. Researchers asked them to solve challenging math problems across a variety of topics using approaches to instruction that build on student-generated ideas.

A second set of Annenberg workshops, *Private Universe Project in Science*, focuses on concepts, such as photosynthesis, from science curricula at the elementary and secondary levels that are difficult for students to understand because of misconceptions developed from everyday experiences. Student interviews clearly demonstrate

the nature of the difficulties, and the videos provide examples of instructional approaches that are effective in overcoming such difficulties.

In *How Students Learn: History, Mathematics, and Science* (Donovan and Bransford 2005), the authors provide extensive discussion of student preconceptions in the three subject areas cited in the title. In combination, this book and the Annenberg videos provide a good foundation for educators interested in learning how to address students' prior knowledge.



Annenberg's *Private Universe Project in Science* videos illustrate that even a Harvard graduate might still misunderstand important, and often basic, science concepts.

How can I get more information about research on teaching and learning?

Print Sources

- ▶ The National Academy of Sciences recently published two useful volumes. *How People Learn: Brain, Mind, Experience, and School* (Bransford, Brown, and Cocking 1999) is for general readers and provides a scholarly synthesis of the research. Another, *How Students Learn: History, Mathematics, and Science in the Classroom* (Donovan and Bransford 2005), is for teachers and explores how research findings can be used to improve classroom instruction.
- ▶ The American Educational Research Association published an edition of its *Handbook of Research on Teaching* (Richardson 2001) that synthesizes research on teaching.
- ▶ The National Education Association published a research synthesis paper, *Theories of*

Learning and Teaching: What Do They Mean for Educators? (Wilson and Peterson 2006), that identifies conceptual benchmarks for best practice. Both that paper and a "Brief" are available electronically: email researchinfo@nea.org or go to <http://www.nea.org/research/bestpractices>. This Guide was developed as a companion piece to that paper because the videos discussed here provide extensive examples at different grade levels in different subject areas of concepts discussed there.

Video Sources

- ▶ Annenberg Foundation has produced two videos, *The Learning Classroom: Theory into Practice and Looking at Learning...Again, Parts 1 and 2*, that discuss the findings from research on learning.

Reading Instruction

A substantial body of research currently exists on the nature of effective reading instruction. Some focuses on the nature of skilled reading and on how students acquire reading proficiency. Other research looks more directly at methods for teaching reading, such as methods for teaching sound-symbol correspondences and text comprehension strategies. Still other research focuses on students who experience unusual difficulties learning to read. Such research seeks to understand the nature of those difficulties and to provide advice on how to address them. In recent years, several major syntheses of these different lines of research have been published (see, for example, Anderson 1985, Stahl et al. 1990, Snow et al. 1998, and National Reading Panel 2002).

Annenberg's *Teaching Reading K-2*

Annenberg has videos on reading instruction that focus on early reading and include both a video library and workshop. The library, *Teaching Reading, K-2: A Library of Classroom Practices*, consists of 13 videos illustrating instructional practices recommended by the National Reading Panel's synthesis of the research litera-



PBS/WETA's *Reading Rockets* videos help teachers launch young readers by providing current research on effective instructional approaches to teaching reading.

PBS/WETA's *Reading Rockets* series helps make viewers aware of new research on reading.

ture on reading instruction. The workshop, *Teaching Reading, K-2 Workshop*, consists of eight videos that collectively address many critical issues in early reading instruction.

PBS/WETA's *Reading Rockets*

With funding from the U.S. Department of Education, public television station WETA has

produced a series of videos on reading instruction. These are designed for teachers, parents, caregivers, and others interested in helping young children learn to read.

The series consists of eight 30-minute programs called *Reading Rockets: Launching Young Readers*. These help viewers understand research on how young children learn to read and on effective approaches for teaching reading. An emphasis is placed on children who encounter difficulty learning to read. The programs provide infor-

mation on how to identify such children and on how best to teach them. Collectively, the videos span a variety of topics related to reading instruction, such as teaching letter-sound correspondences, teaching writing and spelling, teaching children how to read for meaning, and teaching bilingual students. Each program includes brief video clips illustrating

recommended approaches along with expert commentary on the nature of the approaches recommended and their impact on student outcomes.

The *Reading Rockets* programs come with supporting materials, including a print guide and electronic resources. The guide summarizes recent research on literacy development and instruction for young children. The electronic resources refer teachers to additional reading instruction materials and offer an opportunity to sign up for a free monthly e-newsletter.

In contrast to some of the other video materials already discussed, *Reading Rockets* isn't meant to provide teachers with stand-alone professional development. The niche these products seek to fill is to enhance awareness of the nature of effective instruction and increase motivation to adopt research-based practices. Teachers who identify in the videos methods they want to adopt need to consult other resources to learn how to successfully engage in such practices. Because

these videos are relatively short and nontechnical, they can also be used with parents and other general audiences to develop awareness of the multiple dimensions of reading instruction.

Teaching Diverse Student Populations: CREDE's *Teaching Alive*

In recent years, the United States student population has become increasingly diverse. As a result, more teachers find themselves in classrooms comprised of students from a broad range of ethnic and linguistic backgrounds.

The Center for Research on Education, Diversity, and Excellence (CREDE), now at the University of California-Berkeley, developed a set of video ethnographies that offer insight into effective strategies for working in such diverse settings. Based on an extensive research literature review, CREDE identified five standards for effective pedagogy that are applicable across different grade levels, different types of student populations, and different academic content domains (see the box, below right). Working in partnership with the Center for the Improvement of Teacher Education and Schooling at Brigham Young University, CREDE produced a set of video ethnographies, *Teaching Alive*, designed to help teachers learn how to engage in instruction consistent with those standards.

CREDE's video ethnographies are stored digitally on CD-ROM and DVD. Each disk includes a video depicting a master teacher teaching a lesson in a particular content area to a class of ethnically and/or linguistically diverse students and also a variety of interpretive materials to support viewer analysis.

Disks are formatted in ways that encourage viewers to identify and reflect upon effective lesson features. Viewers are encouraged to watch the lessons in their entirety and analyze the instruction portrayed. To help viewers conduct analyses, each disk contains sidebars that provide access to a variety of studies and probes. The studies refer back to CREDE's five pedagogical standards for effective instruction, and provide lesson video clips illustrating how an on-screen teacher's practice meets each standard. The probes help viewers engage in a more finely grained analysis of the lesson by highlighting the features of a teacher's practice

that meet a particular standard, by explaining how such features contribute to effective instruction, and by exploring practical issues associated with successfully incorporating them into actual lessons.

CREDE's ethnographies exemplify an interactive approach to helping teachers improve their practice. They encourage viewers to analyze and reflect upon lessons taught by master teachers in order to more clearly see theory in practice, especially as it pertains to teaching diverse student populations. As teachers work with such materials, CREDE hopes they will be able to achieve a practically grounded understanding of important theoretical ideas about teaching and learning that they can then use with their own students.

CREDE's materials are designed for use by both individuals and groups. They have been used in professional development workshops offered by CREDE, in university-level preservice teacher professional development programs, and in school professional communities. Further information about them is provided in CREDE's newsletter, *Talking Leaves*; issues are available at <http://www.cal.org/crede/pubs/#NEWS>. A vignette on using CREDE's video ethnographies appears on the following page.

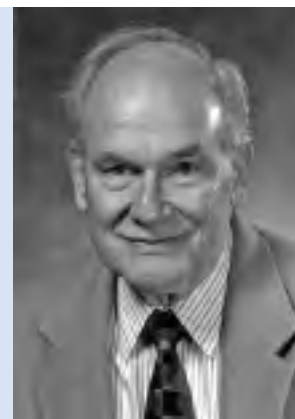
What are CREDE's five pedagogical standards?

1. Teachers and students producing together (joint productive activity).
2. Developing language and literacy across the curriculum.
3. Making meaning by connecting school to students' lives.
4. Teaching complex thinking.
5. Teaching through conversation.

(Dalton 1998, Tharp et al. 2000)

Using CREDE's Video Ethnographies

Roland Tharp, right, is CREDE's director and a professor emeritus at the University of California-Santa Cruz and the University of Hawaii.



Roland speaks about video use from two perspectives. He uses video material in his own teacher professional development efforts and he has developed video material at CREDE for others to use. Roland used video in his preservice teaching methods classes at the University of California, and still does so in the inservice workshops he conducts for practicing teachers. "I introduce principles research has validated and intersperse lectures with videos depicting real classroom activity so teachers can see what those principles look like in actual practice," says Roland. "I primarily focus on pedagogy for ESL, poor, minority, and geographically isolated children."

In Roland's experience, video is an ideal medium for stimulating meaningful dialog. It gives teachers a common classroom experience to use to focus discussion. He cautions, however, that "video isn't a stand-alone professional development tool, but it does promote dialog among educators and between teachers and students."

As part of their research-and-development program, CREDE produced videos of high-performing classrooms comprised of diverse students. Roland believes such videos can be valuable to teachers, especially teachers whose classrooms are becoming increasingly diverse with each passing year. CREDE's videos have also been used in distance learning; Brigham Young University sent the videos out on the Web to students who then used them as text for online discussion.

"It's clear from participant feedback, both preservice and inservice, that professional development participants value the opportunity to see real-life enactment of good teaching practices," notes Roland. "Professional development often relies on classroom visits. But this isn't practical because there are always more teachers who want to visit than there are examples of diverse, high-quality, research-based classrooms."

Video not only provides a way for more teachers to 'visit' classrooms, it also encourages and promotes analysis and reflection about what's been observed by individual and groups of educators. "Video is most useful when it's used to promote reflection," says Roland. "We have some absolute genius teachers out there, but not everyone has enough experience to fully appreciate what they see. Video allows guided observation."

That's why CREDE's video materials are specifically designed to guide the viewing experience. To this end, the video disks include not only extended teaching scenes but also commentary from the teacher, the professional developer, multiple research experts, and students and parents. CREDE's videos are designed as a virtual 'classroom visit'.

Roland's tips: "If you're in a group of viewers, treat it like a common classroom experience. This will provide you with a basis for discussion. Focus on the lesson plan the video depicts, but also respond to events in the classroom that just happen. This is one of video's most valuable attributes: not only do you see things you might have missed, you can stop, go back, go forward, and view a classroom event as many times as it takes to fully understand it. That's true for the guidance segments as well. Stop, discuss, listen again, and discuss some more."

A complete list of CREDE's video ethnographies and other research products can be downloaded from their Web site archive at <http://www.cal.org/crede/pubs>. See page 28 for descriptions of and information on obtaining CREDE videos and other products.

INTERNATIONAL COMPARISONS VIDEOS

Videos in this category help teachers understand how typical instructional practice in the U.S. compares with that in other countries and how our capacity for high-quality instruction can be improved. Recently, many large-scale studies have compared instructional approaches and student outcomes across an international spectrum. In such studies, information on instruction is typically collected through a variety of methods, such as asking teachers to respond to questionnaires, sending observers into classrooms, and, sometimes, videotaping instruction.

Why is it useful to compare patterns of typical instruction among different cultures? Teaching is a cultural activity. It varies considerably across cultures but comparatively little within cultures. Sometimes it is necessary to look outside one's own culture to see something truly new and different. Studying teaching across cultures introduces the unfamiliar, widens the known possibilities, and allows teachers to examine their practice from a fresh perspective (Hiebert et al. 2003, Stigler and Hiebert 1999).

Although teachers often bristle when international comparisons are mentioned because politicians and the press tend to focus on negative test score comparisons, many helpful insights can be gained from such comparisons about both the nature of effective teaching and the enabling conditions that make effective teaching possible. For example, international comparisons have considered how such factors as school workplace conditions and professional development opportunities contribute to effective teaching.

TIMSS' Teaching Videos

The largest video study of international teaching and learning to date took place in 1999. TIMSS-R (Third International Mathematics and Science Study-Repeat) collected extensive information on eighth-grade mathematics and science instruction. Seven countries participated in the math component—Australia, the Czech Republic, Hong Kong Special Administrative Region (SAR), Japan, the Netherlands, Switzerland, and the United States. Within each country, classrooms and lessons were randomly selected to result in a

set that was nationally representative of instruction at that grade level. Altogether, 638 math lessons were videotaped. The findings were published in *Teaching Mathematics in Seven Countries* (Hiebert et al. 2003).

These findings speak to issues involving both pedagogy and content. One significant finding is that no single math instruction method was observed among all the high-performing countries. Other findings involve differences in the content students had the opportunity to learn. Issues of pedagogy tend to dominate debates about U.S. teaching, but TIMSS-R suggests that issues relating to content have not been sufficiently addressed. Some results from the *TIMSS 1999 Mathematics Video Study* are summarized in the box on page 14.

The U.S. Department of Education—the agency responsible for coordinating the TIMSS study—has publicly released 28 lessons. These are available on CD-ROM through LessonLab, Inc., and through Research for Better Schools. The public-release lessons currently available include a set of four math lessons from each of the seven participating countries. The set for each country was selected to illustrate typical features of instruction in that particular country.

The TIMSS lessons include supporting materials on the same disk as the video to assist viewer analysis. Viewers can shift easily from watching a segment to reading materials that will help them understand the nature of the instruction portrayed. Each TIMSS lesson consists of a complete unedited video of the full lesson as it occurred (with English subtitles), a complete time-marked English-language lesson transcript, teacher commentary about goals and methods, national researcher commentary about features of a teacher's practice and its typicality for that country (except for the U.S.), a lesson graph denoting how time was used, examples of textbook pages and other materials used, and examples of student work.

In addition to the materials specifically developed to accompany the videos, the more detailed TIMSS-R analysis reports from the National Center for Education Statistics (available at <http://www.nces.ed.gov/timss/>) and Boston College (available at <http://timss.bc.edu/>) can

What did the *TIMSS 1999 Mathematics Video Study* report say?

The broad purpose of the study was “to investigate and describe teaching practices in eighth-grade mathematics in a variety of countries.” The report offers significant findings about both pedagogy and content.

Pedagogy. A broad conclusion is that no single teaching method was observed in all the relatively high-achieving countries. Any discussion of effective teaching needs to underscore complexity. There are no simple or easy stories to tell.

Content. Both similarities and differences were observed. In all countries, eighth-grade math was usually taught through solving problems—on average, at least 80% of lesson time was devoted

to this activity. However, in comparison to the U.S., lessons in higher-achieving countries placed greater emphasis on more complex content, pursued content in greater depth, and were more coherent.

Some potentially significant content differences worth looking for include:

- In Japan, greater emphasis was placed on introducing new content; in Hong Kong SAR, the emphasis was on practicing content.
- The level of procedural complexity of problems in Japan was greater than in any other country.
- In Japan, more emphasis was

placed on making connections among concepts, procedures, and facts within a problem and between one problem and the next.

- Clear goal statements and summaries helping students understand a lesson’s point were emphasized in Japan and the Czech Republic.
- Dutch problems were more often set in real-life contexts.

A PDF of the complete report can be downloaded from <http://www.nces.ed.gov/timss>. A bound version—which includes a CD-ROM with short clips illustrating key findings—can be obtained at no cost by calling the toll-free number, 1-877-4-EDPUBS.

help focus viewing of particular country tapes on the most salient and potentially fruitful issues. For example, because we know Japanese lessons set the highest international benchmark for procedural complexity, it makes sense to attend to that issue in viewing those tapes. On the other hand, viewers interested in connecting mathematics ideas to real-life situations would probably find the best examples in the tapes from the Netherlands.

Research for Better Schools conducts workshops to introduce teachers to the TIMSS findings and help them study the videos. James Hiebert, director of the *TIMSS 1999 Mathematics Video Study*, facilitated one workshop. An *Education Week* article (Hiebert et al. 2003) describes reactions to the videos among participating teachers, mentioning that some were initially skeptical about the value of analyzing ordinary lessons. They wondered if they shouldn’t be focusing instead on exemplary lessons.

As the workshop progressed, however, many teachers became convinced that much could be learned from this approach. In particular, they began to notice a variety of ways in which the

teaching depicted could be improved. For example, they noticed how missed learning opportunities could have been avoided, how students could be helped to connect key concepts, and how small successes could be strengthened by altering the instructional methods used. In short, they found that studying these videos enabled them to develop insight into a broad range of possibilities for improving classroom instruction.

Teachers interested in working with the TIMSS videos can also enroll in online courses offered by LessonLab, a Pearson Education Company. In one, *TIMSS Video Studies: Explorations of Algebra Learning*, participants work with algebra lesson videos to observe and learn from counterparts in countries recognized for high mathematics achievement. Included are interactive tools for guiding teachers in reflection activities designed to help them not only study the videos but also connect what they learn with what they want to happen in their classrooms. Academic credit can be arranged for participation.

As noted, TIMSS-R also includes a video study of science instruction. Five countries

participated—Australia, the Czech Republic, Japan, the Netherlands, and the United States. Four hundred thirty-nine science lessons were videotaped, and 25 have been publicly released. A report of the findings is also available (see page 29).

Lesson Study

International comparisons studies have enhanced our understanding of promising strategies for teacher professional development as well as for classroom instruction. Lesson study, an ongoing school-based process engaged in by Japanese teachers, is one example. Lewis and Tsuchida (1998) and Stigler and Hiebert (1999) describe how groups of teachers meet regularly over long periods of time to work collaboratively on the design, implementation, testing, and improvement of a single lesson.

Through lesson study work, teachers seek to better understand their students' thinking in order to develop lessons that will be effective in advancing learning. Despite its name, lesson study (see the box, below right) is not about studying a lesson in order to make it perfect. Rather, it is a professional development process

in which teachers systematically and collaboratively examine their practice in order to become more effective instructors (Wang-Iverson 2002).

Lesson study's benefits are in both the process and the product. The collaborative inquiry process supports the gradual improvement of teaching over time. In Japan, this has resulted in a set of lessons developed by classroom teachers that collectively addresses important topics in the school curriculum and is widely shared with other teachers throughout the country.

Several video resources are available about the lesson study process that may be useful to groups of teachers interested in getting started. Global Education Resources' 22-minute DVD, *Lesson Study: An Introduction*, describes how Japanese teachers engage in lesson study. The Lesson Study Group at Mills College has a variety of video resources. One, *Three Perspectives on Lesson Study*, presents academic experts answering a series of questions about lesson study. Other videos in this set illustrate different parts of the research lesson cycle and provide examples of research lessons taught in Japanese and U.S. schools.



No single instructional method was observed among high-performing countries. The most significant finding involved differences in content students had opportunity to learn.



Where can I get more information about lesson study?

There is a wealth of online and other information about lesson study, as well as about using video technology in facilitating it. A Web site with helpful introductory information is <http://www.teacherscollege.edu/centers/lessonstudy>. At <http://www.rbs.org/> use the key words, "lesson study," in the search function.

LOCALLY MADE AND USED VIDEOS

A fourth category of videos comprises those made and used in local settings to help teachers study and critique their and others' instruction. Video has been used in preservice teacher education—especially methods courses—for decades. But with the advent of low-cost video cameras it is increasingly feasible for individuals working in local schools to videotape the teaching and learning that takes place in their own buildings. In this section are examples of how videos have been made and used in schools and a discussion of their role in teacher professional development.

Studying Complete Lessons

Locally made videos can contribute to teacher professional development by helping teachers craft more effective lessons. As teachers in the United States begin to adopt variants of the Japanese lesson study approach, some have found that within-school videotaping may serve as a tool to support this process.



Video is a permanent record for viewing instruction as often as needed, enhancing teachers' ability to study, critique, and discuss a lesson at each viewing.

focus on different aspects during different viewings (Sherin 2004). Similarly, when the lesson is taught in its final form, it may be videotaped a second time. The final videotape can be shared both within and outside the school building (Viadero 2005). See the box on the opposite page for a vignette of how lesson study worked in one school setting.

Examining Particular Issues

Some teachers have formed video clubs that meet regularly to watch and discuss video excerpts of instruction taken from their classrooms (Sherin 2004). In some arrangements, a researcher acts as group facilitator and videotapes participating teachers' classrooms. The facilitator and teacher then jointly select a short excerpt to show the group. During club meetings, the group views excerpts and discusses issues that appear salient to them.

Sherin found that participating in video clubs helps teachers become more reflective about their practice. When engaged in instruction, their attention needs to be focused on immediate issues—deciding what to do next and carrying out those decisions. In contrast, when teachers watch videos of instruction they have an opportunity to reflect on the instruction depicted. During video club meetings, participants talk about possible reasons behind the decisions made by on-screen teachers, alternative instructional strategies that could have been used, and what student remarks indicate about their understanding of the material taught.

Over time, reports Sherin, teachers who participate in video clubs begin to think about pedagogical issues in new ways. They develop increasingly complex ways to explore the ideas students raise during instruction, and they begin to connect discussions of actions taken by teachers with analyses of student thinking.

Teacher clubs are a means to improve instruction, and video can play an important role.

There are many ways videotaping can enhance the lesson study process. For example, in some schools, when an initial version of the research lesson has been developed and is ready for testing, one group member teaches it in the classroom while others observe and sometimes videotape it. The videotape provides a permanent record of the lesson group members can view as often as needed. This enhances their ability to study and critique the lesson by enabling them to

Using Video at Paterson School No. 2

Lynn Liptak, principal, and Bill Jackson (at left in picture), fifth-grade math teacher, Paterson, New Jersey.

This elementary school is about 61% Latino and 30% African-American, with some Bangladeshi students. Ninety-eight percent get free and reduced lunch. For nearly a decade, its math teachers have been involved in a curriculum and instructional improvement initiative that began when Lynn, Bill, and another teacher studied the findings of an early TIMSS report and viewed the tapes.



Over two years, they rewrote and resequenced their lessons in the math curriculum to conform in style to the Japanese lessons. In this format, teachers begin with a thought-provoking problem, ask students to develop and discuss possible solutions, summarize the lesson and relate it back to the problem, and assign students similar ones to practice. More teachers got involved and began watching tapes, the first time any had seen Japanese lessons.

The initiative has grown into a voluntary school-wide activity. Most teachers in grades one through eight participate in lesson study groups to explore ways of improving practice and student outcomes. Four groups were established; each meets weekly to create, conduct, and evaluate research lessons. As part of the process, they videotape their lessons. Bill says that “video motivated us all to start sharing lessons. Before, I would just teach my class and close my door and never share what I was doing.”

When they first started taping, everyone was pretty nervous and self-conscious. There was a certain amount of getting used to it all. Once that hurdle was cleared, the teachers found it to be a very powerful tool. Teachers tape research lessons and debrief at several points throughout the school year. One plans and conducts the lesson, another tapes it, then there’s a videotaped group discussion. Bill says the school has a lot of student teachers, and they found this process especially beneficial for looking at and analyzing their work. One student teacher wanted to use her videotape for a job interview.

“We got more focused on the students,” says Bill, “on what students were doing and how the lessons affected their thinking. When we watched student presentations, we could clearly see how their thinking was evolving.” Students got comfortable with the idea of being taped quicker than teachers did. As for outcomes, the school experienced a spike in eighth-grade math scores when teachers began engaging in lesson study. But Bill isn’t making any direct connection: “We get asked if it’s affecting outcomes,” says Bill, “but we’re not sure. We are sure that it affects things that affect outcomes.”

So far, they haven’t used video much for parent involvement. When parents do see their kids on screen, they find it very interesting. “They can see them actively engaged,” says Bill, “and this has a very positive impact, especially on first-generation Americans.” Through lesson study, Bill and his colleagues have created a documented record of good teaching that includes a bank of about 60 taped lessons and other materials, providing a valuable professional development resource. Most importantly, the math teachers now have a strong professional community that’s improving instruction and achievement, says Lynn.

Bill’s tips: If your school is thinking about doing its own taping as part of an improvement initiative, “first and foremost, be clear about intent. This is about finding effective ways of improving learning, not about showing what a great teacher someone is. Don’t just tape lessons. Think going in how you’re going to use the tapes. Focus on a specific lesson and use the tape to discuss, review, and evaluate critically and in depth. What did the teacher hope to accomplish? What does the tape show about their success? How can the tape be used to focus on the students (are they learning?) and not on the teacher (am I talking too loud)? Video is a tool, not a test. Share, ask, critique, discuss. And enjoy!”

Combines interviews with information from Dunson 2000.

Focusing on Student Learning

A third way locally made videos can contribute to teacher professional development is by affording teachers opportunities to look at the nature of the educational experiences available to students in their school. Educational researcher Alan Schoenfeld (2003) reports findings from a project at a middle school with a diverse student population. The school was in the process of detracking its mathematics instruction, so Schoenfeld conducted a professional development seminar for its math teachers. The teachers watched and then discussed videos of small homogeneous groups of honors- and low-track students working with their classmates to solve math word problems.

The teachers noticed substantial differences in the nature of the work and the conversations that took place among students in the different instructional tracks. Schoenfeld reported that the opportunity to watch such videos served as an impetus for thoughtful and productive discussions about equity issues. The experience led him to conclude that locally made videos can



Locally made videos open up rich territory for collaborative discussions. Such collaborations can illustrate both successes and challenges.

describes his efforts to implement a video-supported mentoring program in an urban elementary school serving children from low-income families. The program's goals were threefold: help new teachers learn more effective teaching skills, promote a building-wide culture of inquiry among all teachers employed at the school, and improve teacher retention.

As part of the program, teachers who were new to the school were paired with mentors. All program participants—new teachers and mentors—

were asked to develop video case studies of their instruction. As a first step, they identified an aspect of their instruction they wanted to improve and began to work on it. As they did, they collaborated with their partners to provide video illustrations of the successes and challenges they experienced. They then presented their videos to the entire group to

stimulate discussion about how to make further improvements.

Yusko reports that the project experienced both positives and negatives during its initial year. On the positive side, many participants said they enjoyed seeing videos of and hearing commentaries about their practice. They said the experience was helpful in enabling them to become more aware of their own practice.

As for negatives, Yusko highlights several lessons learned for enabling projects like this to succeed. He suggests that mentors receive training before entering into mentoring relationships, in how to mentor but also in how to physically use the technology. Also, beginning teachers should be paired with mentors who share common teaching concerns, such as instruction at a particular grade level or in a particular subject matter area. Finally, adequate provision should be made at the building level to insure that teachers assigned to work together are given sufficient freedom from classroom responsibilities to do so.

Video can provide opportunities for teachers to observe and discuss student learning issues.

open up rich territory for collaborative discussions on possibilities for improving teaching and learning within a school building.

Mentoring New Teachers

Locally made videos can play a role in mentoring programs designed to ease the induction of new teachers into the teaching profession. Brian Yusko (2004), an educational researcher,

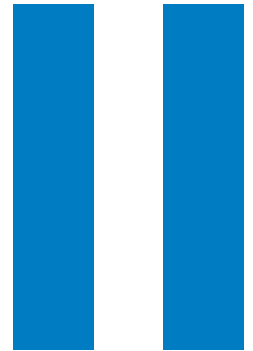
Video demonstrates instructional strategies used by teachers in diverse educational settings, strategies that can be tailored to suit the needs of individual and groups of students.



Video helps demonstrate what standards-based teaching looks like among different curriculum areas. Instructional improvement may involve changes in content as well as pedagogy.

Video enables education professionals to compare and contrast the effectiveness of teaching techniques and strategies used in classrooms around the world—and down the hall.





Section II:
Things to Keep in Mind



This section summarizes key points about the potential benefits teachers, teacher educators, and education administrators can realize from working with videos. It also describes some of the supports needed—especially for school professional communities—to help educators achieve their goals.

HOW CAN VIDEO HELP IMPROVE TEACHING PRACTICE?

Video enables viewers to see a wider variety of instructional strategies. Too often, teachers' work is conducted in isolation with too little access to colleagues. Video can provide access to different classrooms and to a wider variety of instructional strategies, curricula, and classroom cultures.

Video helps viewers understand what excellent instruction looks like. Video can illustrate what excellent instruction looks like when implemented among different content areas, at different grade levels, and across different types of student populations. While all producers of videos discussed in this Guide seek to help viewers understand the nature of excellent instruction, they approach the task from different perspectives. Some focus on national standards and offer illustrations of instructional practices consistent with them. Others focus on theories about teaching and learning as they emerge from recent research and offer illustrations of instructional practices consistent with those theories. Still others offer illustrations of instructional practices used in high-achieving countries.

Video helps viewers understand how children learn academic content and skills. Video illustrates how children think about topics taught in school. Children are not blank slates when they arrive at school. They often bring with them widely shared preconceptions and misconceptions about the topics they are taught. Their preconceptions can serve as building blocks for further learning, and their misconceptions must be challenged if they are to achieve correct understanding. Teachers are often unaware of the nature of the intuitive knowledge students bring to instruction and of what it might mean for how students interpret the information presented.

Video also provides insights about the learning trajectories children experience as they develop understanding, insights that can be helpful in designing improved instruction.

Viewing classroom instruction through the medium of video enhances one's ability to study teaching and learning. Teachers can benefit from opportunities to study teaching and learning as they occur, both in their own classrooms and in the classrooms of others. Video can serve as a powerful medium for facilitating such studies.

As Sherin (2004) points out, one advantage of video for helping teachers study instruction is that it doesn't require immediate response from the viewer. When teachers are engaged in the act of teaching, they must respond to events in the classroom as they occur. But when they watch videos of instruction they have time to reflect, especially on the meaning behind student remarks made during the lesson, on the impact of on-screen teacher actions, and on trade-offs associated with different options available to that teacher.

Providing insight to student learning, video helps teachers design improved instruction.

Another advantage of video in this regard is its ability to provide a permanent record that can be viewed more than once. Teaching is a complex phenomenon that involves many different components. In teaching a lesson, for example, the teacher must make decisions about how to present the content, how to manage the classroom, and how to adapt the lesson to take student feedback into account. If viewers want to understand how a given lesson achieved its outcomes, they need to be able to disentangle such components. Video enables viewers to focus on different aspects of a lesson during different viewings. As Stigler and Perry (2000) put it, video makes it easier for one to study instruction “because it allows a complex transitory phenomenon to be slowed down and replayed for study” (p. 259).

WHAT TYPES OF SUPPORT DO PRACTITIONERS NEED TO USE VIDEO EFFECTIVELY?

Viewers need supplementary information about the lesson depicted beyond just the video record. While video depicts what takes place in a classroom, if the viewer really wants to understand how a lesson worked and whether it was successful then other information is also needed. Viewers need information about the:

- ▶ on-screen teacher's goals in teaching that lesson;
- ▶ student population to whom the lesson was taught;
- ▶ fit between that lesson and the curriculum for that subject matter area;
- ▶ knowledge students possessed about that topic coming into the lesson;
- ▶ readings and tasks that were assigned to help students prepare for the lesson;
- ▶ work students produced during the lesson;
- ▶ nature of the formative assessments used to guide instruction and the summative assessments used to determine what students learned; and
- ▶ further instruction, if any, provided about that topic after the lesson.



In the teacher professional development materials already discussed, supplementary information was provided through a variety of mechanisms, including printed and/or online lesson guides that accompanied the videos, voice-overs that were incorporated into the videos, and close-up video clips of artifacts associated with the lesson, especially textbook pages, worksheets, and teacher-made tests included on the same CDs as the videos.

Video is often used as one component of a larger school improvement initiative. Viewers should relate the information provided by the video producer to other sources of information that can help them better understand the nature of the initiative. For example, standards-based videos might be viewed as part of an initiative in a school where teachers are also using state and national standards materials as a basis for instructional improvement. Alternatively, videos emphasizing research fit with initiatives where teachers are studying theories about teaching and learning or implementing research-based programs such as Reading Recovery.

Viewers need help learning how to view video records of classroom instruction productively.

Brophy (2004) points out that teachers in general—and beginning teachers in particular—often fail to gain new insights about improving practice simply by watching videos of classroom instruction and practice. To benefit from such opportunities, teachers need to have a clear purpose in mind for viewing, they need to know what to look for, and they need to be active thinkers during the viewing experience.

Absent such purpose, knowledge, and active engagement, viewers are likely to watch videos passively, much as they might watch a television program. Thus, viewers may miss important aspects of the instruction depicted. In the materials described, viewers received guidance on how to view videos through a variety of mechanisms, including in-person and online facilitators who helped to structure the viewing experience and written or electronic commentary on the instruction depicted.



Video can help teachers identify and understand conceptions students bring to the classroom, and assist them in designing improved instructional techniques and strategies.

Viewers need help learning how to discuss video records of classroom instruction productively.

Viewers benefit from opportunities to discuss video of classroom instruction in a group setting with colleagues. Under such conditions, the ability to learn is not limited by one's own knowledge but can be enhanced by hearing and discussing other perspectives. However, as Brophy (2004) points out, for group viewing experiences to result in improvements in the knowledge of group members, appropriate group discussion norms need to be established.

According to Brophy, two different kinds of norms are important. One focuses on helping group members work together as a learning community. For example, such norms emphasize listening and responding respectfully to one another, arguing with positions rather than individuals, and citing relevant evidence and arguments to support one's opinions.

The other focuses on helping group members engage in constructive criticism of the instruction depicted. Brophy notes that when viewers first watch classroom videos, often their initial reaction is to make global judgments about the on-screen teacher's performance, such as characterizing it as "good" or "bad." He argues that viewers benefit more when they adopt an analytic perspective. For example, viewers might consider the different response options available to the on-screen teacher and systematically explore advantages and limitations.



Video is a point of entry viewers can use to access a wide spectrum of instructional strategies, teaching practices, and cultural dynamics that take place among diverse classrooms.



Section III:
Resources and Research



Sources of Video Materials

In this section are representative examples of video products currently available from producers and distributors discussed in this Guide, along with some additional resources not discussed. Availability of resources across subject areas is unequal; far more are available in math, science, and reading than in other areas. The imbalance reflects decades of uneven investment in research and development. Along with references for works cited, this section includes other references that may prove useful.

The videos listed are grouped first by type—standards-based instruction, research-based instruction, and international comparisons—then by distributor, then by content. Purchase prices, descriptions of package contents, and program lengths can be obtained directly from individual distributors by using the contact information provided. Many VHS format videocassettes are also available on DVD. Some are available on CD-ROM.

Standards-based Instruction

Annenberg Foundation

The Annenberg Channel—a free satellite channel for schools, colleges, libraries, public broadcasting stations, public access channels, and community agencies—is available 24 hours a day, 7 days a week. Access its range of teacher professional development and instructional programs using a non-commercial agency with a Ku-band dish and a DigiCipher II receiver.

Users with a broadband connection can view broadcasts online (<http://www.learner.org/channel/broadband/video.html>) at no cost once registered. You'll need Windows Media Player (go to <http://www.microsoft.com> and click on "Downloads" for the latest version), DSL, and a cable modem or LAN connection to a T1 line or greater. Enable Java in your browser.

To order a free catalog or buy programs on videocassette or DVD, call Annenberg Media at 1-800-532-7637, or write Annenberg Media, P.O. Box 2345, S. Burlington, VT 05407-2345.

Foreign Language

Title: *Teaching Foreign Languages: A Teaching Practices Library*

Grades: K–12

Description: Illustrates effective instruction and assessment strategies. Subtitled in English, including Spanish, French, German, Japanese, Italian, Latin, Russian, and Chinese.

Math

Title: *Teaching Math: A Video Library*

Grades: K–12

Description: NCTM standards are used in classrooms. The elementary library illustrates each of the content and process standards. More limited middle and high school sets address selected issues.

Title: *Mathematics Assessment: A Video Library*

Grades: K–12

Description: Depicts classrooms in which formal and informal assessments illustrate the six Assessment Standards developed by NCTM.

Science

Title: *Learning Science through Inquiry* (Video Workshop)

Grades: K–8

Description: Focuses on using inquiry-based teaching and learning consistent with the National Science Education Standards and the Benchmarks of Science Literacy.

Title: *Science K–6: Investigating Classrooms* (Video Library)

Grades: K–6

Description: Classroom vignettes show teachers incorporating inquiry using the National Science Education Standards and the Benchmarks of Science Literacy.

Social Studies

Title: *Social Studies in Action: A Teaching Practices Library*

Grades: K–12

Description: Blends content with methodology as teachers model National Council for the Social Studies standards.

Title: *Social Studies in Action: A Workshop for K–5 Teachers*

Grades: K–5

Description: Provides a framework for teaching social studies that emphasizes effective citizenship. Explores theories of learning and teaching strategies and reviews National Council for the Social Studies standards and themes.

Title: *Making Civics Real: A Workshop for Teachers*

Grades: 9–12

Description: Illustrates a constructivist approach to teaching civics, developed in collaboration with the National Council for the Social Studies and the Center for Civics Education.

Title: *Teaching Geography*

Grades: 7–12

Description: Models teach approaches and content that are consistent with National Council for Geographic Education standards.

PBS

Download free teacher professional development materials, videotaped lesson plans, and guides from PBS' TeacherSource Web site (<http://www.pbs.org/teachersource/>), a gateway to TeacherLine (<http://teacherline.pbs.org/teacherline>) and Mathline (<http://www.pbs.org/teachersource/math.htm>). To view and/or download materials, you'll need access to a fast computer and a high-speed Internet connection.

Or, obtain broadcast information in your area by plugging your zip code into a TeacherSource search function; their opening page can be personalized using a user profile function.

You can also buy videotapes, lesson plans, and user guides. Call 1-800-752-9727, log onto <http://shop.pbs.org/education/>, or write PBS Video, 2100 Crystal Dr., Arlington, VA 22202-3708.

Math

Title: *PBS Mathline*

Grades: K–12

Description: These programs show teachers modeling NCTM standards-based instructional strategies and practices in classrooms.

Science

Title: *PBS Scienceline*

Grades: K–5

Description: A collaborative effort with the National Science Teachers Association, these videos are based on the National Science Education Standards that call for learning and teaching science through scientific inquiry.

The Concord Consortium's *Seeing Math Project*

Elementary Math

Altogether, eleven case studies are available. Two are free to educators working in schools who have registered with the project. Access these on the *Seeing Math* Web site (<http://www.seeingmath.concord.org/>), a gateway to the project. To view or download case studies, you'll need a fast computer and a high-speed Internet connection.

The full set of case studies is available commercially through Teachscape, an organization that provides Web-based professional development. Write to Teachscape at 335 West 16th St., New York, NY 10011-5902, call 1-877-98TEACH, or visit <http://www.teachscape.com/>.

School districts can offer locally provided professional development courses using *Seeing Math* case studies; they must designate a local facilitator. The Concord Consortium offers a special training netcourse, and a Teachscape content expert provides online support as needed.

Secondary Math

Five online courses are currently available through PBS TeacherLine. See above for information on obtaining PBS products.

NCTM's Illuminations Web Site

The National Council of Teachers of Mathematics (NCTM) has a Web site (<http://illuminations.nctm.org/>) devoted to their vision for school mathematics. It contains a growing array of resources for math educators at the elementary, middle, and high school levels. The site's resources are organized by category: lessons, standards, tools, and Web resources. The lessons section includes sample math lessons for different levels. The standards section contains the NCTM standards and materials designed to illuminate their nature, including brief video clips illustrating the teaching and learning of particular standards. The tools section contains interactive electronic tools for use in instruction. The Web resources section refers users to other online instructional resources.

Research-based instruction

Annenberg Foundation

See page 25 for contact information.

Learning Theory

Title: *The Learning Classroom: Theory into Practice*

Grades: K–12

Description: Applies a variety of learning theories to classroom practice.

Title: *Looking at Learning...Again: Parts 1 and 2*

Grades: K–12

Description: Seven educators share ideas on how students really learn. They address such questions as: How does technology affect learning? What strategies will facilitate inquiry-based teaching?

Title: *A Private Universe*

Grades: 5–12

Description: Documents student misconceptions of key scientific concepts and suggests how to move toward the conceptual change necessary for scientific understanding.

Title: *Minds of Our Own*

Grades: K–12

Description: Expands on *A Private Universe* and further explores how students learn, especially by refuting unfounded assumptions.

Math

Title: *Private Universe Project in Mathematics*

Grades: K–12

Description: Explores how mathematics teaching can be structured to resonate with students' prior knowledge. Follows the development of a single group from grades 1–12.

Reading and Language Arts

Title: *Teaching Reading K–2 Workshop*

Grades: K–2

Description: Reviews current research on reading instruction and illustrates how it can inform classroom practice.

Title: *Teaching Reading, K–2: A Library of Classroom Practices*

Grades: K–2

Description: Depicts instructional practices recommended by the National Reading Panel's synthesis of research on reading instruction, employed by a diverse cross-section of teachers from around the country.

Title: *Write in the Middle: A Workshop for Middle School Teachers*

Grades: 5–8

Description: Explains effective writing practices and strategies, including classroom footage modeling successful techniques and interviews with teachers, students, and nationally recognized experts.

Title: *Developing Writers: A Workshop for High School Teachers*

Grades: 9–12

Description: Presents advice for teaching writing and examines particular issues, such as high-stakes testing and addressing the needs of students at varying ability levels. On-screen participants include professional writers, researchers, students, and teachers.

Title: *The Expanding Canon: Teaching Multicultural Literature in High School*

Grades: 9–12

Description: Using the workshop format, explores the richness of multicultural literature through four research-based teaching approaches: reader response, inquiry, cultural studies, and critical pedagogy.

Title: *Envisioning Literature Series*

Grades: 3–5 (*Engaging With Literature*)

6–8 (*Making Meaning in Literature*)

6–12 (*Conversations in Literature*)

Description: Based on the research of Dr. Judith Langer, a workshop and video library is available for each grade span.

Science

Title: *Private Universe Project in Science*

Grades: K–12

Description: Illustrates why teaching science is so difficult, and provides advice for effective teaching by focusing each video on one theme and content area. All use specific examples to show how students' preconceptions can create barriers to learning, and all review classroom strategies and results.

PBS/WETA

Go to <http://www.readingrockets.org> to order video material, to find out whether reading-related shows will be broadcast in your area, and to obtain support materials. See page 26 for information on obtaining PBS video products.

Launching Young Readers titles that explore the elements of reading are listed below.

Reading and Language Arts

Titles: *The Roots of Reading*

Sounds and Symbols

Fluent Reading

Writing and Spelling

Reading for Meaning

Grades: K–3

Description: Explores different research-based reading strategies that help children with their reading skills.

CREDE

CREDE is now at the University of California-Berkeley. You can obtain a complete list of video ethnographies and other research products, such as their standards for pedagogy, from their Web site (<http://crede.berkeley.edu/>). The videos listed below (and others) can be purchased through the Center for Applied Linguistics (CAL) online store (<http://calstore.cal.org/store/>). For product ordering call 1-800-551-3709 or write CALstore/CAL, 4646 40th Street NW, Washington, DC 20016-1859.

Pre-school

Title: *The Sheri Galarza Pre-school Case*

Grades: preK

Description: Illustrates developmentally appropriate teaching of language and literacy using CREDE's pedagogical standards.

Reading and Language Arts

Title: *Engaging Students in Reading Comprehension Using Instructional Conversation*

Grades: preK–12

Description: Shows a two-way immersion teacher providing instruction in reading comprehension guided by clear academic goals. The teacher models instructional conversation and purposive teacher-student dialog.

Special Needs Students

Title: *The Mara Mills Case*

Grades: 9–12

Description: Depicts a two-day multi-grade lesson in ecological science in a sheltered English classroom that features instruction based on CREDE's pedagogical standards.

Title: *The Craig Cleveland Case*

Grades: 9–12

Description: Focuses on a Mexican-American social studies unit in a Spanish/English bilingual classroom using CREDE's pedagogical standards.

Title: *Studies in Native American Education: Improving Education for Zuni Children*

Grades: preK–12

Description: Depicts strategies for improving classroom instruction for Native American students based on CREDE’s pedagogical standards.

Title: *Helping English Learners Succeed: An Overview of the SIOP®*

Grades: preK–12

Description: A brief introductory video illustrates eight components of the SIOP® model for teaching English language learners, including researcher and teacher commentary.

Title: *The SIOP® Model: Sheltered Instruction for Academic Achievement*

Grades: preK–12

Description: A more in-depth treatment of the SIOP® model, including footage from the math, science, and social studies classrooms of six teachers. Also includes teacher and expert commentary.

Teaching Principles

Title: *Teaching Alive for the 21st Century*

Grades: preK–12

Description: Designed as a virtual classroom, this two-CD set (elementary and secondary) explores CREDE’s five research-based pedagogical standards that apply to any subject or grade level (see Dalton 1998 in the Works Cited section beginning on page 31).

Learning Point Associates

Obtain video and supporting materials illustrating math practices at <http://www.learningpt.org/> or write Learning Point, 1120 East Diehl Road, Suite 200, Naperville, IL 60563.

Math and Science

Title: *Powerful Practices in Mathematics and Science*

Grades: K–12

Description: Includes two research-based CDs and a monograph explaining findings from

several years of in-class research conducted through the National Center for Improving Student Learning and Achievement in Mathematics and Science. Classroom episodes show how “powerful” practices—such as modeling, generalization, and justification—strengthen student learning and understanding of complex math and science ideas.

International Comparisons

LessonLab, Inc., and Research for Better Schools

The 1999 mathematics videos from the *TIMSS 1999 Video Study* are available on CD-ROM for purchase from LessonLab, Inc. (<http://www.lessonlab.com/>) and from Research for Better Schools (<http://www.rbs.org/catalog/index.php>). For LessonLab, call 1-800-348-4474 or write 3330 Ocean Park Blvd., Santa Monica, CA 90405. For Research for Better Schools, call 1-215-568-6150 or write 112 North Broad Street, Philadelphia, PA 19102. LessonLab also has an online algebra instruction course that uses the TIMSS videos.

Title: *TIMSS 1999 Video Study Mathematics Public Release Lessons*

Grades: 8–12

Description: Examines eighth-grade classroom mathematics and science teaching in more than 1,000 classrooms in seven participating countries.

Title: *TIMSS 1999 Video Study Science Public Release Lessons*

Grades: 8–12

Description: Five-CD set examines eighth-grade science lessons from each of the countries participating in the TIMSS 1999 Video Study Science: Australia, the Czech Republic, the Netherlands, and the U.S.

Title: *TIMSS Video Studies: Explorations of Algebra Teaching*

Grades: 8–12

Description: Course participants work with the TIMSS algebra videos to observe and learn from counterparts in countries recognized for high mathematics achievement.

National Center for Education Statistics

To obtain a free bound copy of the *TIMSS 1999 Mathematics Video Study, Teaching Mathematics in Seven Countries* that includes a CD-ROM with clips illustrating selected findings, call 1-877-4-EDPUBS. The publication number is NCES 2003-103. To match numbered clips to the report's findings by chapter, you must be connected to the Internet and open the clips in HTML.

Title: *Teaching Science in Five Countries: Results from the TIMSS 1999 Video Study*

Grades: 8-12

Description: A follow-up and expansion of the TIMSS 1995 Video Study.

Annenberg Foundation

See page 25 for contact information.

Title: *The Missing Link: Essential Concepts for Middle School Math Teachers*

Grades: 6-8

Description: Focuses on ten core concepts accentuated in TIMSS high-performing countries but mostly undervalued in the U.S.

University of Michigan

Obtain ordering information for an awareness video and for the video listed below by sending an email to fliao@umich.edu, by calling 1-734-764-2443 and asking to speak with Frances, or by writing Frances Liao at the Center for Human Growth and Development, University of Michigan-Ann Arbor, 300 N. Ingalls, 10th Floor, Ann Arbor, MI 48109.

Title: *The Polished Stone*

Grades: 6-8

Description: Classroom scenes depict key features of math lessons in Japan and Taiwan (see Stigler and Stevenson 1992 for an analysis of depicted practices).

Lesson Study

Global Education Resources

Obtain this video online at <http://www.globaledresources.com/>, call 1-973-410-0840, or write to Global Education Resources, 37 Station Road, Madison, NJ 07940.

Title: *Lesson Study: An Introduction*

Grades: 1-6

Description: Overview of how Japanese teachers engage in lesson study showing footage from a Japanese elementary school. This video is designed to answer questions frequently asked by American audiences when they first hear about lesson study.

Lesson Study Group at Mills College

Seven videos are available from the Lesson Study Group at Mills College, obtainable directly from their Web site (<http://www.lessonresearch.net/perspectivescenter.html>), by calling Shelley Friedkin at 1-510-430-3379, or by writing her at the Education Department at Mills College, 5000 MacArthur Boulevard, Oakland, CA 94613.

Titles: *How Many Seats?*

Can You Find the Area?

To Open a Cube

Can You Lift 100kg?

The Secret of Trapezes

The Secret of Magnets

Three Perspectives on Lesson Study

Grades: 1-8

Description: Some show different parts of the lesson study research cycle, some show research lessons in American and Japanese schools, and one shows experts answering questions.

Works Cited and Other Research

- Arcavi, A., and A. Schoenfeld. 2003. "Using the Unfamiliar to Problematize the Familiar." Paper presented at the American Educational Research Association Annual Meeting in Chicago.
- Atkins, S. 1998. "Best Practice: Preservice Teachers' Perceptions of Videodisc vs. Videotape of Classroom Practices in a Methods Course." *Journal of Technology and Teacher Education* 6: 51–59.
- Barab, S. A., R. Kling, and J. Gray, eds. 2004. *Designing for Virtual Communities in the Service of Learning*. Cambridge, UK: Cambridge University Press.
- Barron, L. C., and E. S. Goldman. 1994. "Integrating Technology with Teacher Preparation." In B. Means, ed., *Technology and Education Reform: The Reality Behind the Promise* (pp. 81–110). San Francisco: Jossey-Bass.
- Beaton, A., I. V. S. Mullis, M. O. Martin, E. J. Gonzalez, D. L. Kelly, and T. A. Smith. 1996. *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study*. Chestnut Hill, MA: Boston College.
- Beck, R. J., A. King, and S. K. Marshall. 2002. "Effects of Videocase Construction on Preservice Teachers' Observations of Teaching." *Journal of Experimental Education* 70(4): 345–361.
- Bishop, A. J., J. Clements, C. Keitel, J. Kilpatrick, and C. Laborde, eds. 1996. *International Handbook of Mathematics Education*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Bransford, J. D., A. L. Brown, and R. R. Cocking, eds. 1999. *How People Learn: Brain, Mind, Experience, and School*. Washington, DC: National Academy Press.
- Bransford, J. D., and N. J. Vye. 1989. "A Perspective on Cognitive Research and its Implications for Instruction." In L. B. Resnick and L. E. Klopfer, eds., *Toward the Thinking Curriculum: Current Cognitive Research* (pp. 173–205). Arlington, VA: Association for Supervision and Curriculum Development.
- Brophy, J., ed. 2004. *Using Video in Teacher Education*. Oxford, UK: Elsevier Ltd.
- Center for Research on Education, Diversity, and Excellence (CREDE). 2002. *Talking Leaves* (6)1. Retrieved June 15, 2006, from http://repositories.cdlib.org/crede/talkingleaves/tl6_1/.
- Clarke, D. J. 2003. "International Comparative Studies in Mathematics Education." In A. J. Bishop, M. A. Clements, C. Keitel, J. Kilpatrick, and F. K. S. Leung, eds., *Second International Handbook of Mathematics Education*. (pp. 145–186). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Clarke, D., and H. Hollingsworth. 2000. "Seeing Is Understanding." *Journal of Staff Development* 21: 40–43.
- Cohen, D., M. McLaughlin, and J. Talbert. 1993. *Teaching for Understanding*. San Francisco: Jossey-Bass.
- Dalton, S. S. 1998. *Pedagogy Matters: Standards for Effective Teaching Practice*. Santa Cruz: University of California.
- Daniel, P. 1996. "Helping Beginning Teachers Link Theory to Practice: An Interactive Multimedia Environment for Mathematics and Science Teacher Preparation." *Journal of Teacher Education* 47: 197–204.
- Donovan, M. S., and J. D. Bransford. 2005. *How Students Learn: History, Mathematics, and Science*. Washington, DC: National Academy Press.
- Donovan, M. S., J. D. Bransford, and J. W. Pellegrino, eds. 1999. *How People Learn: Bridging Research and Practice*. Washington, DC: National Academy Press.
- Dunson, M. A. 2000. "From Research to Practice and Back Again: TIMSS as a Tool for Educational Improvement." *CPRE Policy Briefs*. Retrieved June 15, 2006, from <http://www.cpre.org/Publications/rb30.pdf>.
- Eckart, J. A., and S. L. Gibson. 1993. "Using Camcorders to Improve Teaching." *The Clearing House* 66(5): 288–292.
- Flake, J. L. 2002. "Using Web Videos and Virtual Learning Environments to Help Prospective Teachers Construct Meaning About Children's Mathematical Thinking." *Journal of Computers in Mathematics and Science Teaching* 21(1): 31–51.
- Frederiksen, J. R., M. Sipusic, M. G. Sherin, and E. Wolfe. 1998. "Video Portfolio Assessment: Creating a Framework for Viewing the Functions of Teaching." *Educational Assessment* 5(4): 225–297.
- Friel, S., and L. Carboni. 2000. "Using Video-based Pedagogy in an Elementary Mathematics

- Methods Course." *School Science and Mathematics* 100: 118–127.
- Gadzuk, N. 2004. *Ready to Teach Algebra 2004 Annual Evaluation Report*. Wilmington, NC: Edcentric.
- Gadzuk, N. 2004. *Seeing Math Elementary 2004 Annual Evaluation Report*. Wilmington, NC: Edcentric.
- Gadzuk, N. 2003. *Seeing Math Telecommunications Project: Annual Evaluation Report*. Reading, MA: Edcentric.
- Galvis, A., J. Hadingham, and R. Rose. 2002. "Interactive Video Case Studies Help Teachers Reflect on Their Practice." *@Concord* 6(2). Retrieved June 15, 2006, from <http://www.concord.org/publications/newsletter/2002-fall/seeing-math>.
- Gardner, H. 1991. *The Unschooled Mind: How Children Think and How Schools Should Teach*. New York: Basic Books.
- Goldman-Segall, R. 1998. *Points of Viewing Children's Thinking: A Digital Ethnographer's Journey*. Mahwah, NJ: Erlbaum.
- Harris, R. C., S. Pinnegar, and A. Teemant. "The Case for Hypermedia Video Ethnographies: Designing a New Class of Case Studies that Challenge Teaching Practice." *Journal of Technology and Teacher Education* 13(1): 141–161.
- Hatfield, M. 1996. "Using Multimedia in Pre-service Education." *Journal of Teacher Education* 47: 223–228.
- Hatfield, M., and G. Bitter. 1997. "A Multimedia Alternative for Professional Development." *Teaching Education* 8: 67–71.
- Hiebert, J. 1999. "Relationships between Research and NCTM Standards." *Journal for Research in Mathematics Education* 30: 3–19.
- Hiebert, J., T. P. Carpenter, E. Fennema, K. C. Fuson, H. Murray, A. Olivier, and P. Human. 1997. *Making Sense: Teaching and Learning Mathematics with Understanding*. Portsmouth, NH: Heinemann.
- Hiebert, J., R. Gallimore, H. Garnier, K. B. Givvin, H. Hollingsworth, J. Jacobs, A. M. Chui, D. Wearne, M. Smith, N. Kersting, A. Manaster, E. Tseng, W. Etterbeek, C. Manaster, P. Gonzales, and J. W. Stigler. 2003. *Teaching Mathematics in Seven Countries: Results From the TIMSS 1999 Video Study*. Washington, DC: National Center for Education Statistics.
- Hiebert, J., R. Gallimore, and J. W. Stigler. 2003. "The New Heroes of Teaching: Opening Classroom Doors for the Good of the Profession." *Education Week* November 5: 56.
- Hughes, J. E., B. W. Packard, and P. D. Pearson. 2000. "The Role of Hypermedia Cases on Preservice Teachers' Views of Reading Instruction." *Action in Teacher Education* 22(2a): 24–38.
- Hughes, J. E., B. W. Packard, and P. D. Pearson. 2000. "Preservice Teachers' Perceptions of Using Hypermedia and Video to Examine the Nature of Literacy Instruction." *Journal of Literacy Research* 32(4): 599–629.
- Kenny, R., B. Andrews, and M. Vignola. 1999. "Towards Guidelines for the Design of Interactive Multimedia Instruction: Fostering the Reflective Decision-making of Preservice Teachers." *Journal of Technology and Teacher Education* 7: 13–31.
- Knoll, S., and J. W. Stigler. 1999. "Management and Analysis of Large-scale Video Surveys Using the Software vPrism™." *International Journal of Educational Research* 31: 725–734.
- Koehler, M. J. 2002. "Designing Case-based Hypermedia for Developing Understanding of Children's Mathematical Reasoning." *Cognition and Instruction* 20(2): 151–195.
- Krajcik, J., and E. Soloway. 1996. "The Casebook of Project Practices—An Example of an Interactive Multimedia System for Professional Development." *Journal of Computers in Mathematics and Science Teaching* 15: 119–135.
- Lampert, M., and D. L. Ball. 1998. *Teaching, Multimedia, and Mathematics: Investigations of Real Practice*. New York: Teachers College Press.
- Lampert, M., and J. Hawkins. 1998. *New Technologies for the Study of Teaching (Report to the National Science Foundation)*. Ann Arbor: University of Michigan.
- Leung, F. K. S. 1995. "The Mathematics Classroom in Beijing, Hong Kong, and London." *Educational Studies in Mathematics* 29: 297–325.

- Lewis, C. C., and I. Tsuchida. 1998. "A Lesson is Like a Swiftly Flowing River." *American Educator* Winter: 12–17, 50–52.
- Little, J. W. 1982. "Norms of Collegiality and Experimentation: Workplace Conditions of School Success." *American Educational Research Journal* 19(3): 325–340.
- Lu, J., and R. Rose. 2003. "Seeing Math Through Multimedia Case Studies." @Concord 7(1). Retrieved June 15, 2006, from <http://www.concord.org/publications/newsletter/2003-spring/seeing-math.html>.
- McDevitt, M. 1996. "A Virtual View: Classroom Observations at a Distance." *Journal of Teacher Education* 47:191–196.
- McLaughlin, M., and J. E. Talbert. 2001. *Professional Communities and the Work of High School Teaching*. Chicago: University of Chicago Press.
- Manaster, A. 1998. "Some Characteristics of Eighth-grade Mathematics Classes in the TIMSS Videotape Study." *American Mathematical Monthly* 105: 793–805.
- Martin, M. O., K. D. Gregory, and S. E. Stemler. 2000. *TIMSS 1999 Technical Report*. Chestnut Hill, MA: Boston College.
- Martin, M. O., I. V. S. Mullis, E. J. Gonzalez, K. D. Gregory, T. A. Smith, S. J. Chrostowski, R. A. Garden, and K. M. O'Connor. 2000. *TIMSS 1999 International Science Report: Findings from IEA's Repeat of the Third International Mathematics and Science Study at the Eighth Grade*. Chestnut Hill, MA: Boston College.
- National Reading Panel. 2000. *Teaching Children to Read (National Institutes of Health publication #00-4769)*. Washington, DC: Author.
- National Research Council. 2001. *The Power of Video Technology in International Comparative Research in Education*. Washington, DC: National Academy Press.
- National Council of Teachers of Mathematics. 2002. *Principles and Standards for School Mathematics*. Reston, VA: Author.
- Perry, G., and S. Talley. 2001. "Online Video Case Studies and Teacher Education: A New Tool for Preservice Education." *Journal of Computing in Teacher Education* 17(4): 26–31.
- Richardson, V., ed. 2001 *Handbook of Research on Teaching*. Washington, DC: American Educational Research Association.
- Roth, K. J., S. L. Druker, H. E. Garnier, M. Lemmens, C. Chen, T. Kawanaka, D. Rasmussen, S. Trubacova, D. Warvi, Y. Okamoto, P. Gonzales, J. Stigler, and R. Gilmore. *Teaching Science in Five Countries: Results from the TIMSS 1999 Video Study*. Washington, DC: National Center for Education Statistics.
- Rowley, J. B., and P. M. Hart. 1993. "Catching and Releasing Expert Teacher Thought: The Effects of Using Videotaped Presentations of Expert Teacher Knowledge to Promote Preservice Teacher Thinking." In M. O'Hair and S. Odell, eds., *Diversity and Teaching* (pp. 122–137). Ft. Worth: Harcourt Brace Jovanovich.
- Schmidt, W. H., C. C. McKnight, L. S. Cogan, P. M. Jakwerth, and R. T. Houang. 1999. *Facing the Consequences: Using TIMSS for a Closer Look at U.S. Mathematics and Science Education*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Schoenfeld, A. 2003. "Professional Development in Context: Workshop Ideas Embedded in Practice." Paper presented at the American Educational Research Association Annual Meeting in Chicago.
- Sherin, M. G. 2004. "New Perspectives in the Role of Video in Teacher Education." In J. Brophy, ed., *Using Video in Teacher Education*. Oxford, UK: Elsevier Ltd.
- Sherin, M. G. 2003. "Using Video Clubs to Support Conversations among Teachers and Researchers." *Action in Teacher Education* 4: 33–45.
- Sherin, M. G., and E. A. van Es. 2002. "Using Video to Support Teachers' Ability to Interpret Classroom Interactions." In *Proceedings of the Thirteenth Annual Meeting of the Society for Information Technology and Teacher Education* (pp. 2,532– 2,536). Norfolk, VA: Association for the Advancement of Computing in Education.
- Silver, E. A. 2003. "Invited Commentary: Lessons Learned from Examining Mathematics Teaching Around the World." *Education Statistics Quarterly* 5(1): 20–23.
- Spillane, J. P. 1999. "External Reform Initiatives and Teachers' Efforts to Reconstruct their Practice: The Mediating Role of Teachers' Zones of Enactment." *Journal of Curriculum Studies* 31(2): 143–175.

- St. John, M., L. Stokes, and T. Evans. 2003. *Designing Video Cases of Classroom Practice for Teachers' Professional Development in Mathematics and Science: Challenges, Tensions, and Trade-offs* (National Science Foundation conference monograph ESI-0092547). Colorado Springs: National Science Foundation.
- Stevenson, H. W., and J. W. Stigler. 1992. *The Learning Gap*. New York: Summit Books.
- Stigler, J. W., and J. Hiebert. 1999. *The Teaching Gap*. New York: The Free Press.
- Stigler, J. W., and J. Hiebert. 2004. "Improving Mathematics Teaching." *Educational Leadership* 61(5): 12–17.
- Stigler, J. W., P. Gonzalez, T. Kawanaka, S. Knoll, and A. Serrano. 1999. *The TIMSS Videotape Classroom Study: Methods and Findings from an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States* (NCES 1999–074). Washington, DC: U.S. Department of Education, National Center for Education Statistics.
- Stigler, J. W., and M. Perry. 2000. "Developing Classroom Process Data for the Improvement of Teaching." In *Grading the Nation's Report Card: Research from the Evaluation of NAEP*. Washington, DC: National Academy Press.
- Stigler, J. W., and H. W. Stevenson. 1991. "How Asian Teachers Polish Each Lesson to Perfection." *American Educator* 15(1): 12–47.
- Stigler, J. W., R. Gallimore, and J. Hiebert. 2000. "Using Video Surveys to Compare Classrooms and Teaching across Cultures: Examples and Lessons from the TIMSS Video Studies." *Educational Psychologist* 35(2): 87–100.
- Strickland, J., and K. Doty. 1997. "Use of Videotapes of Exemplary Mathematics Teaching for Teacher Preparation." *Education* 118: 259–261.
- Tharp, R. G. 2002. "Bringing Teaching Alive: Professional Development and Multimedia Technology." *Talking Leaves* 6(1): 1–2. Retrieved June 15, 2006, from http://repositories.cdlib.org/crede/talkingleaves/tl6_1/.
- Tharp, R. G., P. Estrada, S. S. Dalton, and L. A. Yamauchi. 2000. *Teaching Transformed*. Boulder, CO: Westview Press.
- Thomas, G., S. Wineburg, P. Grossman, M. Oddmund, and S. Woolworth. 1998. "In the Company of Colleagues: An Interim Report on the Development of a Community of Teacher Learners." *Teaching and Teacher Education* 14(1): 21–32.
- Tochon, F. V. 1999. *Video Study Groups for Education, Professional Development, and Change*. Madison, WI: Atwood Publishing.
- Viadero, D. 2004. "In Lesson Study Sessions, Teachers Polish Their Craft." *Education Week* February 11: 8.
- Wang-Iverson, P. 2002. "Why Lesson Study?" Paper presented at the Research for Better Schools Lesson Study Conference. Retrieved June 15, 2006, from http://www.rbs.org/lesson_study/conference/2002/papers/wang_shtml.
- Wilson, S. M., and P. Peterson. 2006. *Theories of Learning and Teaching: What Do They Mean for Educators?* Washington, DC: National Education Association.
- Yusko, Brian P. 2004. "Improving New Teacher Induction and Professional Development through a Video Technology Mentoring Program (VTMP)." Paper presented at the American Educational Research Association 2004 Annual Meeting in San Diego. Retrieved June 15, 2006, from <http://academic.csuohio.edu/yuskob/tchlm.doc>.

About the Authors

Judith Segal was a consultant to NEA. She recently retired from the U.S. Department of Education.

Elizabeth Demarest is a senior professional associate in NEA's Research Department.

Andrea Prejean is a senior professional associate in NEA's Student Achievement Department.

Illustration Credits

The Concord Consortium: pages 6, 7, and 8.

Annenberg Foundation: pages 4, 9, and 24.

LessonLab, Inc.: page 15.

Bill Jackson: page 17.

Across America, education professionals are actively seeking ways to improve classroom instruction. Determining what “best practice” means among increasingly diverse school settings needs to be well thought out. Educators are drawing on their own experience, on standards of professional practice, on available research, and on research-based tools for instructional improvement. Video is an emerging technology that can be of great service to educators seeking to teach for understanding.

The National Education Association offers *Teaching for Understanding: A Guide to Video Resources* as a good starting point for education professionals who want to explore how this important technology can help.



Research
1201 16th Street, N.W.
Washington, D.C. 20036-3290