



**WISCONSIN  
MATHEMATICS  
COUNCIL, INC.**

## **Wisconsin Mathematics Council Position Statement on Technology**

**The greatest benefits of technology are realized when it is used intentionally and strategically, to assist students in becoming active learners and users of mathematics.**

The Wisconsin Mathematics Council (WMC) views the strategic use of technology as a valuable component of the teaching, learning, and assessment of mathematics. Strategic use of technology can complement computational fluency, promote problem-solving, and lead to higher-order thinking and reasoning and deeper conceptual understanding.

As defined by the National Council of Teachers of Mathematics (2015a), “Strategic use of technology in the teaching and learning of mathematics is the use of digital and physical tools by students and teachers in thoughtfully designed ways and at carefully determined times so that the capabilities of the technology enhance how students and educators learn, experience, communicate, and do mathematics.”

The Wisconsin Mathematics Council interprets strategic use of technology to include:

- using technology in a way that furthers the understanding of mathematics;
- using technology to create an equitable and accessible learning experience for all students;
- being intentional about when it is best to use technology and when it is best to use mental math, estimation, paper and pencil, or other methods; and
- having technology available for interdisciplinary applications.

When technology is used strategically, decisions on the mathematics to be learned are primary: mathematics content is not chosen according to what can be done with technology. Instead, the overriding question must be, how can the use of technology enhance teaching and learning of the mathematical content it is deemed necessary or desirable to cover? That said, strategic

use of technology can allow for the coverage of important mathematical ideas that would not be accessible otherwise, and can “assist students in investigating mathematical ideas and problems that might otherwise be too difficult or time-consuming to explore” (NCTM, 2014, p.82). For example, students studying statistics can work with larger and more realistic data sets by using statistical software than they can with pencil and paper. Similarly, dynamic geometry software can allow students to explore many more different instances of a geometric situation, and to conjecture relationships that hold generally. The universal question “Why?” then leads to the search for a proof of the general result.

Strategic use of technology should begin in the elementary grades (NCTM, 2015b), where students can use calculators to explore number patterns and properties of operations, and can use cell phone apps, or online sites, to collect poll data from their peers. Regarding numbers and operations in particular, students in elementary grades should develop mental estimation skills, if only so that they can quickly check the reasonableness of the answer given by their calculator, and should come to understand the role of properties of operations in multi-digit computations. For example, they should be able to estimate that  $47 \times 35$  is slightly less than  $1750 = 50 \times 35$ ; and also to explain the role of the distributive property in computing

$$\begin{aligned}47 \times 35 &= (40 + 7) \times (30 + 5) \\ &= (40 \times 30) + (7 \times 30) + (40 \times 5) + (7 \times 5) \\ &= 1200 + 210 + 200 + 35 \\ &= 1645.\end{aligned}$$

“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.” (NCTM, 2015b).

It is important to keep in mind that the mere use of technology will, in itself, have little lasting effect on student learning. The greatest benefits of technology are realized when it is used intentionally and strategically, to assist students in becoming active learners and users of mathematics.

## References

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2015a). *Strategic use of technology in teaching and learning mathematics: A position of the National Council of Teachers of Mathematics*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2015b). *Calculator use in elementary grades: A position of the National Council of Teachers of Mathematics*. Reston, VA: Author.