

# Why are so many 12th graders not proficient in reading and math?

February 10 2021, by Elizabeth Leyva, David J. Purpura and Emily Solari

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## Math performance on 2019 national test

Less than a quarter of high school seniors are proficient in math.



Chart: The Conversation, CC-BY-ND Source: National Assessment of Educational Progress

Math and reading scores for 12th graders in the U.S. were at a historic low even before the COVID-19 pandemic forced a massive shift to remote learning, according to results of the [2019 National Assessment of Educational Progress](#) released in late 2020. We asked three scholars to explain why so many high school seniors aren't proficient in these critical subjects.

**Elizabeth Leyva, director of entry-level mathematics, Texas A&M University-San Antonio**

One might expect the jump from high school to college mathematics to be a natural progression, or a small step up in difficulty or expectations.

But over time it has actually [become a chasm](#), and that chasm continues to grow.

[More students](#) are taking advanced coursework—algebra II or higher—in high school. But studying the material doesn't mean that a student has truly learned it. As a result, a student can pass a course which should be a college preparatory course, such as algebra II, yet fail a standardized placement exam, or not score high enough on SAT/ACT tests to be deemed "college ready."

Most [high school teachers](#) hold their students to a different set of expectations than college faculty do. In many cases, the policies are set by the school district, so high school teachers are simply upholding rules that the community and parents have pushed for. This can include allowing students to submit late work, [retest on assessments](#) they performed poorly on and use a calculator for most assignments.

The [rationale is well intentioned](#); high [school](#) students are young learners, and may need multiple opportunities to master a concept.

Multiple opportunities to pass means more students pass. But this generous assessment strategy has [unintended consequences](#) on student motivation and accountability. The effect is that students can earn a passing grade but not retain or master the material in a meaningful way. This is how a [student](#) can receive a B in algebra II, for example, but land in a developmental class when they enter college.

**David Purpura, associate professor of human development and family studies, co-director of the Center for Early Learning, Purdue University**

When looking at the striking data for [12th graders](#) from the [national report card](#), policymakers, researchers, parents and teachers often ask:

What's going on with [high school math](#)? Should we change math instruction at this age?

However, the performance trends [at middle and elementary schools](#) are similar.

Math is often taught with few explicit connections across individual classes. Sometimes these classes follow a certain order: for example, algebra I and algebra II. But the content in and across the classes isn't being thoroughly connected. For example, in the early elementary years, we talk about addition and subtraction, then multiplication and division. We move on to fractions, and then algebra. Yet this still treats these concepts as separable rather than integrated.

But math is an interrelated web of knowledge with new information building on previously learned information. And, this acquisition of knowledge begins early. There are significant individual differences in children's math performance [even prior to kindergarten](#).

I believe children aren't receiving a strong enough foundation for basic math skills in the earliest years. Preschool teachers spend less than [five minutes per day](#) on numbers. Nearly a third of classrooms provide no number instruction at all.

### Reading performance on 2019 national test

Nearly two-thirds of high school seniors are not proficient readers.



Credit: The Conversation, CC-BY-ND Source: National Assessment of Educational Progress

In kindergarten, the level of math instruction is typically well below what [children already know](#) and can do. The misalignment could be attributable to the low expectations set forth in the Common Core Standards—the academic standards shared across the majority of states. [Over 85% of children](#) are able to meet certain end-of-kindergarten expectations before they even enter kindergarten. These disparities continue [through elementary school](#).

So, the question in my mind isn't: Why are so many [high school seniors](#) not proficient in math? The question is: How can teachers better link math concepts across all grade levels and improve learning?

To start, I believe schools and communities need to make math a bigger [priority in the earlier years](#) – even before kindergarten. Research shows that [testing students regularly](#) and tailoring lessons to meet their [individual needs](#) can build their math skills appropriately.

**Emily Solari, professor of reading education, University of Virginia**

How kids learn to read is a well-researched aspect of human learning. Scientists have identified [what happens in the brain](#) when children learn to read and why some children have difficulty mastering this skill. Despite this wealth of evidence about how reading develops, only [37% of 12th graders](#) read at a proficient or advanced level, according to the national assessment.

While standardized tests are not the perfect measure of reading ability, they do provide a pulse of reading attainment across the country.

Importantly, the scores show significant differences in reading performance between particular groups of students. Profound gaps exist [between white and Black students](#) and [white and Hispanic students](#).

The [education system](#) is fraught with inequities that have a greater negative impact on historically marginalized students—particularly those who are [Black](#), [Hispanic](#), [poorer](#) or [have a disability](#). Recent data suggests the COVID-19 pandemic has [exacerbated these gaps](#). Improving the system, and how students are taught reading, is a matter of equity.

Why, if there is solid evidence on how children learn to read, has this not translated into classroom practice and better reading outcomes for students?

[Studies show](#) that children should be taught the alphabetic system—the relationship between the sounds of letters and their written form—in order to learn how to read words. The ability to read words combined with vocabulary and language development is [essential to reading comprehension](#).

In addition to what is taught, how children are taught to read is also important. Reading instruction should have a clear scope and sequence, with skills building on each other over time.

However, a recent survey suggests that [about 75% of teachers](#) use curricula that teach early reading using a cueing approach. And, [65% of college professors](#) teach this approach to new teachers. This method does not align with the scientific evidence of how children learn how to read.

Sometimes called "MSV"—shorthand for meaning, syntactical and visual—the cueing approach emphasizes reading whole words over learning the alphabetic code. This method of teaching reading can be

especially [problematic for children who are having difficulties](#) learning how to read.

To improve students' reading ability, [I believe](#) schools, districts and states must push multiple levers simultaneously. This includes making sure instruction, curriculum and testing all align with the science of reading, and that teachers and administrators are provided adequate professional development about reading instruction.

Further, teacher education programs must commit to preparing teachers who understand how reading develops in children's brains and how to implement teaching practices that are based on current evidence.

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