Chapter 8
Developing Student Agency to Support Learning-Trajectory-Based Formative Assessment

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ABSTRACT

High-quality formative assessment practices depend on teachers having a clear sense of learning goals, an understanding of the learning trajectories students progress along toward these goals, criteria for assessing students' progress, and ways of using this information to inform instructional decisions. In this chapter, the authors describe efforts to support teachers' practice with a focus on learning trajectory-based formative assessment. These professional development efforts moved away from delivering professional development to teachers and evolved into professional learning with teachers as co-researchers and co-designers. The authors discuss this collaborative inquiry approach to supporting elementary teachers' understanding and use of learning trajectory-based formative assessment in mathematics classrooms, and share examples of the various forms of inquiry developed, and ways in which teachers engaged in these activities as part of the collaborative inquiry.

INTRODUCTION

Formative assessment can take on a wide variety of forms in mathematics classrooms, calling for an equally wide variety of instructional competencies on the part of both teachers and students. The breadth of what researchers and practitioners understand as the process of "formative assessment" is suggested in Wiliam's (2011) broadly adopted definition—that is, any process where "evidence about student

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achievement is elicited, interpreted, and used by teachers, learners, or their peers to make [more informed] decisions about the next steps in instruction" (p. 43). While the body of formative assessment research suggests that all such processes tend to support student achievement at some level, those that involve real-time interpretation of and timely responses to student thinking tend to be the most powerful with respect to student learning (Black & Wiliam, 1998; Wiliam, 2011).

In practice, however, implementing high quality formative assessment practices can be quite challenging. For example, classroom instruction persistently favors evaluation of student attainment of concepts and skills over interpretation of and responses to students' mathematical reasoning (Even & Tirosh, 1995; Heid, Blume, Zbiek, & Edwards, 1998). This may be attributable to difficulties many teachers encounter in differentiating between formative and summative assessment processes, or to pressures that focus attention on evaluation, particularly given the necessity of assigning grades (e.g., Black et al. 2004; Stiggins, 2002). Furthermore, effectively interpreting and responding to students' reasoning—particularly in mathematics—requires a set of teaching capacities that are difficult for teachers to adopt into practice. Namely, these capacities involve first creating a classroom learning environment and set of expectations that provide openings for students to take up agency over their own learning. In addition, teachers elicit student thinking, which becomes readily visible to both teachers and students. Based on students' shared thinking and ideas, teachers and students have opportunities to identify how student understanding is developing along the important conceptual strands of a discipline. This process provides information such that teachers and students can take productive next steps in response to the student thinking that has been surfaced. These capacities may be difficult to establish because of the complexity of changes teachers often need to make in their practice and in their classrooms (Cohen, 1991), and because of the depth and types of knowledge about mathematics teachers require in order to interpret student reasoning (Ball, Thames, & Phelps, 2008).

High-quality formative assessment practices also depend on teachers having a clear sense of learning goals, an understanding of the learning trajectories (LTs) students progress along toward these goals, criteria for assessing students' progress, ways of sharing this information with students, and ways of using this information to inform instructional decisions. Teachers need to engineer classroom tasks, discussions, and questions that elicit evidence of learning; and they must provide feedback that moves learners forward (Wiliam & Leahy, 2015). Effective use of these practices requires a strong understanding of students' potential pathways toward learning mathematics content, as well as common obstacles that might arise during the learning process. As such, formative assessment practices can be supported by usable, clearly articulated LTs that enhance teachers' understanding of conceptual landmarks and obstacles to student learning.

In this chapter, we describe our efforts to support teachers' practice with a focus on learning trajectory-based formative assessment (Stzajn, Confrey, Wilson & Edgington, 2012), an approach to teaching that places LTs at the heart of instructional practice. Central to our efforts has been a reconceptualization of formative assessment as a process that has as its goal to develop student agency and make thinking central to the mathematical activity in the classroom. To support teachers in engaging in formative assessment practices that promote student agency, we shifted how we engaged teachers with these ideas over time. Our professional development efforts moved away from delivering professional development to teachers and evolved into professional learning with teachers as co-researchers and co-designers (Penuel, Roschelle & Schechtman, 2007)—a model of professional learning based on collaborative inquiry. We will report on our collaborative-inquiry approach to supporting elementary teachers' understanding and use of LT-based formative assessment in mathematics classrooms, and share examples of the various