

APPENDIX 16: EPIC CURRICULUM AND INSTRUCTION

Analyze & Plan

Summary

Five years after becoming Whittier's principal, Jai Palmer's assessment of his school's implementation of a district math program led him to decide supplemental activities were needed to help students succeed. Successful tutoring in literacy offered a model for more skills practice in math.

Look for:

- How the principal used data to assess professional development and instructional strategies
- How the principal conducted ongoing analyses of how district-wide initiatives were being implemented at his school

Everyday Math, Extraordinary Challenges

I became principal of Whittier in 2001, and about two years later the Denver Public Schools adopted Everyday Mathematics in kindergarten through fifth grade and Connected Math for the middle school grades. After the implementation and district training, we began what would become an ongoing analysis of how each program helped meet the needs of our school's students.

Using the Colorado state standards at each grade level as a guide, we identified areas in which we felt our students would need supplemental activities above and beyond the district-wide programs to master the standards. This analysis became a more effective practice around 2005, after we began receiving student data from district benchmark assessments for the first time, allowing us to identify which standards needed the most emphasis before the end of each year.

Whittier has its own unique challenges, including a highly mobile student population with a low percentage of continuously enrolled students. Our

average daily attendance rate is 90 percent, and because many students do not live near the school, participation in after-school programs and other supplemental activities has been limited. Based on the needs of our transient student body, and with the new benchmark assessment data allowing us to track their improvement in specific standards, we decided that students would require constant repetition and practice during the school day to master standards-based concepts and skills.

Tutoring: A Model for Daily Practice

I believed this approach would work based on firsthand experience. Previously, I had tutored third-graders on several key literacy standards each day at the start of the lunch period. I believed that the daily practice, feedback, and repetition helped build confidence, and the strategy resulted in consistent language arts assessment gains in literacy standards pertaining to prefixes, suffixes, and root words.

I began to talk to math teachers about applying a strategy based on the same concepts for the 2006–07 school year. I showed them the language arts assessment gains and how the pattern of improvement was consistent for those specific standards—both among struggling students and those who traditionally did well. The challenge for the upcoming school year was taking this practical experience and replicating it throughout the school—and in a new subject.

Implement

Summary

The principal divided up instruction in grades 2–5 so that strong math teachers taught math, while other teachers taught the remaining subjects. He then had math teachers work as a team to develop supplemental, standards-based practice

materials. These staff-created materials were used repeatedly based on the concepts of practice and feedback, achieving skill-mastery at the level of "automaticity."

Look for:

- How the principal aligned staff to focus instruction in a key subject area
- How the principal assigned key teachers to data teams to shape supplemental activities and professional development
- How student work and assessment data were used to continuously evaluate instructional strategies

Kick Starting the Practice: Aligning Staff and Strategies

First, I needed to identify the strongest math teachers to focus our instruction. I used personality assessments, gauged teachers' levels of interest, and looked for instructors with strong backgrounds in math. I then implemented a "platooning" system in grades 2–5 at the beginning of the school year. Generally in our district, platooning involves teachers focusing on particular subjects. Many district schools divided teachers between math/science and humanities when they introduced platooning, but I assigned the teachers I identified to teach math across their grade level, while the remaining teachers specialized in the other subjects. Math teachers were also made members of the school's data team and were involved in professional development issues.

At the beginning of the year, I had the school's literacy coach and third-grade teachers share data from the previous year and their perceptions of how daily practice had helped their students in the key literacy standards with the rest of the staff. I then began developing concrete strategies for math instruction based on the concepts of practice and feedback. I had demonstrated that the approach would work, but I still needed to define it in a way that it could be replicated across the school. An in-depth study of the book *Classroom Instruction That Works* by Robert Marzano helped identify broader strategies involving practice

and feedback that teachers could implement.

We needed additional materials to have students practice skills to the level of proficiency, so our newly platooned math team was charged with creating activities aligned with grade-level power standards. In a variety of venues—in weekly meetings, after specific units, and during common planning times—the team and I would work to develop the activities. A typical practice activity would involve a single standard—multiplying a two-digit number by a one-digit number in third grade, for example—and include at least 40 straightforward practice problems tied to that one skill.

After daily practice using these materials, and during a 10- to 25-minute standards review block, teachers immediately reviewed the problems and provided feedback by modeling each step of a math problem on an overhead projector. The teachers also had their students correct a neighbor's work and explain the process to each other.

In their weekly meetings, teachers continuously reflected and fine-tuned both the materials and how they used them, and I kept going back over these practices with them again and again.

Supplementary Practice Materials

The practice materials Whittier teachers developed for the classroom followed two key tenets:

- **Forty straightforward math problems tied to a key standard or skill.** "Forty questions is basically a well of opportunity for kids to get practice," Palmer says. While Marzano stresses that concepts need to be repeated correctly at least 25 times, Palmer believes that 40 is a more accurate number for his students. "Some kids get it in 5, 25, or 36 problems," he says. "Once kids get so many problems right, they're pretty proficient."

- No "trick questions" or practice sheets that mix different kinds of problems or skills. "When you ask kids to do more than one skill, they get lost," Palmer says. A third-grade practice sheet on a key multiplication standard would include 40 problems similar to these: 15×4 , 22×9 , 93×6 , 44×3 . Note how each requires a similar strategy to solve and doesn't introduce any new problem-solving twists—such as multiplying two-digit numbers by two-digit numbers or three-digit numbers by one-digit numbers, for instance.

Keys to Teacher Buy-In

Teachers bought into this strategy for two reasons: First, since we are a small school, with fewer than 250 students, they were familiar with the students and the data, so they saw that the approach had promise. Second, the practice materials were something they could immediately put in the hands of students.

Our ongoing study of Marzano, which we consistently returned to as a tool to help teachers reflect on their practices, also helped develop our strategies of practice and repetition. If we just implemented the strategy without this reflective piece, it would have been much harder to define exactly how we did it—and far more difficult to replicate. We soon learned that for our traditionally low-performing students, it may indeed take 40 to 50 exposures to a new concept or skill to learn it to the level Marzano calls "automaticity"—meaning they have mastered a task to the extent that they can complete it with little or no conscious thought.

Assessing Automaticity

Automaticity benefits our students in two ways. First, the constant practice and predictive nature of the processes learned builds confidence. This confidence, in turn, helps support risk-taking and learning of other grade-level standards. For example, when third-graders learn their multiplication facts to the level of automaticity, they are able to apply these skills to standards involving patterns

and geometric shapes. We've seen this in the problem-solving strategies the students use as they begin tackling new skills.

One criticism I initially heard is that this approach is akin to "drill and kill," and that students quickly get bored by repetitive practice. However, we've found that when our students master a skill to the point where they can look at a problem and apply their skills and knowledge quickly and efficiently, it reduces frustration. Our ongoing study of Marzano also provided additional, objective evidence that the approach works.

Practice and Feedback

As Whittier teachers refined their instructional strategies during the year by working together and reviewing such resources as the book *Classroom Instruction That Works*, they focused on a few core techniques:

PRACTICE

- Mastering a skill requires a fair amount of focused practice.
- While practicing, students should adapt and shape what they have learned.

FEEDBACK

- Feedback should be corrective in nature.
- Feedback should be specific to the criterion.
- Feedback should be timely.

Additional Supports

Principals have to be catalysts, so I made sure that the math team had the initial information they needed to start developing the practice materials—not just a

paragraph about the philosophy of practice and feedback but worksheets listing specific state standards and sample practice questions tying into them. In some cases, I would develop about five practice questions to get the teachers started, and they would then work together to develop additional questions. After the teachers started building upon the sample questions, the math team continued to meet in both formal and informal settings to discuss and refine their approaches. They also began developing and refining additional practice materials, using the state standards as a guide.

To assist teachers with these practices, I hired an additional teacher to provide small-group instruction focused on our strategies of practice and feedback during the school day. I also tutored small groups during the school day and continued to help teachers develop new materials. Students were grouped based on the district's standards-based assessments, given three times over the course of the school year.

Math team members with an intricate understanding of our practices have continued to develop practice materials to support additional district standards at each grade level. Team members have also explored additional strategies outlined in the Marzano book, such as note-taking. Even those math teachers who picked up on the concept less quickly have begun to understand the importance of practice and feedback after consistently using these techniques daily.

To continuously assess our strategies, teachers reconvene and review student work using district benchmark results to determine if they are successful.

Grade-Level Meetings

Throughout the year, weekly grade-level meetings focused on data and standards to ensure the new strategies were working. Here are the key questions addressed during each meeting:

- Which strategies improved standards-based achievement?
- Does student work prove that the strategies are effective and increase achievement?
- How do we replicate and refine the effective strategies to cover other standards?
- Do these strategies also improve academic success for our traditionally low-performing students?

Reflect

Summary

Math achievement increased in the first year of using the supplemental practice activities, as students and teachers became more proficient in working with the new strategies. In hindsight, the principal acknowledges that articulating the strategies was a challenge at first, and that buy-in came only after he was able to present specific examples of standards-based materials.

Look for:

- How data was examined to assess the efficacy of the instructional strategy
- How the principal improved his ability to communicate the importance of the strategy over time

The Signs of Success

After our first year of implementing the new strategy, our average math proficiency rate increased by 18 percentage points—from 21 to 39 percent—in grades 3–7, according to state test results.

By the following fall, I could see that teachers and students alike were becoming more proficient with math operations. For students, the clearest sign was that they could readily apply their knowledge from mastering the content of one standard to the point of automaticity to other standards.

Among the school's teachers, I could see that the strategies used for teaching for automaticity had also systematically improved their own instruction, building confidence in the process. Another sign that the reflective piece of the process is working is that many teachers no longer have difficulty explaining how their classroom strategies tie into data involving specific standards.

There are several reasons why we think this strategy increased student achievement at our school. The supplemental materials created by teachers provided ongoing practice for students. Through the strategy of practice and feedback, teachers also practiced how to explicitly instruct students using the standards-based materials they developed. Some teachers picked up on the strategies more quickly than others, but with the practice materials provided them, many became successful at implementing the strategies before becoming fully reflective about how they were using them. In other words, the concept of automaticity can apply to staff members as well as students.

I also attribute our success to the support of the district's instructional superintendent, who collaborated and engaged me in dialogue about the strategy in an ongoing and transparent manner. The instructional superintendent helped guide me from the specific practice to a deeper reflection of the strategy and encouraged me to use Marzano's work as a tool to help replicate the practice throughout the school.

Lessons Learned

As with any new strategy, mistakes were made along the way. The first was my deficiency in effectively communicating the importance of organizing around the standards and clearly

defining what this strategy looks like. I initially wasted a lot of staff development and teacher time attempting to explain my idea without providing specific examples of what the practice materials and strategy would look like.

I am blessed with a staff that is collegial and tolerant of new ideas. In informal conversations with teachers, I was told that at first they were not always sure what I was talking about—but that the approach seemed like something worth trying. Their honest criticism not only helped me refine the communication of my idea to my staff but also to myself. Once I was able to show some examples of standards-based materials, they became a catalyst for teachers to expand on.

Even if there had been a clear understanding of the plan at its inception, I have observed that all implementation has a lag time and that behaviors change before beliefs. I expected teachers to "just do it" because it made sense. The turning point in this process came only after I started to display concrete examples of standards-based materials and focused on a few specific, explicit goals.

I repeatedly returned to those goals in both formal and informal discussions with my staff, showing examples of student growth from our formative assessments and providing time for teachers to develop their own materials and reflect upon their own strategies. Like the classroom strategies, this approach ties into how human beings learn. As you keep saying the same things over and over again, the conversations begin getting deeper.

Adapt & Improve

Summary

Along with continuing to refine practice materials and evaluate how well they are working, Whittier is now adapting the same strategies of practice and feedback for literacy instruction

Look for:

- How standards and data continue to drive further refinements to the supplemental materials and assess their efficacy

Next Steps

We will continue refining our practice materials, reviewing the standards, and evaluating our work with the benchmark assessments as an indicator of success. One challenge is that we did not systematically retain many of the specific materials teachers developed during the previous year, so many will need to be reconstructed. Another challenge involves using these strategies to increase the amount of differentiated instruction.

In order to do that effectively, we will need to develop a critical mass of supplemental materials across many standards to provide individual students additional opportunities to practice the specific skills they need to master. We also want students to track their own performance using the practice materials over time. In calculating their mean and median scores, they'll also learn additional math standards around those computations.

We are also now using these same strategies of practice and repetition to return full circle to where they were first put into place at Whittier—in literacy. Determining the best way to tackle literacy skills using practice and feedback will shape our work in the 2008–09 school year. We plan to delve deeper into Marzano's work to develop additional instructional strategies, including ones based on his concepts of note-taking, summarizing, and vocabulary.

Because literacy instruction involves an ever-changing array of passages and questions, teachers will simply not be able to develop all of their own practice materials. We will use grade-level materials from the district, along with supplementary materials such as comprehension cards that have been developed as standards-based tools by third-party companies. We intend to give students practice at both their grade level and actual reading level, to ensure they work with materials that are both appropriate and challenging.