Chapter 9
What Does Technology Bring to the Common Core Mathematical Practices?

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EXECUTIVE SUMMARY

This chapter describes how technology can support the implementation of the Common Core Standards for Mathematical Practice. Example problems are provided with details about how dynamic technologies support problem exploration and students’ development of the mathematical practices.

INTRODUCTION

“Major limitations of computer use in the coming decades [in teaching mathematics] are likely to be less a result of technological limitations than a result of limited human imagination and the constraints of old habits and social structures” (Kaput, 1992, p. 515).

It is left to the reader’s judgment as to the predictive nature of this statement from over twenty years ago regarding the current state of technology use in teaching and learning mathematics. It is true though that while resources for teaching mathematics with technology certainly exist, there is much disagreement among teachers as
to what constitutes appropriate and effective use of technology in the field (or if
technology should even be allowed at all). Does a teacher introduce technology
from day one in kindergarten as a tool for mathematics, or does a teacher delay the
introduction of technology until a student knows the “basics” (whatever that might
mean)? Is technology to be the ladder into the tree of mathematics that Kennedy
(1995) described? Thereby allowing students access to mathematics that they might
not otherwise experience. Or, instead, is technology a cheat? The last bastion of a
student who doesn’t understand even the most fundamental mathematical principles?

Since the advent of the first handheld calculators in the seventies (Waits & De-
mana, 2000) to the computer algebra system (CAS) enabled devices of today, the
promise of technology for teaching and learning mathematics has been with us for
quite some time. In 1995, the authors of *Algebra in a Technological World* wrote
that, “This technology demands new visions of school algebra that shift emphasis
away from symbolic manipulations toward conceptual understanding, symbol
sense, and mathematical modeling” (Heid, Choate, Sheets, & Zbiek, p. 1). This was
followed in 2000, by the National Council of Teachers of Mathematics (NCTM)
Technology Principle, stating, “Technology is essential in teaching and learning
mathematics; it influences the mathematics that is taught and enhances students’
learning” (PSSM, p. 24).

In 2014, NCTM further reiterated their strong support for the use of technology in
mathematics teaching and learning through an updated Technology Principle (called
the Tools and Technology Guiding Principle) in *Principles to Action: Ensuring Math-
ematical Success for All*. The guiding principle promotes tools and technology as
“…essential resources to help students learn and make sense of mathematical ideas,
reason mathematically, and communicate their mathematical thinking” (NCTM, p.
5). Fulfilling this promise by integrating technology into a mathematics curriculum
requires that one believes technology enhances and changes mathematics learning
as well as mathematics teaching.

One question to ask if we are to use technology in mathematics, is what do we
want from technology? Another question is what should we expect of students us-
ing technology? Should we enhance the current curriculum or should we attempt
to teach even more mathematics and go further and study mathematical ideas more
deeply than ever before?

With the implementation of the Common Core State Standards in Mathematics
(CCSSM), a new push for the integration of technology in mathematics learning
and teaching should follow. Many of the specific standards call for mathematical
experiences that can either be enhanced or completely facilitated with technology.
These standards should create more opportunities for the judicious use of technol-
ogy in both teaching and learning mathematics.
Linking Education to Creating a Knowledge Society: Qatar's Investment in the Education Sector
www.igi-global.com/chapter/linking-education-to-creating-a-knowledge-society/121875?camid=4v1a