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Unleashing the Power of Best First Instruction

To help students catch up from interrupted learning, close achievement and opportunity gaps, and ensure more equitable outcomes for all students, there's likely no better place to begin than best first instruction.

By Bryan Goodwin

About the Author

Bryan Goodwin, president and CEO of McREL, thrives on translating insights from education research into practical strategies and professional learning for effective teaching and school leadership. He is the author or co-author of several McREL books, including *The New Classroom Instruction That Works*, *Learning That Sticks*, *Building a Curious School*, and *Instructional Models*. Before joining McREL in 1998, Bryan was a college instructor, a high school teacher, and a business journalist.

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Over the years, policymakers and educators have attempted to "reform" or fix schools in myriad ways. They've attempted to raise expectations for students with curriculum standards and high-stakes assessments. They've crafted complex teacher evaluation systems in an effort to raise teacher quality. And they've spent billions on technology to modernize classrooms. Yet studies suggest these reforms have produced, at best, mixed results (Fullan, 2011; Taylor & Tyler, 2012; Organisation for Economic Co-operation and Development, 2015) and did little to close racial and socioeconomic achievement gaps (Reardon et al., 2013).

That's perhaps because, as education historian Larry Cuban has noted, so-called school reform efforts often resemble a hurricane at sea—there's lots of bluster from policymakers "whipping up the waves on the surface," yet "deep down on the ocean floor, life goes on, undisturbed by the roiling waters and huge waves on the surface" (2013, p. 16). In short, these so-called sweeping reforms do little to effect real change where it matters most—the daily interactions between teachers and students in the classroom.

The power of best first instruction

That's the bad news. Here's the good news: Through a review of rigorous scientific studies of teaching strategies in classrooms with diverse learners, a team at McREL International has discovered (or perhaps re-discovered) that ***best first instruction has tremendous impact on student learning—equivalent to months or years of additional learning while closing achievement gaps.*** Over two years, our team examined hundreds of research studies and identified 105 that met the U.S. Department of Education's What Works Clearinghouse standards for evidence. Together, the findings from these studies demonstrate that when applied at the right time and in the right way, a relatively small number of teaching practices (14 in all) can have a tremendous impact on learning, especially for marginalized students.

We all learned back in math class that the shortest distance between two points is a straight line. When it comes to improving student achievement, closing gaps, and ensuring more equitable outcomes, the "straightest line" for educators is to focus squarely on ensuring that every student receives best first instruction every day, in every classroom.

Best first instruction: Do we know it when we see it?

Perhaps the most important contribution of this analysis and presentation of research, which we will publish at the end of 2022 with ASCD as the book, *The New Classroom Instruction that Works: The Best Research-based Strategies for Increasing Student Achievement* (Goodwin et al., in press) is that it offers a clear and accessible definition of "best first instruction"—a term regularly bandied about but often ill-defined. To date, definitions for best first instruction often are vague (e.g., teaching that gives all students "opportunities to learn"), grounded more in theory than research (e.g., applying debunked theories such as teaching to students' learning styles), or circularly defined (e.g., teaching that meets the needs of 80% of learners) without describing *what exactly* teachers must do to reach the needs of most learners.

All too often, calls for using best first instruction *appear* to assume that we know best first instruction when we see it. But do we? In our work with schools and school districts across the nation and world, we have seen that teachers and school leaders in the same building often have very different definitions of, and assumptions about, what it means to deliver high-quality instruction. Is it teacher-directed or student-centered? Independent or group-based? Personalized or standardized?

It's not surprising then that studies find wide variations in teaching quality in classrooms and worse, generally low-quality instruction in most (Pianta et al., 2007). Yet we also know from research that what teachers do in the classroom can have a tremendous impact on student learning—a highly effective teacher can deliver 18 months of learning over the course of a school year whereas a highly ineffective one only provides six months of learning (Hanushek, 2002). In short, teaching matters.

Moving toward a scientific definition of best first instruction

So, if we want to ensure more equitable outcomes for students, we could do worse than start with a clear definition of best first instruction—one that's based on science and provides every teacher with a straightforward list of teaching practices that have been shown to improve learning outcomes of all students. After reviewing hundreds of research studies as well as decades of research in cognitive science (sometimes referred to as the science of learning), we suggest the following definition: *Best first instruction is the skillful use of proven teaching techniques that are intentionally sequenced to help all students convert new learning into long-term memory.*

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Two big ideas are embedded in this definition. The first is *skillful* use of a manageable set of evidence-based teaching practices shown to support better outcomes for today's learners in real classrooms. This is the ***science of teaching***. Although implementing proven teaching strategies may sound relatively straightforward, studies suggest that only about 17% of classrooms reflect high-quality instructional practices (Pianta et al., 2007).

The second big idea is the *intentional* use of these practices to guide the process of learning—from immediate memory to short-term working memory to long-term memory. This is the ***science of learning***. In short, teachers must understand how students convert new information into memory. While this, too, may sound obvious, few teachers fully comprehend the science of learning because it's seldom taught in teacher preparation programs (Roediger & Pyc, 2012) or included in the textbooks used by aspiring teachers (Pomerance et al., 2016). So, it's not surprising that students forget as much as 90% of what they learn within 30 days of learning it (Medina, 2008).

Research shows that when we combine these two disciplines—the science of learning and the science of teaching—we dramatically improve the chances that all students will succeed as learners without special interventions beyond occasional targeted supports in small groups.

The framework on pages 3 and 4 shows how these two big ideas—the science of learning (which we show as a six-phase model of learning [Goodwin, Gibson & Rouleau, 2020]) and the 14 evidence-based practices that reflect the science of teaching—come together to describe best first instruction in a clear and practical way.

McREL's Framework for Best First Instruction

How does learning occur? *The science of learning*	What teaching practices support each phase of learning? *The science of teaching*
Phase 1: Become interested Because our brains ignore most of the stimuli they encounter, to learn anything, students must first become interested in it, finding it personally relevant, meaningful, and/or intellectually stimulating.	**Cognitive interest cues** Scientific studies demonstrate the power of hooking student interest in learning with thought-provoking questions, compelling visuals, and personal connections to new knowledge and skills that draw students, intellectually, into new learning.
Phase 2: Commit to learning Learning takes mental effort, so students must commit to it—convincing their brains "switched on" to learning.	**Student goal setting and monitoring** Numerous studies show significant effects for engaging students in setting and monitoring progress toward goals—translating teaching objectives into personal goals for learning that they find valuable and achievable.
Phase 3: Focus on new knowledge To learn anything, students must focus on it in their short-term working memory. Research suggests they do this best if they encounter material presented both visually and verbally and have opportunities to translate complex ideas into concrete examples and concise packets of information called words (i.e., vocabulary).	**Vocabulary instruction** Words are the pegs upon which we hang ideas. So, it's not surprising that direct instruction of subject-specific and academic vocabulary has been shown to significantly improve student learning outcomes. **Strategy instruction and modeling** Studies make a strong case for providing students with step-by-step direct instruction and modeling of new skills and procedural knowledge, including thinking skills. **Visualizations and concrete examples** The human brain is hardwired to process information better when it's received visually and verbally. Not surprisingly, using images and nonlinguistic representations as well as helping students grasp abstract concepts with concrete examples have all been shown to greatly enhance learning.
Phase 4: Make sense of learning Students' short-term working memories can juggle only small amounts of information at once. So, we must provide them with regular opportunities to pause and process new learning by connecting it to prior learning, thinking about it, and discussing it with peers.	**High-level questions and student explanations** Students only learn what they *think about*, which helps them to consolidate new learning in their brains. Accordingly, multiple studies demonstrate the power of posing high-level questions to students that prompt them to analyze, synthesize, and reflect on new learning, and/or explain their thinking. **Guided initial application with formative feedback** After seeing a new skill demonstrated, students need opportunities to try it for themselves and begin forming the neural connections that will eventually become automated mental scripts. During these initial attempts, it's vital they receive feedback that helps them reflect on error patterns and how to correct them. **Peer-assisted consolidation of learning** Multiple studies point to the power of group learning to help students consolidate new learning by processing together what they've learned following lectures, independent reading, or experiments.

McREL's Framework for Best First Instruction *(cont.)*

How does learning occur? *The science of learning*	What teaching practices support each phase of learning? *The science of teaching*
Phase 5: Practice and reflect Repetition is the key to long-term memory. To commit new learning to memory, students must practice it, attempt to recall it, think about it, and/or apply it multiple times.	**Retrieval practice (quizzing to remember)** Racking our brains to retrieve learning strengthens the neural connections that store knowledge. Hence, providing students with frequent (ungraded) quizzes has been shown to significantly strengthen their recall of new learning. **Spaced, mixed practice** Research shows massed practice ("cramming") leads to fast learning and fast *forgetting*. It also shows that rehearsing a *mix of skills* (instead of just one skill) during the same practice session enhances memory. So, student practice sessions should be spaced over days and weeks and engage them in practicing a variety of related skills. **Targeted support (scaffolded practice)** Multiple studies show the benefits of providing students who initially struggle to master new learning with opportunities to re-learn and re-practice it. Delivered well, targeted supports can virtually close achievement gaps and help students return to on-grade-level performance.
Phase 6: Extend and apply Ultimately, for new learning to stick, students must return to it in multiple ways—applying it, thinking about it, and using it to engage in personal and creative expression. Hence, to support deep learning, we must provide students with opportunities to extend and apply their learning. .	**Cognitive writing** Research points to the power of cognitive writing (extended writing assignments that engage students in high-order processing of new learning) to support deeper learning. **Guided investigations** Several studies demonstrate that guided investigations (such as students exploring compelling questions, observing real-world phenomena, analyzing data and evidence, and reporting their discoveries) have lasting effects on learning. Likely, that's because inquiry helps them develop richer mental and personal connections to new material. **Structured problem solving** Multiple studies point to the power of teaching students the step-by-step processes required to apply new knowledge and skills to identify the underlying structure of complex, real-life problems and retrieve prior learning to solve them.

Best first instruction supports diverse learners

It's worth noting that these strategies have been shown to work with diverse learners. In fact, fully 75 of the 105 studies in our sample (71%) were conducted in classrooms where at least 40% of students were either Black, Indigenous, multilingual, learning disabled, previously low achieving, or in poverty. Thus, we don't need to speculate if these strategies will work for diverse students. We know definitively that they do. And in several studies, these strategies were found to significantly close achievement gaps between marginalized and non-marginalized students.

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It's likely no surprise then that these strategies mirror many of those identified as culturally responsive teaching practices (e.g., Gay, 2018), including:

- Making learning interesting and relevant for students by situating it in their personal lives (i.e., cognitive interest cues, cognitive writing, structured problem solving, and guided investigations).
- Engaging students in active dialogue with peers to process their learning (i.e., peer-assisted consolidation of learning).
- Helping students develop self-efficacy and a positive image of themselves as learners (i.e., personal goal setting).
- Using relatable concrete examples to illustrate abstract ideas (i.e., visualizations and concrete examples).

In addition, our synthesis of scientific research identified several other teaching strategies shown to reduce achievement gaps, including the following:

- Providing students with direct instruction in key subject-specific and academic vocabulary words (i.e., vocabulary instruction).
- Modeling and demonstrating key skills and processes, including reading, writing, and thinking skills (i.e., strategy instruction and modeling).
- Observing students closely during initial attempts to develop and apply newly learned skills and guiding them with real-time feedback that supports reflection on their learning (i.e., guided practice with formative feedback).
- Using formative assessments to identify student learning gaps and providing them with immediate supports to catch them before they fall (i.e., targeted supports).

One takeaway from these strategies is that the key to helping each and every student succeed appears to be teachers using "high touch" approaches to instruction and learning rather than using a hands-off, minimally guided approach (which, at best, only work for already high-achieving students and thus exacerbate achievement gaps). Collectively, the strategies included in this definition of best first instruction help educators to define, in a scientific way, practices that are truly responsive to student learning needs—that is, brain-based teaching practices that support more equitable learning outcomes for all students.

Quantifying the impact of best first instruction

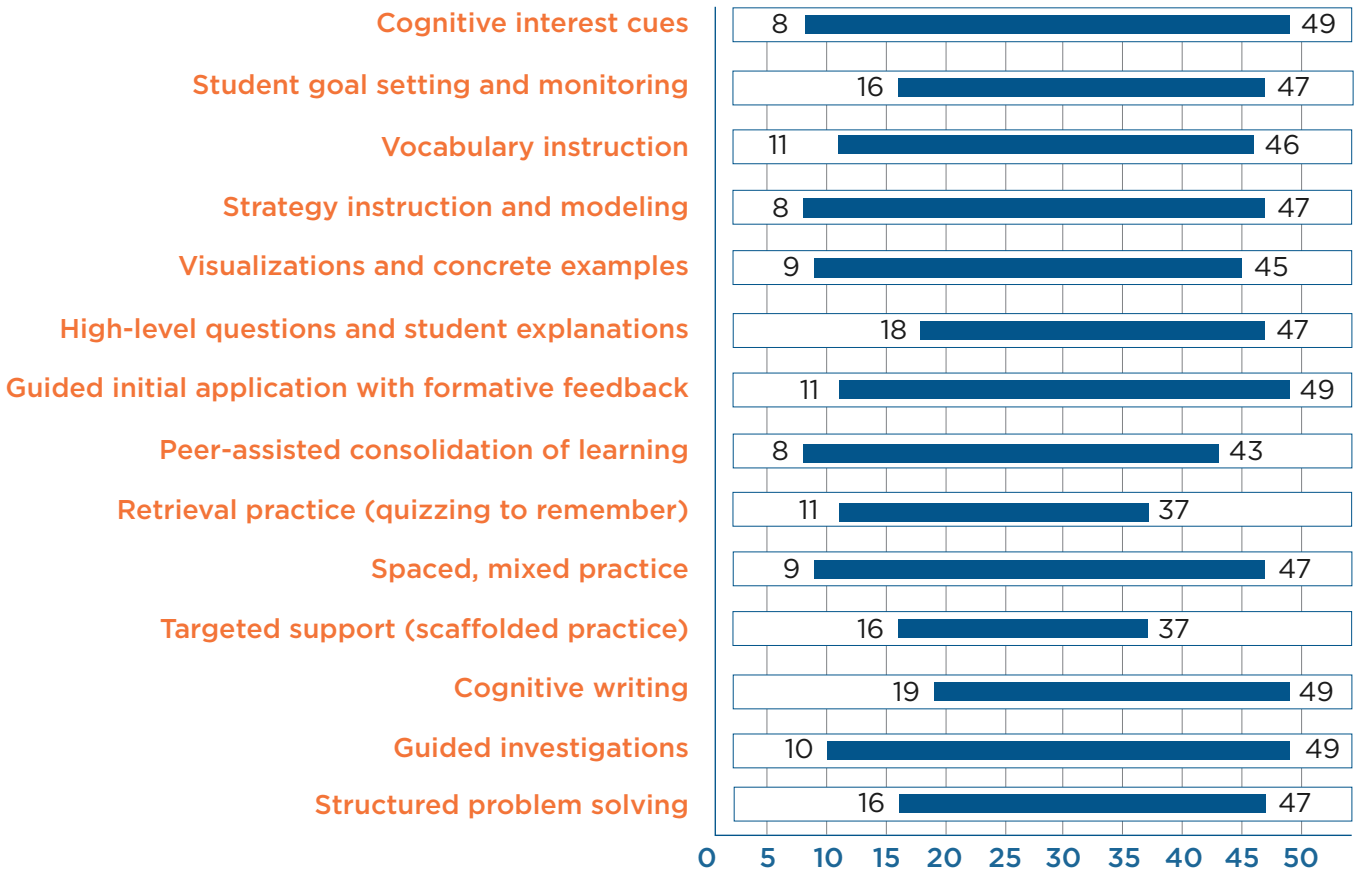
Finally, it's worth emphasizing that these teaching practices were shown to have a significant, positive impact on student outcomes. In *The New Classroom Instruction that Works,* we use a measure from the federal What Works Clearinghouse called an "improvement index score" (see https://ies.ed.gov/ncee/wwc/glossary). Basically, this score is a number from 0 to 50 that indicates how many additional *percentile* points an average student (one at the 50th percentile) would perform after receiving a particular instructional strategy or intervention. For example, an improvement index score of 10 suggests an average student would improve from the 50th to the 60th percentile after receiving the teaching intervention.

Notably, only a handful of the studies included in our research base examined a single strategy in isolation. Rather, they tended to examine a combination of strategies (for example, combining goal setting, strategy instruction, and spaced practice). So, in our reporting of effect sizes, we refrained from attempting to offer a single score for any particular strategy. Instead, we reported the range of improvement scores that emerged from the studies associated with each strategy. We show these ranges in the chart on the following page.

Overcoming learning loss and interrupted learning with best first instruction

We can translate these effect sizes into another commonly used (though often criticized) metric—how many additional weeks or months of learning students might demonstrate in classrooms where teachers use these strategies consistently well. These calculations are a

Improvement index score ranges for the 14 strategies



bit messy and easily misinterpreted, so we'll explain briefly how they work. Researchers arrived at this measure by starting with the average year-over-year learning gains students demonstrate on nationally normed standardized tests (Bloom et. al, 2008). For example, if you were to compare the test results of average second graders (those at the 50th percentile) to those of average first graders, you would find that average second graders are almost a full standard deviation above the mean in both reading and math—that is, they perform at roughly the 84th percentile of first graders (Bloom et. al, 2008). Thus, for second graders, an improvement index score of 34 translates into roughly one full year's worth of learning, and half of that, an improvement index score of 17 points, translates into six months of learning, and so on. As students get older, these yearly differences in performance shrink. By the time they reach high school (e.g., grades 10 and 11), the year-over-year differences in performance are just 8 percentile points difference in reading and 6 percentile points in math (Bloom et. al, 2008).

Because the 105 studies we examined spanned every grade level and subject area (which, of course, all have their own months-of-learning metrics), we cannot say with certainty that using teaching strategy X will result in Y months of additional learning in the classroom. Nonetheless, this months-of-learning measure is common. For example, a recent McKinsey & Company study (2022) reported that students fell an average of five months behind in math and four months behind in reading during the pandemic. Given the proliferation of this measure, it might be helpful to compare apples

to apples, so to speak, by translating the effects of best first instruction into months of learning.

So, how exactly does best first instruction compare to the so-called learning losses of the pandemic? Even in early grades, where students' year-over-year gains are the largest, an improvement index score of 8 (the lowest reported in our studies) translates into roughly three months of additional learning. At the high end of these ranges, improvement scores in the upper 40s (as reported for many of the 14 strategies) translate into approximately 18 months of additional learning for elementary students and multiple years of additional learning for older students. Such a seemingly high effect size, of course, defies belief (and illustrates some of the problems with using this months-of-learning metric in the first place).

Nonetheless, it's safe to say that the reported learning gains from these 14 strategies are all equivalent to several months or more of learning—equal to or greater to the learning setbacks that appeared to occur during the pandemic.

Best first instruction: The right place to begin

In sum, the good news in all of this is that the positive effects of best first instruction far outweigh the negative impact of interrupted learning during the pandemic. Herein lies the most hopeful message of all: To help students catch up from interrupted learning and ensure more equitable outcomes for all students, there's likely no better place to begin than best first instruction.

The powerful effects of best first instruction ought to be difficult to ignore—especially when, as noted earlier, the majority of the studies we examined were conducted in classrooms with diverse learners, students in poverty, students with prior low achievement, and multilingual learners. Moreover, these practices were shown to narrow achievement gaps and thus ensure more equitable outcomes for every learner.

To help students catch up from interrupted learning and ensure more equitable outcomes for all students, there's likely no better place to begin than best first instruction.

Collectively, these findings should provide some inspiration for beleaguered teachers and school leaders, especially as best first instruction is a straightforward and inexpensive approach to supporting all learners. We don't need sweeping changes, new whiz-bang technologies, or the latest reform du jour to support more equitable outcomes for students and help kids catch up. We simply need to help teachers at all grade levels consistently use a handful of tried-and-true instructional strategies that comprise best first instruction. ■

References

Bloom, H. S., Hill, C. J., Black, A. R., & Lipsey, M. W. (2008). Performance trajectories and performance gaps as achievement effect-size benchmarks for educational interventions. *Journal of Research on Educational Effectiveness, 1*(4), 289–328.

Cuban, L. (2013). *Inside the black box of classroom practice: Change without reform in American education*. Harvard Education Press.

Fullan, M. (2011). *Choosing the wrong drivers for whole system reform* [Summary of Seminar Series Paper No. 204]. Australia Centre for Strategic Education.

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice* (3rd ed.). Teachers College Press.

Goodwin, B., Gibson, T., & Rouleau, K. (2020). *Learning that sticks: A brain-based model for K–12 instructional design and delivery*. ASCD.

Goodwin, B., Rouleau, K., Baptiste, K., Gibson, T., Kimball, M. (in press). *The new classroom instruction that works: The best research-based strategies for increasing student achievement* [Manuscript submitted for publication]. ASCD.

Hanushek, E. A. (2002). Teacher quality. In L. T. Izumi and W. M. Evers (Eds.), *Teacher quality* (pp. 1–12). Stanford, CA: Hoover Press.

McKinsey & Company. (2022, April 4). *How COVID-19 caused a global learning crisis*. Retrieved August 29, 2022 from https://www.mckinsey.com/industries/education/our-insights/how-covid-19-caused-a-global-learning-crisis.

Medina, J. (2008). *Brain rules: 12 principles for surviving and thriving at work, home, and school*. (p. 221). Pear Press.

Organisation for Economic Co-operation and Development. (2015). *Students, computers and learning: Making the connection*. OECD Publishing. http://dx.doi.org/10.1787/9789264239555-en

Pianta, R. C., Belsky, J., Houts, R., & Morrison, F. (2007). Opportunities to learn in America's elementary classrooms. *Science*, 315(5820), 1795–1796.

Pomerance, L., Greenberg, J., & Walsh, K. (2016). *Learning about learning: What every new teacher needs to know*. National Council on Teacher Quality.

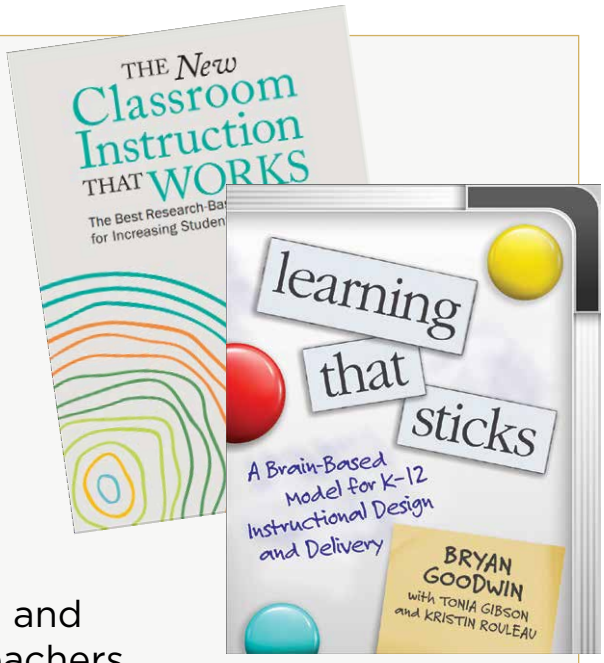
Reardon, S. F., Greenberg, E. H., Kalogrides, D., Shores, K. A., & Valentino, R. A. (2013). *Left behind? The effect of No Child Left Behind on academic achievement gaps*. Stanford Center for Education Policy Analysis.

Roediger III, H. L., & Pyc, M. A. (2012). Inexpensive techniques to improve education: Applying cognitive psychology to enhance educational practice. *Journal of Applied Research in Memory and Cognition, 1*(4), 242–248.

Taylor, E. S., & Tyler, J. H. (2012, Fall). Can teacher evaluation improve teaching? *Education Next, 12*(4).

Additional Resources

For a deeper dive into best first instruction and the strategies listed in this paper, check out the following books and online resources.



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