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The Formative Assessment Action Plan

Practical Steps to More Successful Teaching and Learning

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THE FORMATIVE ASSESSMENT ACTION PLAN

Practical Steps to More Successful Teaching and Learning

1

Creating a Formative Assessment System

"I don't know how you're going to learn this, but it's on the test," said the professor of a graduate class on neuroanatomy that Doug was taking.

The teacher's words clearly articulated one perspective about education: Students should study and learn the content assigned to them. Her statement suggested that the teacher's job is to provide information and the students' job is to learn it, whatever way they can. When his teacher implied that the responsibility for learning rested solely on the students, Doug's confidence plummeted. Having looked at intricate pictures of the human brain, Doug was already questioning how he was going to learn this information. Now his teacher was telling him that she, too, didn't know how he (or any other student in the class) would learn it.

Understand that Doug was highly motivated to learn this content, and understand that his teacher was armed with the latest technology and instructional methods. The teacher was caring and passionate about her subject area, and, further, she had clearly communicated her high expectations at the outset of the course and summarized information weekly. Were these measures enough to ensure that Doug, and the other members of the class, reached high levels of understanding? Simply put, no. Even though high-quality instruction, innovative technology, motivation, high expectations, and passion are

important in the teaching and learning process, they are not sufficient to ensure that learning occurs.

What was missing from this scenario—and from the entire class experience—was a formative assessment system. The teacher needed to establish learning goals, check for understanding, provide feedback, and then align future instruction with the students' performance. She needed an instructional framework that allowed her to feed-forward, not just provide feedback.

A Formative Assessment System

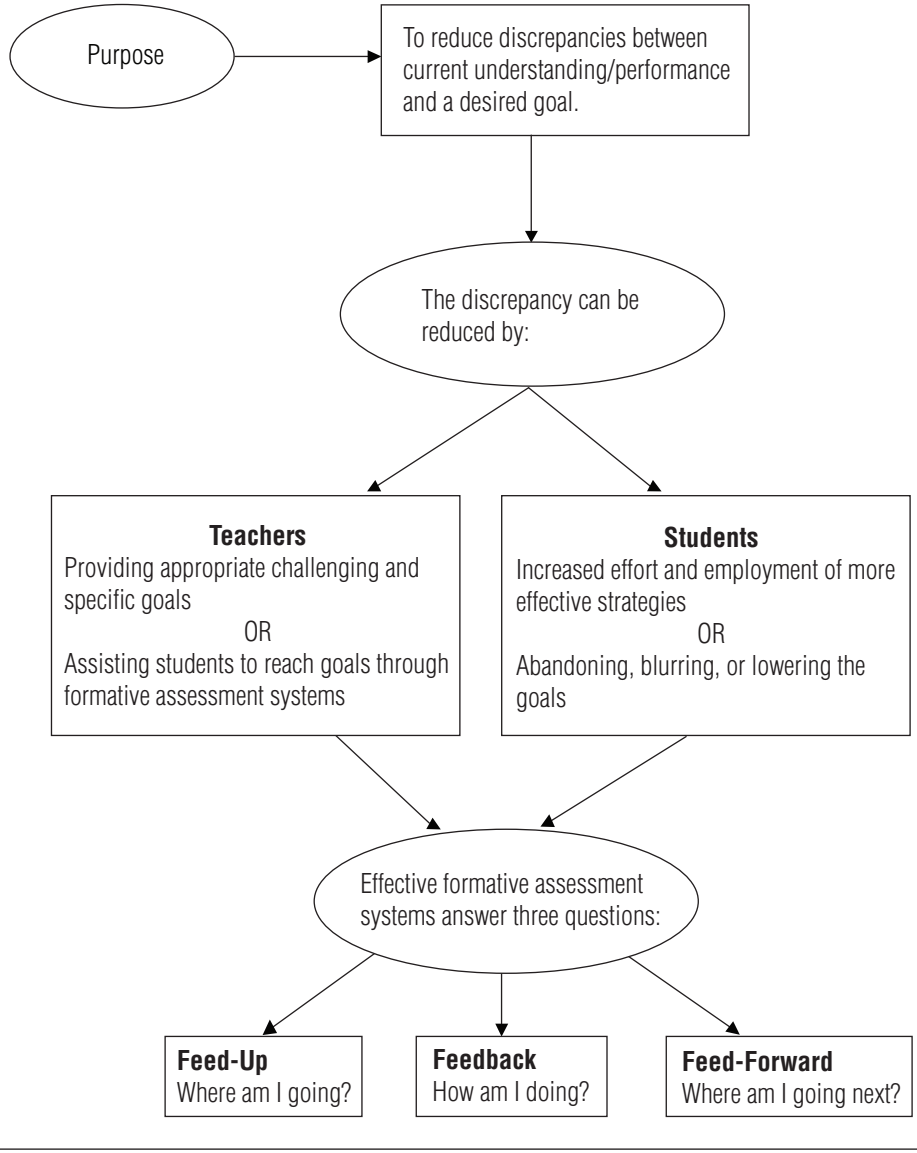
Feedback, when used as part of a formative assessment system, is a powerful way to improve student achievement. Feedback by itself, though, is less useful. As John Hattie and Helen Timperley note, "Feedback has no effect in a vacuum; to be powerful in its effect, there must be a learning context to which feedback is addressed" (2007, p. 82).

Hattie and Timperley propose a formative assessment system that has three components: feed-up, feedback, and feed-forward (see Figure 1.1). Feed-up ensures that students understand the purpose of the assignment, task, or lesson, including how they will be assessed. Feedback provides students with information about their successes and needs. Feed-forward guides student learning based on performance data. All three are required if students are to learn at high levels. Each of these three components has a guiding question for teachers and students:

- Where am I going? (feed-up)
- How am I doing? (feedback)
- Where am I going next? (feed-forward)

Imagine Doug's teacher establishing the purpose for one of her classes, perhaps something like this: *To use cytoarchitecture to identify locations in the cerebral cortex*. She might then check for understanding, maybe through an audience response system, and provide individuals and the class with feedback. For example, she might ask, "Do the various regions of the brain contain the same number of cellular levels?" This dichotomous question has an answer

Figure 1.1 | **A Formative Assessment System**



Source: From *Visible learning: A synthesis of over 800 meta-analyses relating to achievement* (p. 176), by J. Hattie, 2009, New York: Routledge. Copyright 2009 by Routledge. Adapted with permission.

(*yes*), and students would receive feedback about whether they had answered the question correctly. Based on the number of correct and incorrect responses, the teacher could decide what to feed-forward. The performance data from the class might suggest that the teacher needs to provide additional information and instruction to the whole class. Alternatively, the data might suggest that the teacher needs to ask specific students to elaborate on their answers so that she can determine the source of their misunderstanding. Then again, the data might suggest that the class has a good grasp on this content and is ready to move on.

When all three components of a formative assessment system are present, there is a give-and-take between teachers and students that facilitates learning. The absence of any one component places learning at risk. For example, when students do not understand the purpose of a lesson (feed-up), they are unlikely to demonstrate their best effort. Without a clear purpose, students are not motivated and do not see the relevance of the content they're expected to master. When students are not assessed or do not receive assessment results (feedback), they are unsure about their performance and assume that they are doing just fine. They are unlikely to make mid-course corrections in their learning processes and understanding. When teachers fail to plan instruction based on student performance (feed-forward), misconceptions are reinforced, errors go unaddressed, and gaps in knowledge persist. Teachers march through their pacing guides and continue to "teach" while students passively observe. Unfortunately, when this is the case, teachers remain oblivious to the lack of real learning their students are doing.

Feedback Alone Is Not Enough

We have argued that formative assessment is a system with three interrelated components and that no one component alone is sufficient to ensure student learning. We want to take that one step further and focus on the ways in which feedback by itself is problematic. We have already noted that feedback should not be used in a vacuum. In part, this is because feedback is external to the learner; it is "external regulation," meaning that a student

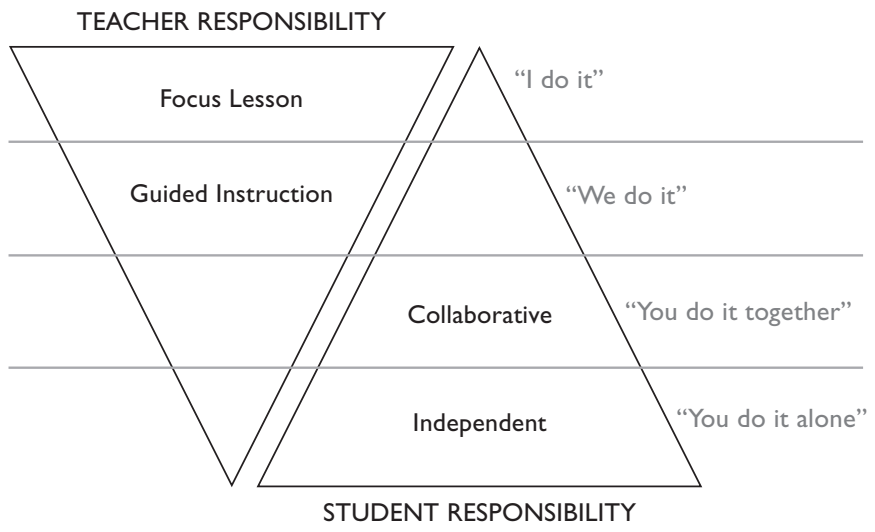
is responding because of something happening to him or her from the outside, rather than responding intrinsically or internally (Ryan & Deci, 2000). Although students may occasionally use external feedback in their internal regulations, it takes more than feedback to ensure that internal regulation occurs.

External regulation is not the only reason that isolated feedback is ineffective. Another reason is that it transfers responsibility for further learning and performance improvement back to the learner. Consider the ubiquitous research paper. Students typically work on these projects for an extended length of time, maybe even getting peer editing and feedback. Finally, the due date arrives, and the teacher takes the stack of papers home to grade. Some days later, the papers are returned with feedback. What do students do with this feedback? Anyone who's been in school knows that students either recycle the paper or, if required, make the noted changes and resubmit the paper for another round of review. The teacher has likely spent a great deal of time writing comments, but this time seems wasted when students throw away their work or simply correct the mistakes the teacher identified for them. They haven't really learned from their mistakes.

The problem bears repeating. *Feedback reassigns responsibility back to the learner*. Think of a recent project on which you have received feedback. After you received the feedback, did you realize that it was, once again, up to you to figure out the next steps? Were you frustrated with this experience? Did you say to yourself, "Now I have to create another one, only to be judged again? Why can't she just tell me what she wants?" If this has happened to you, you've experienced the abrupt shift of responsibility that we're talking about.

This is not to say that we don't want students to assume increasing responsibility; we do. It's just that increasing responsibility should be planned, based on student confidence and competence. We don't want students to suddenly be responsible for the first time when they make mistakes. Rather, a sophisticated formative assessment system built on a solid instructional framework should be in place from the beginning.

Figure 1.2 | **Gradual Release of Responsibility**



Source: From *Better learning through structured teaching: A framework for the gradual release of responsibility* (p. 4), by D. Fisher and N. Frey, 2008, Alexandria, VA: ASCD. Copyright 2008 by ASCD. Reprinted with permission.

The Gradual Release of Responsibility Framework

A formative assessment system is only as good as the instructional framework on which it rests. No formative assessment system can compensate for poor instruction. Neither does simply having an instructional framework ensure that students will learn; both a framework and a system are required. The instructional framework we recommend is based on a gradual release of responsibility from teachers to students (Fisher & Frey, 2008a; Pearson & Gallagher, 1983) and includes five distinct components (see Figure 1.2).

Establishing Purpose

Every lesson must have an established purpose. This purpose can be in the form of a goal or objective, provided that the students know what that goal or objective

is. The established purpose can have different components, such as content versus language (which will be more fully addressed in Chapter 2). Establishing purpose is important for many reasons, including alerting students to important information and keeping the teacher from getting off topic by discussing tangential information. In a formative assessment system, the purpose drives both feedback and feed-forward. Most people agree that it's not fair to assess or test students on things that haven't been taught. Sometimes students don't get the purpose of the lesson, and, in those cases, it's not fair to assess students on things that haven't been clearly established as important.

Consider these two examples. In one classroom, the teacher has students working on projects, but they don't know why or what is expected of them. There is no learning goal or purpose. In this class, the feedback students receive may be meaningless. In another classroom, the teacher has students working on projects with a clearly communicated purpose: to understand how sonar is used to determine water depths. When the teacher checks for understanding, the feedback is aligned with this purpose and the teacher can provide additional instruction to students who make errors, feeding forward until they understand the content.

Teacher Modeling

School is more than a pile of discrete facts that students have to memorize; it's about thinking, questioning, and reflecting. As apprentices, students need examples of the kinds of thinking that experts do in order to begin to approximate those habits of mind. Thinking is a complex cognitive process that is largely invisible. To make it visible, teachers model through a think-aloud in which they "open up their minds" and let students see how they go about solving the various problems of school, from quadratic equations to decoding a word. As Gerald Duffy points out, "The only way to model thinking is to talk about how to do it. That is, we provide a verbal description of the thinking one does or, more accurately, an *approximation* of the thinking involved" (2003, p. 11).

In a formative assessment system, teacher modeling serves to highlight the processes that students should use to complete tasks and assignments. It's less

about the specific content and more about the ways in which experts in different disciplines go about their work. As we will explore in greater detail, formative assessment systems require attention to more than the correct response. Feedback and feed-forward also focus on the processes that students use as learners and thinkers, as well as their self-regulation and self-monitoring. Teacher modeling, through think-alouds, can provide students with examples of "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (Zimmerman, 2000, p. 14) such that students are responding to the feedback and future instruction they receive about learning.

Guided Instruction

In each lesson, the teacher must guide students toward increased understanding. This happens through the systematic use of questions, prompts, and cues. In this phase, questions are used to check for understanding. When a student's response indicates a misconception or an error, the teacher prompts the student. Prompts are cognitive or metacognitive and focus on getting the learner to think. If prompts fail to resolve the misconception or error, the teacher provides a cue. Cues shift the learner's attention to a resource that may help. As we will see in greater detail in Chapter 5, guided instruction is difficult to do in a whole-class format and works better in addressing the needs individual students present as they learn.

In a formative assessment system, guided instruction is an opportune time to provide students with feedback while also providing additional instruction. In this way, guided instruction plays a pivotal role in a formative assessment system as teachers feed-forward instruction based on real-time student responses. Consider the following exchange between a teacher and a small group of students having difficulty with the concept of writing mathematical sentences as inequalities.

Teacher: Tell me more about your answer. Read to me what you've written.
Alexis: The sentence says "Twenty minus the product of four and a number x is less than four." [$20 - 4x < 4$]
Teacher: Yes, it does. So what did your group write on the chart paper?

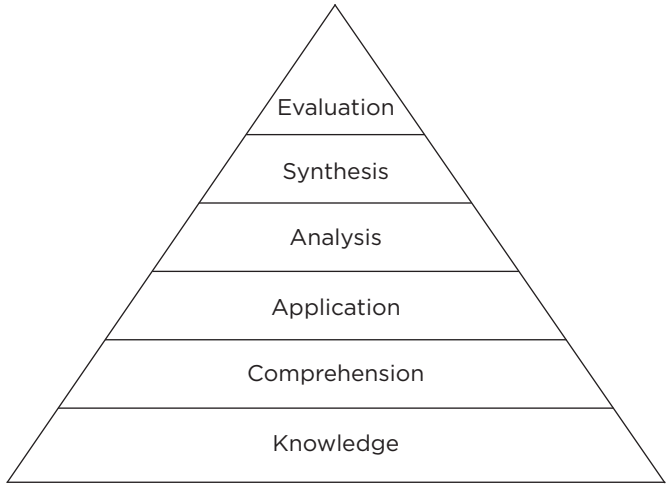
Brandon: Right here. [points]
Teacher: Can you read that to me? Not from the projector but from your chart paper?
Justin: We wrote twenty minus four plus x is less than four. [$20 - 4 + x < 4$]
Teacher: Did that sound the same as when Alexis read it?
All: Yeah?
Teacher: Think about the word *product*.
Alexis: That's to multiply.
Justin: But we didn't multiply.
Brandon: Where do we multiply?
Alexis: Maybe right here? [points to the minus sign]
Teacher: Be careful. You might want to read it again.
Alexis: Twenty minus the product of four and a number x is less than four. Oh, wait, first we have to write 20 and then minus.
Justin: Then it says *product*, so we have to multiply. But you can't have multiply next to minus.
Teacher: [Cups her hands around the words "the product of four and a number x."]
Brandon: Wait. Look. It's 4x, not minus four plus x.
Alexis: Oh, it's $20 - 4x < 4$. That's right, huh?
Justin: It is, now read it again. It's just like the sentence up there. [points to projected problem set]

This brief exchange allows the teacher to prompt and cue such that students experience success and complete the task. Will they need additional instruction? Probably. That's what formative assessment systems are all about: reducing discrepancies between current understandings and a desired goal (Hattie, 2009). Feedback alone would probably not have resulted in new understanding.

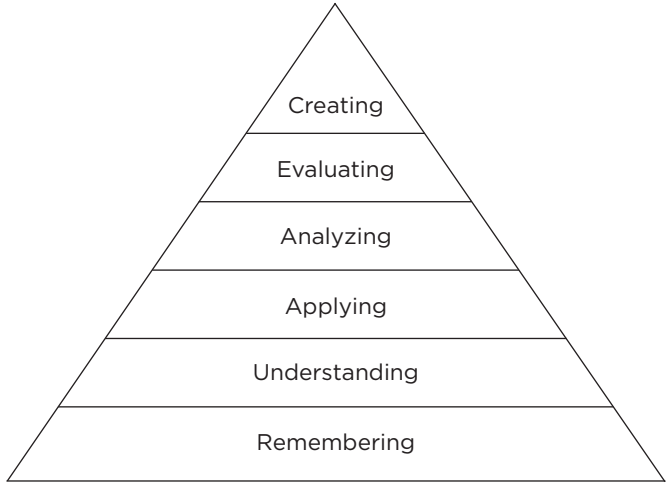
Productive Group Work

Though students stand to learn a lot from and with their teachers, they are unlikely to consolidate that understanding unless they also work alongside peers in creating and producing something. Importantly, creating is now considered the highest-order thinking task in the Bloom's taxonomy revised for the 21st century (see Figure 1.3). Creating something requires that students use their

Figure 1.3 | **Bloom's Taxonomy in the 21st Century**



Original Version (Bloom, 1956)



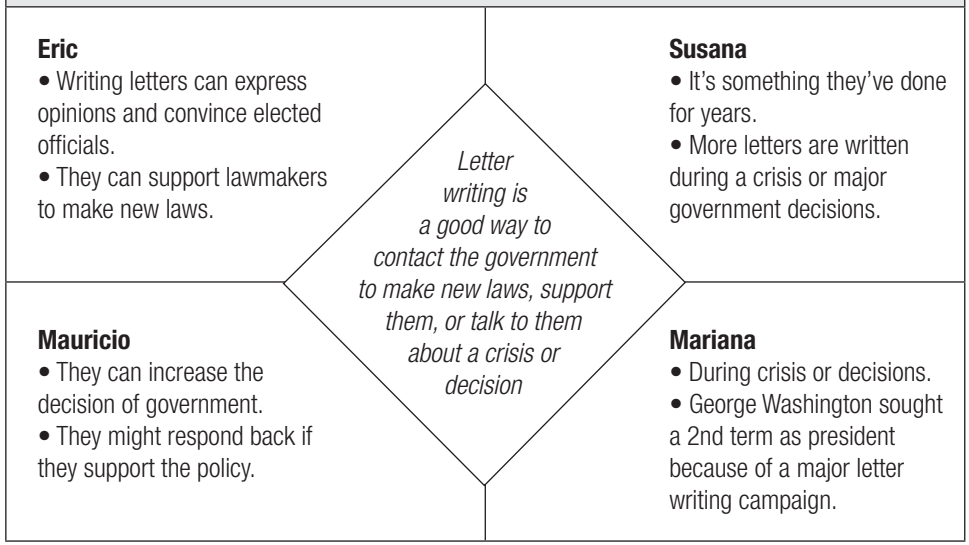
21st-Century Version (Anderson & Krathwohl, 2001)

Source: From *Guided instruction. How to develop confident and successful learners* (p. 11), by D. Fisher and N. Frey, 2010, Alexandria, VA: ASCD.

prior knowledge in new ways and that they rally resources to complete the task. As Matthew Crawford argues in *Shop Class as Soulcraft* (2009), thinking should not be separated from doing. It is the doing that solidifies understanding. Of course, educators have known this for a long time, but group work got a bad reputation because we have all experienced bad examples of this good idea. How many times have we been assigned to a group, just to do all of the work and watch others share the credit for it? That's not the productive group work we're talking about, nor is it the cooperative learning that David Johnson and Roger Johnson (1999) envisioned. The key to productive group work is individual accountability. Each member of the group must produce something based on the group's interaction. It is when students work alongside their peers that they interact, using academic language and argumentation skills.

Figure 1.4 contains an example of a product from a productive group work task in a government class. The example is one of the products from the group; each student produced his or her own notes. In this case, students were reading a text about the importance of writing letters to elected officials. Each student

Figure 1.4 | **Conversational Roundtable**



took notes about the reading in the upper left quadrant of the conversation roundtable. Then, as each member of the group discussed the reading, the other members took notes in a corresponding quadrant. When the group completed its reading and discussion, each person wrote a single-sentence summary in the middle of the paper.

In a formative assessment system, the work students create during a productive group session serves as excellent fodder for checking understanding. The instructor reviews these work products against the lesson's purpose to determine which students need additional instruction (as will be described in the subsequent chapters of this book). For example, even a quick review of Eric's conversation roundtable suggests that he understands this content and that the group had a very interesting conversation while creating notes. Following this review, the teacher modeled his own search for his elected officials, examined the officials' perspectives on specific issues, and then chose a topic on which to write a letter to an elected official.

Independent Tasks

The goal of education is to produce lifelong learners who can independently access and use information. Thus, each lesson must include opportunities for students to apply what they have learned on their own. Both in-class and out-of-class independent tasks provide students with opportunities to apply what they have learned.

The key to effective independent work lies in timing. Independent work should be used when students have demonstrated some level of success with content in the presence of their teacher and peers. Here's what doesn't work: homework assigned just after students have been introduced to content. If, for example, students were just introduced to methods for calculating the slope of a line or adding fractions, it is probably best not to assign homework on that content on the same day—because that homework is premature in this instructional cycle. It's not that homework is bad or evil; it's just that it must come when students are ready. In a formative assessment system, independent work allows for practice and application. It can also serve as a review for determining if students have grasped the prerequisite content or if additional instruction is necessary.

The components of a gradual release of responsibility model do not have to occur in a specific order to be effective. Take, for example, a lesson in which the teacher starts with students independently writing a journal entry in response to the question "How are we connected to our environment?" When the timer rings, the teacher has students work in triads to create a visual representation of their collective ideas. As part of this productive group work, each member of the group writes in a different color so the teacher can track each student's contributions. As the groups work, the teacher meets with small groups for guided instruction, asking questions and then prompting and cueing their responses. After meeting with several groups, the teacher identifies an area of need and gains students' attention. In this think-aloud, the teacher models his or her understanding of the word *connected* and the various ways that things can be connected, both physically and metaphorically. The teacher then establishes the purpose of the lesson and invites students to return to their groups and complete their charts, taking into account the additional information provided.

Again, the order of components is not important. What is important is that the teacher has an instructional framework that allows him or her to identify instructional needs, provide students with feedback, and plan appropriate instruction.

Looking Back, Looking Forward

We've introduced a system for formative assessment that provides teachers with a way to take action on student performance data. This system includes feed-up, feedback, and feed-forward, such that students understand a lesson's purpose and goal, are given information about their successes and needs, and experience high-quality instruction that closes the gap between what they know and can do and what is expected of them.

We do know that there is more information collected about students than ever before *and* that most of it is not used to make instructional decisions—probably because teachers spend too much time on student feedback and not enough time on feed-up and feed-forward. As we have noted, an exclusive focus

on feedback is ineffective because it transfers the responsibility back to students exactly when they are struggling. Instead, we need an instructional framework that allows us to use performance data to make future instructional decisions. Our instructional framework, based on the gradual release of responsibility, provides an intentional way for teachers to increase student responsibility at appropriate times and reassume responsibility as needed.

In the next chapter, we turn our attention to the first part of the system—feed-up. We will explore the ways in which a lesson's purpose can be established and why a clearly communicated purpose is important. We will also investigate the role that motivation plays in student learning as well as how goal-setting can ensure that students become intrinsically motivated and exhibit internal regulation of their learning.

2

Feed-Up: Where Am I Going?

Not too long ago, Doug set a goal for himself—run a marathon to benefit leukemia research. Part of his motivation was altruistic, because he feels strongly about the importance of this cause. Part of it was social, because a number of his high school students and fellow teachers expressed interest in participating in the event as volunteers or walkers. Doug's competitive nature also played a role: he wanted to be the top fund-raiser for the run. Also, we can't overlook the importance of the sense of personal accomplishment to be gained from completing such a daunting task.

Several factors came into play during the period leading up to the event. For one, he had to find various ways to motivate himself. "I'm going to run a marathon in June," he told anyone who would listen. Doug realized that this provided some public accountability and helped with his fund-raising efforts. "Less than 1 percent of the population ever completes a marathon," he told others, furthering his goal to be a part of this elite group. With assistance from the sponsoring organization, he established a training plan and documented his progress. The training plan was systematic and incremental, and most important, it mapped out a path to his goal. Doug also talked with other long-distance runners to gain insights about equipment, training, and nutrition.

We see parallels between Doug's approach to running a marathon and the dynamics of teaching and learning in the classroom. Presentation of information is important—in fact, we will devote an entire chapter of this book to the importance of a gradual release of responsibility model of instruction. Here's what's key: Interleaved between instruction and attainment are the intrinsic and extrinsic factors that motivate students and propel them forward. In this chapter, we will explain a vital aspect of the teaching and learning cycle: feeding up to establish purpose, increase motivation, and set goals.

Feed-Up in the Instructional Cycle

Feed-up lies at the heart of teaching since it makes the student a partner in the business of learning and creating. It also addresses some of the individual variables that make each learner unique, especially when it comes to motivation. As any experienced teacher will tell you, what motivates one student may not work for another. The feed-up process addresses the "Where am I going?" question that students and teachers ask.

Think about a trip you've been on, perhaps to visit relatives in another state. Once you knew where you were going, you could decide how best to get there, how much time it would take, and what you would need along the way. You likely made mid-course corrections as the trip unfolded—after all, who hasn't been inconvenienced by transportation providers or traffic? When you saw your relatives' smiling faces, you clearly understood that you had made it to where you wanted to go. Like any journey, part of the learning process is to decide where you want to go. That's what this chapter is about.

The answer to the "Where am I going?" question should be jointly shared by teacher and student. In a traditional classroom, the teacher assumes the responsibility for identifying *what* will be learned and *when*, thereby leaving students to play a passive role in their learning. A student who asks, "Will this be on the test?" is desperately seeking to take back some of this responsibility, albeit in a limited way. Jay McTighe and Ken O'Connor describe three elements that shape learners' perceptions of their ability to learn:

1. *Task clarity*—when they clearly understand the learning goal and know how teachers will evaluate their learning.

2. *Relevance*—when they think the learning goals and assessments are meaningful and worth learning.

3. *Potential for success*—when they believe that they can successfully learn and meet the evaluative expectations. (2005, p. 15)

That's why attention to each of these factors—establishing purpose, increasing motivation, and setting goals—is critical to the process of learning. When each factor is carefully attended to, students take a more active role in their learning.

Establishing Purpose

Motivating students to become actively involved in their learning begins with establishing a purpose. In too many schools, the only apparent purpose is compliance—in other words, "You're going to learn this because *I* said so." Although obedience may hook some students (at least for a while), it is likely to miss many others. Those missed students are often the high-profile ones who exhibit social and behavioral problems and regularly get themselves into trouble.

A lesson's purpose lays out the content of what will be learned, the learner's role in what will be accomplished, and the expectations for the interactions. We call these the content purpose, language purpose, and social purpose (Fisher, Frey, & Rothenberg, 2008). Taken together, these elements explain what will be learned today, what the students will do with the content, and how they will work with others to accomplish these tasks. It should be noted that *today* is the operative word here. We've seen content, language, and social purposes that are too broad and therefore not perceived as doable by the learner. Consider the two versions seen in Figure 2.1.

The non-examples are not much good for describing what the learner will learn *today*. Although they may be useful as representing larger skills or concepts, they are likely to leave the learner feeling as though they are not attainable. Also, the non-examples lack the level of specificity that engenders

Figure 2.1 | **Example and Non-Example of Purpose Statements**

Purpose Statements	Example	Non-Example
Content	Learn the properties of halogens.	Learn how to use the periodic table.
Language	Compare and contrast the halogen elements using a graphic organizer, and discuss these similarities and differences with your lab partner.	Use logic and evidence to formulate explanations.
Social	Work collaboratively with your partner to submit a revised version of the graphic organizer.	Be nice.

confidence in students' perceptions about whether they are making forward progress. Just as it would be foolish to tell Doug to run a marathon and then leave him on his own to figure out how, there is limited effectiveness to simply stating ambitious objectives that don't include a plan for what to do today.

On the other hand, the examples provide the learner with a plan of action concerning what will be learned, what the learner will do with the content, and the ways he or she will interact with others in the process of learning it. A student entering a chemistry class might hear this:

> Today we're going to learn about halogens, a family of elements on the periodic table. We're going to examine their unique characteristics, and you're going to discuss with your lab partner the ways that halogens are similar to and different from other elements on the chart. The two of you will develop a graphic organizer of your choice that shows how these halogens compare with other families of elements.

Consider the intended audience for the statement above—students—and then consider learning objectives. Though it is true that most lessons are organized according to objectives, objectives are primarily constructed with the

teacher in mind, for they serve as an effective way to plan a lesson. However, lesson objectives "stay on the page"; objectives must be translated into purpose statements, like the one above, that are then expressed to the learners themselves. In some classrooms, especially those with young students, these purpose statements might also be posted on the board for reference. For example, in a kindergarten classroom, the teacher might have a content purpose related to the way that stories are constructed. The focus for the day might be:

> After hearing a story, identify the characters, settings, and important events.

One of the ways that purpose statements can be communicated to students is through the use of "I can" statements (Au, Carroll, & Scheu, 1995). These are statements of future achievement that communicate expected learning outcomes in student-friendly language. They do not reflect what the student can currently do but, rather, what they will be able to do after following instruction. As Kathryn Au notes, teachers plan instruction with an objective or purpose in mind, but these expectations "may require rewording before they can be readily understood by students, particularly those in the lower grades" (2010, p. 18). An "I can" statement for the kindergarten purpose above might be "I can retell a story and name the characters, setting, and important events." In some cases, like this example, "I can" statements are closely connected with purpose statements. In other cases, the purpose is more abstract and students are not always sure what they are expected to learn. A sample list of "I can" statements can be found in Figure 2.2.

Establishing purpose facilitates the process of moving from initial learning to transfer of learning. In the chemistry example above, the content purpose *(unique characteristics of halogens)* represents initial learning. More permanent learning is measured by the ability to apply what is learned. This application of learning is called transfer, and the statement alerts students to the ways they will accomplish this today through the language purpose *(discuss the ways that halogens are similar to and different from other elements and develop a graphic organizer that shows how these halogens compare with other families of elements)*. Of course, transfer of learning doesn't automatically occur just because you announced it. In the book *How People Learn*, the authors caution that "[i]t is

Figure 2.2 | **Sample "I Can" Statements**

Reading

I can retell a story in my own words.
I can make meaning when I read a variety of texts.
I can make connections between my own life and what I am reading.
I can make connections within and between texts.
I can figure out a theme from my reading.

Writing

I can write to communicate my ideas.
I can use writing for different purposes and audiences.
I can show "me" in my writing.

Discussion

I can contribute to a good book club discussion.

(a) I can stay on topic when I talk.
(b) I can share my feelings and ideas.
(c) I can respect others' ideas and opinions.
(d) I can build on others' ideas.
(e) I can bring others into the discussion.

Evaluation

I can show and/or tell what I learned and how I learned it.

Culture

I can use artifacts to describe

(a) my own cultural heritage,
(b) others' cultures, and
(c) similarities and differences across cultures.

I can define culture and how cultures change.

Source: From "Thinking for ourselves: Literacy learning in a diverse teacher inquiry network," by T. E. Raphael, S. Florio-Ruane, and M. J. Kehus, 2001, *The Reading Teacher, 54*(6), pp. 596–607. Copyright 2001 by the International Reading Association, www.reading.org. Reprinted with permission.

important to view transfer as a dynamic process that requires learners to actively choose and evaluate strategies, consider resources, and receive feedback" (Bransford, Brown, & Cocking, 2000, p. 66). The purpose statement sets up a schema for what will be learned and how it will be applied.

It is that construction of a schema that is essential for all learners but is especially important for English language learners (ELLs). At various times, and especially when academic language is used, ELLs may need to rely on internal translations between their first and second languages to make sense of instruction. In addition, the ability of an ELL to process and understand speech does not occur uniformly across types of words. In fact, intermediate ELLs often process content words more accurately than function words (such as conjunctions, prepositions, and articles). An ELL in that chemistry classroom is more likely to accurately interpret *halogen*, *discuss*, and *graphic organizer* than he or she is to understand *with*, *to*, and *on* (Dutro & Moran, 2003). A purpose statement fosters further understanding of these function words by pairing them with the actions and gestures used by the teacher, providing learners with "multiple examples of natural language in use" (Field, 2008, p. 429).

Establishing purpose is one element in a feed-up system that views the learner as an active partner. Another element is motivation, both internal and external. Motivation is linked with purpose as students decide if they are interested in the purpose that has been established. That's not to say that students only study things that are interesting to them individually. They also have to learn specific things in specific grades. We have standards for different grade levels and content disciplines. It's up to the teacher to ensure that the purpose for achieving those standards is relevant and that students are invited into the content.

Increasing Motivation

Motivation and its effect on learning has long been the subject of educational research. Motivation is considered vital because it "affects the amount of time that people are willing to devote to learning" (Bransford et al., 2000, p. 60).

A number of conditions can increase or decrease one's level of motivation. The first is the perceived relevance of the information. Think of the safety

instructions given before each airplane flight. The flight attendant presents important information to the passengers, and this information is mostly ignored—yet this same information would be critical if an emergency erupted. Passengers would be riveted to the flight attendant's instructions and would faithfully execute every command. The difference is perceived relevance. A smoke-filled airplane cabin motivates passengers to learn quickly and well. We're not suggesting that creating a climate of imminent danger is a good motivational tool, but it does say something about the importance of relevance. Although the language purpose in the chemistry example is not as dramatic as a smoke-filled airplane cabin, knowing that you're going to develop a graphic organizer makes learning about halogens more relevant.

A second facet of motivation concerns competence. Learners are more motivated when they see themselves as capable learners. We've all witnessed the slouched shoulders of the student who has already decided that he or she won't do well in a subject. "I just can't do math," a student might say, "I'm not any good at it." This self-fulfilling prophecy is set into motion, and chances are very, very good that he or she will in fact not do well in math. Subsequently, the resulting lack of achievement in math is used as further evidence that he or she can't do math. It's a chain that is difficult to disrupt. This student is displaying a fixed view of intelligence that prevents him or her from doing well.

Unfortunately, this is sometimes unintentionally reinforced by well-meaning adults who praise intelligence ("You're so smart at this!") instead of effort ("I can see you worked hard on this!"). The difference is important because the latter focuses on a growth mind-set about intelligence (Dweck, 2007). Even among students who do well, praise about one's intelligence sets them up for failure because the only way they can interpret future difficulty in a subject is telling themselves they're *not* smart. In addition, these students limit the amount of educational challenge they are willing to assume because it might expose a lack of intelligence. Students who have been praised for their intelligence are less willing to try tasks at which they might not succeed because their belief is built around being viewed as intelligent (Dweck, 2007).

A fixed view of intelligence can also result in negative behavior. Learners who believe they don't do well because they're not smart are left with two

undesirable choices—tell themselves either they're dumb or they're not doing well because they don't do the work. The second choice is the more desirable of the two because it preserves some scrap of self-concept. Follow the logic: "I'd rather be seen as lazy than dumb." The resultant work completion and attendance problems become predictable.

Students who correctly view intelligence as malleable understand that effort matters, recognize that not everything comes easily the first time around, and seek challenge because it means they are learning. They see learning as analogous to a muscle that needs to be flexed and exercised. Although they may suffer setbacks, they are more resilient because they know that their use of learning strategies—such as meeting with the teacher, asking questions, getting homework help, and studying for exams—will lead to improved performance. Students who are recognized for their efforts are more likely to develop this malleable growth mind-set.

It is wonderful when students arrive at our classroom doors with this mind-set, but the reality is that many don't. At our high school, we've made this topic a focal point throughout the school. During the first week of classes, students learn about persistence and a malleable view of intelligence. They take a 17-item questionnaire that measures "grit"—one's persistence and passion for long-term goals—in order to learn about themselves. Interestingly, grit has been found to be a primary factor in National Spelling Bee finalists, West Point graduates, and successful teachers (Duckworth, Petersen, Matthews, & Kelly, 2007). (This questionnaire, developed by Duckworth and her colleagues, can be downloaded at www.sas.upenn.edu/~duckwort/images/17-item%20Grit%20and%20Ambition.040709.pdf.)

Throughout the year, our students participate in lessons about brain physiology, intelligence, and learning theory, with special emphasis on a growth mind-set. We reinforce this by repeating one of the founding principles of our school—"It's never too late to learn." All of this would be pointless without student resources for changing their mind-sets. For this reason, we offer lunchtime and after-school tutorials, and every teacher holds office hours and schedules a weekly "academic recovery" for students who are falling behind. In addition, we have developed a grading system that replaces *D*s and *F*s with