

## Chapter 5

# Preparing Teachers to Formatively Assess: Connecting the Initial Capabilities of Preservice Teachers With Visions of Teaching Practice

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### ABSTRACT

*To engage in formative assessment, preservice teachers (PSTs) need to develop skill with the practice of interpretation. The initial preparation of teachers would benefit from having a sense of the interpretation skills brought by PSTs to teacher preparation. We articulate the nature of interpreting as a teaching practice including: articulating inferences, sampling evidence, developing and applying guiding criteria, and monitoring and redressing bias and distortion. We use a teaching simulation to identify the assets of PSTs' initial interpretive skills and areas in which PSTs might need to reconsider and change. An investigation with a group of PSTs from one teacher education program suggests that many PSTs bring skills with making evidence-based interpretations about a student's process for solving a mathematics problem. However, their skills are much more limited for making interpretations about a student's understanding and have potential for bias and distortion. Implications for teacher education are discussed.*

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## INTRODUCTION

The students in Ms. Z's second grade classroom are exploring collections of pattern blocks. Their task is to find different ways of describing the collections. This activity is structured so that Ms. Z can learn about the ways in which her students are using ideas from their current unit of study (geometry), including their knowledge of shapes and use of shape attributes in their communication. As she circulates, she notices that the children are recording the number of each type of shape in each of the collections and the shapes that are the most and least represented in each collection. In addition, Ms. Z is using this activity to gather information before the next unit of study (addition and subtraction). She is interested in how students use numbers and operations to describe the collections. Prior to the activity, she anticipated that students would likely calculate comparisons between the amounts of each type of shape, as well as the total the number of shapes in each collection. Ms. Z purposefully put amounts of shapes in the collections that will present different mathematical situations. As she walks around, she notices that Xavier has recorded the work shown in Figure 1.

Ms. Z asks Xavier to share how he found the total number of shapes in both collections. He runs his finger across 15, 24, and 30 for Collection A and says, "I added these up." He runs his finger across 29, 36, and 18 for collection B. Ms. Z then asks Xavier to share how many shapes are in each collection. He says that there are 69 shapes in Collection A. Prior to reporting the number of shapes in Collection B, he pauses and says, "There are 83." Ms. Z notes that 83, the correct sum, is not written on his paper. She is curious about how he came up with 83 given that 623 appears to be recorded as the answer. She asks, "How did you get 83?" Xavier responds, "There are 60 shapes when I think about tens and 23 shapes when I think of ones." He finishes by saying, "sixty plus twenty-three is eighty-three." She jots some notes on a chart on her clipboard that includes aspects of the work that she wanted to document. Later, as she records ideas about the focus of her next unit, she considers what Xavier had written and her notes on what he mentioned in response to her questions.

Ms. Z is engaged in formative assessment. She purposefully designed a task for her students that was likely to provide her with information that she could use to understand how her students, including Xavier, are thinking about particular mathematical topics. She has an explicit aim of using what she learns to formulate subsequent learning opportunities for Xavier and other students in the class. It is this aim that indicates that she is engaging in formative assessment (Popham, 2009). This sort of assessment is vitally important to Ms. Z's job and professional commitments. Professional organizations have identified formative assessment as an integral component of effective teaching (AMTE, 2017; NCTM, 2014). Further, seminal studies indicate that there are few other instructional interventions that have as strong a potential to impact student learning as formative assessment (Black & Wiliam, 1998).

*Figure 1. Xavier's written work*

Collection A	Collection B
$  \begin{array}{r}  15 \text{ red traps} \\  24 \text{ green triangles} \\  + 30 \text{ blue diamonds} \\  \hline  69 \text{ Shapes}  \end{array}  $	$  \begin{array}{r}  29 \text{ green triangles} \\  36 \text{ orange squares} \\  + 18 \text{ hexagons} \\  \hline  623 \text{ Shapes}  \end{array}  $

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