

Teaching for Rigor: A Call for a Critical Instructional Shift

Why essential shifts in instruction are
necessary for teachers and students
to succeed with college and career
readiness standards.

By Robert J. Marzano and Michael D. Toth

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Our Mission

Learning Sciences Marzano Center, West Palm Beach, Florida, promotes excellence in public education by developing and providing next-generation pedagogical tools, data systems, and training for K-12 educators at the school and district level. Built on a foundation of expert research into best practices under the direction of national researcher and author Dr. Robert Marzano, the Marzano Center identifies, develops, and disseminates cutting-edge resources in educational best practices. With a staff of expert practitioners, consultants, and researchers, our goal is to support all K-12 educators to be highly effective, lifelong learners, and in doing so, to significantly impact student growth and achievement over time.

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Summary

Are teachers prepared to instruct students in the cognitively complex skills necessary to meet new college and career readiness standards? Based on more than 2 million data points generated by classroom observations and analyzed by Learning Sciences Marzano Center that document the pedagogical strategies teachers are currently using in their classrooms, we have uncovered evidence that the majority of

teachers are not adequately prepared to make the critical instructional shifts necessary to meet the requirements for rigor in college and career readiness standards. This monograph offers a new, focused model of essential classroom strategies to support the demanding instructional shifts in pedagogy needed in an environment where academic rigor is no longer an option but a requirement for all students.

Introduction

The ACT testing organization reported in 2008 that more than three-quarters of students who took and passed a core college-prep curriculum were nonetheless unprepared to do college-level work. Nearly half of ACT-tested 2005 high school graduates who earned a grade of A or B in high school Algebra II were not ready for college math, and more than half of those who earned a grade of A or B in high school physics were not ready for college science.

– The Hechinger Report, “Rigor: It’s all the rage, but what does it mean?” (April 7, 2010)

An article published in *The Hechinger Report* summarized the anxieties of educators, parents, and reform advocates who have recognized for years that the majority of U.S. high schools are simply not matriculating students who are ready for college or career. The article quoted an estimate from Michael Kirst, emeritus professor of education and business at Stanford University, that 30% of high school students need remedial math or English at four-year colleges; and 60% require remedial courses at community colleges. If 75% of four-year college students¹ are not prepared as freshman for college English, math, reading, and science – students who have for the most part been channeled through college preparatory classes – the report makes clear that our public education system is ill-prepared to adequately develop students to succeed at college and career.

Of course, it was the recognition of this college and career readiness gap that spurred a nationwide movement, led by the Council of Chief

State School Officers and the National Governors Association, to implement national K-12 Common Core and states’ college and career readiness standards (CCRS). The new standards, as we know, have been designed to ensure that all students in every state will meet college and career requirements. A major focus of the new standards is their emphases on higher-order thinking skills and the ability to solve complex problems. Students planning to enter the workforce directly after high school, as well as college-bound seniors, need these essential reasoning and decision-making skills equally. This emphasis on higher-order learning is the foundation for the concept of “rigor.”

Teaching for Rigor: A Call for a Critical Instructional Shift

This paper describes the essential shift in classroom instruction necessary to ensure that students achieve the level of rigor required by new state academic standards. Many districts have implemented curricula to align with the new standards; new textbooks are in the hands of students; and assessments are being chosen or developed to test students’ acquisition of more rigorous content and skills. But teachers still lack a carefully calibrated model of instruction with a clear pathway of supports and data monitoring to ensure that the significant shifts in instructional strategies are being fully accomplished in every classroom with fidelity. A solution to fill this need is all the more urgent, as early student assessments aligned to Common Core and other college and career readiness standards are showing troubling drops in student achievement.

¹Three out of four ACT-tested 2006 high school graduates who take a core curriculum are not prepared to take credit-bearing entry-level college course with a reasonable chance of success in those courses.” (ACT, 2008). In 2011, just one in four high school graduates met all four college readiness benchmarks – English, reading, math, and science (ACT, 2011). Just 52% met the Reading benchmark.

Tests for College and Career Readiness Standards: What Do They Measure?

New PARCC and SBAC (Smarter Balance) assessments developed to test college and career readiness content and skills require deeper cognitively complex processing than previous state assessments, or other assessments designed to address the new rigorous requirements. In fact, subject matter and skills tested by the new assessments are likely to focus on *analysis* and *knowledge utilization* rather than mere recall of content. Linda Darling-Hammond has explained the standards-aligned tests this way:

Performance tasks ask students to research and analyze information, weigh evidence, and solve problems relevant to the real world, allowing students to demonstrate their knowledge and skills in an authentic way. The Smarter Balance assessment system uses performance tasks to measure skills valued by higher education and the workplace — critical thinking, problem solving, and communication — that are not adequately assessed by most statewide assessments today. (Smarter Balance Assessment Consortium, 2012)

A UCLA analysis by Joan Herman and Robert Linn (2013) investigating PARCC and SBAC assertions about the rigor of the tests supported Darling-Hammond's description. The authors conclude their study with a warning:

Initial [test] results are likely to provide a shock to the public and to teachers' usual instructional practice. ... the availability of resources to support that transition will make a tremendous difference in how well the new assessments are accepted and/or whether there is additional pushback to them. (p. 19)

The demands of the new tests have already presented a "shock to the public and teachers' usual instructional practice" (Herman, 2013) in many states. In 2012, for example, with the publication of *Primary Sources*, the Bill & Melinda Gates Foundation reported that while 78% of teachers knew about Common Core State Standards, only 22% felt very prepared to teach to meet them. More than 79% of unprepared teachers felt they needed professional development to understand the standards and teach to meet them effectively.

In a 2012 blog for Core Commons, Emily Workman sounded concerns shared by many:

Teachers have repeatedly voiced concerns about their ability to successfully teach the standards through blog posts and other media outlets, as well as at meetings and conferences where implementation of the standards is discussed... A number of initiatives have popped up, offering teachers opportunities for training and professional development, but feedback from teachers and policy experts indicates that these resources are either not reaching enough teachers, are a one-size-fits-all approach, or are of questionable quality."²

Taken together, Workman concluded, teachers' concerns amount to a "cry for help."

Providing teachers with programs, tools, and professional development to support this shift in practice will be crucial if districts hope to avoid serious drops in test scores under the new standards. Preliminary

²A Center for Education Policy survey indicated that more than half of the 315 districts surveyed reported they had no plans to provide professional development on new standards for teachers of mathematics or English language arts during the 2011-12 school year.

reports indicate that such declines have already begun. An August, 2013 op-ed in *The New York Times* noted that the first release of New York's Common Core-aligned state test scores showed a drop even more precipitous than expected:

...the data show that about 31 percent of the state's students in third through eighth grades met or exceeded the proficiency standard in language arts. That is down from about 55 percent in 2012 and 77 percent in 2009, when the state tests were easier. (Chapman & Letch, 2013)

Where is the "HOW?" Many of my fellow teachers and I understand the need for more rigor and challenging our students to help them achieve. We get it. What is lacking is the "how." How is teaching with the new standards different from teaching with the old?

New York schools with high concentrations of ELL, Special Ed, or Black and Latino students were particularly hard hit. An unpublished Annenberg analysis of 2013 state test scores, summarized in the *New York Daily News*, reported that in New York, schools with the highest concentrations of special education students dropped 64% in reading scores and 72% in math scores. Schools with heavy populations of ELL students saw scores fall approximately 70% in both reading and math. Black and Latino student scores fell 56% in reading and more than a 60% in math from 2012 to 2013.³

The *Baltimore Sun* pointed to similar declines with Common Core-aligned tests in Maryland:

...drops in test scores for both elementary and middle schools were seen in nearly every school district and were as great in the higher-performing districts of Howard and Montgomery counties as they were in Baltimore City. (Bowie & Green, 2013)

In Kentucky, scores fell by "a third or more" in both elementary and middle school according to an article in *Education Week*. (Ujifusa, 2014). The news was equally troubling in North Carolina, where educators saw a "dramatic drop in performance by students, schools and districts on standardized tests." (Bonner, 2013)

In her 2013 blog for the National Network of State Teachers of the Year, "My View from the Common Core", teacher Kathy Powers was specific in her plea for the kind of support teachers need:

Where is the "HOW?" Many of my fellow teachers and I understand the need for more rigor and challenging our students to help them achieve. We get it. What is lacking is the "how." How is teaching with the new standards different from teaching with the old?

³In a related March 3, 2014 discussion of Common Core on NPR's *The Diane Rehm Show*, high school principal and education writer Carol Burris cited as her primary concern that new standards would work to widen the achievement gap beyond repair.

Getting to How

Michael D. Toth, Learning Sciences International CEO, has described classroom visits and video analysis where “we see teachers working much harder than their students.” In other words, teachers still rely heavily on traditional *teacher-centered* strategies to deliver content, strategies where students remain dependent on continuous teacher direction.

Teacher-centered instruction which emphasizes lecture, practice, and review is the pedagogy most teachers likely experienced as students themselves, later found modeled by professors in college, and then had reinforced when they entered the teaching profession. It is not surprising that teacher-centered instruction continues to be the mainstay of teaching today.

This traditional pedagogical profile may have worked for teachers in the past under less demanding standards. This is not a pedagogy, however, that will help students succeed with the new standards. Instead, it is far more likely to result in teacher burnout and student fatigue. Photos of students weeping over their homework (Twitchy, 2014) and stories of student frustration with standards-aligned assessments, students who are becoming scared of school⁴ (Baker, 2014), and who suffer high anxiety over increasingly demanding content, are already going viral. Teachers and parents, too, are feeling stressed and demoralized (Hurley, 2013).

But a great deal of this stress can be alleviated when teachers are trained to make significant shifts in their pedagogy to move to *student-centered* strategies, and to support student learning by scaffolding content from basic knowledge to complex application.

⁴Among several prominent examples: A Feb. 16, 2014 *New York Times* article, quoted high school principal Carol Burris: “We see kids . . . they don’t want to go to school anymore.”

Engagement and the Student-Centered Classroom

Klem and Connell (2004) have reported that “by high school as many as 40% to 60% of students become chronically disengaged from school – urban, suburban, and rural – not counting those who already dropped out” (p. 262). Causes and consequences of engagement include the reaction to challenge, or students’ coping strategies for dealing with a challenge, particularly whether they engage or withdraw: “Students who perceive the situation as challenging [as opposed to students who feel threatened, not challenged] actively persist in the face of failure through the use of effort, strategic thinking, problem-solving, information-seeking, and experimentation” (p. 262).

For new standards to be a healthy challenge and not a threatening one for students, teachers must intentionally scaffold lessons using student-centric strategies with more frequency and in greater depth. It’s clear that the development of such skills requires a new way of thinking about the traditional teacher-centric classroom.

The move toward rigor places students squarely at the center of the classroom, where they will grapple with challenging content individually and collaboratively, and where they will be expected to actively demonstrate their learning. Teachers will have to embrace a shift in their instructional methods, the strategies on which they rely to teach content, to methodically empower students to successfully own their learning at the highest levels of complexity.

Teachers need models and training to help them step back to the role of skilled facilitators, to guide students to take ownership of their own learning. The teacher's role here is to equip students with tools to work collaboratively in groups, or to individually apply and solve complex real-world problems. In other words, students must learn to *use* their knowledge, to put it to work on solving problems, not to simply recall it in some fashion without elaboration. The teacher's new role will be to facilitate this transition.

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Our own research at Learning Sciences Marzano Center, an analysis of more than 2 million data points collected from observer ratings on specific classroom instructional strategies, indicates that even today, with the increased focus on rigor, the great majority of teachers still devote the highest frequency of classroom instruction to introducing and practicing new knowledge, activities which are at the lower levels of Bloom's (1956), Webb's (2002), and Marzano's (2001) taxonomies of educational objectives. Students must develop the ability to test hypotheses, analyze and synthesize in order to be successful not just on the new assessments, but also in college and in future careers. Additionally, they must be able to work collaboratively, to take knowledge and utilize it in real-world situations. If we hope to move students to these higher levels of skills and cognition, it's imperative that we equip teachers with the "how," those essential teaching strategies that will scaffold students to problem-solve and make decisions in real-world scenarios with less teacher direction.

Instructional Readiness: Where Teachers Are Now

As discussed previously, although teachers may have new standards-aligned textbooks, a carefully revised curriculum, and standards-based assessments, few teachers feel prepared, in terms of a well-developed pedagogy, to teach rigorous new standards. Until now, the focus of most professional learning has been on understanding the new college and career readiness standards – “the what” – with scant emphasis on the necessary and demanding pedagogical shifts – “the how.”

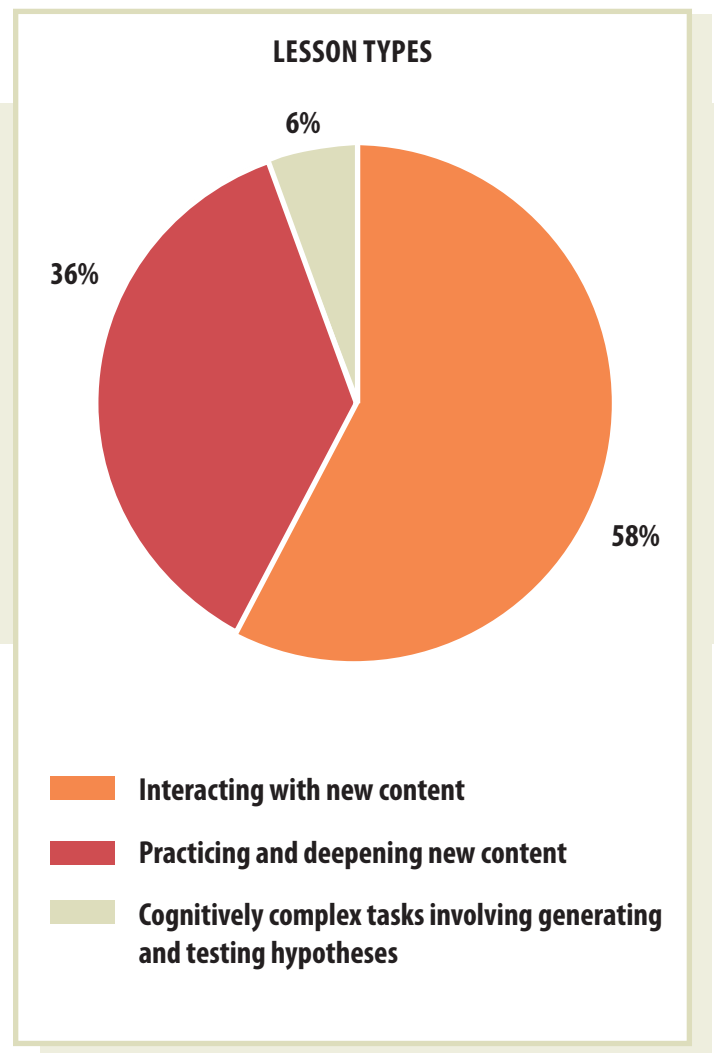
Data analyzed by Learning Sciences Marzano Center support this view.

Less than 6% of observed lessons were devoted to the highest level of cognitively complex tasks involving hypothesis generation and testing. The data indicate that most teachers are placing a significant majority of their classroom emphasis (58%) on teaching new content.

Learning Sciences researchers analyzed more than 2 million data points from across the nation related to the frequency with which teachers were using specific classroom strategies. The data were gathered from the classrooms of teachers using 41 identified categories of research-based instructional strategies. The data were drawn from classroom observations performed by school administrators for the purposes of evaluating teachers, and were analyzed by the Learning Sciences research team.

For the purposes of this discussion, we will focus on those strategies used in the classroom for teaching content (as opposed to planning strategies, classroom management strategies, etc.). In Figure 1, lessons are categorized into three types and indicate the frequency with which the lessons were observed.

Figure 1: Frequency of observed content lesson types



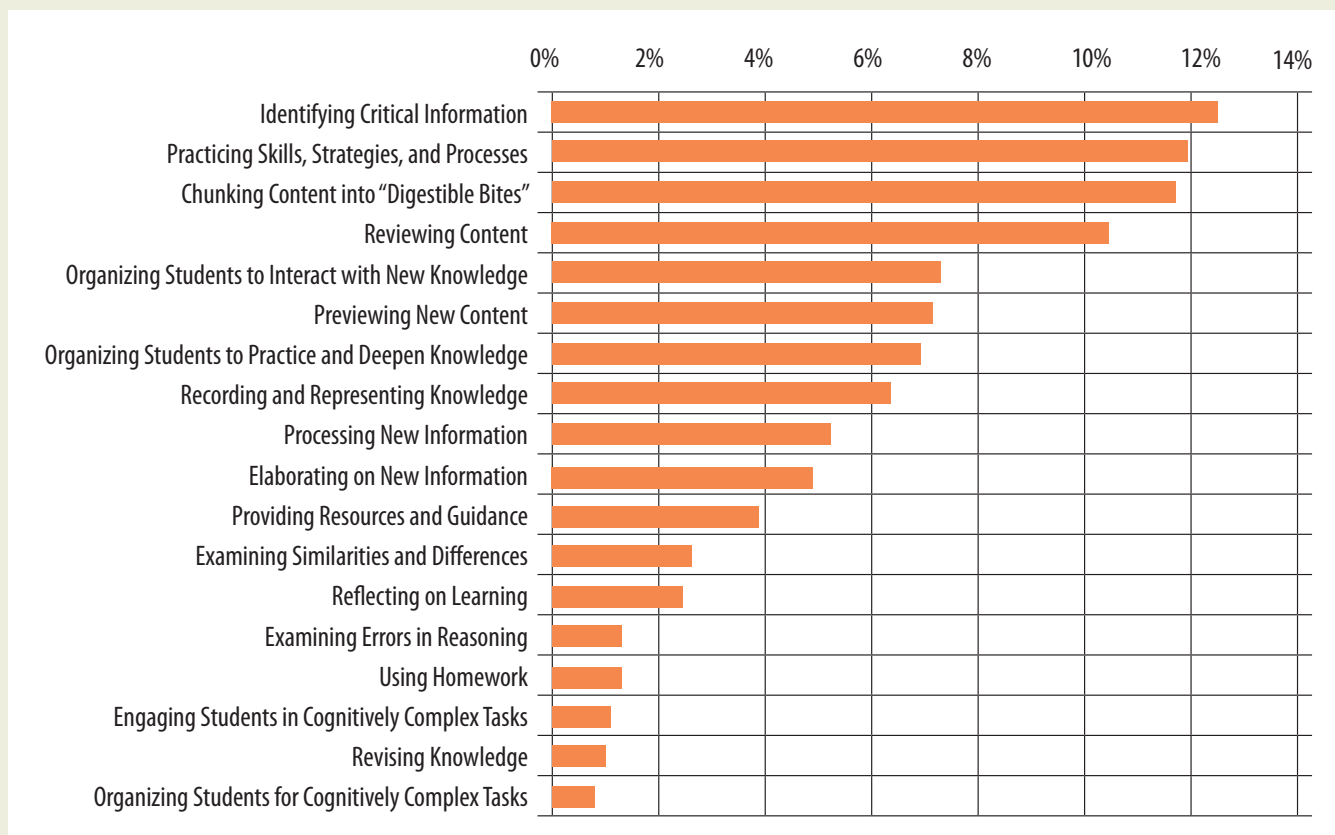
- 58% percent of observed lessons focused on **helping students interact with new content**, including previewing and processing new content, identifying critical content, etc.
- 36% of lessons focused on **helping students practice and deepen new knowledge** (such as examining similarities and differences, examining errors in reasoning, reviewing and revising knowledge).
- **Less than 6% of observed lessons were devoted to the highest level of cognitively complex tasks involving hypothesis generation and testing.**

While it is vital to ensure that students have a solid understanding of introductory-level concepts, we should see evidence that teachers also plan and implement instruction that gradually cedes control

as students move through lessons and begin to deepen their understanding. With the cognitive demands of rigorous standards, students must also quickly build on new knowledge and engage in tasks involving collaboration with peers on rigorous tasks that develop self-sufficiency. Instructional frequency should also reflect those more cognitively complex tasks.

To break it down even further, Figure 2, below, provides details that display a portrait of national teacher practice. Figure 2 illustrates the frequency with which teachers are observed using specific teaching strategies.⁵ At the top of the chart, we see that nearly half of observed instructional frequency (47%) is devoted to four traditional, teacher-centered strategies: **Identifying Critical Information (12.5%)**, **Practicing Skills, Strategies, and Processes (12.0%)**; **Chunking Content (11.8%)**, or teaching targeted pieces of content as appropriate for the students; and **Reviewing Content (10.7%)**.

Figure 2: Frequency of observed content strategies



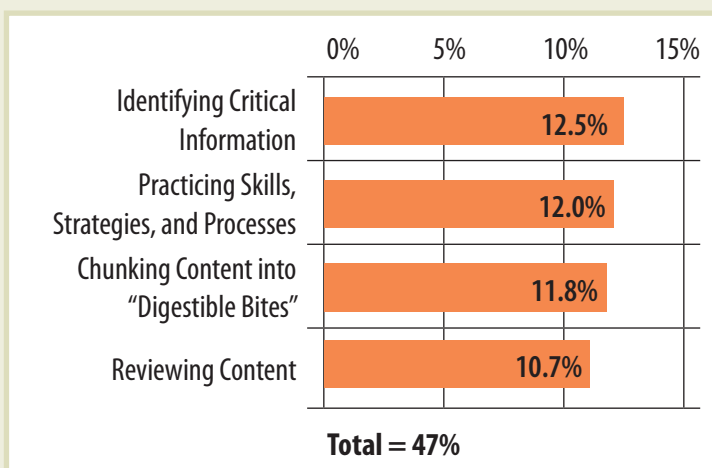
⁵Strategies not listed in this graphic, that will be discussed in future reports, include strategies related to classroom management, communicating learning goals and feedback, engaging students, establishing and maintaining effective relationships, and communicating high expectations for all students.

In contrast, at the bottom of Figure 2, the *least observed strategies* (3.2%) are more student-centered and less teacher-directed. These strategies – **Engaging Students in Cognitively Complex Tasks** (1.2%), **Revising Knowledge** (1.1%) and **Organizing Students for Cognitively Complex Tasks** (.9%) – require students to think on their own or with peers as they refine higher-order thinking skills, such as hypothesis generation and testing, with few interruptions by the teacher. Such cognitively rigorous strategies are startlingly infrequent – just over or under 1%.

To put this in perspective, the data indicate that most teachers are placing a significant majority of classroom emphasis (47%) on teacher-centered instruction that can be generally categorized as lecture, practice, and review (Figure 3).

These types of lessons are hallmarks of what we describe as traditional teacher-centered pedagogy. While this lesson type is important, student ownership and independence are limited within it. Students spend the bulk of these lessons receiving information and listening to teachers. In short, teachers carry the heavy load of thinking and working, while students rely on teacher direction. Such classrooms place a high value on compliance and less emphasis on building independent cognitive skills.

Figure 3: Highest frequency strategies associated with lecture, practice, and review.

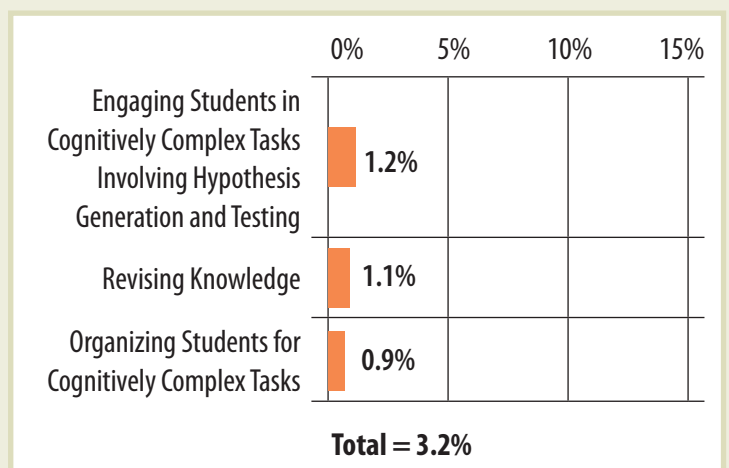


We should see evidence of students wrestling with new content as they build the stamina required to reach higher levels of thinking.

If the majority of instruction is spent at lower levels of complexity, it is unlikely students will perform to standard on state and national assessments written to test cognitive complexity. As new college and career standards are implemented in classrooms, this new emphasis cannot be sustained unless pedagogical strategies change as well.

Figure 4 illustrates those strategies that are more student-centered and that demand sophisticated levels of analysis, hypothesis testing, synthesis, and collaboration in the service of applying knowledge to authentic, real-world problems. The cumulative frequency is just 3.2% – which illustrates that, while we wish students to live and operate here, in fact, they are barely visiting under the direction of their teachers.

Figure 4: Lowest frequency strategies, among the most critical for developing cognitively complex skills.



Instruction focused on achieving rigor is rare. The lack of such instruction amounts to a crisis if we expect students to meet the standards that have been put in place for them.

Within classrooms, there should be ample evidence of students wrestling with new content as they build the stamina required to reach higher levels of thinking. Without the opportunity to struggle with a problem or decision, for instance, students may attain surface-level knowledge of a concept, but be unable to utilize that knowledge in meaningful ways.

How will our students develop these skills if classroom lessons continue to reflect only traditional, teacher-centered instruction? How will teachers thrive in their chosen profession if the outcomes expected of their students are mismatched to pedagogical strategies customarily in use in their classrooms? It is our conclusion that instruction focused on achieving rigor is rare. The lack of such instruction amounts to a crisis if we expect students to meet the standards that have been put in place for them.

Adequate support for the shift to ensure that teachers have the necessary instructional knowledge and skills to reach the required level of rigor will hinge on the professional development they receive. Standards experts agree that the major challenge for new standards has been getting teachers the aligned training to help them refine and adjust their pedagogy⁶. To succeed with new standards, teachers will need a carefully calibrated model of instruction that clarifies and supports these instructional shifts, along with high-impact coaching. Collecting data on these shifts will be equally vital, as data give teachers the monitoring and feedback tools they need to track their own growth and the impact of their pedagogy on students. Additionally, data can be carefully monitored over time, to ensure that every classroom benefits.

Standards experts agree that the major challenge for new standards has been getting teachers the aligned training to help them refine and adjust their instructional techniques.

⁶During a March 3, 2014 discussion devoted to Common Core on NPR'S Diane Rehm Show, Michael Cohen, president of ACHIEVE, and EdWeek Associate Editor and author Catherine Gewertz both stressed that targeted professional development should be a top priority. Cohen noted that such training was in "short supply" and that "doubling down on providing support" was crucial.

Marzano Center Essentials for Achieving Rigor

In collaboration with Dr. Robert J. Marzano, Learning Sciences Marzano Center has developed a model of instruction to refine and supplement teacher instructional skills to meet rigorous new standards. The model focuses on 13 essential classroom strategies for achieving rigor, drawn and condensed from the instructional content strategies illustrated in Figure 2, along with a foundation of supported steps for standards-based planning, data reflection and action, collaboration, and setting optimal conditions for learning. As we continue our research, we will update the model accordingly.

College and career readiness standards require more clarity in the progressions of learning being addressed in class.

Thirteen Essential Classroom Strategies for Achieving Rigor

A new model of instruction, developed by Dr. Robert Marzano and the Learning Sciences Marzano Center, focuses on 13 essential teaching strategies necessary for rigorous instruction.

The Marzano Center's Essentials for Achieving Rigor model posits that, while many factors influence student learning, the greatest contributor to student achievement is classroom instruction.⁷

What Rigor Looks Like

Common Core State Standards and state versions of college and career readiness standards require more clarity in the progressions of learning being addressed in class. Teachers need to plan for not only what students should understand and be able to do by the end of the learning cycle, they need to scaffold their instruction from facts and details to robust generalizations and processes in order to reach these rigorous standards. As part of this clear progression of learning, students need more opportunities to apply their knowledge and make inferences based on what they are learning. The shift to rigorous standards also requires students to make and defend claims with sound evidence including grounds, backing, and qualifiers as part of utilizing the knowledge they acquire in class.

Throughout this progression of learning, scaffolded student autonomy should also be an area of focus. Students should frequently be asked to evaluate the validity and accuracy of their thinking and beliefs. At the conclusion of a learning cycle, students should be able to demonstrate the standard independent of help and describe how the details of the lesson built to support bigger ideas and processes.

⁷Rockoff (2004) found, for example, that a high-performing teacher is four times more effective in driving student learning than a low-performing teacher. Sanders and Rivers (1996) demonstrated that three consecutive years with a high-performing teacher raised student achievement 40 percentile points.

This model provides teachers with the tools they need to intentionally align their instruction with higher taxonomic levels as well as purposefully plan for student autonomy.

The Marzano Center Essentials for Achieving Rigor model scaffolds instruction through the taxonomy from content retrieval to knowledge utilization while conveying high expectations to all students in a student-centered classroom. This model provides teachers with the tools they need to intentionally align their instruction with higher taxonomic levels as well as purposefully plan for student autonomy.

Figure 5 illustrates the 13 core instructional strategies. These 13 strategies, as noted, were drawn and condensed from the content strategies illustrated in Figure 2 (see p. 11). Considered and implemented as a set, these strategies represent a dramatic shift from traditional classroom pedagogy and align directly with the goals of college and career readiness standards.

Note that while these 13 strategies are listed in a linear fashion, they may be used in any phase of instruction, from building foundational content, to deepening content, to utilizing knowledge and skills to engage in complex tasks.

For example, the strategy “Identifying Critical Content” articulates the responsibility of the teacher to continually highlight the important information that is being addressed in class. Further, this strategy functions as the foundation for rigorous instruction. Identifying critical content is crucial when a teacher is introducing new information.

Figure 5: 13 Essential Instructional Strategies to Achieve Rigor

13 Essential Strategies

- Identifying Critical Content
- Previewing New Content
- Organizing Students to Interact with Content
- Helping Students Process Content
- Helping Students Elaborate on Content
- Helping Students Record and Represent Knowledge
- Managing Response Rates with Tiered Questioning Techniques
- Reviewing Content
- Helping Students Practice Skills, Strategies, and Processes
- Helping Students Examine Similarities and Differences
- Helping Students Examine Their Reasoning
- Helping Students Revise Knowledge
- Helping Students Engage in Cognitively Complex Tasks

It is just as important during content review. Even during activities designed for cognitive complexity, it is essential that students know what is critical about the content for which they are generating and testing hypotheses. The difference lies in the level at which the student is working with the critical information. All of the strategies can be used with intentionality throughout the progression of learning.

The 13 essential strategies are:

- **Identifying Critical Content.** As described above, teachers identify which information or skills are critical to mastery of the standards on which they are working. The teacher highlights this crucial information throughout the lesson and across the unit, to enable students to focus on key points, helping them build a logical foundation on which to build from simpler to more complex
- **learning. Previewing new content.** Previewing allows for students to access prior knowledge and analyze new content. It may be used in any level of lesson to connect new content to previously learned information.
- **Organizing students to interact with content.** Students are organized into appropriate groups that facilitate their interaction with content. Shared experience and cooperative learning are essential building blocks of the teaching-learning experience (Marzano & Brown 2009). Whether it's learning introductory content or knowledge utilization, students are provided help regarding how to collaborate in a manner that will help them interact with content and ways they might focus on cognitive or conative skills.
- **Helping students process content.** This strategy systematically engages student groups in processing and generating conclusions about content. Note: For the student-centered classroom, the focus shifts from teacher to student. The teacher is "helping students process content." Inherent in this phrase is that students are expected to work with, summarize, and elaborate on content, not just listen as the teacher discusses or lectures.
- **Helping students elaborate on content.** Helping students elaborate requires students to make inferences about the information addressed in class. Equally important, students are asked to provide evidence and support for their inferences. This strategy has great purpose in any lesson.
- **Helping students record and represent knowledge.** This strategy allows students to create their own representations of the content and processes with which they are interacting. Rigorous standards highlight the need to expand the types of representations elicited from students to include mental models, mathematical models, and other more abstract representations of content.
- **Managing response rates with tiered questioning techniques.** The teacher purposefully asks questions with ascending cognitive complexity in order to support students in deepening their thinking about content. In addition to ensuring that all students respond, the teacher ensures that student responses are backed up by evidence.
- **Reviewing content.** Reviewing content engages students in a brief review that highlights the cumulative nature of the content. For rigorous standards, the teacher also reviews activities to ensure that students are aware of the "big picture" regarding the content.
- **Helping students practice skills, strategies, and processes.** With this strategy, students perform the skill, strategy, or process with increased competence and confidence. The shift in instructional practice to demonstrate rigorous standards also requires students to both develop fluency and alternative ways of executing procedures.

- **Helping students examine similarities and differences.** This strategy engages students in activities such as comparing, classifying, and creating analogies and metaphors that address the “big ideas” and “conclusions” as well as specific details. The strategy can be useful not only when students are deepening their thinking but throughout the learning cycle. There are times when examining similarities and differences is appropriate for previewing, but it is also a highly effective strategy when students are asked to analyze at a deeper level, or to utilize their knowledge to solve a real-world problem.
- **Helping students examine their reasoning.** With this strategy, students produce and defend claims by examining their own reasoning or the logic of presented information, processes, and procedures. The shift to rigorous standards requires the analysis of information for errors or fallacies in content or in students’ own reasoning, as well as the examination and critique of the overall logic of arguments.
- **Helping students revise knowledge.** Students revise previous knowledge by correcting errors and misconceptions as well as adding new information. Additionally, this instructional strategy involves viewing knowledge from different perspectives and identifying alternative ways of executing procedures. This strategy allows students to build a sense of themselves as active learners as they broaden and deepen their knowledge throughout a unit of instruction.
- **Helping students engage in cognitively complex tasks.** Engaging in cognitively complex tasks is not merely an end-of-unit or culminating activity. Students must begin to “live” in a land of cognitive complexity. Students who are presented with a complex knowledge utilization task at the end of a unit, for instance, with no questions, tasks or activities built-in along the way that required them to use that level of thinking, will have much more difficulty making meaning of the task. Effective teachers incorporate “short visits” throughout the unit to help build student capacity for complex tasks.

Students must begin to “live” in a land of cognitive complexity.



A New Standard of Professional Development

Every teacher achieving rigor for every student.

In response to the urgent need for an instructional model to align with the significant shifts required by college and career readiness standards, the Learning Sciences Marzano Center developed the Marzano Center Essentials for Achieving Rigor model based on our research and pilot projects, conducted in large and small districts across the U.S. Our analysts have examined more than 2 million specific data points related to classroom instruction, allowing us to create what amounts to a national profile of teaching.

From this profile, Marzano Center researchers have been able to draw conclusions about the effectiveness of specific instructional strategies, teachers' consistent or inconsistent use of strategies correlated with student achievement gains, and the accuracy of classroom observation as a tool for pedagogical growth.⁸

The Essentials for Achieving Rigor model has been developed to support teachers to make the necessary instructional shifts to prepare students to meet the demands of the new assessments.

The model was designed specifically to assist teachers to develop their pedagogy, the crucial missing component that educational researchers, district and school leaders, journalists, and above all, teachers, have been requesting.

The model was designed specifically to assist teachers to develop their pedagogy, the crucial missing component that educational researchers, district and school leaders, journalists, and above all, teachers, have been requesting.

The Essentials for Achieving Rigor model integrates a full program of resources to support the 13 essential strategies. The program is flexible by design and can be tailored to meet the unique needs of large and small school systems in both urban and rural districts, and to align with state directives. This unique model incorporates:

- **High-quality teacher training** developed by Marzano Center practitioner experts on topics such as
 - Facilitating complex learning
 - Helping students engage in cognitively complex tasks
 - Instructional decision-making
 - Standards-based planning on measurement topics
 - Reflection on lesson outcomes, with action plans for intervention and enrichment.
- **Integrated monitoring tools**, to help teachers transition their instructional practice in profound ways.
- **Parallel training for teacher-coaches** to ensure fidelity within professional learning communities and in one-on-one mentoring.

⁸This report is the first in a series that will detail our analysis of this data.

- **Student feedback components** to help teachers monitor the success of their strategies, provide differentiated instruction, and recalibrate their practice as necessary.

Our trainings for the Essentials for Achieving Rigor model are designed to produce profound shifts for teachers and instructional coaches in guiding students in rigorous learning. We would like to share our insights into this research and to help develop plans to assist teachers to meet goals for achieving rigor.

“That’s the direction we must move in every content area and grade level, to continue to build our teacher capacity and ultimately to provide our kids with the skills to be successful for a lifetime.”

About Learning Sciences Marzano Center and Learning Sciences International

Based in West Palm Beach, Florida, and Mount Joy and Blairsville, Pennsylvania, Learning Sciences International has been at the forefront of teacher professional development, educator effectiveness, and data systems and technology to support educator growth for close to 15 years. In 2003, Learning Sciences partnered with national researcher Dr. Robert J. Marzano and in 2012, founded Learning Sciences Marzano Center. The Marzano Center has developed unique educator effectiveness systems for teachers and school and district leaders focused on an embedded model of instruction. Those effectiveness

Witnessing the Shift

Martin County High School Principal Al Fabrizio discusses the instructional shifts he observed when teachers were trained in the Marzano Center Essentials for Achieving Rigor model:

“Seeing [teacher] Laura scaffold her lessons and her rigorous approach to questioning was absolutely exciting. As we support more of our teachers moving in that direction, it’s going to directly impact student achievement. Ultimately we need to develop kids who, when they leave us, are critical thinkers and problem solvers.

And what better way to work on that skill, in an age when the information is at their fingertips, than to have kids move through the process where they are using their inferencing skills, drawing conclusions, hypothesizing, and then proving what they do hypothesize? That’s the direction we must move in every content area and grade level, to continue to build our teacher capacity and ultimately to provide our kids with the skills to be successful for a lifetime.”

systems have since been implemented across the U.S. and abroad. Our dedicated research team and staff of 80 professionals, including more than 50 educator consultants, provide tailored training solutions and direct implementation in the four effectiveness models and the Essentials for Achieving Rigor model across the U.S. and internationally.

To learn more, or to request a demonstration of the Marzano Center Essentials for Achieving Rigor, contact us at 1.877.411.7114, or visit MarzanoCenter.com.

About the Authors



**Robert Marzano, Executive Director
Learning Sciences Marzano Center**

Robert J. Marzano, Ph.D. is a nationally recognized education researcher, speaker, trainer, and author of more than 30 books and 150 articles on topics such as instruction, assessment, writing and implementing standards, cognition, effective leadership, and school intervention. His practical translations of the most current research and theory into classroom strategies are widely practiced internationally by both teachers and administrators.

Dr. Marzano has partnered with Learning Sciences International to offer the Marzano Teacher Evaluation Model, the Marzano School Leadership Evaluation Model, the Marzano District Leader Evaluation Model, and the Marzano Center Non-Classroom Support Personnel Evaluation Model. The Marzano evaluation models have been adopted by school districts across the country because they don't simply measure ability, they actually help teachers and leaders grow, improving their instruction over time. Dr. Marzano also co-developed the Marzano Center Essential Strategies for Achieving Rigor, a model of instruction that fosters essential teaching skills and strategies to support college and career readiness standards.

Dr. Marzano received his doctorate from the University of Washington.



**Michael Toth, Chief Executive Officer,
Chief Learning Officer
Learning Sciences International**

Michael D. Toth is founder and Chief Executive Officer of Learning Sciences International, iObservation, and Learning Sciences Marzano Center for Teacher and Leader Evaluation. Formerly president of the National Center for the Profession of Teaching, a university faculty member, and director of research and development grants, Mr. Toth transformed his university research and development team into a company that is focused on leadership and teacher professional growth and instructional effectiveness correlated to student achievement gains.

Mr. Toth is actively involved in research and development, gives public presentations, and advises education leaders on issues of leadership and teacher effectiveness, school improvement, and professional development systems. He is co-author, with Robert J. Marzano, of Teacher Evaluation That Makes a Difference: A New Model for Teacher Growth and Student Achievement.

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