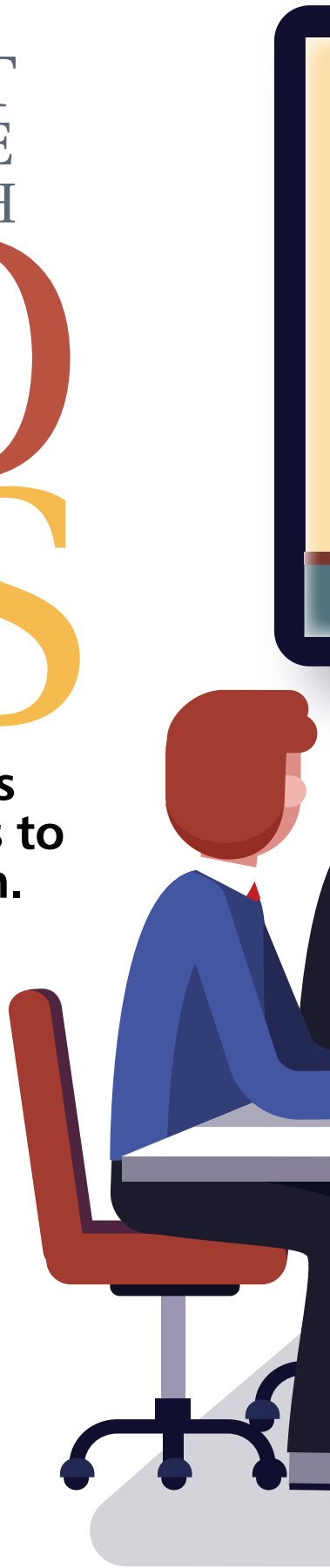
SUPPORTING EXCELLENT TEACHING OF COMMON CORE CONTENT AND PRACTICES WITH VIDEO CLUBS



Three colleagues share key experiences from their work with practicing teachers to show effective CCSSM implementation.

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Teachers face many challenges helping students meet the expectations set forth in the Common Core State Standards for Mathematics (CCSSM) (CCSSI 2010). CCSSM content standards not only introduce new concepts at each grade level but also require teachers to learn new terminology for old concepts and consider how students' understanding of concepts builds across grades. The Common Core's Standards for Mathematical Practice (SMP) pose an even greater challenge, as these "habits of mind," or processes for doing mathematics, will be assessed in many states for the first time. And, of course, CCSSM expectations demand such effective teaching practices as those outlined in *Principles to Actions: Ensuring Mathematical Success for All* (NCTM 2014).

We describe how using video clubs for professional development can help teachers effectively implement CCSSM. We begin with an overview of video clubs and why we believe they are useful. We then share key experiences from our own work conducting video clubs with practicing teachers. Finally, we provide recommendations for others who wish to start video clubs.

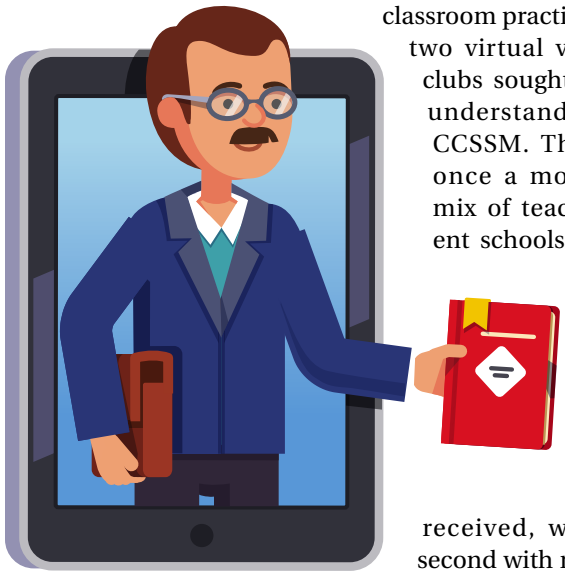
ICONICBESTIARY/THINKSTOCK

Overview of video clubs

Video clubs are a form of professional learning involving regular meetings to watch and discuss video clips from actual math classrooms (Sherin and van Es 2009). For several reasons, these clubs offer an ideal context for examining CCSSM. First, video clubs allow teachers to learn about CCSSM content and practices in context. Teachers need to understand how the Common Core's content and practice standards look, feel, and develop in real classrooms with real students. Second, video clubs have been shown to be linked to positive changes in instruction (Sherin and van Es 2009). As noted in *Principles to Actions* (NCTM 2014), effective instruction is the key to implementing any set of standards, including CCSSM. Through video clubs, participants explore such pedagogical issues as mathematical discourse, using multiple representations, productive struggle, and high-quality questioning—in the context of video clips clearly keyed to student learning goals. Finally, video clubs help teachers attend to evidence of students learning specific content and practices. Focusing on student learning, as opposed to content or pedagogy alone, is both a highly effective professional learning practice (Kennedy 1998; van Es 2010) and a skill that teachers must use routinely in their own instruction (NCTM 2014).

Video clubs in action

A small group of university-based professional developers partnered for two years with classroom practitioners to conduct two virtual video clubs. Both clubs sought to help teachers understand and implement CCSSM. The first club met once a month, involving a mix of teachers from different schools and grade levels; the second met every two weeks with a group of first-grade teachers from one school. Although both clubs were well received, we went into the second with much clearer goals and structures for discussion as well as a plan to record and transcribe all our sessions so that we could review, improve, and report on them. For these reasons, this article draws on our work with the second video club.



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This club met for eight sessions, each lasting about ninety minutes. In most sessions, we were able to view and discuss two video clips. The clips ranged from ninety seconds to just under seven minutes in length and mainly focused on first-grade concepts of addition facts (CCSSM 1.OA.6) and addition and subtraction within 100 (CCSSM 1.NBT.4 and 1.NBT.6). However, to extend our discussion about how students learn operations, we also used two third-grade clips on subtraction within 100. In line with research by Sherin, Linsenmeier, and van Es (2009), we selected clips that focused on students rather than teachers, showing them at work on problems or sharing strategies. For the first six sessions, we used free video clips from the Everyday Mathematics Virtual Learning Community (http://vlc.uchicago.edu) in our clubs. For the final two sessions, two participants volunteered video clips of their own teaching and ultimately valued that experience.

In facilitating discussion, our aim was to focus teacher attention on evidence of students' mathematical thinking, consistently moving participants away from discussions of teacher or student characteristics or other off-goal considerations and toward specific teaching practices known to support student understanding of mathematics content and practices (NCTM 2014). As facilitators, we structured conversations around videos to include three types of discussions: (1) open, (2) content-focused, and (3) practice-focused. Our purposeful questioning within each discussion type guided teachers to adopt different lenses on student thinking and teaching practice, attending sometimes to supporting student thinking about content, sometimes to student development of mathematical practices, and other times to general observations about student thinking and teaching. The following describes examples of each discussion type.

Open discussions

Open discussions generally occurred toward the beginning of video club sessions. After

showing a clip for the first time, we engaged participants in mathematical discourse by asking direct questions—"What do you notice?" "What questions do you have about this clip?"—and inviting them to voice observations (Sherin and van Es 2009). We then selected a few rich observations to probe and extend (van Es 2010), keeping attention on students rather than teachers. However, we sometimes started with teacher-focused observations and *turned* the discussion to how students learned from or reacted to the teacher moves.

Below is an example of an open discussion. The first participant observes that a student is off-task. The facilitator quickly turns the conversation to the mathematics, asking what this student contributed to the mathematical discussion. When a participant notes the teacher's failure to respond to the student, the facilitator again turns the discussion to evidence of the student's understanding of the mathematical content. This opening discussion led into a rich content-focused discussion of students counting by tens (CCSSM 1.NBT.1 and 1.NBT.5).

The group had just watched a clip of first-grade students using number grids to determine the addition "rule" applied to the numbers 4, 12, and 20 to get the numbers 14, 22, and 30. Students shared strategies for determining that the rule is that ten is being added to each number. The facilitators asked participants to share what they had noticed.

Participant: For those that weren't following along, like the little boy waving his paper, maybe having a larger size number grid to use and some ways to model with that would help keep them on task.

Facilitator: OK. The little boy who shared his answer with the class—what did you notice about him? What did you notice about what he said? What did you notice about what he was doing?

Participant: I'm not sure what he was doing [*pausing*], but he said something about starting at four, counted by ones, and got nine. Is there fours and ones on her rule? I didn't see anything about fours there. I don't know why he started at four and why he stopped at nine.

Facilitator: What was the reaction? Or what was the response after he gave that answer?

Participant: She just moved on to the next person.

Facilitator: Let's talk about him. From what we see here, what do we think he knows?

Participant: He knows he's got to start at four. So, he knows that "in" number.

Participant: And he knows that he needs to count forward, that they're adding. But he doesn't know that shortcut.

Content-focused discussions

After participants freely shared impressions of a video clip, we turned to CCSSM content by asking participants to identify the mathematical content addressed in the clip. We then discussed what the students in the video appear to know and not know about this content, pushing participants to cite specific evidence of student knowledge. We continued by asking what prerequisite knowledge students need to engage with the content and ended by asking what a teacher could do to push students to further their understanding. Along the way, we sometimes discussed common misconceptions, connections between content in different CCSSM standards, and useful tools and routines for teaching content. These conversations allowed us to highlight effective teaching strategies that support student understanding of the Common Core's content standards (NCTM 2014).

Below is an example of a content-focused discussion. It begins with what a student knows about solving number stories (CCSSM 1.OA.1). A participant shifts the conversation to what the student knows about addition facts (CCSSM 1.OA.6), discussing her implicit use of commutative property "turnaround facts." After further discussion about the student's knowledge of number stories, participants are asked to consider other questions they might pose to further probe the student's mathematical knowledge and improve her ability to explain it. These questions prompt another rich discussion about a student's

Sample discussion questions to support using video clubs to teach CCSSM content and practices

1. Questions for open discussions

- What did you notice?
- What are some questions you have about the clip?
- You said____. Can you tell us more about that? What evidence can you state that shows that?

2. Questions for content-focused discussions

- What content does this student know? What content does this student not know? What is your evidence?
- What common misconceptions do we often see with this content?
- What kinds of things do you think students need to know beforehand to be able to think about the content this way?
- What might you ask the student in the video to move her thinking forward?

3. Questions for practice-focused discussions

- What evidence do you see of children being engaged in the mathematical practices? Which practices?
- What questions is the teacher asking to get at mathematical practices?
- How are students making sense of the problem (SMP 1)?
- How good are students at verbalizing their strategies (SMP 3)?
- What kind of tasks could you give the students in this video to engage them more with tool use (SMP 5)?

strategy and content knowledge, focusing participants on student thinking.

The group discusses a video clip of a student sharing her strategy for solving an addition and subtraction number story in which a teacher has eighteen pencils and wants to give one pencil each to seven girls and eight boys. The student must determine whether the teacher has enough pencils.

Facilitator: What mathematics did [the student] understand and use to solve this problem?

Participant: Multisteps. She made it easy for herself by adding the seven to the eight first.

Facilitator: What do you mean, "She made it easy"?

Participant: I just think that's a little more advanced thinking, to add the seven to the eight instead of drawing the pencils and crossing off seven and crossing off eight.

Facilitator: Right. What other mathematics did she use or understand?

Participant: Well, I think she knows turnaround facts, because I think she says seven plus eight and then at some other point says eight plus seven. She didn't really say why we needed to know that, but she knew that seven plus eight and eight plus seven were the same.

Facilitator: Good call. What else did she know about? You mention these multistep problems—so what was the last step that she took, and did she have to take that step?

Participant: Subtracted.

Participant: Yeah, she subtracted to see how many were left, which we didn't need to know. We just needed to know he had enough.

Participant: So, it's like she knew when to add and when to subtract to get the answer. And she knew how to pick the numbers from the story problem too. She didn't try sticking the ones in someplace.

Facilitator: What else might you want to ask the little girl?

Participant: I'd ask her how she knew if there was enough or not. She knew how many she needed and how many were left, but did he have enough? She never really answered that one.

Participant: Or "How did you know to add the seven to the eight first?" Or "Why did you add the seven to the eight first?"

Practice-focused discussions

Moving beyond content to mathematical practices, we began by discussing which practices appear in the clip (walking participants through the eight practice standards as needed) and asking for specific evidence of students engaging in the practices. We then discussed how a teacher could push students' knowledge and demonstration of the practices, including asking purposeful questions or proposing tasks to engage them in the practices.

In the practice-focused discussion below, facilitators begin by prompting teachers to identify specific practices on display, turning then to making sense of the practices themselves—what they mean and whether student behaviors fit the definition of each one. The video thus becomes a tool, helping participants

understand both what the practices are and how to recognize them in student behaviors.

The group discusses a video clip in which students recite and share what they notice about plus-zero and plus-one addition facts. Participants are asked to identify Common Core Standards for Mathematical Practice (SMP) that appear in the clip.

Facilitator: So, what evidence did you collect of students engaged in the SMP?

Participant: Well, after they had finished repeating the plus-zero facts, the teacher said, "What do we know about those?" A student was using SMP 1, I think, to explain the meaning of the problem—make sense of the problem she was asking—and restate it in his own words when he said, "plus-zeros" or "zero-plusses." Which also is SMP 6, communicate their understanding of mathematics to others.

Facilitator: What else?

Participant: Where the teacher was asking them to do zero plus fifty, she then asked, "How about zero plus ninety? How about zero plus one thousand?" I thought that was maybe SMP 7, looking for patterns, and then maybe looking for shortcuts, SMP 8.

Facilitator: Why did you think that?

Participant: Because when they know the plus-zeros, they can generalize that any number plus zero is still that same number; it's kind of a shortcut, or a generalization, of the zero-plus fact or rule.

Participant: And when they do a turnaround fact, isn't that a shortcut too? Because they don't have to solve the other problems; they already know the one, and they really know two. Oh, I was getting off on the wrong thing. That's family of facts. They know the twos facts if they know the turnarounds.

Facilitator: You've mentioned the question, "Well, if you know zero plus ten, and zero plus fifty, and then zero plus ninety, and zero plus one thousand"—what SMP was that question getting at?

Participant: Wouldn't it be SMP 7, looking for patterns?

Facilitator: That's a really good point. Had they established the pattern?

Participant: I think so, if they're able to carry it further than zero plus nine, because the facts chart they have only goes up to zero plus nine.

Facilitator: Right. So, they definitely were using structures, such as categories, patterns, and properties.

In practice, we found our sessions moving organically among open, content-focused, and practice-focused discussion. Our main commitment was to have teachers examine evidence of student thinking and propose concrete strategies about how to push that thinking forward, helping students develop their own facility with the content and practices (NCTM 2014).

Recommendations for video clubs

Our video clubs successfully focused teachers' attention on CCSSM implementation, student thinking, and effective teaching practices. Teachers expressed how much more they noticed about what was going on in the classroom after watching the videos. When teachers

shared videos from their own classrooms, they were surprised at what they had missed. As one wrote on the exit survey,

> It was very beneficial to discuss what the children know how to do and how we, as teachers, should push each child a bit further . . . . After filming and analyzing a lesson of my own, I have changed how I teach. I stop and take time to think about what students know already and how to push up to the next level of understanding.

On the basis of this success, we encourage professional developers, instructional coaches, and teams of teachers to use video clubs to explore CCSSM (or other state standards) implementation. We end with several recommendations for conducting your own video clubs:

- Recruit a group of fewer than ten teachers to hold video clubs on a regular, sustained basis. If possible, integrate sessions into existing meetings of grade-level teams or professional learning communities at your school.
- Have one or two people in your club take leadership over selecting clips to use and facilitating discussion of those clips.
- Gather clips from participating teachers' classrooms, or use free online video clips, as we did. Make sure the clips focus on students, rather than teachers, and on specific Common Core content standards relevant to the teachers in the video club.
- Discuss each clip for about 40 minutes. Prioritize a rich discussion of one clip over trying to watch multiple clips.
- Alternate among open discussions, content-focused discussions, and practice-focused discussions. Emphasize evidence of student understanding of Common Core content and practice standards as well as teaching practices that support that understanding. We have included some sample questions (see the **sidebar** on **p. 434**) adapted from our own work that you can use for each type of discussion.

In general, we encourage teachers to embrace video clubs as a chance to focus on important mathematical ideas and student understandings without the pressure of responding to students in the moment. Exploring student thinking in the safe space of the club, teachers will become more adept at responding to students in practice.

Let's chat about "Video Clubs"

On the second Wednesday of each month, *TCM* hosts a lively discussion with authors and *TCM* readers about a topic important in our field. You are invited to participate in the fun.

This month, we will discuss "Supporting Excellent Teaching of Common Core Content and Practices with Video Clubs," by Meg S. Bates, Cheryl G. Moran, and Lena Phalen, on **Wednesday, March 8**, 2017, at **9:00 p.m. EDT**. Follow along using #TCMchat.

Unable to participate in the live chat? Follow us onTwitter@TCM_at_NCTM and watch for a link to the recap.

Common Core Connections

1.OA.6 **SMP 7**
1.NBT.4 **SMP8**
1.NBT.6

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