

Models and Resources for the Use of Video in Mathematics Teacher Professional Development: A Report of the NCTM Video Task Force

Sessions presented at the annual meetings of the
National Council of Supervisors of Mathematics
and the
National Council of Teachers of Mathematics
Orlando, Florida
April 2001

Excerpts from the Final Report of the NCTM Video Task Force

Task Force Members

Lauren Pfeiffer-Childs, South Lyon, MI
Yvonne Grant, East Lansing, MI
Marilyn Hala, Reston, VA (NCTM Liaison)
Brent McClain, Hillsboro, OR (PDSAC Liaison)
Lew Romagnano, Louisville, CO (Chair)
Chuck Thompson, Louisville, KY
Margaret Wilsman, Madison, WI

Overview

The Video Task Force was charged by NCTM’s Professional Development and Status Advisory Committee (PDSAC) with “developing appropriate and timely written materials ... to illustrate the power and guide the use of video as a tool for professional development...” During its two meetings, the task force members brought their collective expertise and experience to wide-ranging discussions of the unique contributions this medium might make to practice-focused professional development programs designed according to the framework presented by Smith (2001). The result of these discussions was an outline for a “product” that would promote a reflective, inquiry-based stance toward the use of video records of classroom teaching practice in mathematics teacher professional development.

Summary of Meetings

The task force sought to situate its considerations in the larger context of mathematics reform and changes in the vision of effective professional development, as shown in figure 1.

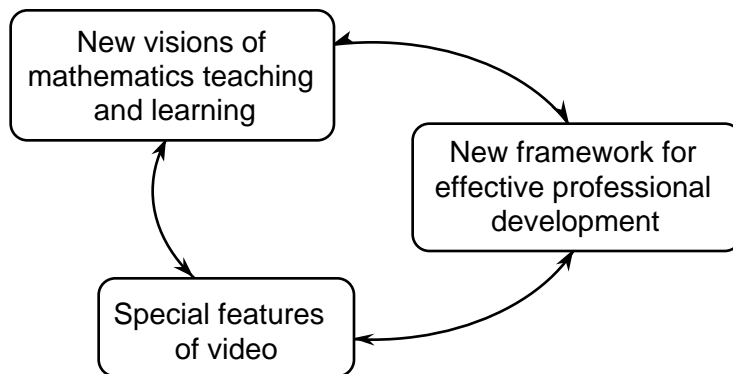


Figure 1.

The subsequent discussions can be summarized using the following six broad, overlapping categories:

- *General features of professional development*

Video’s uses in professional development must be seen as part of a larger professional development program. The task force used early drafts of the NCTM professional development handbook (Smith, 2001) to clarify its vision of the features of such a program. The guiding principle that informed the subsequent work of the group is that inquiry-based professional development arises from, and is an integral component of, teachers’ daily professional work. Such “transformative” professional development would be on-going, content-centered, and focus on the daily practice of teachers and the issues that arise from that practice.

Following Cohen & Ball (1999) we conceived of daily teaching practice as having three aspects: mathematics content, teachers, and learners (students). These aspects can be pictured as three vertices of a triangle. Professional development, analogously, also has three aspects: content (in this setting, daily teaching practice), learners (in this setting, classroom teachers), and teachers (in this setting, professional developers). This relationship is captured in figure 2.

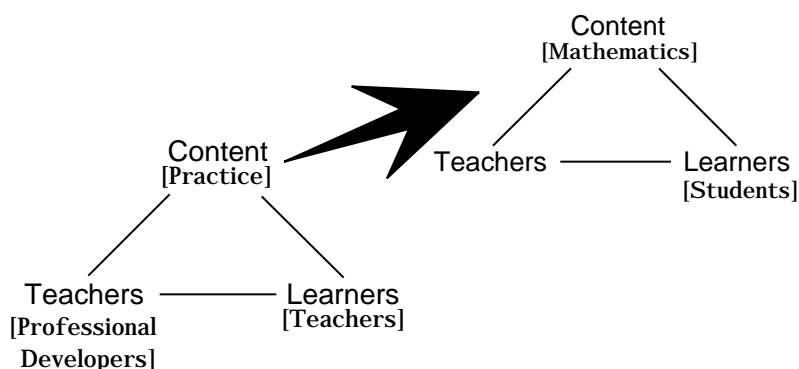


Figure 2.

- *What video affords*

The task force took the term “video” to mean any visual medium, including (but not limited to) VHS tapes, CD and DVD, and web-based images. In contrast to written accounts of teaching, video captures more of the complexity of classroom practice. It provides a common experience, albeit one with many potential foci for viewers, that—in contrast to live observations—can be reviewed repeatedly. Video provides an authentic, common learning experience for viewers. It allows for the creation of a common language for discourse about teaching. The viewer watches from a “safe” distance (especially valuable when observing one’s own teaching) that allows for an analytic stance in discussions with other viewers. (Careful facilitation is required for these features of video to be exploited fully in professional development experiences. See below). To summarize, videos provide shared access to the complexity of classrooms, as focus for discourse and reflection among a community of professionals.

- *The content of videos*

While we discussed video resources such as the “Life by the Numbers” series, instructional videos like Project MATHEMATICS!, and films such as “Stand and Deliver,” the task force decided that the videos we would focus on would be those that captured examples of *thoughtful, considered classroom teaching practice*. (We contrast this description of teaching with value-laden characterizations such as “exemplary” or “poor” practice.) Videos that capture thoughtful, considered practice:

- are generative; that is, viewers (i.e. teachers) generate issues for discussion, inquiry and analysis;

- spur inquiry into: mathematics; pedagogy; resources; perspectives, views and beliefs of the viewer and others;
- create disequilibrium (one of our favorite features of professional development)
- require facilitation, mediation, guidance, focus, and clear purpose to accomplish all of the above.

The task force noted that video of classroom practice might focus on students or the teacher. In either case, thinking is not as apparent as observable actions; student or teacher thinking will be inferred by the viewer.

- *Facilitation of video-centered professional development*

Because of the complexity captured by video, it is crucial that the viewer’s attention to particular aspects of the practice captured on the video be established prior to viewing. A facilitator’s decisions about where to focus viewers’ attention depend on: the learning goals of the professional development program; the specific goals of the activity of which viewing this video is a part; and the characteristics, capacities, and needs of the viewers.

The task force envisioned a “pedagogy of video-centered professional development” in which facilitators provide carefully-designed pre- and post-viewing activities that foster discourse among viewers. This discourse would be descriptive and analytical rather than judgmental, and would allow for “informed dissent” (Little, 1993). We thought of video excerpts as “cases” of practice, and we were influenced by the work of Barnett et al. (1994) and others who have done extensive work developing written cases and designing structures for facilitating their use in professional development.

Finally, we discussed the need for facilitators to consider details such as when to start and stop the tape and whether to provide written transcripts, as well as considering the larger question of how the specific viewing activity fits into the overall professional development program of which it is a part.

- *Roles of video in the larger professional development picture*

Professional teachers have the disposition to ask, and seek answers to, questions that arise from practice. Effective professional development supports this process, and video is one important tool in this effort. The task force pictured video as being at the center of at least three different types of inquiry: mathematical tasks, their conceptual underpinnings and uses in the classroom; teaching and learning situations and the issues they raise; and the thinking of students while learning mathematics (see figure 3).

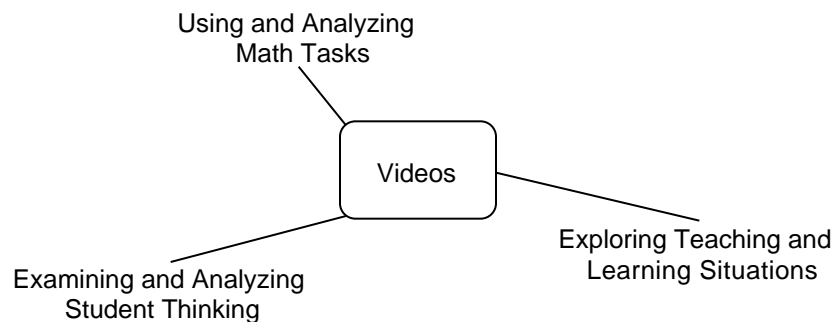


Figure 3.

By fostering the study of teaching, of learning teaching, and of learning to teach, video-centered professional development can create collaborative, reflective communities of professionals who engage in an extended conversation about their own practice and the practice of others.

- *Available video resources*

A first pass at a typology of video resources was built by the task force. The types of resources discussed included:

- Commercially-produced videos of teaching such as those produced by Annenberg;
- PBS Mathline, a collection of videos and a program for discussion and analysis by on-line communities;
- Developing Mathematical Ideas, a curriculum of written and video cases of elementary teaching, including, significantly, cases of professional developers using cases;
- Videocases for Mathematics Teacher Development, an NSF-funded project developing video cases and a curriculum for their use;
- The TIMSS Video Study, containing excerpts from 8th grade algebra and geometry classrooms from Japan, Germany, and U.S.A.;
- Project M.A.T.H., a complete video record of Deborah Ball's 2nd grade mathematics classes for a full academic year, along with transcripts, lesson plans, student work, and other classroom artifacts;
- STREAM, a project developed by COMAP to provide professional development support for adopters of NSF-funded secondary curriculum projects;
- Web sites like NCTM Illuminations and the Math Forum's Bridging Research and Practice (BRAP) project.

Many research projects have collected extensive video data, and the task force discussed the potential of these data, as well as the challenge of obtaining permission to use them.

We discussed the potential benefits of teachers videotaping their own practice, and we noted that this activity is part of the National Board for Professional Teaching Standards (NBPTS) certification process. We discussed the potential value of the tapes submitted by those who ultimately obtain Board certification, and explored the possibility of building a collection of these tapes. NBPTS provides guidelines for taping one's own practice, and a resource like this would be of value to all teachers.

References

- Barnett, C., Goldstein, D. & Jackson, B. (1994). *Fractions, Decimals, Ratios, & Percents: Hard to Teach and Hard to Learn?* Portsmouth, NH: Heinemann.
- Cohen, D. K. & Ball, D. L. (1999). *Instruction, Capacity, and Improvement*. (CPRE Research Report No. RR-043). Philadelphia, PA: Consortium for Policy Research in Education.
- Little, J. W. (1993). Teachers' Professional Development in a Climate of Educational Reform. *Educational Evaluation and Policy Analysis* 15 (2): 129 – 151.
- National Council of Teachers of Mathematics (1991). *Professional Standards for Teaching Mathematics*. Reston, VA: The Council.
- National Council of Teachers of Mathematics (2000). *Principles and Standards for School Mathematics*. Reston, VA: The Council.
- PDSAC (1998). "NCTM's Role in Strengthening the Practice of Professional Development, Growth and Interaction in Mathematics Education." A Concept Paper submitted to the NCTM Board of Directors, January 1998.
- Seago, N. & Mumme, J. (Draft, February 2000). "Videocases for Mathematics Teacher Development: What we are Learning."
- Smith, M. S. (2001). *Practice-Based Professional Development for Teachers of Mathematics*. Reston, VA: NCTM.