Chapter 8
The Evolution of Drawing as an Equitable Way to Assess ELLs in a Middle School Science Classroom

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ABSTRACT

In this chapter, the authors discuss what they observed and learned as drawing was integrated into assessments already in use in a middle school science classroom. Informed by a growing body of evidence that supports the notion that allowing students to draw answers on assessments disrupts normative assessment practices, promoting more equitable assessments for ELLs. Their overall goal was to add to the understanding of how drawing can provide a more complete picture of ELL students science content understanding. This chapter begins with the historical importance of drawing in science, and then the intersection of ELLs, drawing, science, and assessment, followed by a description of how drawing was adapted into middle school science assessments. Examples of how middle school students responded to prompts to draw answers on assessments are included followed by implementation barriers that were confronted by their teachers. The authors then conclude this chapter with a discussion focusing on recommendations to fellow teachers.

THE BEGINNING

It was early Fall in the southeastern United States. A group of seventh grade science educators were engaged in their weekly planning meeting at Mountain Middle school. The discussion that week focused on assessments, as the unit on the skeletal, muscular, and nervous systems was coming to an end.

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Amanda (the first author), regularly attended the planning meetings at Mountain Middle school as part of a research activity. Martha (the second author and a bilingual middle school science teacher), was one of the science teachers in the group. The following vignette, crafted from a transcription, demonstrates the nature of the meeting:

As the teachers discussed the skeletal, muscular, and nervous system assessment, Amanda asked if students could utilize drawings as a mode to answer questions on assessments. Kelly, another science teacher in the meeting, seemed to be agreeable to the idea while some of the other teachers were not. When Martha pressed the group for a decision about adding a drawing component to the current assessment, Kelly's support began to waver. Kelly voiced concerns to the group that students had variable drawing abilities and that some students would not label their drawings with the correct terminology. Peyton, (Kelly's student teacher) agreed and added that drawing would be too difficult for students. Martha and Amanda countered the group's skepticism by reminding the teachers that drawing took cognitive effort and helped students communicate their understanding of science concepts. Kelly began to consider adding drawing and became focused on having the students illustrate how the skeletal, muscular, and nervous systems worked together. Peyton remained skeptical and suggested that the students would just draw stick figures kicking soccer balls and doubted that the students would be able to illustrate how the skeletal, muscular, and nervous systems are involved in the process. Patiently, Martha explained that drawing activated a student's thinking and prior knowledge. The resulting model or illustration could then serve as a vehicle to help students organize their thinking and writing about learned content material. Eventually, Martha convinced Kelly to allow students to draw answers on two of the questions on the skeletal, muscular, and nervous systems assessment.

This adaptation was a radical change to the short answer and multiple-choice assessments commonly found in Mountain Middle's science classrooms. Martha also saw this as an opportunity to support Mountain Middle's English Language Learners (ELL) in science learning. This modification was also personally significant for Martha who recalled her own academic struggles as an ELL when she came to the United States as a child.

In this chapter, we discuss what we observed and learned as drawing was integrated into the common assessments already in use in Mountain Middle school's seventh-grade science classrooms. Our work was informed by a growing body of evidence that supported the notion that allowing students to draw or illustrate answers on assessments disrupts normative assessment practices, promoting more equitable assessments for ELLs (Buxton, et al., 2017; Penuel & Watkins, 2019; Zhang, 2016). Our overall goal was to add to the understanding of how drawing could be implemented in a middle school science classroom, to provide a more complete picture of ELL students science content understanding. We begin with a short discussion about the historical importance of drawing in science and then introduce some of the previous literature that focused on drawing and science learning, drawing as an assessment tool, and the intersection of ELLs, drawing, science, and assessment. We then provide a description of the environment of Mountain Middle school and context of our project. Martha then describes how she integrated drawing into her classroom assessments. Examples of how Mountain Middle school students responded to drawing prompts on assessments are included. A discussion of implementation barriers that Martha and her colleagues confronted follows. We conclude the chapter with a discussion focusing on recommendations to future teachers who may consider drawing of assessments and implications for further research.