

The Iceberg Problem

How Assessment and Accountability
Policies Cause Learning Gaps in Math
to Persist Below the Surface . . . and
What to Do About It

The Iceberg Problem

The Iceberg Problem refers to the observation that only a very small amount of information is available or visible about a situation or phenomenon, whereas the more comprehensive information or bulk of data remains hidden from view.

It gets its name from the fact that only about one-tenth of an iceberg's mass is seen outside while about nine-tenths of it is unseen, deep underneath the water's surface.



Executive Summary

Ms. Rodriguez has many high hopes for her sixth-grade math students. She hopes they will find joy in learning about the beauty and complexity of mathematical concepts and make connections to the world around them. She hopes they perform well on the end-of-year test so they are set up to succeed in the seventh- and eighth-grade courses designed to prepare them for high school. She hopes they will excel in high school math, enroll and succeed in college, and perhaps pursue a degree in science, technology, engineering, or math. She hopes that these degrees will open up opportunities to pursue rewarding and lucrative careers.

When the school year began, Ms. Rodriguez's students arrived from six different elementary schools. Since she didn't have access to their grades or incoming state test scores when the school year began, she was not sure what to expect. In the first few weeks, she realized that of her class of 30 sixth-grade students, maybe five were keeping up with grade-level work. She is now frustrated but not surprised that some of her lessons don't seem to stick. She tries her best to help her students understand what the sixth-grade work is asking for, but some just seem lost. She wishes she had the time to work with each of them one-on-one, to break down any misunderstandings and figure out what they may have missed in the past.

One day, sensing that many of her students were struggling with Operations on Decimals because they hadn't quite mastered Decimal Place Value in the fifth grade, she taught her students a lesson on Decimal Place Value that she thought might help. (Decimal Place Value was not included in the sixth-grade curriculum that her district adopted, so she found a lesson online that she thought might work). That day her principal also happened to come in for a classroom observation. In her post-observation conference, her principal told her to adhere to the grade-level curriculum since that is what would be covered on the statewide summative test and would thus serve as the basis for the school and district evaluation. There was little time to cover much beyond that.

Ms. Rodriguez has high expectations for all of her students and believes that all of them are capable of being ready for the rigors of high school math. But she does not see how they will ever get there if she is unable to properly address her students' unfinished learning from elementary school. She is beginning to wonder if an exclusive focus on grade-level material is truly what is best for each of her students.

This is just one example of the varied challenges educators experience every day in schools across the country—their hopes for their students are high, but the tools teachers have and the rules they are told to follow often do not yield the results students need.

In our experience, the fastest way to accelerate student learning is to provide opportunities where students are challenged at the appropriate level for their existing skills and knowledge—not too easy, not too

difficult. A student might not be able to conquer a brand-new topic on their own, but with the right supports, they can learn and retain something new that was previously out of reach. This insight, known across educational and psychological literature as the “zone of proximal development,” undergirds many widely used curricular and instructional strategies.

But policies from district, state, and federal educational authorities signal to them to focus their instruction on grade-level standards each year regardless of their students' zones of proximal development. Grade-based accountability systems are understood as necessary safeguards against inequity, but they may also limit the potential for more effective, student-centric instructional approaches that can better achieve college and career readiness for each student.



In developing this paper, we have drawn upon seven years of experience operating a program called Teach to One: Math in partnership with hundreds of teachers across 15 states, serving more than 40,000 students. Our work has enabled us to operate in schools governed by public school districts, charter school boards, and independent entities in urban, suburban, and rural settings. We have worked with students who are behind grade-level expectations and with students who are ahead; with students who qualify for special services; with English learners; and with students from across a variety of racial and ethnic groups.

Our perspective is further informed by a concerted research and development effort we conducted that is focused on how best to accelerate students through middle grade math standards. As part of that effort, we have meticulously investigated the standards and underlying concepts reflected at each grade level, explored and tested the mathematical relationships among those concepts, and reviewed tens of thousands of lessons that relate to those concepts. We also analyzed the results of over 100,000 summative and formative assessments, administered over six million assessments of our own, and partnered with universities and research firms in order to advance our collective understanding of how students learn math.

This paper is not only based on the experiences of our day-to-day work; it draws upon existing research, policies, and literature. We conducted extensive interviews with policy leaders, math experts,

advocates, and researchers, including those with perspectives that differ from our own. We analyzed publicly available data and our own internal data on student progress. We examined results from focus groups with middle school math teachers in three cities, in schools both within and outside of our partner network, to hear directly about teachers' instructional strategies when students come in with unfinished learning from prior years as well as teachers' experiences with curriculum, assessment, and accountability.

Working directly with districts and schools across the country to address this challenge has given our organization a firsthand perspective on the challenges faced by educators to improve these outcomes. In some communities, there are particular challenges in recruiting, developing, and retaining high-quality math teachers, many of whom might have more attractive employment opportunities in other sectors. In other communities, ongoing leadership transitions at the school or district level can lead to continual shifts in organizational direction. Poverty-related issues such as trauma, violence, and nutrition are all, of course, highly relevant to student academic performance. So too are the expectations that adults have for students.

While these and other factors undoubtedly contribute to the challenges of preparing more students for high school math, we believe there is another consideration at play that has gone relatively unnoticed by policy makers: the underlying policy landscape itself and its ultimate impact on teacher practice.

We believe there is another consideration that has gone unnoticed: the underlying policy landscape itself.

Based on our experience and publicly available research and data about middle school math, we argue:

1. **Math is cumulative.** Unfinished learning from prior years makes it harder for students to master more advanced concepts.
2. **Policies incentivize an exclusive focus on grade-level instruction.** Current education policies signal to educators to focus their instruction on annual grade-level standards regardless of individual student needs.
3. **This approach is hindering college and career readiness.** An instructional focus on grade-level instruction keeps students from addressing the unfinished learning from prior school years that is required to master more advanced concepts.

To be clear, this is not a call to reverse the principles of standards, accountability, rigor, transparency, and equity that undergird the Every Student Succeeds Act (ESSA). They are essential elements for building a school system worthy of the students they serve. Our education system gained significantly from the development of these systems, and they are substantial accomplishments.

But these accomplishments cannot be the end. Even under the most optimistic of circumstances, it would take decades for our schools to ultimately achieve the vision of every child succeeding. If our nation is to ever have an educational system that can enable all students to unlock their full potential, we will need new ideas and approaches to get there.

This is a call to federal, state, and local leaders to create the space within ESSA for more innovative approaches to learning and measurement that allow for students to take different paths to the same outcome of college and career readiness. While ESSA provides states with far more flexibility than was permitted under No Child Left Behind (NCLB), the primary growth measures used for purposes of accountability are limited by the fact they are confined to the narrow band of each grade's standards and assessments. So long as that single path defines the benchmark of success, it is unlikely that approaches to learning that accelerate students from their unique performance levels can be successful.

To accelerate math achievement, opportunity, and equity, this paper urges federal, state, and local education leaders to:

- ✓ Measure learning growth through the use of assessments that cover standards from across multiple grade levels.
- ✓ Modify accountability systems in order to incentivize instructional practices that best support each student's ability to accelerate to grade level and beyond.
- ✓ Launch Math Innovation Zones.
- ✓ Make available high-quality instructional supports and strategies that account for unfinished learning from prior school years.
- ✓ Advance a future vision for assessment and accountability that incorporates more precise measures of student learning growth.

Our goals for this paper are to push forward the conversation about assessment, accountability, innovation, and student learning, and to find ways to resolve growing tensions between grade-based accountability systems and more personalized approaches to instruction. The resolution must prioritize high, rigorous standards and protect against systemic bias so that students from every community can benefit from all the opportunities that come with a college- and career-ready education. We welcome perspectives from others in the field, including those who may disagree with our assessment of the problem and potential solutions. And we recognize that there are real tensions here, as there are in almost every policy-related educational issue.

Nonetheless, it is time to honestly confront the challenges facing too many schools and work together toward an educational system where every student can reach his or her full potential.

This paper is NOT arguing:

1. that high expectations and academic rigor are unimportant. They are essential.
2. that our nation's system of schooling is free from systemic biases. These biases are pervasive, and our educational policies must target overcoming them.
3. that standards-based reform and related accountabilities should be eliminated. They are key building blocks to future progress.
4. that proficiency doesn't matter. It does. However, for some, achieving college and career readiness in the long term requires building key foundational skills in order to get there.
5. that students should not learn any grade-level content. Grade-level exposure matters, but an exclusive focus on grade-level material can keep some students from filling critical pre-grade gaps and others from accelerating beyond grade-level expectations.
6. that the recommendations in this paper apply to anything other than middle grade math. That's just what we know best.