



# Data Processing

Teachers often do not make instructional decisions that are based on data because they do not know how.

A six-step process guides teachers in data-based inquiry that focuses on students' current performance levels and actions that teachers may take to improve them.

**W**e've talked about it.  
We've read about it.  
We've gone to conferences about it.

But do we actually *do* it, at a high level of quality on a regular basis?

Despite all the speeches, articles, and meetings about data-based instructional decision making, my observation after more than 20 years of working with middle and high school teams is that teachers and administrators often make important instructional decisions on the basis of historical precedent, anecdotal information, experience, or intuition, rather than by using information they have collected in a systematic manner.

### The Root Cause

Why is this so? Perhaps teachers and administrators don't routinely use data to make classroom decisions—although they know they should—because in most cases, teachers and sometimes principals don't know a specific and concrete process that will enable them to use data effectively. But it is not their fault. They have never learned how to use district and classroom assessment results to identify classwide strengths and weaknesses in the state content standards, specific students in need of enrichments and interventions, and instructional improvements that will make the next unit more effective than the previous ones.

This was the conclusion that my colleague Mike Hickey and I came to as we worked with several hundred school teams over the years: educators need to learn a simple, straightforward data-analysis process because usually nobody taught them one before.

Leithwood, Bauer, and Riedlinger (2009) recently noted,

Our case studies indicate that most principals felt quite uncertain about their understanding and use of numerical data for school improvement purposes... As one of our case study principals put it, "No one *showed* us how to analyze test scores before. They just *told* us to analyze test scores." (emphasis added) (p. 146)

An important finding of a 2010 report from the U.S. Department of Education was that the "greatest perceived area of need among districts is for models of how to connect relevant data to instructional practice" (Means, Padilla, Gallagher, & SRI International, 2010, p. 47). Even Secretary of Education Arne Duncan lamented in a June 2009 speech that "part of the problem is that people don't know how to read data, how to sift through it or understand it and that's really a challenge for all of us.... We cannot communicate in an undecipherable code" (para. 22).

## A Concrete and Specific Data Process

To help remedy this situation, we've partnered with many talented teachers to refine what has become known as the Classroom-Focused Improvement Process (CFIP), a six-step question-based data analysis protocol. Most protocols focus on narrow segments of classroom work (such as a teacher's assignment or a few student writing samples) and attempt to generalize to the whole class, but CFIP is convergent. That is, teacher teams answer a series of questions that guide their analysis of district or classroom assessment results to identify:

- Patterns of classwide strengths and weaknesses in students' understanding of the content
- Individual students who are ready for enrichments or require interventions and the instructional focus that those differentiations should take
- Instructional upgrades that should be implemented in the next unit.

CFIP is a process, not a program. The flow of the model is intuitive and responds to the overall question, What can we learn from the available data about current student performance levels? and, How will we respond to these data? We have found that a focused exploration of powerful questions in a logical sequence enables collaborative teacher teams to draw actionable conclusions from assessments in the 45 minutes or less usually available for meetings.

Because it is driven by teacher teams, CFIP picks up where school improvement plans must leave off. Dialogue on the CFIP protocol questions empowers teachers and engages them in the work of true professional learning communities.

## The Six Steps

The CFIP model has six steps, and each is based on one or more focus questions that direct the team's inquiry. (See figure 1.)

**Step one.** Team members build their assessment literacy by clarifying the characteristics of the assessment being analyzed. Team members must take time to understand the purpose and quirks of the assessment, who participated in it and who did not, and the terminology and statistics used in the data report. This step helps create common understanding of assessment terms and concepts among team members, as opposed to their individual ideas of what those terms mean and what those concepts are, which may vary widely or be incorrect.

**Step two.** Team members ensure that every data session is designed to answer at least one essential question. Answering clearly focused questions helps team members avoid the tedious and time-wasting exercise of trolling

through spreadsheets and databases without any direction (Reeves, 2008–2009). Lachat and Smith's 2004 study of data use in urban high schools showed that focusing on key student performance questions built staff members' skill in analyzing data, increased their motivation to use the data, and helped them look beyond the data to examine other pertinent information.

**Step three.** Team members describe the specific patterns that they see over and over again in the data, beginning at the whole-class level with one data source. This means identifying classwide strengths and weaknesses at the most granular level of the content standards as possible. The team may need to prioritize and note only the weaknesses that are the most important to students' future understanding.

Also at this step, team members discuss how their conclusions compare with those from other data sources to gain insight. In-depth conversation is particularly important if the results among data sources differ dramatically, especially between classroom and district benchmark assessment data.

**Step four.** A reflection guide helps team members identify a few essential instructional factors that might have contributed to the student performance patterns shown by the data. (See figure 2.) The reflection guide, which is based primarily on the insights of Marzano (2003) and Stiggins, Arter, Chappuis, and Chappuis (2007), alerts team members to effective instructional and assessment practices that, if they were not present, might have contributed to student achievement deficits. On the basis of those findings, team members decide how they will reteach key concepts and skills using an alternate strategy and then reassess.

**Step five.** Team members use the data to identify the students who are learning at an advanced level and craft enrichment activities that will continue to challenge them. Team members also identify the students who were not successful in acquiring the targeted knowledge and skills despite reteaching and who might need some additional assistance or a significant amount of help. That conversation then leads to the development of specific in-class differentiations to help both groups of students.

**Step six.** Team members use the reflection guide to consider the implications of the data analysis for their own future teaching practice and agree on one or two powerful instructional upgrades to implement in the following unit. Also, team members decide when the data will be reviewed again to determine the success of the enrichments, interventions, and instructional changes. Finally, they identify questions that the data did not answer and discuss how those issues will be pursued by team members.

Figure 1

## CFIP Protocol

**Data Sources:** Identify the data sources to be used to complete the data analysis.

**Major curriculum indicators or objectives covered in the most recent assessment:** Identify the most important parts of the curriculum that were assessed recently.

**STEP 1: Identify the relevant assessments and define the terms used in the assessment data reports (as needed).**

- What assessment data will we be analyzing and what do the terms in the data report mean?
- What special characteristics (or “quirks”) about the assessments should we understand prior to analyzing the data?

**STEP 2: Identify the questions to answer in this data dialogue.**

- What questions about student achievement are we trying to answer through this data analysis?

**STEP 3: Identify the major patterns of students’ strengths and needs at the class level (if possible, by using more than one data source).**

Major Patterns of Class Strengths	Major Patterns of Class Needs
<ul style="list-style-type: none"> <li>■ What knowledge and skills are the most important overall class strengths (from more than one data source, if possible)?</li> </ul>	<ul style="list-style-type: none"> <li>■ What knowledge and skills are the most important overall class needs (from more than one data source, if possible)?</li> </ul>

**STEP 4: Use the reflection guide to help identify the instructional factors that might have contributed to the patterns of student weaknesses.** Identify the steps that team members will take to address the patterns of class-level weaknesses and determine when and how re-assessment will occur.

- What instructional factors might have contributed to the patterns of student performance on these assessments?
- What steps will we take (such as scaffolding or reteaching using a different strategy) to address the patterns of class needs? How and when will we re-assess to determine progress?

CONTINUE WITH STEPS 5 AND 6 AFTER RETEACHING HAS OCCURRED (IF NEEDED).

**STEP 5: After whole-class reteaching (if necessary), name the students who excelled and the students who still need additional assistance.** Identify and implement in-class enrichments and interventions for these students.

Students Who Excelled	In-Class Enrichments to Implement	Students Who Need Additional Assistance	In-Class Interventions to Implement
<ul style="list-style-type: none"> <li>■ Which students are ready for enrichment and more independent work?</li> </ul>	<ul style="list-style-type: none"> <li>■ What in-class enrichments will we implement for these students?</li> <li>■ What assistance and resources will we need to implement the enrichments?</li> <li>■ Who will be responsible for implementing the enrichments?</li> <li>■ What data will we use to determine the success of the enrichments?</li> </ul>	<ul style="list-style-type: none"> <li>■ Which students will need some additional assistance to attain the targeted knowledge and skills?</li> <li>■ Which students will need the most additional assistance to attain the targeted knowledge and skills?</li> </ul>	<ul style="list-style-type: none"> <li>■ What in-class interventions will we implement so that these students will attain the targeted knowledge and skills?</li> <li>■ What assistance and resources will we need to implement the interventions?</li> <li>■ Who will be responsible for implementing the interventions?</li> <li>■ What data will we use to determine the success of the interventions?</li> </ul>

**STEP 6: Use the reflection guide to help identify and then implement one or two improvements in future instruction.** Plan for the next data analysis session.

- After reflecting on our past instruction and the current levels of student performance, as shown by the data, how will we improve future instruction to increase the learning of all students?
- When will we review the data again to determine the success of the enrichments, interventions, and instructional changes?
- What do the data not tell us? What questions remain about student achievement that we need to answer? How will we answer these questions?

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## Climate Change

Teaching educators the structured CFIP protocol has resulted in dramatic cultural changes and increased student learning. Michael Goins, the principal of Ellicott Mills Middle School in Howard County, MD, reported, "We are at full implementation stage of CFIP, and in 2010, we made AYP for two years in a row. Three years ago, we wondered if we would make AYP even with the confidence interval.... The most exciting part for me is that I see teachers really buying into CFIP. It makes the atmosphere of the entire building very positive and professional.... In three years, we have shifted the culture to one that totally embraces collaboration, biweekly review of student data, and the belief that all students can achieve. As an administrator, I now have a really clear view of my role as an instructional leader" (personal communication, September 3, 2010).

Washington County (MD) Public Schools implemented CFIP as the centerpiece of its school improvement process

in 2005–06. Over time, student outcomes in many data points have improved substantially, and achievement gaps are being reduced. For example, Washington County was one of only four districts in the state to achieve adequate yearly progress (AYP) in every middle and high school in 2009. Achievement gaps separating White, Black, and Hispanic students in the state NCLB assessments have been cut, drop-out rates are down, and graduation rates up (Maryland State Department of Education, 2010). (At press time, 2010 district data have not yet been released.)

## Conclusion

CFIP provides a data reduction process that enables school teams to analyze and act on a large volume of data. It empowers teachers to act decisively to increase student learning, and according to Mike Markoe, the assistant superintendent of Washington County, it can "transform a school" (personal communication, April 2009).

Figure 2

## Reflection Guide

### As we planned instruction, how well did we:

- Consult the state and/or district curriculum or pacing guides for lesson objectives and their sequence?
- Understand the prerequisite knowledge and skills that students needed to master to be successful?
- Understand the level of cognitive demand (rigor) that students needed to demonstrate to show proficiency?
- Assemble needed resources for the unit?
- Administer a pre-assessment and use the results to help determine class and individual student needs?
- Anticipate common student misconceptions?

- Plan for differentiation in content, process (instructional strategies), and product (ways students will show what they know and can do)?

(Add instructional strategies that are important for planning in your grade, school, or subject area.)

### At the beginning of instruction, how well did we:

- Share the unit and daily objectives with students in terms that they understand?
- Involve students in setting their own learning goals for the unit and tracking their own progress?

(Add instructional strategies important at the beginning of instruction in your grade, school, or subject area.)

### During instruction, how well did we:

- Make connections to prior learning or related content to engage students and promote synthesis of information?
- Model the concept or skill and provide exemplars to work toward?
- Correct misconceptions students may have or that may occur during the unit?
- Assign work that is mostly "on grade level," with appropriate scaffolding where needed?
- Base assignments on real-world tasks to engage students?
- Vary instructional activities to meet individual student needs?

And it all started by teaching educators a specific and concrete process for how to analyze data. PL

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**Author's note:** Additional information and resources to implement the Classroom-Focused Improvement Process (CFIP) are available at the Maryland State Department of Education school improvement Web site, [www.mdk12.org/process/cfip](http://www.mdk12.org/process/cfip).

- Use graphic organizers and other nonlinguistic representations to show content in symbolic form?
- Use cooperative learning activities?
- Provide multiple opportunities for student writing?
- Assign purposeful homework and vary the approaches to providing feedback on the homework?
- Provide students specific, timely, and varied feedback on their assignments?
- Ask students to respond to higher-level questions in which they must analyze, synthesize, and evaluate?
- Provide multiple opportunities for students to practice, review, and apply their new knowledge and skills?

- Include strategies that involve students in monitoring their own progress toward learning goals?
- Check for student understanding frequently and modify instruction on the basis of the data obtained?
- Reinforce student effort and provide recognition of student success?

(Add additional instructional strategies important during instruction in your grade, school, or subject area.)

### At the end of each part of instruction, how well did we:

- Use the most appropriate type of assessment for the knowledge and skills being assessed?
- Use a variety of assessment formats, including those that mirror the state assessments in content and format?

- Mirror the level of rigor used in scoring external assessments when scoring classroom assessments?
- Involve students in identifying the next steps in their learning?

(Add additional strategies important at the end of instruction in your grade, school, or subject area.)

**Sources:** Marzano, R. (2003). *What works in schools: Translating research into action*. Alexandria, VA: ASCD; Stiggins, R., Arter, J., Chappuis, J., & Chappuis, S. (2007). *Classroom assessment for student learning: Doing it right, using it well*. Upper Saddle River, NJ: Pearson Education, Inc.

