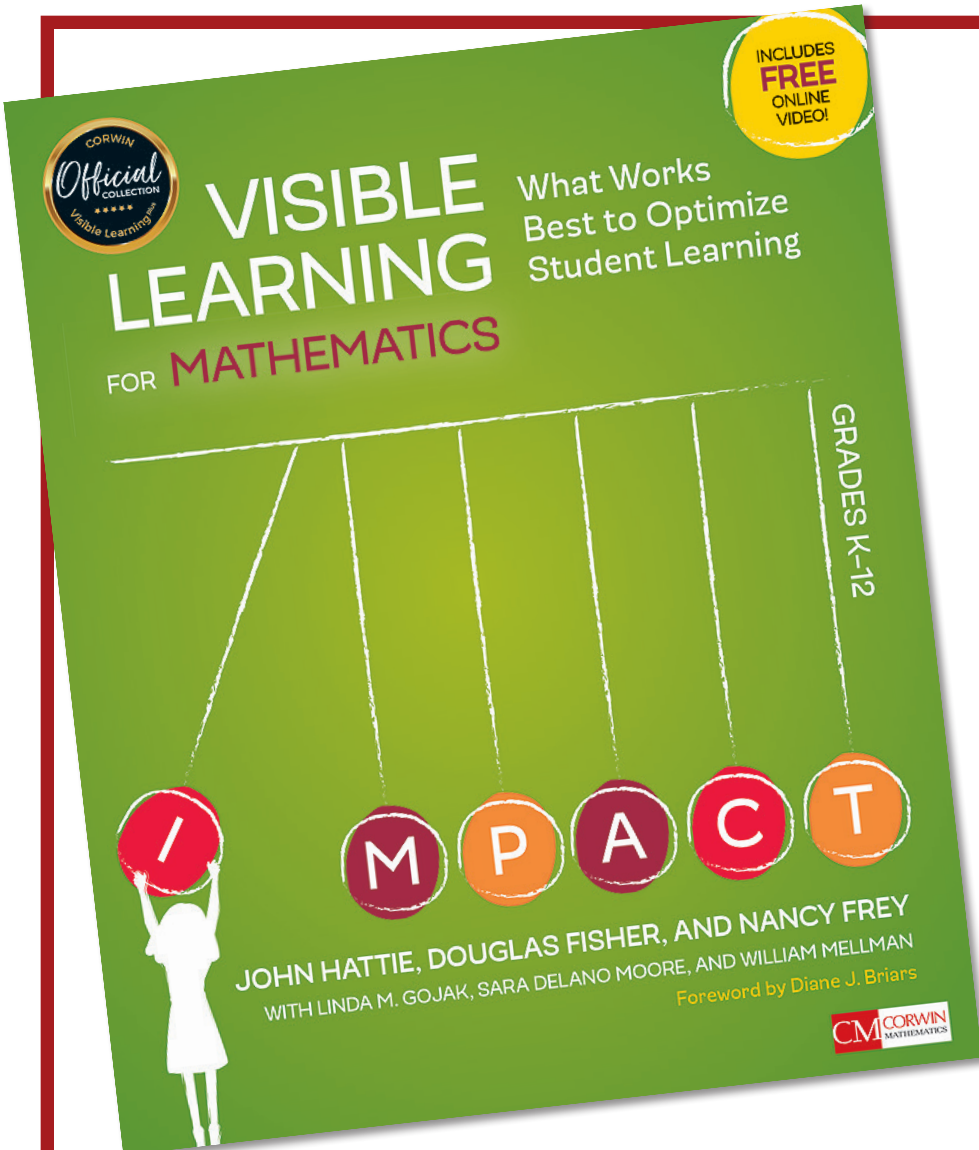

Thank you

FOR YOUR INTEREST IN CORWIN

Please enjoy this complimentary excerpt from *Visible Learning for Mathematics, Grades K-12.* This excerpt explains how making learning visible starts with teacher clarity and the strategic use of learning intentions and success criteria promote student self-reflection and metacognition.

LEARN MORE about this title, including Features, Table of Contents and Reviews.

2 MAKING LEARNING VISIBLE STARTS WITH TEACHER CLARITY

Early in Will's second year of teaching middle school, after learning about the importance of routines and procedures, he felt sure that he finally had his classroom running smoothly. His teaching pattern was this: students would come in and get their notebooks, open a textbook from the middle of their tables, and do the warm-up on the assigned page. When they finished the warm-up, they would be introduced to the daily objective—a "students will be able to" or SWBAT—and then Will would explain the math before students got started on the problem set from the textbook that usually consisted of practice exercises on that skill. When two thirds or so of the students had finished (some with Will's individualized help), the class would go over the questions together and students would have the opportunity to change their answers to the correct ones. Then he'd assign homework, and the bell would ring. Although Will's students were relatively well behaved and seemed busy, they weren't learning as much as they deserved to. Like many novice teachers, Will valued compliance over learning. Here are five reasons why true learning was limited:

- Will's students didn't know what they were supposed to learn, or why they were supposed to learn it. So, they were less likely to learn it, or even to want to learn it.
- Even if Will's students did decide to memorize his objective from the SWBAT on the board, and even if they understood what it meant, at the end of the lesson they wouldn't know whether or not they had learned it.
- Will's students didn't really benefit from Will's expertise.
- Will's students didn't have a sense of where this learning would lead, or how it connected to what they had already learned.
- Will's students never learned how to manage their own learning.

As we begin this journey of visible learning, let's think about the importance of teacher clarity. Teacher clarity involves the instructional moves a teacher makes that begin with carefully planning a lesson and making the learning intentions for that lesson or unit clear to herself and her students. It extends to consistently evaluating where students are in the learning process and describing the success criteria on which students can assess their own progress and on which the teacher bases her evaluation of a student's progress with a mathematical idea or concept. What was lacking in Will's early teaching experiences was clarity!

Will went on to drastically improve his teaching when he read about and applied some key ideas, and his early struggles made him more effective in coaching and leading other teachers to success in their classrooms later on. A major step in this journey was when he examined the way he planned his lessons.

A starting place for lesson planning is the **learning intention**, or the statement of what students are expected to learn from the lesson. The learning intention for a given lesson, and the ability to communicate it clearly to students such that they can use it to gauge their progress, is foundational in the learning sciences. Stated simply, when one knows what the target is, there is an increased likelihood that the target will be achieved. Knowing one's learning destination is crucial for mathematics students.

Learning intentions describe what teachers want students to learn.

If learning intentions serve as one bookend for learning, the other bookend consists of the criteria used to measure success. How do you know whether your students are successful at learning what you wanted them to? How do *they* know whether they're successful? How can they know whether or not they've met the intended learning intentions, or whether they're making progress toward doing so? With success criteria. **Success criteria** are statements that describe what success looks like when the learning goal is reached. They are specific, concrete, and measurable. In this chapter, we will focus on the importance of knowing and communicating learning intentions and success criteria to students. When success criteria are communicated clearly, and teachers and students are actively looking for evidence of learning, learners understand the importance of the lesson. Even better, strategic use of learning intentions and success criteria promote student self-reflection and metacognition—that is, thinking about their own thinking. These are two essential yet often overlooked lesson outcomes. For students, this means knowing what they are expected to learn (learning intentions) and what the learning goal looks like when they have learned it (success criteria), having an idea of the route or strategies that will help them get there, and knowing what to do when they don't know what to do (Bransford, Brown, & Cocking, 2000).

Success criteria are specific, concrete, measurable statements that describe what success looks like when the learning goal is reached.

EFFECT SIZE FOR METACOGNITIVE STRATEGIES = **0.69**

Strategic use of learning intentions and success criteria promote student self-reflection and metacognition.

As we noted in the previous chapter, Hattie (2009) underwent the enormous task of studying and consolidating more research on quality teaching and learning than had ever been amassed before. After completing this monumental feat, John realized that the single most important thing teachers can do is to *know their impact on student learning*.

Teacher clarity is clarity of organization, explanation, instruction, and assessment that is seen by the students.

EFFECT SIZE FOR TEACHER CLARITY = **0.75**

Teachers need to be aware of the effect they have on their students (Hattie, 2009). Thus, teachers have to assess students' understanding. To determine if learning occurred, teachers first use preassessments to identify baselines in understanding and performance.

Taken together, learning intentions, success criteria, preassessments, and checking for understanding contribute to **teacher clarity**. Fendick (1990) defined teacher clarity as "a measure of the clarity of communication between teachers and students—in both directions" (p. 10) and further described it across four dimensions:

1. *Clarity of organization* such that structured lessons include links to the objectives and outcomes of learning.
2. *Clarity of explanation* such that explanations are accurate and comprehensible to students.
3. *Clarity of examples and guided practice* such that the examples are illustrative and illuminating, and students gradually move to independence, making "quick and accurate progress without help" (p. 10). Guided practice refers to the guidance teachers provide as they make strategic decisions about the right type of practice for each student throughout instruction.
4. *Clarity of assessment of student learning* such that the teacher is regularly seeking out and acting upon the feedback he or she receives from students, especially through their verbal and written responses.

Learning Intentions for Mathematics

Effective teachers know where their students are in the learning cycle and design their instruction to foster learning. As we mentioned in Chapter 1, learning intentions can include a combination of surface, deep, and/or transfer learning, with the exact combination dependent on what kinds of choices a teacher makes based on where her learners are and where she wants them to go. A teacher who fails to identify where her students are in their mathematical learning is likely to undershoot or overshoot expectations for them. In mathematics and science, it is more often the latter, and there's a term for it: the expert blind spot (Nathan & Petrosino, 2003). This is the condition created when a teacher knows the content well, but fails to recognize the fits and starts of students as they attempt to learn new concepts. This can often happen in mathematics when students have learned a procedure but do not know the meaning of the calculation they've done. Our algebra example in Chapter 1 included a discussion on the meaning of slope as an example of deep learning. A teacher with an expert blind spot might mistake the fact that students can identify or calculate the slope without understanding of what it means and how to interpret its value. "But I taught it! Why don't they get it?" is the lament of anyone who has possessed an expert blind spot. That's why it is essential to align the right instructional practices at the right time in the learning cycle. Kolb (1984) defines the learning cycle as having four elements: concrete experience, reflective observation of that experience, abstract conceptualization (based on the experience and reflection), and active experimentation (applying the new learning to daily life). Different strategies support learning at each phase in this cycle. The first three elements of the learning cycle will incorporate surface and deep learning, while the active experimentation phase is about transfer. The daily learning intentions that are communicated by the teacher are an end product of her careful planning, as she determines the type of expected learning (surface, deep, or transfer) and how to implement instruction for that type of learning. The success criteria provide a means for students and the teacher to gauge progress toward learning, thereby making learning visible.

Video 2.1
Learning Intentions in the Elementary Classroom

http://resources.corwin.com/VL-mathematics

Learning intentions (which some people call objectives, learning goals, targets, or purpose statements) are where teacher planning begins. Learning intentions are different from standards. Standards are statements for teachers that identify what students should know and be able to do at a given point in time. Standards are tough for yet-to-be-educated students to understand, and they are too broad for students to master in a single lesson. Effective teachers start with a standard, break the learning that standard requires into lesson-sized chunks, and then phrase these chunks so that students will be able to understand them. Each one of these chunked phrases—a daily statement of what a student is expected to learn in a given lesson—is a learning intention. Learning intentions can focus on knowledge, skills, or concepts, and should be aligned to the mathematics standards and to the learning intentions of related lessons. As mathematics researchers and educators Margaret Smith and Mary Kay Stein (2011) remind us, "The key is to specify a goal that clearly identifies what students are to know and understand about

Video 2.2
Learning Intentions in the Secondary Classroom

http://resources.corwin.com/VL-mathematics

mathematics as a result of their engagement in a particular lesson" (p. 13). Following are some examples of learning intentions that we have seen in mathematics classrooms.

- Know that a ten is really just a group of ten ones.
- Recognize that area is a specific kind of array (built from unit squares) that measures two-dimensional space, and understand why we find area by multiplying the length times the width of a rectangle.
- Learn to add two fractions with like denominators by modeling on a number line.
- Understand how to divide a decimal number by a decimal number by considering place value.
- Examine a given data set to determine if the function that it describes is linear or exponential by assessing the way the function changes over equal intervals and relating this change to students' knowledge of a given context.

Some mathematics teachers might be concerned that statements such as these can rob students of a period of investigation and inquiry. Learning intentions don't have to be used at the outset of the lesson and may be revisited over time. Teachers can withhold their learning intentions until after an exploration has occurred. And teachers can invite students to explain what they learned from the lesson and compare that with the initial learning intention for the lesson. Interesting class discussions about the alignment (or lack of alignment) can provide a great deal of insight on student understanding.

Learning intentions are themselves evidence of a scaffolded process that unfolds over many lessons. A key to planning a lesson is in knowing where your students currently are in their learning. It would be tough to teach students that a ten is really just a group of ten ones if they don't understand the value of one, just as it would be difficult for students to determine growth patterns in functions if they don't really understand what functions are or why they're useful. However, learning intentions can (and often should) have an inherent recursive element in that they build connections between previously learned content and new knowledge. Savvy teachers embed previous content in the new content. The teacher is not only creating a need and a purpose for students to hone learned skills, but also providing opportunities for students to experience those "aha" moments that relate concepts to a previous lesson's content. In this way, students are continually connecting and deepening their mathematical knowledge.

Students have a right to know what they're supposed to learn, and why they're supposed to learn it.

There are a few other hallmarks of good learning intentions that Clarke, Timperley, and Hattie (2003) have identified:

- Learning intentions should be shared with students, so that students understand them and what success looks like. Recognize that not all students in the class will be working at the same rate or starting from the same place, so it's important to adapt the plan relating to the intentions to make it clear to all students.
- Learning does not happen in a neat, linear sequence; therefore, the cascade from the curriculum aim (the standard) through the achievement objective (unit goals) to the learning intention (for a specific lesson) is sometimes complex.
- Learning intentions and activities can be grouped if one activity can contribute to more than one learning intention, or one learning intention may need several activities for students to understand it fully.
- Learning intentions are what we intend students to learn, but it is important to realize students may learn other things not planned for, so teachers need to be aware of unintended consequences.

Student Ownership of Learning Intentions

Doug travels the world talking about quality instruction for all learners. He speaks to teachers and administrators, and he used to tell them that teachers should communicate their learning intentions because doing so has been shown by extensive research to boost student learning and achievement (Hattie, 2012). Furthermore, it is consistent with the first of NCTM's (2014) effective mathematics teaching practices: to establish mathematical goals to focus learning. But he found that people actually took this advice more seriously when he framed learning intentions as a students' rights issue. Students have a right to know what they're supposed to learn, and why they're supposed to learn it. After all, teachers are going to evaluate student performance and mark report cards and transcripts that last a lifetime. These records open doors to colleges and careers, or close them. It's only fair that students understand what they're expected to learn if teachers are going to evaluate that learning.