Chapter 1

Cases about Using New Assessment Approaches

The Power of the Blank Page

It was March, time for spring cleaning in my classroom. I left a tall stack of booklets on the edge of the counter near the classroom library. The booklets were stapled copier paper, completely blank except for one single number written at the top of each page. I originally intended to use them as counting booklets, thought better of the idea, and stashed them away just in case I thought of another use.

Three of my first graders discovered the booklets and asked if they could have them for the class. "What will you do with them?" I asked.
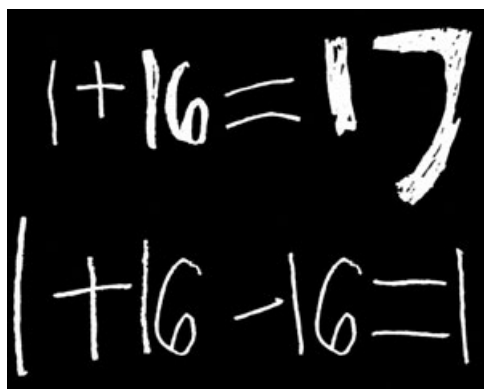
They responded excitedly, "We could do plus and subtract."

"We could draw pictures that makes the right number."

"I would do hard math, and when I was finished with it, I would give it to the people that have hard problems that they don't know."

I asked what they would say to the class about the number 1 written at the top of the first page. Chris enthusiastically offered, "I was thinking the math problems. Like 1 + 16 = 17. Then minus the 16 would make it go to 1. (See **fig. 1.1**.) I think we should write on it the things that make 1. On the 3 page, I'd make some 3s here like 6 – 3 = 3."

FIG. 1.1

Flipping back to page 1, he continued, "OK, want me to show that to you on the paper?" He wrote 6 – 5 = 1. He told me, "I've been thinking it all the time. I just started from 3 – 2, 4 – 3, 5 – 4, 6 – 5. I just did it all the way."

Joan suggested, "When you take away, you do something—like if I write something, like a number, it has to equal 1. And tell the kids that. They should do it because it'll learn them how to plus and subtract."

The children presented their ideas to the class, and these are some of the results.

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Joan

Joan had taken her number booklet, attached it to a clipboard, and positioned herself comfortably on the pillows in the class library area. She worked very quietly during the morning, sitting next to her friends but choosing to work independently.

She brought her booklet to me and announced, "This is a really hard one— look at all the zeros," as she pointed to the equation $0 + 0 + 0 + 0 + 2 - 1 = 1$. "I know how to make it really long." A closer look at her work showed her understanding that 1 can be obtained by subtracting one less than any given quantity. (See **fig. 1.2**.)

FIG. 1.2

Joan cleverly incorporated multiplication, addition, and subtraction in her equations. She knew $9 \times 9 = 81$ and then knew how to subtract the number that is one less (80) in order to equal 1.

"Can you tell me about this part?" I asked, pointing to 9×9. (See **fig. 1.3**.)

"I just know 9×9 is 81.... My brother told me. Times is kind of hard, but it's easy for me … like 2×3, you just know it."

I asked Joan if she could draw me a picture of 2×3. Her response was, "You just know it … you just have 3 blocks and 3 blocks … it doesn't matter how big they are." She then showed me how to use the calculator to figure out multiplication facts that she hadn't memorized. "It's easy to make 1. Just 8×7 [using the calculator] is 56, take away 55 to make 1...." And she ended our discussion by telling me about several other possibilities.

FIG. 1.3

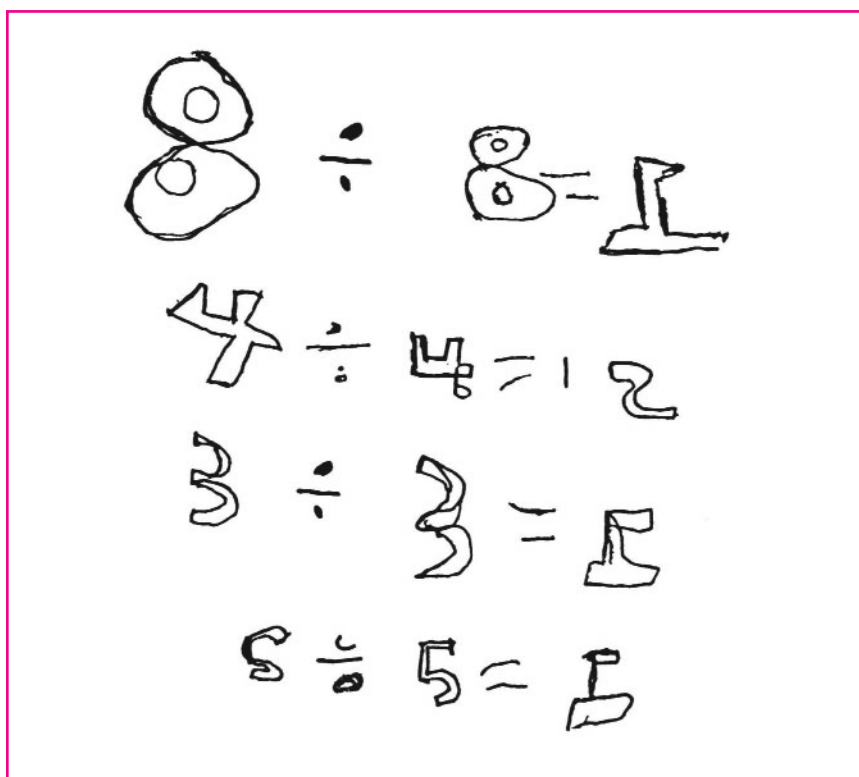# The Power of the Blank Page

Frank

Frank quickly gathered his number booklet, a fistful of colored pencils, and a calculator. As he dashed past me to a table, he said, "Of course, I'm going to do the hard math," referring to division. Frank was a very confident student who often struggled with his mathematics but always persevered.

Earlier in the week, he had asked his fifth-grade buddy to teach him how to do that hard mathematics, making a sketch that looked like long division. His buddy showed him how to use a calculator to solve simple division problems. (See **fig. 1.4**.) Frank's paper was covered with "calculator number" equations, showing that he knew the technique that any number divided by itself equaled 1. However, neither his work nor his discussions demonstrated real understanding of the larger concept of division.

FIG. 1.4
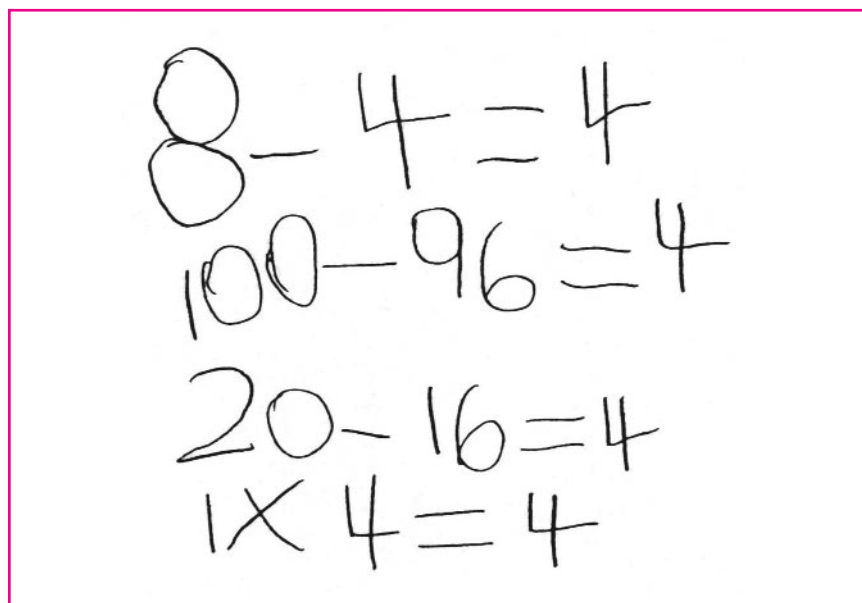
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Frank

When I asked Frank to think of other ways to make 1, he could not respond immediately and instead went back to the table to work. Several minutes later he returned with 8 – 8 = 1 written on his paper in "plain numbers." During our discussion, it was clear that he was confused that the pattern he had discovered worked for division but not for subtraction. He worked quite a while longer to generate two correct subtraction problems. (See **fig. 1.5**.)

Alisha

Giant crocodile tears dripped down her cheeks as Alisha asked, "Do I have to use numbers? I just like letters." Alisha was a very verbal student, writing book after book filled with invented spelling and large expressive pictures. She felt very competent expressing herself verbally and was equally as uncomfortable in the world of numbers.

Alisha reluctantly picked up her number booklet, searched out just the right crayons and marking pens, and sat very close to her best friend. Together they generated a variety of equations to equal 4. (See **fig. 1.6**.)

FIG. 1.5

FIG. 1.6

FIG. 1.7
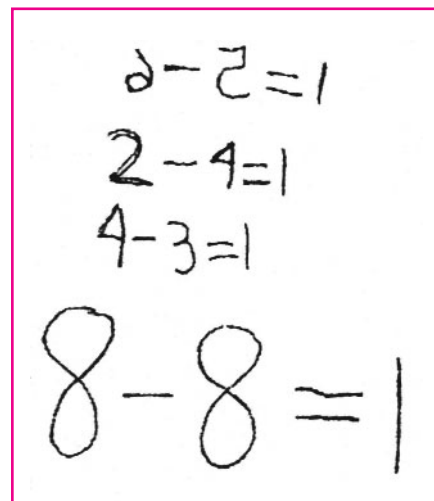
When I asked Alisha to explain her work, she replied, "I don't like this." Alisha helped her friend record the work, but she did not create it or seem to understand it.

"Can't I just write something?" she lamented. I asked her what she would like to write, and she wrote her friend's name, "Francesca."

"How can we use this to show 4?" I asked. She took her paper and wrote one number under each letter. (See **fig. 1.7**.)
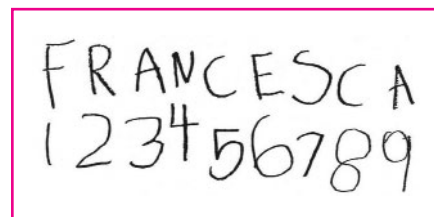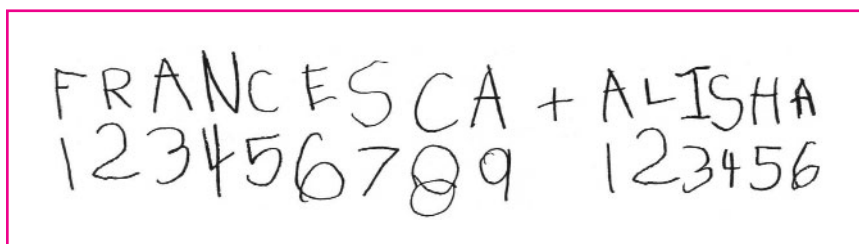
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Alisha

"But that's not 4," she sighed.

"What else could you do?" I asked. She added "+ Alisha." When I asked if that made 4, she wrote the numbers under her own name. (See **fig. 1.8**.)

FIG. 1.8

FRANCESCA + ALISHA
123456789 123456

Again I asked gently, "Does that make 4?" At this point, she realized that she had too many letters and needed to take some away. She pointed to F and wrote "–F," pointed to R and wrote "–R." She pointed and wrote letters until all of them were used from "Francesca."

"Does that make 4?" She counted all the letters written so far on the page and decided there were still too many. She pointed to the last A in her name, wrote "–A," and then counted all the letters again. She pointed to the H in her name, wrote "H," and then counted all the letters again. She was satisfied that she had 4. (See **fig. 1.9**.)

FIG. 1.9

FRANCESCA + ALISHA
123456789 123456
– FRANCESCA– AH=4