Response for Pearson's *digits,* Grades 6–8

Based on our review of the EdReports evaluations of ***digits***, a comprehensive middle grades mathematics program, we believe that the conclusions of the EdReports evaluation reflect a very narrow interpretation of the goals of the Common Core State Standards for Mathematics (CCSS-M) and fall short of the true intent of the standards.

In evaluating instructional materials, it is important for evaluators, at any level, to keep in mind that standards do not dictate a curriculum, nor do they define learning progressions. In fact, the writers clearly state in the introduction to the CCSS-M that the standards "do not dictate curriculum" (p. 5). The role and purpose of any set of standards is to guide curricula by providing expectations or benchmarks for learning. Further, we believe that these standards, the CCSS-M, should represent "the floor, and not the ceiling" in terms of expectations for student learning so that students are always encouraged to set and reach higher goals and expectations.

An effective curriculum requires a carefully laid-out and thoughtful learning progression that often involves concepts and skills that may not be specifically articulated in the standards, but, without exposure to these concepts and skills, students may not achieve the expected proficiency with certain standards. Again, the writers of the CCSS-M acknowledge the difference between standards and curriculum:

> ...a teacher might prefer to teach a topic of his or her own choosing that leads, as a byproduct, to students reaching the standards for topics A and B. (CCSS-M, p. 5)

So while everyday curricular experiences may be guided by standards, such experiences should not be limited to the standards. Curricula should offer learning activities that engage students and challenge them to think deeply about concepts and skills while providing adequate time for them to develop understandings and eventually reach and demonstrate proficiency with the standards.

A Focused Curriculum

digits was conceived and developed to explicitly address the CCSS-M. The ***digits*** authors, consultants, and editorial teams began the process of planning for a CCSS-M-focused middle school mathematics program even as the CCSS-M were still being vetted by thousands of reviewers. In their planning, the authors and editorial teams paid particular attention to building opportunities for students to develop proficiency with the Standards for Mathematical Practice.

The teams carefully analyzed the Grade 6-8 content domains of the CCSS-M before they began developing lessons. They spent time researching and discussing how learners become proficient with concepts, skills, and related understandings, and created an instructional model

that began with opportunities to interact with constructs and concepts, followed by activities to deepen students' understanding of and proficiency with these concepts.

As Dr. Francis "Skip" Fennell explained, "Given the author team's collective involvement with the development of the CCSS-M, the CCSS-M progressions documents, and other publications and initiatives that helped to suggest the need for the CCSS-M (e.g., NCTM Curriculum Focal Points, the National Mathematics Advisory Report), it was our intent to develop a middle grade mathematics program that clearly identified particular topics of emphasis, was coherent and challenging. In essence, as we developed ***digits*****,** we considered focus, coherence, and rigor before these criteria were formally suggested by the Chief Council of State School Officers in their 2012 Publishers' Criteria."

Although the Grade 6 and Grade 8 courses were evaluated as meeting expectations for the focus criteria (Grade 7 met only one of the two focus criteria), we believe that the process that the reviewers used to evaluate focus compromises the intent of CCSS-M. The notion of grouping lessons into categories (major, supporting, additional) -- groupings that were set by the assessment consortia rather than the writers of the CCSS-M -- with each lesson counting in a single category only leads to a siloing of content and disregards the horizontal coherence and connections among concepts that are integral to an effective curriculum, and a priority for instructional materials according to the writers of the CCSS-M. This misplaced emphasis on quantifying major work leads to a skewed view of the instructional materials, placing greater importance on individual parts without looking at the whole.

A Coherent Curriculum

The ***digits*** program was also designed around a *coherent* organization of content with explicit and embedded connections among concepts both from grade to grade and within the different mathematical domains in each grade. The topics across grades represent a strong, logical vertical progression of concepts and skills. Within a grade level, students encounter and apply key concepts from topic to topic in different areas of mathematics (e.g., measurement, geometry), highlighting the interrelatedness of these concepts and the powerful connections among concepts in different domains.

The EdReports evaluation offers limited insight into the reasons that the ***digits*** program was rated as only partially meeting expectations for coherence. The comments suggest that the reviewers relied on a broad-brush look of the program through the Program Overview Guide rather than an in-depth exploration of lesson content. Citing the listing of standards on student pages and in the teacher's support as evidence of the coherence of a program ignores the extensive curriculum planning, design, and evaluative reviewing that went into creating the ***digits*** program.

A Rigorous Curriculum

As was noted earlier, the ***digits*** instructional model was designed to provide students with a rigorous curriculum, one that helps them develop in-depth understanding of key mathematical concepts, computational or procedural fluency with concepts and skills, and frequent opportunities to apply these concepts in varied contexts. The Launch, Examples, Close and Check, Homework and Practice -- were intentionally created to provide students with a comprehensive and rigorous learning experience.

In the evaluation of Grades 6 and 8 relative to Rigor and the Math Practices criteria, reviewers noted insufficient opportunity for students to develop fluency with grade-level concepts. These frequent comments suggest that the reviewers did not review all components of the program, for ***digits*** provides robust and varied opportunities to help students build fluency through the integration into the program of *MathXL for School*®, an award-winning online program used by over 5 million students nationwide. The *MathXL* engine powers students' homework exercises, as well as the students' study plans that prescribe individualized practice for students based on their scores on periodic readiness assessments. With *MathXL for School, s*tudents encounter practice items in a variety of formats including multiple choice, gridded response, and open response. More importantly, the items are algorithmically generated, which provides students with **unlimited practice.** As students complete each exercise, they are provided with instant feedback so that they know right away whether they have solved the exercise correctly.

At the beginning of each unit, students can take a readiness assessment that identifies areas of strength and weakness for each student. Based on the students' scores, they are assigned exercises that match their learning needs. Students with prerequisite deficiencies are provided with supportive practice exercises that help them develop mathematical thinking, while students with few or no deficiencies are provided additional challenge to extend their understanding.

MathXL for School® includes built-in tools, such as **Help Me Solve This,** which scaffolds the problem by breaking it down into individual steps or **View An Example,** which provides a fully worked out step-by-step solution of the exercise. Once the student returns to the problem, the item algorithmically regenerates with new values for a fresh attempt.

The Math Content-Practices Connection

The Mathematical Practices (MP) are one of the distinguishing features of the CCSS-M and an integral component of the instructional design of ***digits.*** Student engagement in these eight habits of mathematical thinking permeates the ***digits*** materials. To facilitate teachers' and students' understanding of the mathematical practices, the ***digits*** program uses labels and icons throughout the program to highlight the one or two Mathematical Practices that are most prevalent within each activity or lesson.

Because all of the Mathematical Practices are visited and revisited during the year, the authors thought it unnecessary to address every mathematical practice in every lesson; however, they did provide additional suggested questions and other instructional supports for teachers if they want to incorporate all of the Mathematical Practices in a single lesson. The questioning strategies offered in the *Program Overview Guide* provide the best example of how to assist the educator in leading their students to apply- the MPs to enrich and deepen mathematical content understandings.

Below are some examples of the embedded support to help students develop proficiency with the Mathematical Practices.

- Students can use dynamic tools to evaluate various solution pathways to any problem (MP 1).
- Dynamic visual and auditory presentations of the concepts in each lesson support students as they reason abstractly and quantitatively (MP 2).
- The interactive tools built into the program are continually available to provide extended opportunities for students to present and critique one another's reasoning (MP 3).
- These easily accessible displays also provide students and teachers with the ability to select appropriate tools to experiment with and make immediate connections among a variety of mathematical models within each lesson (MP 4 and MP 5).
- Since presentation and defense of solution strategies is foundational to the instructional design of ***digits***, precise definitions, explanations, and supporting visuals for key vocabulary are available in context through hyperlinks within each lesson (MP 6).
- The lesson progressions within the topics focus on using analysis of patterns to build student understanding of the mathematical structure involved in the concept as well as to lead to important generalizations based on repeated reasoning (MP 7 and MP 8).