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Agile learners
Agile tools to support high achievement

The University of Texas at Austin
Charles A. Dana Center

Agile Mind and the Charles A. Dana Center at The University of Texas at Austin, the authors of our high school programs, have valued our discussions with *Ed Reports* as their review process and methodologies have matured in response to the field. We appreciate the diligence of the review teams in examining our programs and in sharing detailed feedback. We are gratified that *Ed Reports* has evaluated our high school programs as meeting expectations in all three gateways—placing them among those they consider the best in the nation.

As an organization dedicated to continuous improvement, we routinely gather information from schools and teachers to inform our work to enhance our programs, and our Dana Center collaborators bring invaluable experience from research, study of high-yield practice, and implementation at scale. We are pleased that the reviewers recognized the results of this collaboration as meeting expectations in each of the three gateways.

In service of the continuing development of resource evaluation processes, we offer two primary recommendations for future work: First, an established and expanding body of research makes clear that social-emotional development (SED) is a key component to student learning, particularly for historically underserved populations in mathematics.[1][2] We believe that curricula and learning resource evaluations should reflect SED's cornerstone role for students. Second, we encourage *Ed Reports* to share the evidentiary basis for their evaluation criteria, to allow the field to provide additional feedback and to ensure that the criteria reflect proven, high-yield resources and practices that impact student learning and achievement. We worry that, in their current form, some *Ed Reports* criteria could overlook the promise of tools with the potential to enhance educator practice, while rewarding supports that lack evidence of impact on student learning. We believe there remain opportunities to improve key criteria in each of the three gateways, as described below.

An example from Gateway 1

Indicator 1c. *The materials require students to engage in mathematics at a level of sophistication appropriate to high school.*

To fully meet this indicator, according to the *Ed Reports* high school evidence guide, materials must do three things. They must "regularly use age appropriate contexts, use various types of real numbers, and provide opportunities for students to apply key takeaways from grades 6-8." While the second aspect of this criterion speaks to the use of various types of real numbers, we worry that *Ed Reports* appears to be overweighting the amount of student practice with

[1] Mangels JA, Good C, Whiteman RC, Maniscalco B, Dweck CS. Soc Cogn Affect Neurosci. 2012 Feb;7(2):230-41.

[2] West, M. R., Kraft, M. A., Finn, A. S., Martin, R., Duckworth, A. L., Gabrieli, C. F. O., & Gabrieli, J. D. E. (2014). *Promise and paradox: Measuring students' non-cognitive skills and the impact of schooling.* Cambridge, MA: National Center for Teacher Effectiveness,Harvard University.

operations with a variety of number types, when compared to other aspects of this criterion. We believe that high school mathematics must take a balanced approach—attending both to providing students access to problems that use a variety of concept-appropriate real numbers and also to providing students—in the context of learning new concepts—opportunities to maintain the fluency with operations they mastered in middle school.

Students' understanding of number operations is an important component of their success in developing proficiency with algebraic expressions. They use this understanding when solving equations and rewriting algebraic expressions and equations in different forms. Our instructional materials balance students' need to maintain quantitative understanding and skills with the need to allow students to focus on mastering new mathematical concepts without introducing an added level of complexity at the outset of new learning by also asking them to address operations with a variety of types of real numbers. We believe this design principle is supportive of students as they work to develop fluency with new algebraic and geometric skills and is vital for teachers in making formative assessments of students' progress toward mastery of content.

Our materials provide students with a variety of opportunities in which they naturally and authentically work with the range of real number types in the context of the mathematics content they are learning. For example, in the Algebra I course we focus reinforcement of operations in areas in which the mathematical content is not new to students, such as solving linear equations. However, we also ask students to reason with a variety of numbers when introducing new ideas, as when we ask students to solve problems using a quadratic model for wind chill that includes decimal coefficients. In the Geometry course, you will see reinforcement of work with a variety of number types, mostly in topics dealing with measurement concepts. In the Algebra II course, we make connections between rational number operations and operations on rational expressions.

We believe the scoring for this indicator should better reflect the balance of the expectations it seeks to evaluate.

An example from Gateway 2

Indicator 2g. *The materials support the intentional development of modeling and using tools in connection to the high school content standards, as required by the mathematical practice standards.*

We wonder about the evidence required to fully meet this indicator. While materials can and should clearly demonstrate instances of explicit instruction and discussion that build students' proficiency in choosing and using tools, as well as include rich problems to which students can apply the tools of their choice, we would suggest materials cannot authentically foreshadow or predict every instance in which students might choose a tool to solve a problem. Throughout our high school series, we provide explicit instruction in support of MP5 by giving students exposure to and instruction with a variety of tools. We also provide opportunities for students

to consider the appropriateness of various tools. For example, in Algebra I when students solve quadratic equations, we prompt teachers to engage in discussion with students about the choice of tools they use to answer a question. This encourages students to be thoughtful about the tools they choose. In Geometry, when investigating special lines and points in triangles, we suggest that teachers make Patty Paper, rulers, protractors, dynamic geometry software, and scissors available to students. Students then choose a tool to solve the problem.

Once students are familiar with various tools, they have multiple opportunities to strategically choose and apply them to solve the rich problems embedded throughout the programs. This is the way MP5 should naturally manifest in the classroom.

Two examples from Gateway 3

We devote a great deal of attention to research and development to ensure that our programs are usable by teachers and by students. For this reason, we are extremely gratified to have met expectations in this gateway. With that said, we worry that, by classifying certain indicators as unscored, *Ed Reports* may overlook opportunities to remind the field to attend to important aspects of mathematical identity, equity, and access. Two specific examples are below.

Indicator 3q. *Materials encourage students to monitor their own progress.*

We believe that awarding points for this indicator would send a clear message about the importance of building deliberate structures to equip students to self-monitor and adjust. Our programs encourage students to monitor their own progress through the same type of real-time data reporting that enables teachers to monitor student effort and performance. Each student can access reports on his or her individual effort and performance on the *Guided practice*, *More practice*, and *Automatically scored* components. In a number of the schools in which we serve, we have seen students use these reports to take ownership of their learning, developing a sense of capability that causes them to view themselves as mathematical learners.

Indicator 3w. *Materials provide a balanced portrayal of various demographic and personal characteristics.*

The impact of experiencing four years of rigorous high school mathematics on students' later success and life-long earnings is well documented. Research has also made clear that students' sense of belonging can have a profound effect on motivation and academic achievement, especially for underrepresented students.[3] Across our programs, we are committed to providing a balanced portrayal of demographic and personal characteristics to ensure that every student in the classroom sees him or herself as a doer of mathematics, reinforcing a sense of belonging to a mathematics community. We strongly encourage *Ed Reports* to award points for this indicator for high school programs, as it does for middle school programs. Not

[3] Hausmann, Schofield, & Woods, 2007; Walton & Cohen, 2007; Cheryan, Plaut, Davies, & Steele, 2009; Good, Rattan, & Dweck, 2012; Lewis, Stout, Pollock, Finkelstein, & Ito, 2016; Wilson et al., 2015.

doing so may send a message that attending to diversity in the upper grades is no longer important, causing many students—especially those who have been historically underrepresented and underachieving—to disengage from their high school mathematics experiences. This is a fundamental threat to equity.

We and our Dana Center colleagues are excited to continue to work with all organizations concerned with the equitable improvement of student achievement in the days ahead.