A Tale of Two Teachers

CASE STUDY
THE SHIFT IN TEACHING AT DEMONSTRATION SCHOOLS FOR RIGOR

Written by Gail Shepherd
Picture this teacher. As an educator, you’ve probably seen her before. She’s one of the good ones.

Mrs. Roman is a 17-year veteran of the public school system. She started teaching kindergarten, and since then, she’s bounced around the elementary grades, going where she’s needed. And Mrs. Roman is needed a lot. Her principal tends to move her from year to year, from third to fourth grade or from fourth to fifth, so she can mentor and model for new and struggling teachers or so she can help pull together a grade-level team. When end-of-year tests roll around, neither Mrs. Roman nor her principal are very worried about how her students will do. They score high every year. Mrs. Roman is one of the reasons her school is among the top-rated schools in her district.

A Fourth-Grade Math Lesson

Mrs. Roman’s principal sends new teachers to sit in on her classes to observe the way she plans and executes her lessons. She has an organized mind; she thinks of herself as a born strategist. Her lesson plans are thoughtfully structured. Her class is, for the most part, free of behavior issues. If you happened to be a new teacher visiting Mrs. Roman’s room last year, this is what you might have seen.

It’s obvious Mrs. Roman’s planning for this lesson started before she set foot in the door this morning. But the planning is not particularly burdensome. Her district provides a standards-aligned math textbook, and her teacher edition features full instructional support, plus lots of resources for planning and teaching. There are also podcasts she can access for professional development in each lesson, if she needs it. The book suggests ways to introduce each lesson; gives examples of sample questions she can ask to help students process their learning; and suggests practice and engagement activities, along with possible projects related to real-world activities and their scoring rubrics. Mrs. Roman uses the book’s planning tools for differentiating instruction and teaching for depth. She follows the book to a T.

If you ask Mrs. Roman, she’ll tell you that the math book drives her instruction. She assumes the lessons are aligned to her state standards—after all, the book has been vetted by the district’s curriculum department and the applicable standards are printed at the beginning of every lesson. She’s comfortable with the structure the
book delivers. It highlights a learning target and an essential question to keep everybody focused. Today, she is teaching her students how to convert fractions into decimals and vice versa. Today’s essential question is: “How can you record 10s as a fraction or a decimal?” The first thing she’ll do before class starts today is post the day’s essential question on the board.

As a new teacher sitting at the back of her classroom madly taking notes, you’ll likely notice she has arranged student desks in pods of four, strategically grouping the kids to moderate any potential behavior problems. The students settle in and open their textbooks. They know the way this lesson will run; it’s routine. Pretty much every math lesson follows the same structure. Today, they begin with a problem written on the MOBI screen. The kids go to work to solve it. You could hear a pin drop.

When they’re finished, the teaching begins. Mrs. Roman models how to do a problem converting fractions to decimals. She’s animated and lively, speaking clearly and slowly enough to make sure the kids can follow her thinking as she shades in the place values. The kids sit quietly, tracking her with their eyes.

“For seven-tenths, why is there a zero in this place chart?” she asks. About half the students raise their hands. “If your hand is not in the air,” she reminds them, “then you should be looking for an answer. Don’t sit and wait for a classmate to answer your question.” She waits to give the kids a chance to think, then calls on a lower-performing student—she’s strategically hoping to give this student a chance to experience success. “Because it’s holding the ones place,” the student says.

“Good!”

The kids copy the answer into their books. Then they go to work on their own, following the same procedure she has just demonstrated. While they work, she walks around to see how they’re doing. Mrs. Roman is in motion; the kids are engaged. She’s enthusiastic about what she’s teaching, and she treats her students with compassion and fairness. They obviously adore her. The lesson is well-paced and moves along at a good clip. All eyes, from the children’s to yours, are on Mrs. Roman.

Just about anyone watching Mrs. Roman teaching this lesson would agree she’s doing a good job. Mrs. Roman would agree, too. She knows she’s not perfect, but she’s been at this long enough that she’s achieved a good deal of expertise. Both her evaluations and her students’ performance attest to that. She’s proud of what she’s accomplished.
A Fourth-Grade Math Lesson: Take Two

Now, let’s travel to another classroom. This time we’re going to observe a teacher we’ll call Lisa. Lisa is teaching essentially the same content—the students are learning to convert decimals to fractions and vice versa. Again, you’re a new teacher observing in the back of the room. This is what you see.

As in Mrs. Roman’s class, the students are seated at their desks in groups of four. “Okay,” Lisa says. “Let’s look at our math scale.” She points to a four-point scale posted on the wall. “Yesterday our learning target was relating fractions, decimals, and money. I want you to read your reflections about yesterday’s lesson.” The kids open their notebooks and read their reflections.

“Now today,” Lisa says, “we are not moving up on the scale. Today we are going deeper into the same learning target. We’re going to do an activity based on what you have learned. Before we get started, I’d like to know if you really understand what a decimal is and what it represents. And I’d like for you to discuss in your groups everything you know about decimals.”

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His table partner adds: “Can I say something? It’s also the same as a fraction because of its place value that’s in it. You have your ones and your tens and your hundreds, like if you want 50 one-hundredths.”

Another student elaborates: “Also a fraction and a decimal are worth the same.”

“How do you know?” yet another student chimes in.

Sitting in the back of the room trying to take notes, you can hardly keep up with the conversations.

“Okay, 1-2-3, back to me,” Lisa calls. The kids quiet down and give her their attention. “I’d like Table 4 to share your thoughts about what a decimal is and what it represents.”
“A decimal is similar to a fraction,” says one student. “If you say, like five-tenths, or 50 hundredths, it looks different but it’s just the same thing as .50. It’s also because it shows the place value.”

Does everybody agree or disagree with her explanation?” Lisa asks.

Most of the students hold up cards with clothes pins marking “Agree.”

“Okay, we’re going to bump it up,” Lisa says. “Please write this”—she writes .6— “as a fraction on your whiteboards.”

The students let out a collective sound of excitement: “Ooooooooh!” They dive into the work.

“Okay what’d you get?” Lisa asks after a minute.

“6/10 is the fraction. 6 over 10,” says one student.

“60/100 is 6/10 using equivalent fractions,” adds another.

“Okay, erase your boards. Let’s take this same 6/10 and change it to money, adding one more element.”

Making connections with “Ooooooooh!,” the kids write, then hold up their whiteboards.

Lisa scans the boards. “Okay, here’s what I need from you right now,” she says, “because I see a bit of controversy. I want you to discuss in your groups what your answer is and how you came to that answer.”

The room explodes into animated conversation. Trying to take notes, once again you can’t keep up.

“I got 60 cents because I know you have to add a zero for the money,” a student in one group says. “So it looks like 0.6 cents but you want to make it the way you would actually see it in stores.”

Her table partner adds: “So you need to put a dollar sign or a cents sign.”

Another student probes the answer: “But where do you put it?”

Lisa calls for their attention: “I would like someone from Table 1 to share. What did you find? I saw that some of you revised your thinking and changed “I got 60 cents because I know you have to add a zero for the money,” a student in one group says. “So it looks like 0.6 cents but you want to make it the way you would actually see it in stores.”

Her table partner adds: “So you need to put a dollar sign or a cents sign.”

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Lisa calls for their attention: “I would like someone from Table 1 to share. What did you find? I saw that some of you revised your thinking and changed your answer.”

At Table 1, a student pipes up: “I got 0.6 dollars, or zero dollars and six cents. But I forgot that yesterday we learned that the first place after the decimal is tenths, so that’s not six cents, but 60 cents.”

“Oh, good point,” Lisa says. “I see that a lot of you revised your thinking. At first, you had 0.6 as money form. But can someone tell me, and I want you to think about it for a minute. Why does money have two places after the decimal?”
The discussion continues to deepen. The students are struggling with place values in money. Lisa lets them struggle. When a student makes a mistake, she asks her to articulate her thinking. She asks other students to agree or disagree, and why.

One last practice problem follows:

“Let’s try one more.” Lisa writes .25 on the board. “I want a fraction, on your white boards.” She circulates the room. “White boards up, please.”

Some students have written 4/100.

“Hmm. You knew it was out of a hundred, I see that. But I see something very interesting over here. Very interesting,”

“Oh, yeah!” the students exclaim.

“Marco, can you explain how you got one-fourth please?”

“I got one-fourth because I know that 25 cents is called a quarter, so I thought in my head it takes four quarters to make a dollar. So that’s why I got one-fourth,” Marco says.

“Nice job. I love that. Extended thinking. Thinking outside the box. Okay, question.” She places a base-ten rod and a dime on the overhead. “I want to know, and you’re going to discuss it in your groups, how is this rod related to this dime?”

And so it goes. The kids talk, they revise each other’s thinking. They agree or disagree. They come to consensus: “So we all agree?” you hear one kid asking his partners. Lisa walks around, listening attentively. At times, you see her lean forward, as if she wants to jump in and correct one of the children. You watch her visibly pull herself back, as if she’s training herself to let them go for it on their own.

But for the most part, your attention is riveted on the students. They are clearly the stars of this show.

What you are seeing, you realize, is marvelous. And you’re only 16 minutes into the lesson. The heart of today’s math class hasn’t even begun yet.

Marco, the boy who just answered the question about quarters, is autistic. But unless you knew Marco, you’d never be able to tell. He's completely engaged, completely on task, and he's acing even the most difficult questions Lisa is throwing at him.
“So today,” Lisa says, “you are going to apply everything we just talked about today and yesterday, and everything we talked about on our scale up to today. Today we are going to do a shopping activity.”

Cries of excitement. “OOOOh!” “Yay!”

“Our tables are going to turn into stores. You will be shopping. Take notice of what it costs to buy each item. There’s something funny going on here. The prices are not in money form. You have to convert the fraction to see how much it costs. Here are some cool accessories and yummy treats for you to sell. (“Ooooh! Aaaah!”) And of course some school tools.” (“Yay!”)

“Each item is written as a fraction. You have to change the fraction into money form. You need three things to change your fraction into money form. Please discuss in your groups. I want to make sure you know.”

Here’s what you overhear: “You need a dollar sign. Then you need the decimal, and then you need your hundredths.”

“I agree.”

“Okay,” Lisa says, “I’m pretty sure you know that. Here’s another obstacle. You don’t have all the money in the world. You have five dollars. No more and no less. That’s a problem, because if you go over that amount, you’ll have to trade things in. So there will be some problem-solving going on. Five dollars is all you have. You work together, but I will be monitoring to see that each and every one of you knows how to turn a fraction into money form.”

As Lisa passes out the materials, you notice that each group has a leader and a recorder. The room is buzzing with enthusiastic chatter. “I’m going to add one more obstacle,” Lisa says. “You must buy one thing from every store.”

Lisa circulates, answering questions while the kids work on converting their fractions to money. Then they have to assess the cost of each item in each store, both big-ticket items and smaller sundries, and effectively predict how to allocate their five dollars.

The students are using a number of higher-order thinking skills. They will predict their expenditures and then test the prediction. In other words, they’re generating hypotheses about the power of their money. Lisa decides to make this explicit. She signals for the students’ attention.

“As I’m walking around,” Lisa tells the class, “I am reminded of the process we are using, which is like the scientific method. I’m reminded that we are predicting how many items we can buy. And after we make that prediction, how do we test that? To see if we are right?”

The lesson is completely interactive, the kids are learning from each other, they’re acting out a real-world scenario. There is no textbook or worksheet in sight.
One child says: “Whatever we took out, we would minus it from our goal.”

“Holy moly,” Lisa says, “this is why I love sharing our ideas. I was thinking about addition, but here you are using subtraction—you’re taking away what you plan to buy from the five dollars.”

One group has already finished. Lisa encourages them to celebrate. “Go ring the bell! This group has converted their fractions and tested their hypothesis!” A kid in a red shirt runs over and clangs the bell, adding a little happy-dance shimmy.

A lot of teachers would be really uncomfortable with the level of activity in this room, you think to yourself. But Lisa looks relaxed and alert. She’ll step in when the kids are losing focus. But even when some conversations get intense, verging on real conflict over what to buy at which store, she monitors but trusts the kids to work it out. After all, they’re in conflict about math questions. You also notice she circulates the classroom with an iPad, where she records evidence of learning for every student individually.

At 35 minutes into the lesson, you’re pretty much floored by the level of conversation you’re hearing as kids thrash out solutions to their problem. The lesson is completely interactive, the kids are learning from each other, they’re acting out a real-world scenario. There is no textbook or worksheet in sight.

You recall that this is an inclusion class, but you can’t tell which kids are special needs students—they all seem to be working at similar levels. At 56 minutes—16 minutes of modeling and instruction and 40 minutes of group project work, all the groups have finished. Lisa asks them to take a moment with their table partners to reflect on any challenges they encountered. How did they solve their challenges?

You recall the dull worksheets, problem after problem, that you had to complete in your own math classes, growing up. How lucky these kids are, you think. How did Lisa figure out how to do a lesson like this? Years of practice, you guess. Years of trial and error.

As Lisa passes you, she pauses to chat. “I’m so nervous,” she says. “This is the first time I’ve ever tried this lesson.” That’s when your jaw really hits the floor.
A New Vision Of Teaching And Learning

What separates Mrs. Roman from Lisa might surprise you. They’re separated by only one factor: a single year. Mrs. Roman and Lisa are the same teacher. Lisa Roman teaches fourth grade at Acreage Pines Elementary School in Palm Beach County, Florida.

The first classroom scenario described the way Lisa taught fractions and decimals in the 2013-2014 school year. The second was how she taught the same lesson a year later.

Acreage Pines became a Learning Sciences International Demonstration School for Rigor in the 2014-2015 school year. The goal was to help Lisa Roman and her fellow teachers and principal learn how to make exactly this transition. When Lisa reflects on the process of change she went through—the professional development, the coaching, the observations, the collaboration with peers in their refined professional learning communities (PLCs)—she ruefully recalls, “I thought I was a good teacher. One of the hardest things I had to do was admit to myself that I still had a lot of professional growing to do.”

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Above Lisa Roman teaching in her student-centered classroom.
Discussing the shift that Lisa and other teachers made at Acreage Pines, Amy Dujon, Lisa’s principal, says, “This year as a Demonstration School for Rigor is totally different. What we did, we did together as a staff. The progress we’ve made is because of the teachers’ hunger, their deliberate practice, and their collective ability to work hard. When you walk through classrooms now, you would be hard-pressed to see a textbook or a ditto. I jokingly called that rigor-mortis—death by ditto. Early on as a Demonstration School, we all cried—it was never easy. But we got down and dirty. The powerful conversation on my campus now is, ‘How am I teaching? What strategies do we use to make this relevant to our students and to get them to the level of understanding and autonomy they need to be at?’ That is powerful, like, stand up the hair on your arms powerful stuff, when you see that click.”

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For a full report on Acreage Pines Elementary School’s Journey to Rigor, call us at 877.411.7114 or visit us online at LearningSciences.com