CHAPTER 1

What Is Classroom Assessment?

This chapter explains the purpose and defining characteristics of Classroom Assessment and offers principles for good practice.

Classroom Assessment is a simple, practical approach to getting and giving feedback to improve the effectiveness and quality of teaching and learning. It is an evidence-based approach to improving learning and teaching that involves college and university teachers and students working intentionally and collaboratively toward shared goals. When Classroom Assessment is effectively employed, teachers obtain useful information—in terms of direct evidence or learners' perceptions—about what, how much, and how well their students are learning. Analyzing and reflecting on that information provides useful insights for making teaching, assessment, and feedback more engaging, effective, and efficient. By involving students in the cycle of providing, analyzing, and using feedback, teachers help them become more capable, independent, and successful lifelong learners.

K. Patricia Cross and Thomas A. Angelo initially defined and developed *Classroom Assessment* in the mid-1980s, and later refined this concept and practice (Angelo & Cross, 1993; Cross & Angelo, 1988). The terms *classroom assessment* and *classroom assessment techniques* were first mentioned by Professor K. Patricia Cross in speeches and articles in late 1986. She originally envisioned Classroom Assessment as a promising way to engage college teachers in and prepare them for more systematic, ongoing Classroom Research projects. Professor Cross and Mimi Harris Steadman further systematically explored the interrelationships between these two approaches in *Classroom Research: Implementing the Scholarship of Teaching* (1996).

Although Classroom Assessment began as an entry point and adjunct to Classroom Research, it was soon adopted and adapted by many higher education "movements," organizations, communities of practice, and disciplines. Throughout the intervening years, this formative feedback approach has been applied, field-tested, and shared by thousands of teachers in colleges and universities across the United States and beyond. Classroom Assessment has been disseminated, promoted, and employed by national- and state-level higher education associations, disciplinary and professional

societies, and used on many campuses by assessment and academic/faculty development professionals. Information on Classroom Assessment Techniques (CATs) has become a common feature of teaching and learning center websites. Introductions to CATs, and training in their use, are often included in professional development (PD) for graduate teaching assistants and new faculty. Since the late 1980s, teaching scholars and educational researchers have published numerous conference papers, journal articles, book chapters, master's theses, and doctoral dissertations on Classroom Assessment.

Classroom Assessment, a late-20th–century higher education innovation, has survived, thrived, and continues to be widely used in the 21st century. Although Classroom Assessment originated in the United States, it has proven useful to teachers and learners in higher education throughout the world.

PURPOSE OF CLASSROOM ASSESSMENT

By 2023, across the world, there were more than 25,000 post-secondary institutions of all kinds enrolling approximately 235 million students (UNESCO, 2023). In the United States alone, there were more than 3,500 degree-granting institutions, enrolling nearly 16 million students (Irwin et al., 2022). Globally and within many countries, the diversity of post-secondary institutional missions and student demographics is enormous. Post-secondary institutions worldwide—public and private—include small, specialized trade schools, mid-sized comprehensive institutions, and massive research-intensive universities. Internationally, post-secondary students run the gamut from teenage secondary school graduates to advanced PhD students and mature adults.

However complex and diverse their missions and student bodies, all legitimate post-secondary institutions have at least one core mission in common: to educate their students. In other words, a central aim of all higher education institutions is to help students learn more effectively and efficiently than they could on their own. How well or poorly each institution performs that core educational mission depends, to a large degree, on how and how well its teachers and students engage in the work of teaching and learning. In turn, the effectiveness and quality of teaching and learning depend, to a large degree, on how and how well teachers and students get, give, and use feedback.

Although effective learning can and often does occur without the benefit of teaching—and, at times, despite it—there can be no such thing as effective teaching in the absence of learning. Teaching without learning is just talking. That talking may be extremely engaging and entertaining. It may be extraordinarily erudite and informed. But talking that does not result in student learning is not teaching. Of course, no teacher, however dedicated, gifted, or skilled, can make a student learn. Students must also take an active role in their education and put in the effort necessary to learn. What all teachers can and should do is provide every student with equitable opportunities to learn. But without assessment and feedback, teachers cannot determine whether those learning opportunities are being provided equitably or used effectively.

At the most fundamental level, Classroom Assessment is about asking, not assuming. College and university teachers who do assume that students are learning what they are striving to teach them are sometimes surprised and disappointed by evidence to the contrary when they grade

exams, papers, projects, or performances. Too often, until assessed in some way, students themselves may not even realize they have failed to learn core skills and knowledge, or have not learned them as well as expected. There can be gaps, sometimes quite worrisome ones, between what was taught and what has been learned. Unfortunately, by the time teachers discover gaps in their students' learning, it is often too late. What could have been timely learning diagnoses too often become autopsies.

To avoid such unhappy late surprises, both teachers and students need effective, efficient ways to monitor learning processes and progress, detect gaps, and make necessary adjustments throughout courses. For example, suppose a teacher's main goal is for students learn all points *A* through *Z*. To achieve that goal, that teacher needs first to discover whether all students are really starting at point *A*, and, as the course proceeds, whether all have reached intermediate points *B*, *L*, *Q*, and so on. Given the risk of gaps, it would be unwise to assess students' learning only when the syllabus has arrived at midterm point *M* and final point *Z*.

Classroom Assessment is designed specifically to investigate how well students are learning at those initial and intermediate points, identify gaps, and provide teachers and students with timely and useful information for improvement when needed. Used well, Classroom Assessment minimizes unpleasant surprises on high-stakes assessments. Fortunately, feedback from Classroom Assessment can also lead to positive surprises. At times, students outperform expectations, creating opportunities for teachers to investigate and learn from how they succeeded, and, perhaps, to raise the challenge levels of their courses.

Through practice in using Classroom Assessment, teachers can become better able to assess, evaluate, understand, and promote learning, and, at the same time, increase their ability to help students themselves become self-assessing, self-directed, self-regulating learners. Simply put, the central purpose of Classroom Assessment is to empower both teachers and their students to monitor, understand, and improve the quality of learning in and beyond the classroom—whether those classrooms are physical, virtual, or hybrid.

DEFINING CHARACTERISTICS OF CLASSROOM ASSESSMENT

In the United States, it often seems that higher education and kindergarten through grade 12 (PK–12) education are two related sectors separated by a common language. Each sector has its own vocabulary and jargon, often with different terms meaning the same thing, or the same terms meaning quite different things. For that reason, it is important to note that the term *classroom assessment* has long-standing, different, and much broader meanings in U.S. pre-school, elementary, and secondary education than it does in U.S. higher education (see Airasian & Russell, 2011; Brookhart & McMillan, 2020). This chapter will, therefore, define *classroom assessment* as it will be used throughout this handbook, and as the term is often used in American higher education. To differentiate its use in this text from other possible meanings, the term *Classroom Assessment* will be capitalized throughout.

Classroom Assessment is…

1. formative,
2. evidence-based,
3. learning-centered,

4. teacher-directed,
5. constructively aligned,
6. mutually beneficial,
7. metacognitive,
8. context-specific,
9. firmly rooted in good teaching practice, and
10. inclusive and equitable.

The following section elaborates each of the 10 characteristics that define Classroom Assessment.

FORMATIVE

Classroom Assessment is a formative, rather than summative, approach to learning assessment and feedback.

There is general agreement among educators that summative assessment involves gathering and documenting information on learners' knowledge and skills—typically at the end of a course, program, or other learning experience. The main purpose of summative assessment is to provide information for summing up, for making judgments and decisions such as who passes a course of study, who is accepted into a college or university, who receives a scholarship or bursary, who is awarded a diploma or degree, and who is licensed to practice a profession. Typical summative assessments are course-level final examinations, final papers and projects, entrance and exit exams, and standardized state and national educational progress tests. Results of summative assessments are usually communicated after the fact via grades, report cards, letters of acceptance or rejection, and state and national accountability reports. For all these reasons, the high stakes involved in summative assessments can provoke high anxiety in some learners.

Regarding definitions of *formative assessment*, however, there is much less consensus. One simple definition is that formative assessment tells us—in relation to where we want to go—where we are now, and how best to get to our desired destination. A more formal, scholarly characterization from *The Handbook of Formative Assessment in the Disciplines* (Andrade et al., 2019) captures the gist of many current definitions in the higher education literature:

> As part of a planned assessment system, formative assessment supports teachers' and students' inferences about strengths, weaknesses, and opportunities in learning. It is a source of information that educators can use in instructional planning and students can use in deepening their understandings, improving their achievement, taking responsibility for, and self-regulating, their learning. Formative assessment includes both general principles, and discipline-specific elements that comprise the formal and informal materials, collaborative processes, ways of knowing, and habits of mind particular to a content domain. (p. 14)

Formative assessments are typically *back loaded*, in contrast to summative assessments that require significant work prior to the assessment (e.g., instructors writing the exam; students studying for the exam). For teachers and students, most of the work involved with formative assessments occurs after the data are gathered. At that point, the most challenging

tasks for teachers involve analyzing the data, providing students with relevant feedback and guidance on how to use that feedback to improve in future, and making any indicated changes in instruction. For their part, if students are to benefit, formative assessment requires they take teachers' feedback seriously and act on it to improve their learning and performance.

Classroom Assessment is one of many approaches to formative assessment. As such, its primary purpose is to *inform* and *form* students' understanding of their learning to help them improve both their practice and their performance. A secondary, but very important, formative purpose of Classroom Assessment is to inform and form teachers' understanding of the effects of their teaching on student learning. In this way, Classroom Assessment can provide teachers with useful, actionable information to revise and adjust their teaching practices to benefit their current students.

EVIDENCE-BASED

The use of *evidence*-based rather than *research*-based as a defining characteristic is intentional. The process of Classroom Assessment and the techniques included in this handbook are based on and informed by the best current, available evidence. Wherever possible, this handbook provides references to relevant educational research, research reviews, and meta-analyses published in peer-reviewed academic journals. High-quality research on post-secondary teaching and learning is, however, not equally available regarding all key topics and all disciplines. Post-secondary teachers in accounting, engineering, physics, biology, nursing, medicine, and psychology, for example, all have relatively long and deep discipline-based educational research traditions on which to draw. In many other fields, however, discipline-based education research is a more recent and less well-developed area of scholarship.

In the third decade of the 21st century, we have access to robust evidence about how people learn and what promotes student learning, in general (see Hattie & Yates, 2014; Lovett et al., 2023; Zakrajsek & Nilson, 2023). In higher education, reviews of powerful, high-level meta-analyses demonstrate the benefit of decades of high-quality educational research (Mayhew et al., 2016; Schneider & Preckel, 2017). At this point, we understand from research that factors such as clear learning goals, high expectations, clear standards, effective assessment, and timely formative feedback promote student learning, just as we know from research that clean water and air, good nutrition, and adequate exercise support good health.

Yet, in many cases, we still lack compelling evidence about exactly what works for different teachers teaching unique students in a variety of circumstances in particular disciplines. Consequently, in those cases where relevant peer-reviewed educational research is not yet available to support specific CATs, other sources of evidence have been sought. In some instances, the only relevant evidence comes from firsthand accounts of Classroom Assessment experiences published by scholarly teachers. Some of these firsthand accounts are based on sophisticated examples of the Scholarship of Teaching and Learning (SoTL), such as case studies and quasi-experiments. Others are simple descriptions of how Classroom Assessment was used. Still others focus mainly on students' perceptions of CATs. As a result, available evidence for the effectiveness of individual CATs included in this handbook varies in type, amount, and strength. Given that some evidence is usually better than none, I trust readers to evaluate the relevance of evidence provided to their specific disciplines, students, and teaching contexts and goals.

LEARNING-CENTERED

Classroom Assessment focuses the primary attention of both teachers and students on observing, analyzing, and improving learning. What teachers do and how they do it are critical to student learning. In many cases, relatively small changes in teaching behavior can lead to more and better learning (Schneider & Preckel, 2017). At the same time, helping students change their study techniques and metacognitive strategies can also lead to improved learning outcomes (Dunlosky, 2013; Kaplan et al., 2013). Ultimately, if students are to become independent, self-regulating, successful lifelong learners, they must develop the knowledge, skills, and will to take full responsibility for their own learning. To progress toward that point, however, most students will need instruction, feedback, and guidance from teachers. Classroom Assessment can provide just-in-time information that both teachers and learners need to design and make effective, ongoing adjustments to their practice.

Although the terms *student*-centered and *learner*-centered are often used in educational literature—often in contrast with *teacher*-centered—*Classroom Assessment* is intentionally defined as *learning*-centered. There are many important dimensions of students' lives beyond the classroom, and many programs and personnel in colleges and universities are decidedly, and, quite rightly, student- and learner-centered in their goals and activities. Students' physical, mental, and social well-being, for example, are critical to their success in higher education and beyond. Students' satisfaction with their overall educational experience is of central importance to recruitment, retention, and ongoing institutional success. Within those broader institutional and social contexts, Classroom Assessment focuses attention primarily on the *process of learning* that takes place in and in relation to formal courses—on what the students do, in other words—without ignoring or underestimating the critical importance of other dimensions of students' experiences.

TEACHER-DIRECTED

Teaching, like all professions, depends on practitioners to make well-informed, ethical, and effective decisions to optimize student learning. Teachers, like all other professionals, require a wide repertoire of knowledge and skills to implement their decisions well. Guidelines and training are valuable and necessary, but not sufficient to inform professional teaching practice. No program or text could possibly provide teachers in advance with a comprehensive set of guidelines covering exactly what to do from moment to moment in the complex and fluid reality of classrooms. What individual teachers do—and how well they do it—depends on their unique combinations of disciplinary knowledge and skills, teaching knowledge and skills, experience, empathy, and insight.

Lee Shulman (1986) coined the term *pedagogical content knowledge* (PCK) for the intersection of teachers' knowledge about and skill in a discipline with their knowledge about and skill in *teaching* that discipline. For example, PCK in organic chemistry involves both knowing a great deal about organic chemistry and knowing about how to teach organic chemistry. Classroom Assessment depends on and respects the PCK, judgment, and autonomy of college and university teachers as professionals. At the same time, engaging in Classroom Assessment can broaden and deepen teachers' PCK and skills.

As responsible professionals—within relevant norms and rules—individual teachers can and should decide what to assess, how to assess,

and how to respond to the information gleaned through Classroom Assessment. Furthermore, although the learners involved have a legitimate need to know, teachers should not be required to share the results of Classroom Assessments with anyone outside their classrooms.

That said, there are many reasons to encourage and support teachers to voluntarily share their Classroom Assessment questions, plans, experiences, and results in support of efforts such as accreditation or informal peer support. As this handbook demonstrates, over the past three and a half decades, many college and university teachers have enthusiastically chosen to share what they have discovered about teaching and learning through the practice of Classroom Assessment in presentations, publications, and online. Local examples can be found on the websites of many institutional teaching and learning centers. No doubt, even more faculty have informally shared experiences and lessons learned with colleagues in their departments, institutions, and disciplines. On many campuses, faculty learning communities and interest groups have been powerful vehicles for this collegial sharing. Throughout, faculty and academic development centers and staff have played key roles in encouraging and facilitating these valuable Classroom-Assessment–related conversations.

Notwithstanding the previous arguments for individually teacher-directed formative assessment, there can also be powerful advantages in collaborative, shared responsibility for the design, delivery, and evaluation of high-stakes summative assessments. One of the great challenges many teachers face is the role conflict inherent in being both coach (teacher) and referee/umpire (grader). Is there any sport in which the same person is responsible both for coaching players and for determining the outcome of games and matches involving those same players? Such a role conflict in sports would seem untenable and obviously unfair to players and spectators alike. In higher education, some departments and programs have avoided this common academic role conflict by designing and administering common summative assessments across classes, having teachers grade the work of students they do not teach, or by grading anonymized work. These and other solutions can increase students' confidence that their high-stakes assessments will be evaluated more fairly—and allow teachers to concentrate on teaching and coaching all their students to achieve their highest potential in learning.

CONSTRUCTIVELY ALIGNED

Constructive alignment is an approach to curriculum design and development closely related to backward design. Widely influential in higher education worldwide, the concept of *constructive alignment* was introduced, elaborated, and popularized by educational theorists John Biggs and Catherine Tang (2011). The *constructive* in *constructive alignment* refers to constructivist theory, which posits that, if learning is to be deep and lasting, students must actively engage in remembering, processing, and making connections—in constructing their own understandings—rather than passively receiving information. The *alignment* in the term refers to the explicit and transparent linkage of intended learning outcomes, teaching and learning activities, and assessment tasks to promote student achievement of those intended learning outcomes (Biggs, 2003).

The term *backward design* first gained currency in the United States among primary and secondary (K–12) educators through the work of Grant Wiggins and Jay McTighe (2005). Despite its potentially confusing name,

backward design is a very common, straightforward, logical approach. Backward design, beginning with the end in mind, like constructive alignment, requires starting by first making clear exactly what we hope to have achieved when we finish. In our daily lives, nearly every product and process we encounter has been designed backward from detailed plans to achieve specified outcomes. For example, before the first shovel of dirt is moved or nail hammered, architects and engineers define, design, and detail exactly what a finished building should look like and how it should function—and only then do they figure out how best to build it. The same backward design approach is used to create nearly every object we use, including coffee cups, cars, and computers.

Alignment, the core idea that links both approaches, means that every aspect of curriculum design must begin with and be explicitly linked to clearly defined, intended learning outcomes, or ILOs (Biggs, 2003). ILOs state what students are expected to know and be able to do by the end of a given lesson, course, or program. Once the ILOs are clearly defined, then teachers or curriculum designers work "backward" from that desired end state to determine the performance/grading standards, assessment and feedback strategies, teaching and learning approaches, content, and resources best suited to help students demonstrate achievement of those ILOs. As many have noted, backward design is the precise opposite of the way in which most courses were traditionally developed and even how class sessions are taught.

At this point, you might wonder how all this relates to Classroom Assessment. Simply put, to be most useful, Classroom Assessment must be constructively aligned with and fit logically in the overall design of the relevant course or program. To be effective, CATs must be transparently and tightly linked to intended learning outcomes, performance/grading standards, and summative assessment approaches. CATs work best when they are designed backward into courses from the beginning, rather than dropped in as afterthoughts.

MUTUALLY BENEFICIAL

Classroom Assessment will only benefit teachers and students if both are motivated to engage in it and take the resulting feedback seriously. Because Classroom Assessment is formative, participating in it typically generates either no or very few "points" toward final course grades. However, although Classroom Assessment offers students no or very minimal immediate extrinsic rewards, it can enhance intrinsic motivation to learn. By collaborating willingly with faculty in formative assessment, students reinforce their grasp of course content and strengthen their skills in self-assessment and self-regulation. Their intrinsic motivation is increased when they realize that faculty are interested and invested in their success as learners.

At the same time, most students' extrinsic motivation to participate and collaborate is enhanced to the extent they believe that engaging in Classroom Assessment can help them improve their performance on summative assessments, and, consequently, their marks and grades. This justified confidence is known as *self-efficacy*, or the extent to which a learner will persist in achieving a desired outcome (Bandura, 1997). Self-efficacy is an essential element in learning. When students can attempt, practice, and initially fail at tasks, without fear of negative consequences (poor grades)—and receive immediate formative feedback on their performance—they obtain performance experience, one of Bandura's key elements of self-efficacy.

CATs allow students to gain this experience in a low-risk zone. They are likely to feel a greater sense of justified self-efficacy and perform better throughout the course, including later summative assessments.

Teacher participation in Classroom Assessment also depends largely, but, not entirely, on intrinsic motivation. By engaging in Classroom Assessment, teachers sharpen their teaching focus by continually asking themselves three questions: (1) "What are the essential skills and knowledge I am trying to teach?" (2) "How can I find out how well students are learning them?" (3) "How can I help students learn better?" As teachers work closely with students to answer these questions, they improve their teaching knowledge and skills and gain new insights into the endlessly fascinating mysteries of learning. As a result, the process of Classroom Assessment can be intrinsically motivating and rewarding for teachers.

As with students, teachers may also reap extrinsic rewards from their efforts over time. For example, in some institutions, teachers may use examples of Classroom Assessment activities and their outcomes to document their involvement and achievements as effective, scholarly teachers for purposes of presentation, publication, and career advancement such as promotion and tenure.

At the writing of this edition of *Classroom Assessment Techniques*, a movement called "ungrading" is gaining popularity. Ungrading de-links student learning from grades in an attempt to defuse fear of grades (Blum, 2020; Stommel, 2023). Like CATs, ungrading focuses on consistent formative feedback to encourage student participation and success in achieving learning outcomes. CATs can, therefore, be useful in supporting ungrading efforts. Although some teachers have found success in running entire courses sans grades, some of the benefits of ungrading can be achieved simply by assigning small learning tasks with no grades attached. Whether ungrading is yet another educational fad or develops into a widely used approach focused on formative rather than summative assessment remains to be seen.

All the potential mutual benefits of Classroom Assessment depend largely on teachers' and students' mutual respect and trust. Both must trust that the others' motivations and intentions are positive. Both must listen, respond, and collaborate with patience and respect. And both teachers and students must be willing to take some (usually small) risks; make and learn from errors; and revise old habits and learn new, more effective learning and teaching behaviors.

The good news is that most students seem willing to give teachers the benefit of the doubt, to trust them until and unless that trust is broken. It is critical, therefore, that teachers demonstrate good faith and lead by example from their very first communications and encounters with students. In the end, however, if neither teachers nor students experience tangible benefits from engaging and collaborating in Classroom Assessment early in the process, neither will be motivated to engage long enough to make substantial improvements in teaching and learning. Promoting both intrinsic and extrinsic motivation, with tangible mutual benefits, is key to sustaining Classroom Assessment.

METACOGNITIVE

Metacognition is often defined as thinking about one's thinking and has been an important concept in learning for nearly a half a century (Flavell, 1979; Rhodes, 2019). To engage in the kind of metacognition higher education

requires, you have to: (1) notice that you are thinking; (2) monitor your thinking; and (3) try to direct or re-direct your thinking. In a very popular and influential book, Nobel prize–winning psychologist Daniel Kahneman (2011) made a now-famous distinction between "thinking fast," or System 1 thinking, and "thinking slow," or System 2 thinking. Kahneman characterized System 1 thinking as instinctive and often driven by emotional responses. He argued that a great deal of research indicates that System 1 thinking is the default setting for most humans most of the time. Slower, System 2 thinking, by contrast, is more deliberative and rational—and, thus, much less common in everyday life. Driving a car and impulse buying are examples of System 1 thinking. Planning a complex road trip or carefully evaluating which car to buy are examples of System 2 thinking.

Although both modes of thinking are necessary and important, virtually all the intended learning outcomes that characterize higher education depend to some degree on slower-paced System 2 thinking. Analytical, critical, and creative thinking all depend on System 2 thinking, as do application and transfer. Self-awareness, self-reflection, self-assessment, and self-regulation all require well-developed System 2 thinking skills. Metacognition is, by definition, System 2 thinking.

Much routine teaching behavior is clearly dependent on thinking fast or System 1 thinking. While one is teaching, there is often little time or opportunity for slow thinking. In face-to-face or synchronous online teaching and learning contexts, teachers depend on System 1 thinking to form impressions of student learning, make quick decisions, and implement real-time adjustments. Few teachers have time to make those informal, sometimes subconscious assessments explicit or to check them against the students' own perceptions or ability to perform. As a result, teachers often assume a great deal about their students' learning, and many of those assumptions remain untested. Testing assumptions and questioning initial impressions requires System 2 thinking.

Effective, scholarly teaching requires teachers to assess, not assume.

Students are also likely to spend most of their time in System 1 mode, relying on habitual and largely subconscious routines during instruction and while studying. Research repeatedly indicates that many students routinely engage in classroom and study behaviors that are either ineffective or counterproductive, often differentiated by the performance level of learners (Geller at al., 2018). Though it may be possible for students to pass tests and courses while operating largely in a System 1 mode, significant, deep, and lasting learning requires students to engage in metacognition and deep processing.

Classroom Assessment invites teachers and students to make time and space for System 2 thinking, for slow thinking, by providing opportunities for reflection on teaching and learning practice. A number of CATs provide useful step-by-step processes for learning reflective practice. And CATs provide teachers and students with useful data for that reflection. Classroom Assessment is, therefore, explicitly designed to stimulate, inform, and promote metacognition and reflection by learners and teachers. Indeed, without metacognition and reflection, there can be no lasting lessons learned from assessment—whether formative or summative.

CONTEXT-SPECIFIC To be most useful, Classroom Assessment must respond to the specific characteristics of the teachers, students, disciplines, and courses in which it is applied. Consequently, Classroom Assessment is highly context- specific.

A CAT that works well in one class, in one discipline, from a given teacher, and with a particular group of students will not necessarily work as well in another context. Each individual student brings a complex mix of background variables to the course, as does each teacher. A few factors that can influence engagement and performance include: socioeconomic class; linguistic and cultural backgrounds; other identities; attitudes and values; level of general academic preparation; self-efficacy; learning (or teaching) strategies and skills; and previous knowledge of the specific subject matter.

As students interact in the classroom, the mixture of variables that can affect learning becomes vastly more complex. In addition to being affected by student variables, individual and group learning can also be influenced by the instructor, the discipline, the organization and format of the course, the media and materials used, the time of day and setting in which the class meets—if it meets synchronously—and the form of interaction in an asynchronous course. As a result of these complex interactions, every class develops its own "microculture." This is what experienced college teachers mean when they talk about individual classes each having its own "chemistry."

Because every course context presents unique and complex challenges and opportunities, Classroom Assessment assumes that the most appropriate person to determine how best to assess and provide feedback on student learning is the person responsible for promoting and improving that learning—the classroom teacher. That is why the CATs in this handbook are presented as examples and suggestions that might be *adapted*, not as models that should be *adopted*.

FIRMLY ROOTED IN GOOD TEACHING PRACTICE

Informally assessing learning and giving learners feedback are nothing new, of course. Parents, caregivers, and teachers in every culture have done this throughout human history. College and university teachers regularly elicit feedback on their students' learning and then use that feedback to inform their teaching, albeit often in relatively informal, episodic, and unplanned ways. Teachers routinely ask questions, monitor body language and facial expressions, read homework and drafts, and so on. Classroom Assessment builds on this common good teaching practice by making it more explicit, systematic, flexible, and effective. Classroom Assessment provides a way to integrate simple formative assessment practices constructively and seamlessly into familiar, traditional teaching practices such as lecturing, questioning, demonstrating, explaining, and responding to questions.

A few examples may clarify how Classroom Assessment can work in practice. By taking a few minutes to administer a simple CAT—such as a Background Knowledge Probe, Opinion/Attitude Poll or Misconception/Preconception Check—*before* a class session, teachers can quickly get a clearer idea of their students' initial levels of knowledge and understanding. After reviewing that feedback from students, teachers can make better informed decisions on where and how to begin instruction. A quick assessment *during* the class session—which might involve Focused Listing, a One-Sentence Summary, or Muddiest Point—can reveal how well the students are following the lesson in progress. Classroom Assessment immediately *after* the class session—perhaps using a Minute Paper or Applications Card—can reinforce the material taught; promote recall, deep processing, and transfer of learning; and uncover gaps in understanding before they become serious impediments to further learning.

Even though teachers routinely gather potentially useful information on student learning through questions, quizzes, homework, and exams, it

is often collected too late—at least from the students' perspective—to positively affect their learning, motivation, and academic achievement. In practice, it is very difficult to de-program students who are used to thinking of anything they have already been tested and graded on as being "over and done with." Consequently, the most effective times to assess and provide feedback for learning are often well before the chapter test, or the midterm or final examination. Classroom Assessment is designed to provide focused, timely, useful feedback to inform good practice in teaching.

INCLUSIVE AND EQUITABLE

From its inception, Classroom Assessment was designed to be engaging and useful to the broadest possible range of teachers and learners, and adaptable to the full range of educational contexts, disciplines, and institutions. Professor Cross and I specifically aimed to develop an approach to formative assessment that could be easily understood and effectively used by inexperienced first-time teachers as well as by extremely experienced expert teacher-scholars. At the same time, CATs were designed for use by a diverse range of learners, from the least-experienced, least-prepared, first-year students to highly successful, advanced, graduate students. CATs were also designed to provide valuable feedback to first-generation students, learners from marginalized groups, and anyone who is not well versed in the hidden curriculum that drives much of the higher education experience. Overall, we hoped that Classroom Assessment would prove useful to understanding and improving teaching and learning across higher education.

The many publications referenced in this third edition are evidence that our original intention to create an inclusive, equitable, widely applicable, adaptable, and engaging approach to formative assessment has borne fruit. Thousands of post-secondary teachers at every level, in almost every discipline, in all types of institutions, and in a broad range of countries have adapted and used Classroom Assessment to their and their students' advantage. The range of students represented in the literature is similarly diverse. We now have accounts of Classroom Assessment experiences published by graduate teaching assistants, master's degree and doctoral candidates, early- and mid-career teachers, and very senior academics as well as by academic and faculty developers, assessment professionals, and educational researchers. Although outside the scope of this book, there are also many examples in the literature of CATs used in primary and secondary education, and in vocational, technical, and professional training. Inclusivity of teachers and learners, across all the dimensions in which they may differ, has always been and remains a key defining feature of Classroom Assessment.

EIGHT PRINCIPLES FOR GOOD PRACTICE IN CLASSROOM ASSESSMENT

Classroom Assessment has been used and documented by college and university teachers and faculty/academic developers in the United States and beyond for more than three decades. The eight principles for good practice in Classroom Assessment that follow are based on that wealth of published experience and the author's own long engagement with this approach. These eight principles for good practice in Classroom Assessment are consistent with and well supported by decades of higher education research on effective post-secondary teaching and learning. Specifically, they are modeled on the *Seven Principles for Good Practice in Undergraduate Education* (Chickering & Gamson, 1987), one of the most widely read, cited, and influential documents in the history of U.S. higher education.

Based on extensive research on college teaching and learning, the *Seven Principles* asserted that good practice in undergraduate education: (1) encourages contacts between students and faculty; (2) develops reciprocity and cooperation among students; (3) uses active learning techniques; (4) gives prompt feedback; (5) emphasizes time on task; (6) communicates high expectations; and (7) respects diverse talents and ways of learning (Chickering & Gamson, 1987).

In American higher education, there is a long tradition of convening panels of experts to create lists of principles summarizing key areas of research to communicate research results and encourage the application of those research results by relevant practitioners. While Chickering and Gamson's *Seven Principles* may be the best known and most influential of these lists, there are other important examples. In 1992, for example, the American Association for Higher Education (AAHE) published *Nine Principles of Good Practice for Assessing Student Learning* (Astin et al., 1992). Those nine assessment-related principles, reviewed more than two decades later (Kinzie et al., 2014), were found to be still relevant to practice. In 2023, Marsha Lovett and her co-authors published a second edition of what has become the most recent influential list in their book *How Learning Works: 8 Research-Based Principles for Smart Teaching*. (Lovett et al., 2023).

The following *Eight Principles for Good Practice in Classroom Assessment* are meant to serve as practical guidelines for use of the CATs explored in following chapters. The works mentioned previously by Chickering and Gamson (1987), Astin et al. (1992), and Lovett et al. (2023) have directly informed and influenced the following list.

Good Practice in Classroom Assessment...

1. Engages teachers and learners in active, collaborative, mutually beneficial work.
2. Focuses on alterable variables: those which learners and teachers can realistically change.
3. Focuses attention and effort on achieving explicit, shared learning goals, and standards.
4. Provides meaningful, timely, useful feedback to improve learning and teaching as well as opportunities and means for both learners and teachers to benefit from that feedback.
5. Emphasizes development of higher-order, lifelong learning skills.
6. Is informed by relevant, high-quality scholarship and research.
7. Respects the rights and responsibilities of teachers and learners.
8. Respects disciplinary, cultural, and individual diversity in teaching, assessment, and learning practices.

Principle 1. Engages teachers and learners in active, collaborative, mutually beneficial work.

By collaborating actively in Classroom Assessment efforts, teachers and students can enhance teaching effectiveness, learning quality, academic success, and personal satisfaction.

Many CATs are designed to promote focused student discussion and collaboration as part of the feedback process. Teachers can also benefit

from discussing their analyses of feedback resulting from CATs, and planned responses to that feedback, with colleagues before responding to students. To reap the full benefits of Classroom Assessment, teachers and students must collaborate effectively in communicating and using feedback to improve teaching and learning outcomes.

Principle 2. Focuses on alterable variables: those which learners and teachers can realistically change.

Many factors influencing student learning cannot realistically be changed within the scope of one course—or even a program of study. What has happened in the past, such as students' prior level of educational preparation, is not alterable. Teachers, likewise, cannot change every aspect of their teaching conditions or environments. Teachers may, for example, be required to test and grade in ways they see as less than optimal. Within these constraints, however, there are often many variables that both students and teachers *can* realistically change. The ways teachers elicit and give feedback and the strategies students adopt in response to feedback are two examples. Research has shown that relatively small changes in practice (Lang, 2021; Schneider & Preckel, 2017) can make relatively significant differences in teaching effectiveness and learning quality.

Principle 3. Focuses attention and effort on explicit, shared learning goals and standards.

To improve their effectiveness, teachers need first to make teaching goals and intended course learning outcomes (CLOs) explicit, and, second, to ensure that learners clearly understand and, to the extent possible, share those goals and outcomes. The same is true of the standards against which student learning and performance will be assessed and graded. At the same time, students need to become explicitly aware of their own learning goals and standards, share those with their teachers, and compare them with the course goals and standards. The degree to which learners recognize that their individual goals align with those of the course will affect their motivation and achievement. Classroom Assessment can, therefore, be used to assess students' views of their own and the course's learning goals and grading standards.

Principle 4. Provides meaningful, timely, useful feedback to improve learning and teaching as well as opportunities and means to benefit from that feedback.

Students benefit from formative feedback on their learning, and sufficient time to make use of that feedback to improve before they are summatively assessed for grades. They also need to understand the meaning of teachers' feedback and how best to use that feedback to improve their learning and achievement. If learners cannot see the point in taking feedback seriously, as well as a clear path toward improvement, that feedback will have few if any positive effects—and the time and effort teachers invested will be largely wasted.

Principle 5. Emphasizes development of higher-order, lifelong learning skills.

Classroom Assessment is most useful when focused on helping students improve their learning strategies and higher-order thinking skills

(HOTS)—skills such as metacognition, deliberate practice, reflection, self-assessment, and self-regulation. Most undergraduate students—as disciplinary novices—need the feedback and guidance expert teachers can provide to develop the higher order disciplinary knowledge and lifelong learning skills that will enable them to become self-directed, self-regulated, and independent.

Principle 6. Is informed by relevant, high-quality scholarship and research.

Classroom Assessment does not require specialized educational research training. It can be carried out by dedicated teachers from all disciplines, provided they have the required time, resources, and support. Good practice in Classroom Assessment does, however, encourage teachers to become informed regarding the current best scholarship and research relevant to their planned use of and response to CATs. For example, before using a CAT to collect feedback on students' study strategy use, good practice would be to do some reading to discover which study strategies might be most effective in your discipline to prepare a useful follow-up for students.

Principle 7. Respects the rights and responsibilities of teachers and learners.

Classroom Assessment should be a safe and positive experience for teachers and students. Making it so requires mutual trust. Mutual trust is built on and maintained by mutual respect. Teachers should be entrusted by their programs and institutions with determining how best to formatively assess their students' learning. They should have the right to share or not share the data resulting from Classroom Assessments with faculty, administrators, or others not directly involved in the course. Students, in turn, should have the right to know, in advance, why they are being assessed and what is to be done with and about their feedback. Students should also have the right to refuse to respond to Classroom Assessments if they do not see providing that formative feedback as in their best interests. Last, students who do choose to respond to Classroom Assessments in good faith should have the right to receive meaningful, timely feedback in return.

Principle 8. Respects disciplinary, cultural, and individual diversity in teaching, assessment, and learning practices.

Even within the same nations and higher education systems, different institutions and disciplines develop distinct teaching and learning cultures. And, of course, individual teachers and students bring many dimensions of diversity to the micro-cultures that develop in each course and classroom. There are many diverse ways to learn and to teach. Good practice in Classroom Assessment involves posing relevant questions and selecting feedback strategies and techniques that are likely to work well at a specific moment, given the unique context of the overall culture, the institution, the discipline, the course, the learning goals, and the students. Managing all those variables well requires PCK—a combination of knowledge about the discipline and about teaching that discipline—as well as good judgment, good timing, and humility.

This handbook contains dozens of examples that embody the *Eight Principles for Good Practice in Classroom Assessment*—examples drawn

from a wide range of disciplines, institutions, and nations. These diverse examples are a testament to the knowledge, creativity, and dedication of all the teachers who have effectively adapted Classroom Assessment to improve their students' learning.

TO LEARN MORE For those interested in learning more about the origins and development of Classroom Assessment, two brief articles by K. Patricia Cross (1988; 1997), and Chapter 1 in Cross and Steadman (1996) will be particularly informative.