

Formative Assessment

A position of the National Council of Teachers of Mathematics

Question

What is the role of formative assessment in mathematics education?

NCTM Position

Through formative assessment, students develop a clear understanding of learning targets and receive feedback that helps them to improve. In addition, by applying formative strategies such as asking strategic questions, providing students with immediate feedback, and engaging students in self-reflection, teachers receive evidence of students' reasoning and misconceptions to use in adjusting instruction. By receiving formative feedback, students learn how to assess themselves and how to improve their own learning. At the core of formative assessment is an understanding of the influence that assessment has on student motivation and the need for students to actively monitor and engage in their learning. The use of formative assessment has been shown to result in higher achievement. The National Council of Teachers of Mathematics strongly endorses the integration of formative assessment strategies into daily instruction.

Formative assessment is an essential process that supports students in developing the reasoning and sense-making skills that they need to reach specific learning targets and move toward mastery of mathematical practices, such as those set out in the Common Core State Standards. It serves to inform both the teacher and the learner, enabling the teacher to change what he or she is doing and the student to understand where he or she is in relation to the learning goal. In other words, formative assessment provides information that changes what *both* the teacher and the learner are doing. The United Kingdom Assessment Reform Group has laid out five requirements for assessment to improve learning (Hattie, 2012):

1. The provision of effective feedback to students
2. The active involvement of students in their own learning
3. The adjustment of teaching, taking into account the results of the assessment
4. The recognition of the profound influence that assessment has on the motivation and self-esteem of students, both of which are crucial influences on learning
5. The need for students to be able to assess themselves and understand how to improve

Linking assessment to everyday classroom instruction requires teachers to make a shift in both their thinking and their practice. When assessment focuses on evidence of student learning, teachers must plan and work in new and different ways. Their planning must be flexible enough to allow them to adjust their instruction to take into account the results of assessment. They must also plan for the provision of effective feedback to students that will move them forward in their learning, and then they must offer their students opportunities to use this feedback to improve their performance. The feedback should tell students what they are doing well, where they need to improve, and what to do next. It should also assist the teacher in making sound instructional decisions.

In 2008, the National Mathematics Advisory Panel cited research to support the position that the use of formative assessment in mathematics classrooms directly correlates with improvement in student achievement. “A review of practice by the OECD [Organisation for Economic Co-operation and Development] across eight countries defined formative assessment as frequent, interactive assessments of students’ progress and understanding to identify learning needs and adjust teaching appropriately” (Wiliam, 2011, p. 37). Formative strategies embedded in instruction provide opportunities for students to make conjectures, incorporate multiple representations in their problem solving, and discuss their mathematical thinking with their peers. Effective formative assessment has a positive impact on student achievement and how they perceive themselves as learners.

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