

Calculator Use in Elementary Grades

A Position of the National Council of Teachers of Mathematics

Question

What is the appropriate role of calculators in the elementary grades?

NCTM Position

Calculators in the elementary grades serve as aids in advancing student understanding without replacing the need for other calculation methods. Calculator use can promote the higher-order thinking and reasoning needed for problem solving in our information- and technology-based society. Their use can also assist teachers and students in increasing student understanding of and fluency with arithmetic operations, algorithms, and numerical relationships and enhancing student motivation. Strategic calculator use can aid students in recognizing and extending numeric, algebraic, and geometric patterns and relationships.

Although calculators—from simple four-function versions to programmable graphing models—are used routinely outside school for a variety of purposes, their specific use in the mathematics classroom must be selective and strategic (NCTM, 2015), with attention to how such a tool will support and advance learning. More important, the use of calculators does not supplant the need for students to develop proficiency with efficient, accurate methods of mental and pencil-and-paper calculation and in making reasonable estimations. Emphasis and implementation are the critical issues—when and for what purposes should calculators be used in the elementary mathematics classroom?

Student learning of mathematical concepts, processes, operations, and procedures is advanced when calculators are used for a pedagogical purpose that goes beyond drill and practice or checking work (Ellington, 2003). Calculator use should be implemented strategically in ways that support the development of problem-solving skills. When used effectively to support problem solving, calculators enable students to engage with cognitively rich problems that address exploration of patterns and relationships (Reys & Arbaugh, 2001).

Access to calculators does not negate the need for students to develop paper-and-pencil and mental methods. Rather, when used appropriately, calculators play a key role in developing students' fluency with numbers and operations and estimation skills. Further, strategic use of calculators supports an effective learning environment that strengthens a positive view of mathematics (Ellington, 2003).

NCTM's *Principles to Actions* (2014) identifies appropriate tools and technology, including calculators in the elementary grades, as essential elements in the classroom to aid students in making sense of mathematics and reasoning mathematically. Strategic use of calculators in the elementary grades supports students in communicating mathematically and making necessary connections across mathematics concepts and procedures and in real-world situations.

References

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