Foundations for Supporting Teachers and the Work of Teaching


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In the last four issues of the *NCSM Newsletter*, I have explored leadership issues that surround curricular and instructional coherence, formative assessment, and most recently, the need to reframe the way we describe and utilize mathematical goals for instruction. In this issue, I connect these previous conversations to a related topic—critical features leaders need to consider as they support the work of teachers. I propose two foundational components in an effective support strategy: first, provide teachers with a coherent curriculum and an aligned set of expertly designed coherent instructional materials to enact that curriculum; second, prioritize time for teachers to discuss and plan for the hard work of teaching in collaboration with colleagues.

One other note for readers to keep in mind as they consider the ideas herein—many of us are grappling with how best to support our colleagues in classrooms and so I am asking that you join this conversation by way of Facebook and Twitter. Please consider sharing your thoughts and suggestions for strategies you believe are foundational in supporting teachers so that we can all benefit from our collective wisdom and experiences.

First, provide teachers with a coherent curriculum and an aligned set of expertly designed *coherent* instructional materials to enact that curriculum.

NCTM published *Curriculum and Evaluation Standards for School Mathematics* in 1989, and by the mid-90s it had prompted the publication of "supplemental books" with rich mathematical tasks that could be used to bring problem solving and discrete mathematics topics into classrooms where they were using traditional textbooks and wanted to more closely align their practice with the new standards. Also by the mid-90s, the new, so-called *Standards-based* textbooks were becoming available. These materials were developed in an entirely new way, as research projects, by teams of university faculty working together to design, pilot, revise, and field test carefully sequenced sets of lessons. These textbooks produced lessons that not only stood the "Is it in the book?" test for a list of required content standards, but far more importantly and for the first time, they helped teachers build mathematical understanding and skills with meticulously structured lessons that worked as a coordinated sequence of challenges. These materials were designed to develop mathematical knowledge and reasoning in far more sophisticated and complex ways than a collated collection of stand alone lessons and their use has now been demonstrated to improve mathematics success for all students.

Much like 25 years ago we find ourselves today in an era of new mathematics standards, and like those times, supplemental materials are widely available to help teachers align their practice to these new standards. Now instead of buying them, you can Google them. They are generally free, and certainly plentiful. Many administrators are looking at their shrinking budgets and once again asking teachers to pull together their own instructional materials using these free resources. The question to be considered, both 25 years ago and today, is: What might you get drawing on these now electronically available lessons in comparison with a research-based, standards-based textbook?

To help answer that question, it is worth reminding ourselves what goes into the development of a *coherent* mathematics textbook series using a research-based approach. These author teams structure lessons to develop a mathematically related constellation of ideas rather than a single discrete skill. The lessons are sequenced beginning with concrete contexts and representations and they move gradually toward greater abstraction and mathematical complexity. This is true for the design of a unit of study, the set of units that compose a textbook, and across a series of textbooks.

Supporting this progression toward greater mathematical sophistication, mathematical representations (drawings, words, tables, graphs, symbols) are intentionally selected and sequenced, lesson and student assignments are composed to encourage the construction of mathematical connections among topics and representations, teacher notes suggest ways to improve the nature of the classroom discourse and planning for possible student misconceptions, and mathematical tools are strategically and appropriately introduced. In addition, great care is given to the tasks in lessons, assignments, and assessments. These tasks are designed to be open enough to provide access to a range of students using a variety of approaches, and scaffolded to support the learning trajectory. They utilize engaging contexts, include an appropriate balance and sequence of items that are cognitively more and less sophisticated, and require students to reason mathematically and to synthesize related concepts

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and strategies. All of these decisions are now based on nearly 30 years of experience building, using, and evaluating these materials.

The work of instructional design and evaluation is highly specialized, expensive, and time intensive. It requires focus and dedication, leadership and vision. It is not random or opportunistic. It demands far more intention from a *team* of education specialists than can be reasonably accomplished by any single person who has been asked to cobble together a set of lessons created originally as stand alone activities and posted on sites across the Internet. Clearly, the development of coherent instructional materials that are aligned to a particular set of standards is not work that we should expect teachers to tack onto their already overloaded plates during planning time or even two weeks set aside in the summer.

Addressing this same concern 25 years ago, at a time when similarly, principals were asking teachers to find or develop their own good lessons Glenda Lappan wrote in an NCTM Presidential Letter,[1] "… think of the complexity of creating coherent, complete mathematics materials that have an internal structure, a spine—materials that guide the development of mathematical understanding and skill." She concluded then, as I do today, that working with teachers to select an excellent mathematics series, aligned to state and national standards, has to be understood to be a more productive approach to the dilemma of optimizing learning for all students.

As leaders, we need to help those in decision-making roles understand the importance of selecting and using well-designed instructional materials. The Internet is a powerful resource but it has limitations that we need to understand, recognize, and articulate for others as it concerns instructional materials design. The work of teaching is far too challenging on its own. How can we allow others to distract from that work with the addition of highly specialized design responsibilities? With this reasoning, a first critical step in supporting the work of teachers is to ensure that teachers have access to a coherent curriculum and an aligned set of expertly designed *coherent* instructional materials to enact that curriculum. Equipped with a coherent set of instructional resources, we free teachers to take up the considerable challenges of teaching.

Second, prioritize time for teachers to explore, discuss, and plan for the hard work of teaching in collaboration with colleagues.

This leads me to the second aspect of supporting teachers and the work of teaching—prioritizing time for teachers to consider the hard work of teaching in collaboration with colleagues. This includes time to explore the mathematics they teach, as well as the mathematical progressions that expand above and below theirs, to understand how best to leverage the intentional designs of the textbook authors, to carefully analyze student work to understand students' current thinking, to consider and then provide actionable feedback to students, and to select student work samples as contexts for follow-up lessons to extend student understanding. I could go on, but by now you will see where I am going. Teachers need time and support to continuously reflect on the myriad of instructional decisions they make for particular students. As leaders, it is our responsibility to prioritize and facilitate these discussions in the scarce time available.

In these recommendations I want to make clear that I do not intend to denigrate the knowledge or expertise or capacity of the dedicated women and men charged with educating our children. Neither do I want to suggest that using resources collected from the Internet is always unproductive. I taught high school for 20 years; I understand deeply what it takes to ensure that every child is successful in my classroom. My intent with these recommendations is to make explicit the challenging complex nature of designing/selecting *coherent* instructional materials and to ask that we prioritize time for aspects of teaching that are most closely related to the needs of our particular students.

Ensuring access to great instructional resources and opportunities to develop the expertise needed to optimize their use, this is the work of mathematics education leaders. This is the foundation teachers deserve.

Once again, I invite you to join colleagues in sharing your views about the foundations leaders need to provide for their teachers by joining us online through Facebook [facebook.com/mathedleadership.org] or Twitter [@MathEdLeaders, @VMillsMath, #NCSMHT (Hot Topics)].

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[1] Lappan, G. (1998, July/August). *Texts and teachers: Keys to improved mathematics learning.* NCTM News Bulletin.