

PART TWO

THE (NEARLY)  
CHEATING-FREE CLASSROOM

For the past dozen years I have been writing a regular series of columns for the *Chronicle of Higher Education*. For the first half of that stretch, I wrote occasional personal essays about my life as an academic on the road to tenure. Once I had achieved that happy milestone, the column shifted in two important ways: it moved from occasional to monthly, and the focus shifted from my personal life to teaching and learning in higher education. Within the first year or two of starting that column, I became acutely aware of the primary challenge of a regular publication deadline: coming up with a new idea each month. In both my series about my life on the tenure track and my first year or two of columns about teaching and learning I tended to draw heavily from my own personal experience, writing about the specific challenges I had experienced, and trying to describe the ways I had either met or failed to surmount them. After a dozen or so columns in my series on teaching and learning, I felt like I had exhausted the number of personal experiences that I could tap. I had to find a new way to approach the series.

At some point I realized that I could best continue the series by identifying individuals who were doing outstanding work in the practice of teaching and learning and shine a light on them. If I chose my subjects well, I could both bring them some well-deserved recognition and guide other interested faculty to new

ideas, new resources, new teaching strategies, new research, new conferences or events, and new ways to think about our work as teachers. In order to help me discover the people who deserved that recognition and had something to offer to the rest of us, I dove back into the world of teaching and learning in higher education—in which I have always kept at least a toe or two—with renewed zeal. I began connecting with faculty from around the country through various social media; I attended more conferences in order to allow me to travel and meet faculty at as many different institutions as possible; I began subscribing to several newsletters and journals on teaching and learning in higher education, and accepted an invitation to join the editorial board of one of them. It wasn't too long before I found myself with the opposite problem from the one that had spurred all of this activity: I now could hardly find time or space to write about all of the fascinating work in higher education that I saw happening all around me.

When I had finished the research for the first couple of chapters for this book and saw what the primary contextual factors were for inducing academic dishonesty, it occurred to me that I knew of faculty members whose research or classroom practices could serve as a model for readers of this book in each of those areas.

I am telling you all of this in order to help explain what you will find in Part II. For each of the first four contextual factors identified in Chapter 2, I have selected a small number of faculty members who will serve as our guides in helping us see how to construct and teach a class that reduces the incentive and opportunity for students to cheat by increasing their desire and ability to learn. In each case I approached my faculty guides—all of whom have received multiple awards and recognitions for their teaching—with a description of this project and asked them if they would be willing to provide their expert assistance; they all

agreed readily. In all cases they provided me with course materials and answered interview questions I sent them about both their specific teaching practices and their experiences with academic dishonesty. So you will find me quoting material from personal interviews, from profiles I may have written about them in the *Chronicle*, from their course materials, or from their own published work on teaching and learning in higher education.

Finally, I am shifting slightly the order in which I will address each of the contextual factors we have considered. We will begin with the one that seems most important to me—fostering intrinsic motivation in our students, as opposed to relying on extrinsic motivators such as grades. That strikes me as the most foundational of the five factors that can induce or reduce cheating—it also strikes me as the one that will require the hardest thinking from you, and the most work, in considering how to revise your courses. In some cases, working to foster intrinsic motivation in your students might require you to rethink your course entirely, or rebuild it from the ground up. In the final section of the chapter I consider less drastic possibilities, such as assignment types that might help foster intrinsic motivation within any type of course structure. But if you are going to commit to making one change in your teaching as a result of reading this book, focus on intrinsic motivation first. If your students are not motivated, they are not only more likely to cheat—they are also much less likely to be learning.

The contextual factors taken up in the remaining chapters are ones that you can address through more modest (and less time-consuming) modifications to your teaching. Having said that, I should clarify that I would not expect any readers of this book to put it down and immediately revamp their courses in all four of the ways I will recommend in the following chapters. Unless you have rampant cheating in your classes, such a wholesale revision is probably not necessary. Start more modestly by selecting one

or two of the recommended changes and implementing them in your courses next semester. If you find that they have increased student learning in your courses and reduced any problems you have been having with academic dishonesty, try another one. I do believe that implementing all four of these recommended teaching practices is both possible and worthwhile, but I also know how much work it takes to revise a course. Better to start small than not to start at all. I hope that the results of even the smallest start will prove effective, and will inspire you to push yourself a little further with each new semester.

## FOSTERING INTRINSIC MOTIVATION

We all face the challenge of inspiring our students to develop intrinsic motivation to learn what we have to teach them—as opposed to inspiring them to learn it in order to achieve good grades or receive other extrinsic rewards—but I have always suspected that historians face that challenge more intensively than the rest of us. I can make a relatively straightforward case to students about why they need to develop their writing skills, for example, which will follow many of them into their careers; I suspect you can make an equally compelling case to students about the many ways in which some basic scientific literacy will help them assess and evaluate the many conflicting claims that they will encounter in their lives about matters related to their health or the environment or the possibility that we'll all be whipping around the sky in flying cars sometime soon. How to convince eighteen-year-olds to care about the French Revolution, however, or the fall of the Roman Empire seems like a more difficult challenge to me. It may be for this reason that some of the most interesting writing I have seen about learning and motivation in college and university courses has come from historians such as Susan Ambrose, the Vice Provost for Teaching and Learning at Northeastern University and the lead author on *How Learning Works*, an excellent overview of research on learning theory that you will see cited frequently in these pages.<sup>1</sup>

But the most powerful work on motivation that I have encountered in the literature on teaching and learning in higher education—and perhaps the most powerful work I have en-

countered on teaching and learning in general—also comes from a historian—Ken Bain, whose 2004 book *What the Best College Teachers Do* has become an essential reference and resource book for many college and university faculty members.<sup>2</sup> I had the excellent fortune to serve for three years as the assistant director of the Searle Center for Teaching Excellence at Northwestern University while Ken was the director, from 1997 to 2000, before I took my first tenure-track job. At that time Ken was preparing to write *What the Best College Teachers Do*; he was in the final stages of collecting and analyzing the materials he had gathered over the past fifteen years on the teaching habits, attitudes, and practices of the most outstanding college and university teachers he had encountered in his career. I was able both to review some of those materials myself and to speak with him extensively about what he had learned from those teachers, and I had multiple opportunities to hear him present his findings to other teachers.

Beginning in the mid-1990s, Ken began offering an intensive three-day workshop on Northwestern's Evanston campus designed to help faculty members from around the country reflect upon and engage with the ideas he had gathered from the outstanding teachers in his study. During that workshop, participating faculty had the opportunity not only to hear about the work of those outstanding teachers, but to meet and interact with them, learning directly from the subjects of the study about the particular innovations that they had pioneered in their courses. For close to twenty years now, that workshop has remained a mind-blowing and career-charging event for the seventy or so faculty members who gather from around the country each year to learn from the most outstanding practitioners in our collective fields of teaching and learning. Several years after I left Northwestern, the workshop followed Bain through several career moves; after he became the provost of the University of the

District of Columbia in the spring of 2012, he began holding the conference each summer in the city of West Orange, New Jersey.<sup>3</sup>

In June of 2012, I returned to the conference for the first time after a twelve-year absence. For three days, while the temperatures outside climbed close to a sweltering one hundred degrees, I was able to reacquaint myself both with the ideas and practices that motivated Bain's work, and with the teachers he both wrote about in the book and has continued to identify and study for his most recent book, *What the Best College Students Do*.<sup>4</sup> So in addition to participating in electrifying workshops on theories of learning and motivation led by Bain himself, I listened in awe as Andy Kaufman, a Slavic languages and literature teacher from the University of Virginia, described for us how his students were teaching Russian short stories and poems to the residents of a local juvenile correctional center; I learned about cutting-edge work in medical education by the Vanderbilt neuroscientist Jeanette Norden; and Charlie Cannon, from the Rhode Island School of Design, walked us through the real-world projects in which students are engaged in his architectural design studios. Although each of the speakers or workshop leaders had a particular focus, the connecting thread among them was how deeply they had each thought about fostering intrinsic motivation in their students. For these outstanding teachers, the most important task they set for themselves was determining how to inspire students to care deeply about what they were learning—to put aside the grade and engage with the material in ways that would create deep and substantial learning.

What struck me just as forcefully, however, was the fact that the innovative approaches these faculty members took to their courses allowed them to create assessments that were virtually uncheatable: their students were engaging with real people, problems, and situations in ways which created unique learning

experiences that rendered it virtually impossible for one student or group of students to grab prepackaged material off the internet or pull last year's assessments out of a fraternity file cabinet. The workshop provided a healthy confirmation for me that the most effective means to teach our students are also the most effective means to reduce the incentive and opportunity to cheat. In this chapter, I am going to begin with Ken Bain's research about intrinsic motivation, then consider the work of one of the exemplary teachers he has studied, and whose work I first encountered at that summer workshop. That teacher has focused his attention on his course as a whole, structuring it from top to bottom in ways that are inspiring intrinsic motivation in his students. But you may not have the time or inclination to restructure your course in such a wholesale manner, so I want to finish the chapter with a quick introduction to one of my own colleagues, a psychologist who has found ways to ground specific assessments, rather than wholly restructured courses, in the lives and interests of her students. I hope that by covering this range of possible innovations, from the entire course to the individual assessment, you will be inspired to find a way into a course or assessment innovation of your own, one that increases intrinsic motivation—and, in the process, reduces cheating.

### Ken Bain's Best Teachers

"People learn best," Bain writes in *What the Best College Teachers Do*, "when they ask an important question that they care about answering, or adopt a goal that they want to reach . . . If we are not seeking an answer to anything, we pay little attention to random information."<sup>5</sup> This should not come as surprising to us if we stop and think about it; we are inspired to learn about topics that we already care about, or that are able to capture our attention when we first encounter them. Bain's research on

learning and motivation suggests two possible avenues for teachers seeking to light the intrinsic fires of their students. First, you might engage students in your course by centering the course on questions or issues that you know the students already care deeply about. That doesn't mean pandering to whatever topics happen to be in *Sports Illustrated* or *Glamour* magazine that week. As Bain explains, the subjects of his study accomplish this task "primarily by helping students see the connection between the questions of the course and the questions that students might bring to the course."<sup>6</sup> Students, like all of us, want the answers to questions, both big and small, about their lives and their futures and their world. They are anxious to know what awaits them in the world beyond college; they might be encountering death and infirmity for the first time with aging grandparents; they struggle with money and sex and morality. In all of these areas they have questions, and thinking about how our courses tie into these big questions can help create connections between their concerns and ours.

Bain, for example, mentions an early-twentieth-century historical event that he has covered in his history courses: the formation of the League of Nations after World War I and the decisions that US president Woodrow Wilson made in attempting to convince the US Senate to join the newly formed international organization. As you might imagine, asking students to care about such a seemingly arcane historical matter might prove challenging to any teacher of history. But Bain painstakingly traces the reasons why historians might take an interest in such an event, focusing on the question of whether Wilson might have made different decisions and taken a different course of action. If he had, might he have ultimately prevented World War II? This inquiry leads Bain to the biggest question of all: "Can people control their own destiny, or does some kind of determinism, economic or otherwise, sweep us along, making us hap-

less observers and chroniclers of our own fate and the antics of even a powerful individual such as Woodrow Wilson insignificant?”<sup>77</sup> That’s the kind of question in which any human being should take an interest; the trick for the historian is to help students understand how a close analysis of the Woodrow Wilson story might help us meditate more deeply about it.

A second way to think about Bain’s research on motivation and learning, instead of trying to seek out and connect with the specific questions the students already have, is to present to the students intriguing or fascinating or puzzling stories and problems and to encourage them to develop their own questions about those stories or problems. “The people we explored,” Bain writes, “know the value that intellectual challenges—even inducing puzzlement and confusion—can play in stimulating interest in the questions of their courses.”<sup>78</sup> This approach might make most sense in upper-level courses, where students already have an interest in the discipline and are more likely to find themselves hooked by a terrific story or a curious problem. The key to this approach is to present to the students the problem or challenge and then let them develop their own questions, rather than trotting them through a series of sub-questions that you have already outlined for them. So in the end, like the first approach, this one establishes an environment in which students are driven by *their* questions instead of *yours*. I should note that this approach will only work if you present to the students big, real, and relatively unstructured problems or challenges. Your conundrums will not count as intriguing challenges or fascinating problems if *you* don’t still see them as such, and if they do not exist within large and unstructured domains that allow for approaches from multiple angles, or questions from multiple perspectives. I have always noticed that my literature classes become the most interesting and energized when I am teaching a work for the first time and have not yet fully formed my own

theories and ideas about the work. In those classes, I am much more open to simply letting the students drive the discussion, rather than trying to lead them by the nose through my pet theories about the text.

I would argue that we need to add one final element to our courses if we want to foster intrinsic motivation, in addition to constructing them in ways that either connect them to students' pre-existing questions or inspire them with fascinating challenges or problems. We have to give the students opportunities to respond in authentic ways over which they have some control. We don't want to pose a fascinating question to our students and then allow them to answer that question only through a multiple-choice exam. To foster intrinsic motivation, we have to think more creatively than that, or at least more flexibly, and give students the choice to respond in ways that emerge from their grappling with those questions.

To consider each of these elements in greater depth, let's turn to the work of Andy Kaufman, and to the University of Virginia students who spend their semester teaching classic works of Russian literature to the residents of a local juvenile correctional center.

### Andy Kaufman's Big Challenge

The first time that Andy Kaufman taught in a correctional center, a prison fight broke out while he was being escorted to his classroom. The guard and chaplain who were accompanying him quickly shuffled him into a locked room, where they spent thirty minutes waiting out the melee. After calm had been restored, and he continued his walk down the corridors of the facility, Kaufman could see prisoners standing or sitting in the small cells they passed. He was struck by the size of the rooms, which he guessed were no more than 150 feet square and were

crowded with beds and metal sinks and latrines. “I grew claustrophobic just looking into them,” Kaufman told me in an interview.<sup>9</sup>

When he finally made it into the classroom at the nearby Virginia correctional center—where he had agreed to teach a class on Russian literature to a small group of inmates as part of a celebration of reading sponsored by the National Endowment for the Arts—nervously clutching his notes for an introductory lecture on *The Death of Ivan Ilyich*, he found himself facing fifteen men in orange jumpsuits and wondered whether they would care about a word he said. Like every good teacher has to do from time to time, he assessed the situation at hand and made a quick decision to abandon his prepared lesson plan and adjust his teaching to the faces in the room.

“So what did reading *The Death of Ivan Ilyich*,” he said to them, “mean to *you*?”

Much to his surprise, Leo Tolstoy’s novella of the unexplained and unexpected death of a Russian judge living in the 1880s meant many things to those inmates. After a brief period of uncomfortable silence—the kind to which we are all accustomed, and have to learn to sit through if we want our students to add their voices to our classrooms—the inmates began to speak to Kaufman about what they had learned from Ivan Ilyich. “How you treat people,” one of the inmates ventured, “you know, how he treated people as judge—that’s how he was gonna get treated as a patient.” Another pointed out that while it was too late for Ivan Ilyich to change his life, it was not too late for the inmates. They had to learn to take better advantage of the time they had left.

Ninety minutes later, Kaufman realized that his time in that prison classroom had been a powerful learning experience for him, reigniting his passion for the great works of literature that he had spent countless hours analyzing in more technical ways

or writing about in his scholarship. As he explained in an essay he sent me about the experience:

By moving outside of my comfort zone, by experiencing the work in a radically unfamiliar context, I was able to rediscover its power and relevance for myself. Russian formalists introduced the concept of *ostranenie*—making the familiar appear unfamiliar—as the means by which a work of art gains force to affect thought and emotions. What I experienced on that day was a classic case of *ostranenie*. It felt as if I were encountering Tolstoy’s great novella for the very first time.

That the experience could have made Kaufman feel as if he were encountering the work for the first time is all the more striking when you note Kaufman’s academic credentials: the author of *Understanding Tolstoy*, published in 2011 by the Ohio State University Press; a lecturer in the Department of Slavic Languages and Literatures at the University of Virginia; and the author of a forthcoming crossover book on Tolstoy’s most famous novel, *War and Peace*. But we all know that scholarly and professional accomplishments like these can come to feel, over the course of a career, like extrinsic motivations through which we drift away from our real love for our subject matter. What Kaufman rediscovered in that prison classroom was his own intrinsic motivation for studying the great works of Russian literature. The responses of the inmates helped him remember the power of literature to transform lives. In the room full of prisoners, he says, “I was forced to have authentic conversations with inmates about things that matter to all of us as human beings and not merely things that matter to me as a professional academic.” As well as reigniting his passion for his subject matter, those conversations revealed new ways of understanding and analyzing the story. The prisoners brought to the discussion table experiences with isolation and alienation and despair that

helped Kaufman rethink elements of the story he had once taken for granted.

Kaufman continued to reflect on his experiences for weeks and months after his visit to the correctional center, wondering how he could provide for his university students the kind of transformative and intrinsically motivating encounter with the literature—and with other human beings—that he had experienced. The eventual result of his reflections was *Books Behind Bars: Life, Literature, and Leadership*, a course at the University of Virginia in which Kaufman's students study selected shorter classics of Russian literature and then teach them to the residents of a juvenile correctional center near the University of Virginia campus. Kaufman has been teaching the class since the spring of 2010, and it has become a mind- and life-changing experience for Kaufman, for the students who sign up each semester, and for the residents of the correctional center. The students in Kaufman's course undergo a condensed version of his experience as a scholar and teacher of Russian literature. They spend the first weeks of the semester seeking to analyze and understand the themes of the works on the syllabus in formalized and historically contextualized ways, and then spend the middle and final weeks of the semester seeing how those themes become meaningful to the human beings sitting in front of them. In their class meetings on campus the students work in small groups to prepare lesson or discussion plans for the residents of the correctional center; in their meetings at the correctional center, they let the concerns and comments and reactions of the residents drive their discussions. Ultimately, Kaufman explained in a radio broadcast about the course, the students and the residents are holding "conversations about life, through literature, about things that really matter to them."<sup>10</sup> Those conversations are the purpose of the course.

It should come as no surprise, when the course's purpose

is characterized in this way, that Kaufman's students find the course such an amazing and intrinsically motivating learning experience. Note first that Kaufman wants the students to have conversations about things that matter *to them*—i.e., both the residents and the students—instead of about things that matter *to him*. In March of 2011, Kaufman and one of his students from the course wrote companion essays about their experiences for the Inside Higher Ed website. The student, Hannah Ehrlinspiel, notes specifically the disconnect she had been accustomed to experiencing between the study of literature and any real or meaningful connections to her own life: “*real*, personal relevance and human connection had often been discouraged in my other classes.” Hence it proved difficult for her at first to hold conversations with the residents in which those connections became central. But once those conversations began to blossom, she was reminded—just as Kaufman was reminded in his prison teaching experience—that “the questions raised by great literature are actually the most important questions raised by life itself.”<sup>11</sup> Multiple students in Kaufman's course have been interviewed for a long-term study of the course's impact, and they speak again and again in those interviews on the way in which the course helped them see the relevance of the literature to their lives, the lives of the residents, and the world around them today.

But such relevance was not found by simply skating over the surface of the works and finding easy points of connection. The students were motivated by their encounters with the residents to dig more deeply into the works than they otherwise might have, in order to help ensure that they were well prepared. As Ehrlinspiel explains:

For years I had always been taught that literature was something you had to stab at, to pick through until it gave up its most com-

plex secrets. “Books Behind Bars,” however, taught me to appreciate simplicity, to yield to the most basic stirrings of emotion caused by a genuine smile or by a beautiful simile. As a result, I got much closer to the texts than ever before, and became genuinely interested in what each work really *means*.<sup>12</sup>

In college-level courses of literature we don’t spend too much time thinking or worrying about the “basic stirrings of emotion” that works of literature inspire in our students. We are much more accustomed to, as poet Billy Collins once put it, “tie the poem to a chair with rope / and torture a confession out of it.” Whatever emotions the poem might stir in our students, we perhaps imply to them, are their business, and don’t belong in the classroom. Stick to the facts (or formulae, or concepts, or whatever the technical tools of our discipline might be). But theories of intrinsic motivation tell us that if we want students to learn the material as deeply as possible, we have to *first* help students see the ways in which our course material connects meaningfully to our lives, or can help us solve problems or enrich our futures. Only after they have seen and understood this will they take the time to become genuinely interested, as Kaufman’s student puts it, “in what each work really *means*”—which should then stir their interest in the formal tools of disciplinary analysis that will help them find that meaning.

I suggested earlier that fostering intrinsic motivation in our students can happen in three ways: connecting the questions of the course to questions the students already have; challenging the students with questions or problems that you can help them see as fascinating and important; and engaging them with authentic assessments. Let’s elaborate on each of these three conditions by considering Kaufman’s course in a bit more detail.

Undoubtedly the conversations that Kaufman's students have with the residents of the correctional center help them see the connections between their own lives and the classic works of Russian literature. The special genius of this course is that Kaufman asks his students to design conversations that will highlight the links between Russian literature and the lives of the residents—as they do so, the students are simultaneously thinking about and seeing connections between the literature and their *own* lives. This should not come as too much of a surprise, since the residents and the students are not too far apart in age and hence share some commonalities. Both groups are in a kind of waiting period before adulthood will really begin, and so they share a particular interest in what the future will hold for them, and how the forces of the world will shape and mold their adult lives. When the students come to see the works of the great Russian writers as offering them insights and ideas into what that process will entail, and how they can best negotiate it, they become intrinsically motivated to learn more about what those authors might have to teach them.

This becomes especially evident when you read the comments of students who have taken the course, which Kaufman has been gathering for his own study of the effectiveness of his approach to teaching literature. The Russian works they were reading and teaching to the residents, one student said, “covered the deepest questions of humanity: Who are we? Why are we here? What is our place in life? How should we act with other people? What does death mean? That’s a big one. All of those kinds of questions that everybody meditates on. These are questions that apply to everybody.” Another student likened the difference between Kaufman’s approach to literature and the approach she encountered in most literature courses to the difference between theoretical and applied mathematics: “If you

can have calculus and applied calculus, I think . . . this class is applied literature. You're applying it to your life. The personal aspect is something you don't ever get in English classes. You're not expected or ever requested to compare it [the literature] to your life to see if you could relate to it." Taken metaphorically, that analogy seems like an apt one to me in thinking about this approach to fostering intrinsic motivation. While every course we teach might have a theoretical or pure side to it, connecting to the questions that students bring to our courses means thinking about the "applied" nature of our disciplines and our courses. What do our courses have to offer that will help students answer the questions that they already have—whether those questions are about mortality, or politics, or race, or the chemicals in our food? How can we design our courses in ways that will give students a clear vision of these applications? Kaufman has approached this challenge in a unique way—by asking his students to think about the applications of the course material to the lives of the residents, he helps them see its applications to their own lives as well.

But the course also fosters intrinsic motivation in that it presents a difficult and fascinating challenge to the students, one that forces them to work together in order to achieve their goals. Prior to the registration period for the coming semester's courses, Kaufman holds an information session on campus about Books Behind Bars, inviting students to come and learn about what they will be doing in the course. Students know well in advance of the course that they will be responsible for guiding conversations about Russian literature with the residents of a juvenile correctional center. This real-world experience looms above them from the moment they enter the course, and guides and inspires all of their learning. One student noted, in her comment about the course, that the prospect of facing this difficult

challenge brought the students together as a group, as well as heightening their interest in the course:

we were all in such a new position and none of us knew what it was going to be like. So, you were naturally on adrenaline, excited when you were talking with people about it. And that makes you feel closer to people when you're that excited. And you're naturally going to be more open with people. And you're all going in with the same kind of fears and vulnerabilities and that bonds people faster, I think. The idea of being so vulnerable and not knowing what's gonna happen. You're naturally more willing to talk to people and to open up. It's a kind of, 'You're all in this together,' feeling.

This student offers a fascinating insight into the way in which a challenging academic task can help not only motivate the students, but also draw them closer to one another, as they realize that they can rely on one another for both emotional and intellectual support. Their shared purpose, and their uncertainty in the face of a large and unstructured problem, creates an immediate sense of cohesion among the group.

Bain's theories on motivation suggest that intrinsically motivating questions we pose to the students have to be authentic ones—they cannot be questions to which we already have the answers, and toward which we slowly lead students in a step-by-step process. They have to be precisely the kind of unstructured, open-ended problems or questions that we all address in our own research. Such questions can be posed to the students through individual assignments, but Kaufman really poses these questions through the entire structure of his course: Can the great works of Russian literature help provide insights or guidance into the lives of these troubled teens? If so, how can Kaufman's students help the residents see and understand—

and perhaps even act upon—those insights? Ultimately, how can these college students—many of whom are coming from positions of great relative privilege—make a positive difference in the lives of these juvenile offenders?

Bain's work also suggests that if we are asking students to grapple with authentic, open-ended questions or problems, we have to give them the freedom and autonomy to follow those questions wherever they may lead—just as our own research questions lead us into a maze of unpredictable places at times, as we follow false leads and dead ends and promising notions, often ending up in places that we could never have predicted at the outset. Kaufman accomplishes this by setting a difficult challenge before his students, and then stepping back and becoming a facilitator who helps the students meet that challenge. He provides readings for them in Russian literature and in pedagogy, guiding them in conversations about how they can best meet the challenge of working with the residents. But the students have the responsibility for creating their lesson plans, for holding the conversations, and for following the paths that are opened up by those conversations. In the words of one student, "It was pretty evident from the beginning that it was going to be the professor laying the groundwork and us doing most of the work. And I think that was pretty consistent. When we went into class we really expected that it was going to be us doing most of the work, which was good. We really had ownership of that class." Their ownership of the course means that each small group conversation between students and residents looks a little different from the others: some students plan more structured activities with the stories or poems they have read while others seek to foster more informal conversations. In every case, though, the students have the primary responsibility for determining how they will meet the challenge that Kaufman has set for them.

Whether you are designing a course that addresses the questions the students bring, or posing them challenging questions that you hope will intrigue and inspire them—or both—the final essential element in fostering intrinsic motivation is the use of authentic assessments. Authentic assessments allow students to respond to the questions in ways that allow them to show what they have learned, rather than to check off boxes or jump through hoops. We will cover this notion in more detail in the next chapter, but for now we can get a glimpse of it in Kaufman’s assignment for his course. Throughout the semester, the students are regularly writing journal entries and other shorter essays that describe what they are learning from their experiences preparing for and talking with the residents. At the end of the semester, they compile those writings into a “Learning Portfolio,” which they use as the basis for a final reflective essay on the course. In describing the purpose of the essay on his syllabus, Kaufman explains that they should analyze their Learning Portfolio in order to see how it “reflect[s] changes in your thinking and/or writing about literature, life, your education as a whole, about you as a learner and as a person, about the way you understand yourself and others, etc. In other words, you and your learning experience [in the course] are the subject of this essay.” What I think really matters about this assignment is the way in which it invites the students to reflect upon and document their own learning. Just as Kaufman gives students autonomy in terms of how they meet the challenge of the course—teaching Russian literature to the residents—so he gives them autonomy in thinking about how to best demonstrate to him what they have learned in the course. Authenticity in this context does not mean that the assignment replicates something you might find outside of the classroom, in the “real world”; it means instead that students must draw from themselves and their own experiences in order to prepare the work they submit for evaluation.

I want to finish my analysis of *Books Behind Bars* by pointing out that, of course, Kaufman's learning portfolios are literally an uncheatable assignment—much of the writing for the Learning Portfolio comes from in-class writing assignments, and students must write their reflective essays about their experiences with the residents, which Kaufman has spent the semester observing. Those portfolios, in addition to the work they do in helping to foster intrinsic motivation, represent the ideal example of what I call a *grounded assessment*.<sup>13</sup> You will not find a more effective means of eliminating cheating in your courses than grounding your assessments, by which I mean that you design assessments that are unique to each specific course you teach, each semester. While that might sound like a time-consuming nightmare, it does not have to be. Kaufman's course, by its very nature, creates grounded assessments because each semester his students will have a new set of conversations with a new set of residents. Since he has supervised and observed those conversations, students cannot simply fabricate their learning portfolio or find similar experiences online—they must speak from and engage with the unique experiences they had in the course in that semester. Courses that depend upon community service learning, or any kind of major event or interaction with others, lend themselves automatically to grounded assessments—perhaps our best defense against cheating.

But grounded assessments don't actually require community service learning, or building your course around visits to a juvenile correctional center, or any other conceptual overhaul of your teaching. You can use highly cheating-resistant grounded assessments in any course with just a little bit of creative thinking. For the past several years I have been hearing from students about a colleague who was grounding her assessments in unique and fascinating ways. Sarah Cavanagh is an assistant professor at

Assumption College who has quickly built a reputation as an outstanding teacher in high demand. Cavanagh's research interests focus on the interaction of psychological and biological processes in healthy and disrupted emotion regulation; her areas of teaching focus are motivation and emotion; social, cognitive, and affective neuroscience; and a multidisciplinary approach to teaching abnormal psychology. Like all of us here on campus, she teaches a mix of lower- and upper-division courses, with a regular suite of introductory courses in her discipline each year—in her case, the general psychology course taken by many freshman for a general education requirement. I asked Cavanagh if she would show me examples of some of the grounded assessments she uses in her courses. The ones she provided for me helped me to see more clearly the different ways in which faculty in any discipline, in even the most conventional types of courses and teaching formats, can ground their assessments. In the examples that I will give from Cavanagh's courses, you will see assignments or exam questions that are grounded in the unique experience of the course in four different ways:

1. *Time*. Students connect course content to events, conversations, trends, or research they experience uniquely within the confines of that semester.
2. *Place*. Students connect to something in the local community, whether that means their dorm, their campus, or the city in which their institution is located.
3. *Personal*. Students consider how course content shapes or could be used to understand a specific experience in their lives.
4. *Interdisciplinary*. Students draw connections not only between your course content and other disciplines they have studied, but especially between your course and other specific

courses they have taken, or co-curricular activities like on-campus lectures, performances, and other learning-oriented events.

Let's consider an example of each of these kinds of grounded assessments from Sarah Cavanagh's courses.<sup>14</sup>

*Time.* In Cavanagh's introductory course in General Psychology, she wants students to develop basic media literacy in the subject, and learn how to evaluate the accuracy of reporting on psychological topics in the press. To help accomplish that goal, she gives them this assignment:

Find a recent (i.e., posted in the last few months) popular media account describing the findings of a psychological study. Good sources include the *New York Times*, "the body odd" on msnbc, and *TIME Magazine* online. Using the school library's website, find the original research article the media account is describing. Write a 1–3 page letter to the editor evaluating the popular media piece. If their account was thorough and accurate, describe why. If their account was inaccurate, over-simplified, or different in emphasis than the original research article, describe why. Conclude with a statement about the influence of popular media on public perceptions of psychology, and the importance of holding the popular media accountable for accurate portrayals.

Such an assignment obviously cannot be shared from semester to semester, since the students have to engage with a very recent piece of research. The concluding paragraph she describes might leave itself open to plagiarism, but the heart of the assignment is one that students will have to engage in afresh every semester. As effectively as this assignment deters potential plagiarism, I find it even more impressive in its ability to help students see the currency and relevance of what they are learning in Cavanagh's

course by asking them to notice how this academic discipline manifests itself on a daily basis in the media that surrounds them. The assignment also encourages students to see themselves as members of a scholarly discipline who are charged with evaluating the work of others who are thinking or writing about their subject matter.

*Place.* Cavanagh's place-based assignment, used in an upper-level psychology course, shares elements of Kaufman's course in the way it asks students to engage with and serve the local community. Supervising this assignment over the past two years, she told me, has been one of the most satisfying experiences of her career. Students in her Physiological Psychology course give a group presentation on a topic in neuroscience. But instead of just asking them to step to the front of the room and do the usual PowerPoint song and dance, she presents them with a much more challenging and innovative assignment:

Working with several other students in a group, you will design a 5–10 minute lesson plan for 5th graders covering some aspect of basic brain anatomy or function. You will submit draft and final lesson plans, and we will hold a “dress rehearsal” of these lesson plans in class. During National Brain Awareness Week in March, you and your group members will present these lesson plans in a local elementary school.

As Cavanagh acknowledged when she sent me this example, students can undoubtedly still get their information from online sources, and potentially plagiarize parts of it. But even if they do this, as she also pointed out, “they still have to modify them to fit the age group and the time frame, and the bulk of the work is in the practicing, dress rehearsal, and leading the students the day of the event.” And, she added, as a bonus, “having to perform in unusual circumstances also seems to lead to a sharp re-

duction in ‘phoning it in’ presentations—the students are really engaged and enthusiastic.” An assessment like this one pulls disciplinary questions from the ether and drops them directly into the community in which our students are living, helping them see its relevance to their lives today—and, of course, making it much more difficult for them to disengage from the assignment and complete it dishonestly.

*Personal.* Research on human memory from cognitive theorists points convincingly to the fact that creating personal connections to knowledge helps create deeper learning. In *The Seven Sins of Memory*, Daniel Schacter, a neuropsychologist at Harvard, notes that “numerous experiments have shown that when we encode new information by relating it to the self, subsequent memory for that information improves compared to other types of encoding.”<sup>15</sup> Our memories, Schacter theorizes, prefer to hang on longer to information for which we can see some obvious personal relevance.<sup>16</sup> In Cavanagh’s upper-level course on Motivation and Emotion, she gives her students the opportunity to make such personal connections to the course material with the following essay assignment:

What are the primary forces that shape your behavior? Which of the topics we’ve covered have the most relevance for your daily experiences and choices? Choose a particular instance/anecdote in which there were strong motivational influences on your behavior and tie in the motivational forces at play in your life with the relevant concepts and topics covered in class. Examples could be a major life decision, your struggles to break a particular habit, your work to reach a particular goal, etc.

As Cavanagh pointed out to me herself, this assignment also does not necessarily preclude cheating, since it would be possible to fabricate an incident or grab someone else’s off the in-

ternet. But as we all know about human beings, and as you probably have learned from the occasional experience you've had sitting next to a chatty stranger on the bus or standing in line at the grocery store, people like talking about themselves and analyzing their own experiences. So the students should likely be more motivated to write this assignment honestly, and use it to understand their own personal experiences more deeply, than they would if they were asked to analyze a hypothetical incident or some textbook example. That motivation, along with the connections they build between the course material and their personal experiences, should help reduce cheating and deepen learning.<sup>17</sup>

*Interdisciplinary.* Four years ago on my own campus we began offering to our first-year students the option to take linked interdisciplinary courses on topics developed by faculty members from two different disciplines. The students took the two courses separately, but the faculty worked together throughout the year to ensure that assessments and course content fed into each other. Many faculty who taught within these linkages—including Cavanagh and a colleague in chemistry—developed assignments that required students to draw upon their specific interdisciplinary pairing. Here is an essay question that Cavanagh proposed to her students on an exam at the end of the semester in the General Psychology course that was linked with an introductory chemistry course:

Imagine you are home for Christmas break when your mother pulls you aside and tells you that she is really concerned with your younger sister's eating patterns. She has been alternating between cycles of eating lots of junk food and then over-restricting her eating by following one of a number of fad diets. Using the information we covered in class regarding personal and societal

influences on eating behavior, what you learned in your linked chemistry course regarding the effects of fad diets on your body, and the information provided by the nutrition speaker at our extracurricular Q&A event, give your mother and sister some advice.

What I found especially compelling about this assignment was the way that it required the student to draw not only upon the interdisciplinary pairing but also on a linked co-curricular event. Drawing co-curricular events like those into the assessments for the course provides one more assurance that students are doing work for your uniquely structured learning experience instead of relying on material developed by students (or professional researchers who prey on students) for a more generic learning experience. If you do not have a connected-course structure like the one on my campus, you can still create unique interdisciplinary groundings by asking students to link course material to co-curricular activities on campus, or to any other required courses you know they have taken at your institution.

Here we are at the close of the chapter, and you might find yourself surprised at how little space I have devoted to cheating, the explicit subject matter of this book. The chapters in Part II are designed to provide guidance in modifying your teaching in ways that reduce cheating by increasing learning. Students who want to learn, and who have been given all of the tools they need to learn, have no need to cheat. So my goal in this part of the book is to help you understand what the experts tell us about how to motivate students to learn, and how to give them the tools they need to learn. Remember, though, that we are not taking on the universe in that respect: we are focused on the elements of a learning environment that research tells us can also—

in addition to increasing or decreasing learning—induce or reduce cheating.

In this chapter we have considered strategies designed to increase intrinsic motivation, which I would argue is the most important feature of a learning environment in terms of its potential to reduce cheating. We saw how Andy Kaufman seeks to inspire intrinsic motivation with the large and fascinating questions he poses to his students, and we saw how both Kaufman and Sarah Cavanagh do so with assessments that are grounded in the lives and unique learning experiences of their students. Kaufman and Cavanagh represent two ends of a spectrum of potential course revisions you might make, from restructuring your course to modifying your specific assessments. In both cases, though, the principles are the same: connect your course material to the questions and interests that students bring to your classroom; challenge and fascinate them with authentic questions and problems that you bring to them; and ask them to respond to those questions and challenges with unique, grounded assessments.

Those principles should be able to guide the work of any faculty member seeking to foster intrinsic motivation in her students, no matter how large or introductory the course they may be teaching—and, hence, no matter how restricted they may feel in their ability to incorporate community service elements like Kaufman's or more personalized assignments like Cavanagh's. Even if you are ultimately responsible for preparing students for some external exam, or covering some basic survey material, or fulfilling a general education requirement, don't begin there. Don't write course descriptions that describe what you will be covering, foreground them on the syllabus, and jump right into that coverage on the first day. Spend a little time thinking about the *questions* of the course—the fascinating questions that in-

trigue you about the course material, and the questions that might connect to what motivates your students in their lives right now. Highlight those questions everywhere you can: on your syllabus, in class, and in your assignments and exams. Find ways to remind your students, as often as possible, that what your course has to offer them is more than just the extrinsic reward of a grade.

## LEARNING FOR MASTERY

We commonly use the phrase “jumping through hoops” to speak of required performances that seem divorced from any meaningful context—I used it in the last chapter to describe assignments that are unlikely to inspire intrinsic motivation. In this chapter I want to take that familiar phrase and build it into a metaphor designed to introduce the basic difference between a performance-oriented classroom environment and a mastery-oriented one. Remember that the first cheating-inducing factor we encountered, in both our historical survey and the social science literature, was a strong emphasis on performance. When students place greater emphasis on performance than learning, they are more likely to cheat; and when the learning or task-completion environment places greater emphasis on performance than on skill or task mastery, human beings are more likely to cheat. Athletics provides an easy arena in which to understand the difference between performance and mastery orientations, so we will spend a few hypothetical pages in that realm before we turn back to higher education.

Imagine you have spent a few months teaching a group of young people to improve their skills in athleticism and dexterity. At the end of your time with them, you bring them to a gymnasium in order to allow them to demonstrate their newly developed skills, and to evaluate them on how much they have improved over the course of their training. In a performance-oriented classroom, you would ask each student in that gymnasium to show off her skills by making a single jump through a

hoop. That jump might certainly tell you whether the student has reached a basic level of athletic ability. But for some students, that single required performance might not give you a true picture of their abilities: a student who was sick that day, for example, or another who suffered from weak ankles, despite solid athletic ability in other ways, might fail at that one particular task. So the test would provide limited—and possibly flawed—data about the athletic ability of your students.

Now imagine instead that you brought those students into a gymnasium that was filled with stations designed to allow your athletes to demonstrate a variety of skills: hoops for jumping, bars for pull-ups, a track for sprinting, barbells for weight-lifting, and so on. I am sure most of us would agree that asking the athletes to engage with as many of these stations as possible, and evaluating their overall performance on multiple stations, would provide a better and more accurate depiction of their true athletic ability than the simple hoop-jumping performance. But now imagine an even more radical innovation. Instead of simply pointing students to five stations and asking them to complete a required performance at each one, you brought each student into the gymnasium, walked them one by one through each of a dozen or more stations, and then said: “Now show me what you can do.” Each athlete would then have the option of selecting the stations that were most conducive to helping you see the athletic skills he had developed; you might select some minimum number of stations that each one had to complete, and pick one or two required ones, but beyond that it would be completely up to the athlete to show mastery of the skills that have been taught. As long as you have designed the stations in such a way that the athletes could not simply spend their training period focusing on one or two skills that would see them through all stations, this environment would no doubt give you the best and most accurate depiction of what your athletes were

capable of, allowing them to show off their particular strengths while demonstrating some basic level of competence in a set of skills.

It might strike you that such a gymnasium sounds like a benign version of the one in which contestants train for their mortal combat in Suzanne Collins's *Hunger Games* novels. As you may recall, those novels (and their film versions) pit two dozen young men and women from impoverished districts of a dystopian world against each other in a fight to the death for the viewing pleasure of wealthy residents of the capital city. Prior to entering the combat arena, the contestants spend several days in a gymnasium that features multiple stations dedicated to various survival skills, from handling weapons to starting fires or identifying edible plants. The contestants are free to choose which skills they want to learn, and wander from station to station according to their interests and abilities. At the completion of their training, they select which skill they will demonstrate to the arbiters of the games. Their demonstration of this skill will help determine their ranking in the competition—a high-pressure performance, no doubt. But that performance tests the candidates on a skill that they have chosen to master, and which best suits their particular talents and abilities. The heroine of the novel wisely chooses to avoid stations devoted to weight training or single-handed combat and instead focuses on archery and basic survival skills—decisions which, in the tidy world of the novel, turn out to be instrumental in helping her win the games.<sup>1</sup>

In both *The Hunger Games* and our benign hypothetical example, the learners *do* have to engage in a performance that is assessed by an evaluator. You will not find me arguing here that we can or should remove that element from the educational process. But in both cases the performance has become secondary to the learning objective. Rather than the *end itself*, as I suspect students often think about our projects or exams, it has become

only the *means* to the end—it serves as one possible opportunity among many to demonstrate their mastery of a skill or a body of knowledge. Our hypothetical athletes know that a weak performance in hoop-jumping can be outweighed by a solid performance on the pull-up bars, and that they can all find some ways in order to demonstrate their general athleticism. Protagonist Katniss Everdeen and her fellow combatants in *The Hunger Games* know that they can impress their judges with their survival skills through fire-building and plant identification just as well as they can through wielding swords and maces. When learners of any kind have multiple ways to demonstrate their knowledge or skill, or are able to choose the types of performances that will best allow them to showcase their knowledge or skill, or are able to make multiple attempts at a performance, the emphasis shifts away from the specific performance and falls more heavily on their mastery of what they must learn. So a learning environment (such as a college classroom) that emphasizes mastery over performance should establish a clear learning objective for the students and then give them choices in how they could best meet that learning objective, as well as providing them with multiple and perhaps even repeated opportunities to do so. Andy Kaufman’s course, in which students write journal entries each week and then compile their own best work into a learning portfolio, represents one excellent example of that kind of assessment strategy. By contrast, a performance-oriented learning environment places the emphasis on students doing well on the specific performances established by the evaluator. This type of classroom lends itself not only to cheating but also to students focusing on things like test-taking strategies (i.e., to guess or not guess on a multiple choice exam) instead of actually learning the material.

Contrary to what you might now be expecting, I have not asked either Katniss Everdeen or Suzanne Collins to serve as our

guide for the creation of a mastery-oriented classroom. Instead, I have asked that favor of John Boyer, a faculty member in the Geography department at Virginia Tech who teaches a World Regions class with an impressive mastery orientation to around 2,670 students every spring semester.

Yes, you read that correctly. 2,670 students.

These are students sitting in a classroom, I should add, not watching his lectures online. He considers himself limited to that number of students only by the size of the auditorium where he holds his classes; if he could find a bigger auditorium, he would happily teach even larger classes—and he would have no trouble doing so, since his classes are filled to capacity and many students have to wait for several semesters before they are able to gain one of the (many) coveted seats in Boyer’s lecture hall. Boyer gained his fame in the academic community when a reporter for the *Chronicle of Higher Education* wrote a profile of this incredibly popular World Regions class in April of 2012. The story focused primarily on the eye-popping numbers of students who took Boyer’s class, and on the implications that his ability to attract such numbers might have for the future of the profession. The article includes statistics about the increasing reliance on large courses in state universities, and also includes a comment from Peter E. Doolittle, director of Virginia Tech’s Center for Instructional Development and Educational Research, who notes that, in tough budgetary times, such massive courses may become more and more popular: “They’re not going anywhere . . . We’re better off learning how to teach well in large classes, rather than trying to avoid them.” Most of the article focuses on precisely that issue: how does Boyer manage to teach well in such a large class?<sup>2</sup>

When I first saw the article headline, I had the same question. And, like many faculty members who commented on the article, I was skeptical at first that much learning could take place in

such an outsized classroom. I wondered whether Boyer was simply a great showman, one who could give dazzling lectures or multimedia performances, more of a performer than a teacher. But what really caught my eye in the *Chronicle* article, and encouraged me to dig more deeply into his teaching, was the following paragraph:

Boyer describes his course as an “Intro to the Planet” that brings “the average completely uninformed American” up to speed on world issues. His approach? Decentralize the rigid class format by recreating assessment as a gamelike system in which students earn points for completing assignments of their choosing from many options (1,050 points earns an A, and no tasks, not even exams, are required). Saturate students with Facebook and Twitter updates (some online pop quizzes are announced only on social media). Keep the conversation going with online office hours.<sup>3</sup>

I tend to respond to any new-fangled teaching approaches or technologies with caution, knowing that sometimes “innovative” technologies or methods turn out to be nothing more than expensive or time-consuming replications of more traditional or conventional approaches that still work perfectly well. So while my eyes rolled a little bit at buzzwords like “decentralize” and “gamelike,” I was intrigued enough by the description of an assessment system with multiple options to hunt down his online course materials, which are plentiful, and explore a little further. In what follows I will draw upon multiple sources, including Boyer’s syllabus and statements of educational philosophy (all available online), as well as email and video interviews I conducted with him about the course and his teaching.

Boyer describes his World Regions course on his syllabus as one designed “to broaden and strengthen the individual’s interest in the world at large; to consider how/where/why physical

and cultural forces shape and define the earth we live on.”<sup>4</sup> Within that broadly defined objective, he breaks down the student learning objectives into a typical triad of skills (such as the ability to critically evaluate media sources), knowledge (such as basic physical characteristics of major world regions) and beliefs or attitudes (empathy with diverse global perspectives). The bulk of his syllabus focuses on explaining to students the structure and *raison d’être* of his assessment system, as well as the details of the individual assignment and exam options. I want to begin my analysis of Boyer’s course with the section of his syllabus that presents and explains his assessment system to his students:

This is a radical, experimental course when it comes to grading, and I hope you embrace and enjoy this change. If you don’t, then you should bail out now, not later. Instead of having a set amount of mandatory activities that you are required to do and then assessing your grade from your performance, I am going to provide a host of opportunities for you to earn points towards your grade, thus allowing you to choose your path according to your interests and skills.

It’s a “create your fate” grade: you choose what you want to work on, and keep earning points doing different activities until you achieve the grade you desire. Are you an excellent test-taker? Then take lots of tests. Not good at taking exams? Then do alternative written or film viewing assignments to earn your points. I would suggest mixing it up and doing a little of everything to cover all your bases and ensure you get enough points to get the grade of your desires.

In alignment with precisely what I think makes this assessment system so effective for learning, Boyer notes that he wants to shift the emphasis away from “your performance,” and instead give the students “opportunities.” This is not the way that I sus-

pect most students, and perhaps even most faculty, think about their presentations or exams or papers. But if we want to create a mastery-oriented classroom—one that both increases learning and reduces the incentive to cheat—this may be precisely the way we *should* think about it. Assessments present *opportunities* for students to demonstrate how well they have achieved the learning objectives for the course; they are not the learning objectives themselves.

Boyer's description of the course options in the second paragraph, I should note, might overstate slightly the wide-open nature of the student's options in the course. No single type of assignment or exam will enable the students to earn enough points to achieve a passing grade in the course. As he suggests to them in the second paragraph, they have to take advantage of several different types of opportunities in order to pass the class. The total points available throughout the semester come out to around 1,500; anything above 1,050 earns the students an A, and they need at least 730 points to pass. The three major exams in the course total up to 350, so even if students are excellent test-takers, they still need to engage in a few other activities in order to pass the course. A student who loves film and takes advantage of the opportunities the course provides to attend and write responses to film viewings would be able to earn only 300 points from those assessments. This is worth pointing out because I can foresee some skepticism from readers about the way in which this system might allow students not only to play to their strengths but also to avoid assessments in some area that you believe is critical for students to know in your course or discipline. A carefully crafted assessment system using this model can achieve the best of both worlds: giving students plenty of opportunities, but also ensuring that they have to engage with whatever you believe are the most critical components of your course.

When I asked Boyer to explain how and why he first adopted this mastery orientation in the course, he said it did not come to him in one grand epiphany; instead, over the course of a few years, three gradually coalescing factors pushed him to try it out for the first time in the spring of 2011, when he had only 550 students in the course. The first main driving force in pushing him to structure the course in this way was the logistical complexity of running a course with close to 3,000 students. As he explained to me in our video interview, trying to mandate any single form of assessment for that many students, even a very conventional one, becomes almost impossible in the face of such large numbers: “The standard operating procedure of having a midterm and final exam was just not workable—it became more trouble than it was worth for all parties involved: me, the TA team, the students. When you bump the numbers up that high, you might end up with 200–300 people who have a very good excuse to miss an exam.” We all know the complexities involved when we are trying to schedule an alternate exam for students who have to miss an exam for a legitimate excuse, such as a death in the family. Imagine trying to deal with such complexities when you have 200–300 students to reschedule, and you are trying to provide reasonable alternatives to each of them. And then imagine that you want to incorporate outside events, such as screening international films, and need to find times that would be available to almost 3,000 students. It just doesn’t work—or it works at the expense of many dozens of hours spent by Boyer and his teaching assistants trying to juggle schedules.<sup>5</sup>

A second reason Boyer adduced for the system was that, in his words, “I had so many cool assignments I wanted to try!” Whether you are communicating with John Boyer by email or video, and I would imagine in person, almost everything comes with an exclamation point. He seems to possess boundless energy, as well as boundless enthusiasm for his course, his teach-

ing, and his students. He also has a passionate interest in educational technology, and so each year he adopts or tweaks assessments that push himself and his students in new directions. In the spring of 2012, for example, he first tried out an assessment form using the social networking site Twitter. Students who opted for this assignment were given a choice of one of eighty-five world leaders to impersonate on a specially designated Twitter network for John's course. They had to post tweets from that world leader at least twice a day, offering information on their location, their activities for the day, and any interactions they had with other world leaders. The students were responsible for consulting news sources, which provided the information they needed for their tweets, and then they used that information to create the words and persona of the leaders they had been assigned. For two tweets per day, or at least sixty per semester, students could earn up to 200 points toward their final course grade. Boyer's interests in new and different forms of assessment allowed him to add such assignments to an already crowded curriculum—more assessments than any individual student could complete during a single semester. The multi-choice assessment system gave the students more options between assignments like the Twitter exercise and more conventional forms of assessment, such as quizzes and exams.

But the third and most important reason Boyer presented for adopting this system was the very basic pedagogical one that, in his estimation, it helps motivate the students to learn. "My first priority in teaching," he explained to me in our video interview, "is getting people interested and inspired, and wanting to learn more on their own time—even after the class is over, I want them to be inspired to continue learning. In my mind, the best way to do that is to get them doing things that they are genuinely interested in doing, in the avenues in which they learn best." So, as he points out, and as we all probably know from

experience, some students claim to be poor test-takers. Whether we should accept that self-definition or not (and some learning theorists would argue that we should not), a student who has that self-definition may view a learning experience that uses nothing but tests as assessments as a negative or intimidating one—even if that student has an inherent or intrinsic interest in the subject matter. Another student might love the study of politics and geography but have little interest in their depiction in films; and that student might find himself equally turned off in a class that had required film viewings and responses. In Boyer's class, students are free to choose the form of assessment that they see as most interesting and most conducive to their showing him what and how much they have learned. So instead of the assessments looming over their heads as potentially intimidating or demotivating moments in the course, they become—as Boyer describes them on his syllabus—*opportunities* to demonstrate learning.

I want to dig a little deeper, with the help of pedagogical theory on mastery learning, to see how and why Boyer's multi-choice assessment system may help students develop the kind of intrinsic motivation and lifelong interest in his subject matter that he describes above. In a statement of teaching philosophy on his website, under the title of "New Educational Approaches," Boyer explains that his assessment system provides a means to individualize the course experience for every student in the (very large) room:

Students in the World Regions class come from diverse backgrounds (with approximately 80 countries represented), with different levels of knowledge and experiences, driven by differing motivations and maturity. As the class size and student diversity increases, it becomes increasingly difficult for instructors to devise a single exam or assignment to challenge and assess such a

group . . . the goal [of the assessment system] is to create an individualized and unique experience for each student, despite the fact that they are participating in a class of 2750 students.

Boyer sees his role as creating an “individualized and unique learning experience for each student”—a difficult enough challenge even in a twenty-student senior seminar; for an instructor to do so with close to 3,000 students in a single semester seems hopelessly quixotic. The default mode, in the face of such a challenge, would be to jump every student through the same set of hoops and hope for the best.<sup>6</sup>

Boyer has chosen an alternate route. Since it’s impossible for the instructor to create unique learning experiences for so many students, the instructor *doesn’t* do so: instead, he gives the students the autonomy to create their own individualized learning experiences through his multi-choice assessment system. In doing so, he has oriented the course away from one-size-fits all performance and toward students determining the best ways for them to demonstrate their mastery of the course’s learning objectives. The literature on how to construct a course with a mastery orientation would affirm the wisdom of Boyer’s assessment system in that respect. Susan Ambrose and her colleagues, in *How Learning Works*, note that providing “flexibility and control” counts as one of the major strategies that help orient students toward learning over performance goals. To develop a mastery learning orientation, they suggest, “allow students to choose among options and make choices that are consistent with their goals and the activities that they value.”<sup>7</sup> Exam-takers get to take exams, in other words, and social media users get to complete assignments on Twitter.

A research report published in a 2005 issue of the *Journal of Marketing Education* points out another key way in which the

assessment system we see in Boyer's class can help promote mastery learning. "Providing numerous opportunities to practice, learn, and master the task at hand," the authors of the study suggest, "will enhance intrinsic motivation by developing students' competencies."<sup>8</sup> Intrinsic motivation and mastery learning are closely linked. When students approach a learning task from intrinsic motivation, they are more likely to engage in mastery learning than performance learning. So how do you give students "numerous" opportunities to practice, learn, and master a task? Again we can look to Boyer. The highest possible point opportunity in Boyer's class comes from the weekly textbook quizzes, which he posts online every Tuesday. Students can earn a total of 400 points if they ace all of those quizzes. And, true to the mastery orientation of Boyer's overall assessment strategy, students can take them as many times as they like, until they get them right. Here is how he presents them to his students on the syllabus (using the occasionally colorful language you will find in everything he writes):

These quizzes are open-notes, open-book, open-website and can be taken as many times as you like. In other words, keep taking the damn thing until you get a 100% on it. Each weekly quiz will be posted on Tuesday after class and will be available until the following Tuesday before class begins, when it will be replaced by the new quiz for that week.

Nothing says mastery—seriously, nothing at all—like telling a learner that they get to keep practicing and trying until they get it right.

Finally, in an older but thorough analysis of the research in this area, the educational psychologist Carole Ames reviews the "the structures of the classroom environment that lead to a mastery goal orientation."<sup>9</sup> Two of the specific features that she

identifies as essential to a mastery classroom are clearly present in the assessment structure used by Boyer. First, she notes that tasks which “give students a sense of control over either the process or product” are more likely to produce mastery orientations.<sup>10</sup> This may be, she points out, because the variety of tasks and the individual paths that students carve through them render it more difficult for students to engage in competitive comparisons of their scores on any given assessment—behavior that would orient them more toward performance than learning. Second, displacing some of the authority from the teacher to the student, in terms of the tasks they complete in the course, helps push students toward mastery orientations. “Allowing students to have a say in establishing priorities in task completion,” as Ames describes it,<sup>11</sup> sounds like a pretty accurate description of John Boyer’s classroom.

Ames’s review helps clarify an important reason that a multi-choice assessment structure like Boyer’s pushes students away from performance orientations: it directs them away from constant focus on their exam or assignment performance *in comparison to others in the class*. Learners who may be doing very well in learning the material, but who perform poorly on an assessment compared to their peers, may become discouraged and unmotivated to continue trying to learn. Whenever I give exams back in my classes, I am always surprised to see how willing and even interested the students are to compare their scores with one another. In smaller classes, in which the students are very comfortable with me and one another, I have even had students call their exam scores out loud when I handed them back, noting how well they did in comparison to their nearby peers. Imagine a student who has worked very hard to achieve an 85 percent on an exam, an excellent score for her specific capacities on that exam in that class. If she happens to be sitting next to

a high-capability student who has aced the exam, and is not shy about broadcasting it, suddenly her remarkable achievement will no longer feel quite so remarkable—and that may, in turn, discourage her from working quite so hard the next time around, since her best effort still fell fifteen percentage points short of her vocal neighbor. Grade competition and comparisons push students toward performance orientations; allowing each student to create their own unique assessment structure de-emphasizes both competition and comparison.

Finally, in his description of his educational philosophy, Boyer points out another way in which the performance emphasis of traditional grading systems actually may serve to discourage learners. In many types of grading systems, Boyer points out correctly, “from the very first day of class, a student has an A+, and then instructors give the students a series of assignments and tests that serve to take points away from them when they mark items as incorrect. Every type of assessment, such as a paper or an exam, is viewed not as a chance to gain points but rather as an opportunity to lose them.” A student operating under such a system sees nothing but bleeding points or grades from the first assessment of the semester. Such a course sets a standard of perfection for the required performances, and almost every student performance will fall short of that standard by at least a little. But when you turn that system upside down, as Boyer has done, the emphasis of the course shifts away from required group performances and toward the individualized opportunities for the students to demonstrate their mastery of the course content. Boyer concludes his explanation of his assessment system using an athletic metaphor akin to the one with which this chapter began: he compares performance-oriented systems to hurdle-jumping, and contrasts that with what students can experience in a mastery-oriented system: “This method

is intended to motivate students with challenge, choice, control, and curiosity instead of presenting them hurdles to be overcome.” Or, put in the terms with which I opened this chapter, such a method allows students to follow their specific strengths and inclinations in order to demonstrate their mastery of the course content instead of simply asking them to keep jumping through hoops all semester long.

As you might expect, making changes like these to a course assessment system—just like making any kind of substantive change to a course—creates the potential for new problems, or problems that might not exist in other types of systems. In Boyer’s course—as I suspect would be the case in any choice-assessment method—the clear problem each student must face comes in the form of procrastination. Students who wait too long to begin their unique package of assessments, and who don’t bother to take and retake the quizzes, may find themselves facing the end of the semester with no possibility of passing the course. As Boyer explained it to me in our interview, “Because it’s so flexible, and so open, and there are so many options, there is a propensity to put everything off until the end. There are students who get lost in the sauce.” The propensity of students to get “lost in the sauce” is exacerbated in a course of nearly 3,000 students, since it’s more difficult for Boyer and his teaching assistants to keep track of the progress of individual students.

I asked Boyer what he did, and what other instructors could do, in order to help students avoid falling into the sauce and finding themselves stuck there, with too few options, at the end of the semester. “You do have to absolutely stress to all students that it’s on their shoulders,” he replied. “You have to do this from day one; you need persistent explanations on the syllabus and regular announcements on the syllabus and via email about how many points they should have, or how many assignments they should have done.” At the end of his explanation of the

course assessment structure on the syllabus, for example, you will find this paragraph:

BUT BUYER BEWARE! You can't wait until the last minute to make this happen! The one way you can screw this up is to keep putting off things until the end of the semester, living under the delusion that you can do a whole bunch of stuff in the last weeks of class to make up for slacking all semester. THIS WON'T WORK! Almost all of these assignments consist of turning in things every week and/or attending scheduled events all semester long . . . AND THERE ARE NO "MAKE-UPS" or "EXTRA CREDIT" or any other additional opportunities offered at the end of the semester to earn points. So choose and plan your semester wisely!!!

On the positive side, as this statement notes, the assessment system for the course eliminates the need for extra credit or make-up exams or penalties for late or missing assignments. If students do not get an assignment in on time, they receive no credit for it; but that's fine, because they still have plenty of other options to earn the same amount of points. And if they come to Boyer looking for extra credit, he responds: "There are hundreds of opportunities for extra credit. It's called the syllabus!" On the negative side, students who miss deadlines throughout the semester may find themselves at the end of the term with not enough options left to pass the course. So this assessment method definitely places a heavier burden of responsibility on students to take control of their own education—and some students will certainly have trouble bearing that responsibility. (We will see how to help students become more effective managers of their learning in Chapter 7.)

During my interview with Boyer in early summer of 2012, he told me that he was planning on introducing a new innovation to the course that fall, one designed to further help students avoid falling too far behind in the course or planning their se-

mester poorly. At the beginning of the next semester, he would be handing to the students a contract that would require them to specify which assignments they would complete. This contract would require them not only to select which assignments would work best for them, but also to map out a semester-long personalized schedule. Boyer was hoping that this innovation to the assessment structure would help students better understand how to budget their time—and their points—over the course of the semester, and would lead to fewer students getting “lost in the sauce.”

We saw in the last chapter that strategies for revising your course to foster intrinsic motivation occur along a continuum that might range from wholesale reshaping of your course structure to more modest revisions to your assignments. So, likewise, strategies to orient your course more toward mastery learning can fall on a similar kind of continuum. Boyer, like Kaufman, sits at the far end of that continuum. If you are totally committed to moving a course in the direction of mastery learning, you can use his model as one example of how to de-emphasize specific performances and provide students with a menu of options to demonstrate their learning to you. His model does not exhaust the range of possibilities, though, even at that far end of the continuum. You could just as well offer more choice and control to students by presenting them with three entirely different types of final projects to complete in your course, and letting them choose the one that best reflects the learning they have done. Or you could structure the course in such a way that it covers six broad units, and break down a final examination into six component parts. Students would be told in advance that they would be required to complete only four of those component parts in the final exam, and would be able to select the four

that best reflected their interests when they came into the exam room.

But providing students with choice and control can take more modest forms, down to the level of individual assignments. We almost always have the opportunity to offer choice for our students in assignments, or in the mix of assignments we construct. When I teach my British literature survey courses, I do have certain basic themes and works from each literary period that I expect students to have mastered. But I also want them to be able to follow the paths that interest them. So while I might drill them on the works of major authors and themes in our weekly writing exercises, on the midterm I can offer them four essay questions and let them choose three. For the paper assignment I can drop the really specific question I might have formulated about William Wordsworth and give them the opportunity to write about whichever poet has most caught their fancy. (In either case, I have to think creatively about grounding the assignment in their lives in a way that will discourage them from simply parroting someone else's ideas). But whatever choices I make, ultimately I am working to give students the opportunity to carve their own unique path through the course material, rather than forcing them to march through it in lock-step.

All of the strategies described in this chapter, enacted by John Boyer in his World Regions classes, should improve student learning—and more learning should lead to less cheating. At least two experts on cheating, Bernard Whitley and Patricia Keith-Spiegel, make explicit the connection between a mastery learning environment and reduced incentive to cheat. “Using a variety of means of evaluating students’ progress,” they argue, “makes it more likely that students will encounter forms of evaluation that are more comfortable for them. This comfort

level will help reduce performance anxiety and the accompanying motivation for academic dishonesty.”<sup>12</sup> Likewise, they claim, “Allowing students the opportunity to be retested on material (using new questions) and redo assignments reduces performance anxiety because students know that if they perform poorly because of illness or other handicapping factors they will have the opportunity to show what they really know.”<sup>13</sup>

Note how that word “opportunity” has arisen once again. Many years ago I attended a lecture on teaching by an award-winning political scientist. He spoke about his final exam with an enthusiasm that took me aback: “I look at my final exam as a wonderful opportunity,” he said, “for students to show me everything they have learned in that semester.” I realized at that moment how differently I thought about my final exams—more like a gauntlet I was throwing down. I still try to remember that political scientist’s description of his final exam as I get to the end of each semester, and begin preparing my students for the opportunities they will have to demonstrate their learning to me, rather than for the challenges I will pose to them. Doing so not only helps me describe for the students final exams or projects in ways that might nudge them toward a mastery learning orientation, but it also reminds me that my job is not constructing hurdles; my job is helping other human beings to learn, and the literature on human learning—not to mention the literature on cheating—suggests that I will do so more effectively if I give them more choice and control in the process.

## LOWERING STAKES

In John Boyer's class, opportunities to earn points on assignments and exams are frequent and plentiful. Even if he did not use a mastery learning assessment system that gave students choices among assignments, the research literature on cheating tells us that merely increasing the frequency of assessments, as he does, should contribute to lower rates of cheating in his course. Remember that in both our historical review and the social science literature, we saw that raising the stakes on an assessment may induce cheating. Infrequent, high-stakes exams—such as the Chinese civil service exams or the kind we saw described in Japanese universities—produce high rates of cheating because they represent the only opportunity for students to earn their grade in the course. The more pressure you put on a single exam, the more likely the chance that students will respond by using any means necessary to succeed on it. The logical inference from this notion would be that the more exams (or quizzes) you give to your students, with lower stakes, the less likely they are to cheat. That might seem immediately counterintuitive to you—the more exams I give to my students, you might be thinking, the more opportunities I am giving them to cheat. You also might be thinking to yourself that the more quizzes or exams you give, the less the students will be learning in the course. After all, every class period they spend taking an exam will be one less exam period devoted to teaching and learning.

That objection rests on the notion, one commonly held by

higher education faculty, that quizzes and exams *measure* learning, while studying and homework and classroom teaching help *produce* learning. That assumption structured my own course design for many years, and led to my having almost no exams in my courses except for the final. Let students write papers to show me what they know, I reasoned; exams just take up valuable class time and are not necessary in my writing or literature courses. In the fall of 2011, however, I first encountered the work of Michelle Miller, a cognitive psychologist from Northern Arizona University who will serve as our guide for this chapter, and who helped me think about tests and exams in a new way. In 2011 Miller published a review in the journal *College Teaching* on recent research in memory and learning theory, and the implications of that research for college and university faculty.<sup>1</sup> After reading this article I was quite abashed to realize, despite many years of reading about teaching and learning, how little I knew about the basic workings of the brain, and the structures that govern memory and learning. I found Miller's explanations so clear and interesting that I ended up profiling her work in a two-part series for the *Chronicle of Higher Education*.<sup>2</sup> She also brought to my attention the work of multiple researchers studying memory and learning theory, and in the months following my interviews with her I dug deeply into their work.

That research helped me understand that the best practices for reducing cheating in our courses coincided with the best practices for increasing learning. So this chapter will begin with a longish introduction of a concept that researchers have dubbed the "testing effect"; once we have become thoroughly acquainted with this important principle of human learning, we will follow Michelle Miller's guidance in thinking about how to implement it in an actual course in order to help your students

learn course content more effectively and reduce their incentive to cheat.

Jeffrey K. Karpicke and Henry L. Roediger III, two psychologists who have been working in the field of learning theory for many years now, published an excellent and concise summary of the testing effect in *Science* in February of 2008. Karpicke and Roediger conducted an experiment designed to test the assumption, described above, “that repeated studying promotes learning and that testing represents a neutral event that merely measures learning.”<sup>3</sup> In order to check these assumptions, the authors divided their study participants, all college students, into four separate groups. Each group was given forty pairs of English and Swahili words to memorize over the course of a learning period, which included both study time and regular tests to see how many of the word pairs they had memorized (during the tests, they were given the Swahili word and asked to remember its English equivalent). In the first group, the students had the entire word pair list (all forty pairs) to memorize during their study period and were tested on the entire list for all five exams they were given. For the second group, whenever a student had learned one of the word pairs and successfully identified it on a test, it was removed from the student’s study list *but remained on all subsequent exams*. So this group was no longer able to study the words in between exams, even though they continued to be tested on them. In the third group any word pairs that were successfully identified on an exam were dropped from subsequent exams *but remained on the study list of words available for them to study*; in the fourth group, successfully identified word pairs were dropped both from the student’s study list and from subsequent exams.

The authors conducted all of these study periods and exams

during the first part of the experiment, which they called the “learning phase.”<sup>4</sup> By the end of this learning phase, members of all four groups had all forty word pairs memorized; all four groups were able to complete that memorization task at roughly the same rate of speed. But Karpicke and Roediger were especially interested in seeing the effects of their experimental conditions on long-term retention. Consequently they recalled all four groups into the laboratory a week after the learning phase had concluded and gave them one final test on the word pairs. During that intervening week, the students no longer had access to the word pair list, so could no longer study.

The differences in the results of that final test, designed to measure long-term retention, are astonishing. A week after the learning phase, students in the first and second groups were able to recall around 80 percent of the Swahili-English word pairs; students in the third and fourth groups were unable to recall more than around 35 percent of the pairs they had successfully memorized just a week earlier. The differences among the groups now come into sharper focus: in the first and second groups, students were tested on all word pairs on all five exams; in the third and fourth groups, word pairs that students had successfully memorized for an exam were dropped from all subsequent exams. This distinction becomes especially clear when groups two and three are put next to each other. Students in group two, who were tested on all word pairs but did not have access to all word pairs during the study condition, still remembered 80 percent of the word pairs a week later; students who had access to all word pairs during the study condition *but were not tested on all of them* could remember only 35 percent of the word pairs a week later.

The conclusion the authors draw from these results seems inevitable: “testing (and not studying) is the critical factor for promoting long-term recall.”<sup>5</sup> This phenomenon has been

hanging around in the literature of cognitive psychology for many years now, but a series of new studies by Karpicke and Roediger and others have pushed it to the forefront of the literature on human learning. All of those studies conclude definitively that testing, not studying, seems to provide the most effective way for students to learn course material. Even if that does not seem counterintuitive to you, as it did initially to me, it certainly runs counter to the way many of us operate our courses—especially larger introductory courses, in which we probably test infrequently but admonish students to study as much as possible. Students in such courses, Karpicke and Roediger’s experiment would suggest, may well learn the material deeply enough in order to succeed on individual tests they are taking during the course (specific learning phases), but they remember far less of it once they pass out of those specific learning phases and move onto the next unit of the course or the next semester. If you’re like me, you certainly hope that students will remember what they learn in your classes beyond the confines of the single semester we spend with them.

This may apply to simple tasks, you may be thinking, such as short lists of English-Swahili word pairs. But does it apply to semester-long courses, often containing complex material? How can we know that the testing effect described by Karpicke and Roediger extends into real college classroom situations?

This was precisely the question addressed in a summary article by Roediger and two colleagues from Washington University in St. Louis, Mark A. McDaniel and Kathleen B. McDermott, published under the apt title of “Generalizing Test-Enhanced Learning from the Laboratory to the Classroom.”<sup>6</sup> The article provides an overview of three experimental studies that were designed to move the theory of the testing effect out of the laboratory and into more typical learning conditions for college students. In the first of those studies, the authors had students

read short articles from a psychological journal. They then separated the subjects into four groups: one group took a multiple-choice exam on the main concepts in the article, another took a short-answer exam, a third simply studied key concepts from the article, and a fourth had no reinforcement at all. Three days later, the subjects were then recalled to the lab and given a final test, which contained a mix of multiple-choice and short-answer questions. The results of the experiment look exactly as the testing effect would predict: the highest scores on both multiple-choice and short-answer questions came from the groups that took the tests immediately after reading the articles. And here the researchers noted an additional distinction that will become more prominent in the next two studies: the highest scores of all, on both multiple-choice and short-answer exams, came from those students who had initially taken the short-answer exams.

The second experiment simulated a college classroom and testing environment even more accurately. Students were given thirty-minute lectures on art history, followed again by the four possible conditions: no reinforcement, studying key concepts, a multiple-choice exam, or a short-answer exam. But here, in order to better imitate the situation of students who might learn a concept in early September and not take their midterm until mid-October, the researchers postponed the follow-up test for thirty days. “This type of delay,” they explain, “simulates the retention interval for a test in college.”<sup>7</sup> Once again, the results were consistent with the testing effect, and confirmed the first experiment’s conclusion that short-answer tests provided the most effective means of promoting long-term retention. Students who had taken the short-answer tests after the lecture were able to answer close to half of the questions correctly after thirty days; students who had merely studied answered only around 35 percent correctly. (Note that the group which merely studied the concepts afterward still scored much higher than the

students who had no reinforcement whatsoever; they clocked in at around 20 percent, which would suggest that study without testing still has some value for our students).

The third and most convincing of their three studies, though, comes when they move out of the laboratory altogether and reproduce these same conditions in a web-based course at the University of New Mexico. There they used a complicated structure across both students and course material in order to recreate the conditions from the laboratory: testing or restudying material presented to students in the course. The experiment spanned six weeks, with three weeks for each of two learning phases followed by a unit test. This experiment allowed all of the conditions that would apply in our courses and students to come into play and potentially disrupt the testing effect; the instructors had no way of influencing how much students studied outside the controlled conditions, or what types of students they were, or what other events may have been taking place in their lives. But even with all of these potentially disruptive factors entering the picture, as they would in any of our college courses, McDaniel, Roediger, and McDermott still found a robust testing effect:

The patterns shadowed those described . . . for the laboratory experiments. Testing effects were evident, with both short-answer and multiple-choice quizzes augmenting performance on unit examinations relative to when content was not quizzed. Focused reading of the facts, on the other hand, did not boost examination performance. As in the laboratory findings, short-answer quizzing produced significantly higher performance on the unit examinations than did multiple-choice quizzing or focused reading of the target facts.<sup>8</sup>

So in addition to confirming the general testing effect, they also confirmed the finding from the first study on the value of short-

answer quizzes or tests as the ones most likely to boost long-term retention.

The authors conclude, as we might expect, that “quizzing benefits learning, and that it does so more than focused reading of target facts.”<sup>9</sup> The one question you might still have left to ask at this point would be *why* this would be so. What creates the testing effect? Although the answer to that question begins to take us somewhat far afield, I do want to provide at least a brief explanation, if only to convince you that this is a real phenomenon. Michelle Miller offers an excellent summary of the key principles in learning theory that account for the testing effect in her article on recent research in memory and its implications for our teaching. For much of its young life as a field of study, Miller explains, cognitive theorists used a model of human memory that had been developed in the 1960s. This influential model divided human memory into three stages or parts: sensory perception, short-term memory, and long-term memory. According to the researchers who developed this model, Miller writes, “these three components worked in concert to perform information processing—i.e., turning sensory experience into a ‘code’ that can be stored and retrieved when needed.”<sup>10</sup> You can envision these three parts of the memory system as three distinct boxes: anything we perceive lands in the first box; a much smaller set of all that we perceive lands in the short-term memory box; and an even smaller subset of that material finds its way into the long-term memory box, where it remains available for us to use long after our perception of it has faded.

Despite the powerful hold that this theory once had on the field, Miller continues, “vanishingly few cognitive researchers”—including the scientists who developed this theory—“now believe [this] model to be the best theory of human memory.”<sup>11</sup> One major problem with this theory, she says, is that short-term memory turns out to be much more complex than this model

posits. And this theory does not do a very good job of explaining why certain information moves from the perceptual field into short-term memory, or how it does so. But whatever other problems this theory contains, the main shift away from it has come from the discovery that our long-term memories can actually store a huge amount of material. A much greater set of what we experience and perceive goes into our long-term memory than researchers previously had posited.

This newly realized storage capacity might seem like a wonderful discovery for those of us who are trying to help other human beings learn—but ultimately it simply shifts the challenges of teaching and learning to a different part of the process. “In long-term-memory,” Miller explains, “the limiting factor is not storage capacity, but rather the ability to find what you need when you need it. Long-term memory is rather like having a vast amount of closet space—it is easy to store many items, but it is difficult to retrieve the needed item in a timely fashion.”<sup>12</sup> According to earlier theories of memory and cognition, the main challenge faced by a learner was how to get material to pass from short-term memory into long-term memory, where it would be available for future recall. According to these newer theories, all of that material we want to learn may easily be passing into our long-term memory—the challenge for us is getting it back out again when we need it.

The testing effect suggests that this very challenge—retrieving material from our long-term memory—is a skill that we can practice and improve. Every time you take a test or quiz, you are drawing material from your long-term memory. In doing so, you are practicing the cognitive skill that proves the greatest challenge for our memories—and in the act of practicing that retrieval skill, you are getting better at it. On a more scientific level, every time you engage in the retrieval of a specific piece of information, you are opening up and strengthening the neural

pathways that lead from that long-term memory to your conscious awareness, and those pathways remain more accessible for you the more often you use them. As Cathy N. Davidson notes in *Now You See It: How the Brain Science of Attention Will Change the Way We Live, Work, and Learn*, a common principle in this area of research (attributed to Donald O. Hebb) is that “*neurons that fire together, wire together.*” As Davidson explains the principle, “the more we repeat certain patterns of behavior (that’s the firing together), the more those behaviors become rapid, then reflexive, then automatic (that’s the wiring).”<sup>13</sup> When you practice memory storage and retrieval, you are helping a specific set of neurons fire together; the more frequently they do so, the more firmly you are wiring them together. You are *not* strengthening those connections in the same way, by contrast, when you are simply sitting and staring at your textbook or your notes, or highlighting key facts and ideas. Those activities, while they may be helpful in some respects, do not strengthen those neural pathways to nearly the same extent.

With that simplified but tidy explanation under our belts,<sup>14</sup> we can now state clearly the implications of all of this for our own teaching: the more quizzes and tests we give to our students, the more we are helping them learn the material we want to teach them. We can broaden this principle by rephrasing it slightly: the more times we test students on their recall of our course material, the more we are helping them learn it. Phrasing it in this way lets in the door other forms of testing recall, such as beginning class by asking students to tell you orally what you covered in the previous class. It would cover Socratic teaching methods, for example, in which you spend class time asking questions of students based on the reading or studying they had done, with the intention of testing their knowledge of course concepts and pushing their thinking in new directions. It might

cover other kinds of classroom activities as well, ones that require students to draw from their knowledge to tackle some task or challenge you have set for them. As we shall see from Michelle Miller's course, she takes advantage of the testing effect through multiple pathways like these, not just tests and exams.

But before we turn to her specific class, I want to fend off one final objection you might have about the utility of this principle for your courses, especially upper-level ones. A number of commentators wrote in response to my first column in the *Chronicle of Higher Education* on Miller's work that the cognitive skills involved in memory storage and retrieval form only a part of what we want to help our students obtain or develop. Of course that is true; no doubt we all see our learning objectives as moving beyond memorization and encompassing broader and more difficult skills like writing, critical thinking, creative problem solving, and so on. But it's worth noting, even if you see yourself as teaching those higher-order thinking skills, that our students—like all of us—typically need a strong foundation of knowledge and information in their memories before they can begin using those advanced skills. Many of those who commented on the article also rightly pointed out that the internet has made the storage and retrieval of information a much easier task for all of us—but that doesn't change the fact that we rely on memory all the time in the practice of our discipline and trades, not to mention in everyday life. An emergency-room doctor rushing a patient to surgery, a lawyer brought up short by a surprising piece of testimony in a trial, a sales clerk responding to an unexpected question by a customer—in all of those moments, the professional in question has to draw quickly from a memorized store of previous experiences and information. Certainly the ability to apply the information from memory to a new situation and respond accordingly represents a different and

more complex thinking skill—but people can't get to that more complex skill without access to their medical, legal, or professional knowledge.

Those of us in higher education surely know that from our own experiences. When a student in my survey course on British literature asks me about the Irish potato famine, she should expect me to expound upon the role that the British government played in exacerbating that “natural” disaster, but she should also expect me to know—without my having to stop class and Google it—that the first potato crop failed in 1845, and that crop failures continued for the next half-dozen years. Likewise, if I expect my students to understand the complex historical and literary relationship between Ireland and England, I want them to know roughly where the famine falls in the historical timeline of that relationship. I might not care whether they know the exact years of the worst crop failures, but I do care that they know how the crisis related to the rise of industrialism and economic theory in the nineteenth century, how it influenced the writings of Marx and Engels, and how it precipitated an Irish diaspora. To understand those more complex historical issues, students must know the approximate dates of the famine. So memory matters, even for those of us teaching the most complex cognitive skills we can imagine. And if memory matters, then we should provide our students with the best possible help in committing our course material to memory, and having the foundational tools they need to pursue higher-level thinking tasks.

Michelle Miller gives her students that help in multiple ways in her Cognitive Psychology course at Northern Arizona University. She described the course to me as a “core requirement for psychology majors that typically enrolls 70–80 sophomore students”—just the kind of large introductory course, she noted, in which cheating would be a very likely possibility.<sup>15</sup> And

just the kind of large introductory course, I would add, in which an instructor might be tempted to manage her time commitments by falling back on infrequent, traditional forms of assessment: a few multiple-choice exams along the way, a final, and maybe a research paper. I wouldn't bat an eye at seeing a faculty member use such an assessment plan in a core course that enrolled between seventy and eighty students.

And indeed, you will find two multiple-choice exams in Miller's course, along with a multiple-choice final exam. But as you might expect from a teacher who was a 2011 appointee to the ranks of Northern Arizona University's Distinguished Teaching Fellows, Miller fills out her assessment structure with a much wider array of methods designed to help her students practice the retrieval of key course concepts *and* put them into practice both in and out of the classroom. First and most obviously, Miller makes use of weekly online multiple-choice quizzes to ensure that students are keeping up with the reading. These quizzes are taken by the students outside of class and are open book. Students are allowed to take each quiz twice and retain only the highest of their two scores—another example of the kind of mastery learning exercise that we saw in John Boyer's class. Miller believes that these quizzes have made a substantive impact: as she said to me in an interview about the course, "I suspect that the reading quizzes make a meaningful difference in learning and grades; my exam scores are similar to what they were semesters ago when the course was an upper-division elective with mostly seniors using the same book." Multiple-choice quizzes like these are an easily applied assessment structure in just about any course, and the ability to offer them online can help allay possible concerns about "giving up" too much class time for additional assessments or about giving up too much of *your* time for evaluating them.

There are two specific aspects of these quizzes that are essen-

tial to note, however. First, the students do *not* receive the answers to the quiz questions as soon as they have taken them—a practice that you see, for example, in many online tutorials. As Miller explains to the students on the syllabus, they are welcome to ask her about the correct answers to any quiz question they are uncertain about, but they have to take the initiative to do that. The merits of handling online quizzes this way can be easily seen by considering a cheating scandal that was reported in the *Chronicle of Higher Education* in June of 2012. A group of students in an online course learned how to cheat on a quiz system that resembled Miller's except for the fact that the students received immediate feedback on each answer they gave, so they could see whether they had answered the question correctly. As a student explained to a *Chronicle* reporter:

If he and his friends got together to take the test jointly, they could paste the questions they saw into [a] shared Google Doc, along with the right or wrong answers. The schemers would go through the test quickly, one at a time, logging their work as they went. The first student often did poorly, since he had never seen the material before, though he would search an online version of the textbook on Google Books for relevant keywords to make informed guesses. The next student did significantly better, thanks to the cheat sheet, and subsequent test-takers upped their scores even further. They took turns going first.<sup>16</sup>

For learning purposes, in an ideal world, it probably makes more sense to have students receive immediate feedback on their answers after they have given them. If you want to reduce opportunities for cheating, though, Miller's plan might be the better one. After all, she can give students in the course feedback on their answers when they request it, and she can review the material from the quizzes during class time, so the students still can

and will receive some feedback within a short time of taking the online quiz.

Another essential aspect of Miller's structure is that the online quizzes and major exams are in the same format, multiple choice. We saw from Karpicke and Roediger's experiments that short-answer testing may produce better learning than any other format. But when you are teaching courses of over seventy students, you can imagine how the time commitment required to give and grade short-answer quizzes or tests starts to rise exponentially. So multiple-choice testing may represent the most feasible option for teachers under those conditions, one that still allows them to take advantage of the testing effect. But an important caveat needs to be established here. Research on human learning suggests that one area that seems to be more complex than instructors might imagine is *transfer*. This concept refers to the ability of a learner to take knowledge or a skill developed in one context and apply it in a different one—so, for example, to take knowledge that they have practiced applying in a multiple-choice exam and be able to transfer it to a short-answer exam. According to multiple studies cited by Susan Ambrose and her colleagues in *How Learning Works*, “transfer occurs neither often nor automatically, and . . . the more dissimilar the learning and transfer contexts, the less likely successful transfer will occur.”<sup>17</sup> So if you spend the entire semester giving your students multiple-choice quizzes and then give them a long essay as a final exam, you are expecting students to make a transfer that they likely find far more difficult than you realize.<sup>18</sup>

The end result of this notion is that, whatever type of assessment we give to our students on our major exams and assignments, we need to give them *prior* practice in developing those skills or applying that knowledge in that specific context. So if you are going to give your students multiple-choice final exams,

they should be taking multiple-choice quizzes along the way. If you are going to be giving students essay final exams, they should be taking weekly essay quizzes. If you have both types of assessment on your final exam, let them practice both. Any type of quiz or exam has the potential to help students deepen their learning through the testing effect; but what we know about transfer helps us understand that we have to help students practice the skills or apply the knowledge we want them to demonstrate to us on our major exams. None of this means, by the way, that students are not capable of transferring knowledge from one domain to another, or from one assessment type to another, and that you should therefore limit your assessments to one single type throughout the entire semester. Students can learn to apply skills or demonstrate knowledge in multiple formats and contexts, and the more of those you offer, the more likely they are to retain the material. But whatever you ultimately expect of them on your major assessments, you should first allow them to practice on lower-stakes, more frequent assessments—just as Miller does with her online multiple-choice quizzes, designed to prepare students for the final exam.

Like every good teacher, Miller wants her students to see the relevance of her course and her discipline to the world outside of her classroom. So in addition to the quizzes and the exams, Miller's students complete two other kinds of graded assignments. She uses a web-based system called Coglab, which requires students to participate in simulated research experiments in psychology. Doing so allows them to gain a first-hand understanding of the experience of designing and participating in real psychology experiments. Near the end of the semester, they are responsible for a project in which they create a “realistic, practical solution to a problem or question” based on the work they have been doing in the course. These “Application Projects,” as she calls them, are excellent examples of the kind of grounded

assessments we reviewed in Chapter 4—we can hear in the title phrase, in fact, echoes of Andy Kaufman’s student discussing the notion of “applied” courses. So, for example, one semester Miller gave the students the assignment to “draft a memo to the university student council explaining why they should not spend \$10,000 on memory enhancing software based on some sketchy scientific claims.” The students had to reference an empirical research article she gave them, but were otherwise encouraged to “get creative with it,” as she put it. “Draft a speech to give to the local school board,” runs another project assignment, this time echoing Sarah Cavanagh’s presentations to the local middle school students, “explaining the advantages of bilingualism.”

In both Coglabb and these application projects, students have to ground the concepts and information they are learning for the quizzes and exams in other environments, whether those be the labs of working psychologists or the field of memory research. We learned already about the difficulties that learners have with transferring what they have learned to new contexts, and that we cannot simply expect such transfer to happen automatically. So if students are going to be evaluated on their ability to apply concepts and information outside of the lab, then they should have some opportunities to practice this skill in advance of those graded assignments. Miller gives them just such practice with her in-class activities: brief, low-stakes exercises that ask students to—in the words of the syllabus—“discuss, reflect on, or apply material we are working on that day.” So, for example, she might pause in the middle or at the end of class and ask students to write a short response to the following question: “Describe one everyday example of the impact of cues on retrieval from long-term memory.” Or: “When are you best off relying on intuition . . . and when should you ignore intuition?” It might seem overwhelming to imagine a faculty member re-

sponding to short-answer questions like these every day in a class of seventy or more students. Miller does not typically write detailed responses to each student, however. She explains on the syllabus that students will receive full credit for “good-faith effort”; she told me that she “might pull a few to comment on in class, or make a few written comments if the student is way off base,” but otherwise simply gives credit for a reasonable response of any kind. This seems especially appropriate given the low stakes of these assessments; although she has at least one of them during almost every class period—which, as she pointed out to me, helps ensure better attendance in a large course—they account for a total of only 10 percent of the student’s final grade.

These in-class activities strike me as accomplishing two important objectives. First, they provide opportunities for students to think about application of the course concepts outside of the classroom, thus helping prepare them for the Coglab experiments and the application project. In giving students such advance preparation, Miller is reducing the number of students who might approach those assignments with anxiety and uncertainty, and might resort to cheating as a consequence. But more important, the in-class activities represent another way in which Miller can take advantage of the memory retrieval practice that we learned about from research on the testing effect. Remember that the principle underlying the testing effect is that students benefit from frequent retrieval and rehearsal of the concepts and information they are learning. We might most easily imagine quizzes and tests as the primary means by which students engage in such retrieval and rehearsal, but those are not the only means available to them or us. Students can practice retrieval and rehearsal activities while they are studying, for example, by studying with the book closed. Instead of simply rereading their textbook or notes over and over again, in other words, they can

close their books and practice retrieving the main ideas from their notes or the chapter by talking about them with one another or by reproducing them in different forms on a new notebook page: as an outline, or in paragraph form, or even as a concept map. That kind of studying will prove much more effective than the typical studying behavior of most college students. (We will consider this in more detail in the next chapter.)

And so, likewise, Michelle Miller helps students begin the process of practicing retrieval and rehearsal of course information with her in-class activities. Consider again the first example I gave of a question she might pose to students as an in-class activity: “Describe one everyday example of the impact of cues on retrieval from long-term memory.” Envision such a question being posed to students after they had read material on the notion of “cues” and heard a brief lecture on the topic. Students are then asked to close their books and respond to that question in writing. Doing so requires two intellectual activities. First, students have to remember and rehearse what they have just learned. All of the in-class activities, Miller explained to me, are like this one in that they “require students to access the material from memory in order to come up with a reasonably thoughtful response.” Second, they ask students to begin building their own connections between the course material and the world outside of the classroom. “I tend to emphasize,” she told me, “application to everyday life or other opportunities for students to personalize the material.” That emphasis first helps students prepare for the application they will be doing on their out-of-class project. But giving students the opportunity to personalize the material also helps them create richer connections between what they are learning and what they already know, which can help students—as it can help all of us—remember ideas and information more deeply.

Miller’s in-class activities do not always take the form of short

writing exercises like this one. Sometimes, for example, the students are given the opportunity to discuss the question in small groups and then turn in a group response. “The critical point,” she says, “is to get students actively responding during class, regardless of the exact specifics of the activity.” And we can envision easily enough that, in some cases, the written component might not even be necessary to take advantage of the benefits of frequent retrieval and rehearsal. Oftentimes we conclude lectures or mini-lectures in class by asking students if they have any questions in response to what we have just presented. If you’re like me, you have plenty of experience in hearing nothing but crickets chirping in response to that question. A much better way to conclude a lecture, according to what we have covered in this chapter, would be to ask students to close their notebooks, and then to spend ten minutes posing specific questions designed to elicit students’ recall of what they have just heard. I know that sometimes instructors shy away from this kind of activity, not wanting to appear like a drill sergeant grilling the recruits. But attitude and tone can make a huge difference when you are engaging students in the classroom; you could conduct such an exercise like a drill sergeant, but you could also conduct it like a researcher inviting a colleague into a fascinating conversation. You can also remove some of the tension from the room if you make it clear, on the syllabus and from the first day of the semester, that all lectures will conclude with the opportunity for students to test what they have learned with some oral questions and answers in class. Make it clear that you are doing so because this quizzing will help them learn by allowing them to practice retrieval and rehearsal—not because you want to embarrass anyone or catch anyone who has been napping during the lecture.

None of the testing-effect strategies I have been describing in the work of Michelle Miller—frequent online quizzes and

regular in-class activities that require retrieval and rehearsal—are revolutionary ones. As she acknowledged to me during our interview, the in-class activities are partially modeled on the now-famous low-stakes assessment model of the “minute paper,” in which a teacher concludes a lecture by asking students to write down one key concept that they learned during the class period. The minute paper has a thousand variations, and Miller’s in-class activities could be seen as a series of such variations. It’s also time to acknowledge that constructing a course using these activities cannot guarantee that you will not have cheating—just as none of the strategies that I am covering in the four chapters of Part II will guarantee that. But if we keep in mind the foundational principle of the book, that the best means we have to reduce cheating is to increase motivation and learning, than I think we can take two essential points away from Michelle Miller’s research on memory and learning, as well as from the ways in which she applies that research to her own course.

First, provide frequent opportunities for students to practice retrieval and rehearsal of the information that you want them to learn. That process can start from the very class period in which you present them with the information, in the ways in which you pose questions and problems to students in class; it can continue outside of class with online exercises or quizzes; and it can be solidified in the form of the tests you give. Each time your students are able to recall your course material from memory, according to the experiments of cognitive psychologists like Karpicke and Roediger, they are sealing up neural connections that will help them recall that material more easily the next time, and that will lead to greater long-term learning. Of course we have not by any means exhausted the possible ways in which a college faculty member can give students practice with retrieval and rehearsal; the important point here is not to faithfully repro-

duce Michelle Miller's example in detail, but to understand the principle of the testing effect and see how you can apply it in your classes. I have used short-answer writing exercises in my literature courses for many years now, at the beginning of almost every class, and I have seen the great potential for taking advantage of the testing effect—but it was not until I learned about the testing effect myself that I understood their power, and began planning them more carefully in order to reinforce student learning of the key concepts in the course. I suspect that many faculty will already have course features that give students the opportunity to practice retrieval and rehearsal and may, like me, now have the opportunity to think a little bit more deliberately about how you deploy them in your courses.

Second, faculty should provide at least some of those opportunities for retrieval and rehearsal in low-stakes formats, and particularly in the formats on which students will have to engage in their high-stakes assignments or exams. The difficulty that students—and perhaps all learners—have in transferring knowledge or skills from one context to another means that if we want them to succeed on our high-stakes evaluations, we should give them plenty of opportunities to practice their skills on similarly formatted low-stakes assessments. If your students take a high-stakes final exam in multiple-choice format, you should have them taking lower-stakes multiple-choice quizzes throughout the semester. If your students take a high-stakes final essay exam, have them respond to essay questions in class throughout the semester. Ideally, you are testing students in more than one format, and asking them to do at least some writing, but with the course sizes that many of us have to manage these days, that can be difficult. While the research does seem to suggest that longer-term learning happens when students are writing, as opposed to taking multiple-choice exams, the differences between the two were not overly large ones. The format matters less than

the alignment between the low- and high-stakes assessments, and the frequency of opportunities you give to students.

We began this chapter with what might have seemed to you a counterintuitive notion: that the more assessments you give to your students, the less cheating you will have. I suspect that most faculty who have taught for a while will have had some version of the following experience, at least if you ever teach classes that allow for student discussion. You pose a question about the reading to your class, and a student formulates an interesting response to the question, one that reflects his reading of the material but puts his own specific spin on it. Later that week, the student comes back to the same idea in a short-answer response on the midterm exam. Still later in that semester, the student takes the idea a little further and uses it as the starting point for a major essay for the course. The first time the student spoke that idea aloud in class, it created a new connection for him. During the exam, the idea was more easily recalled in written form because it had been discussed in class. The idea continued to hang around in the student's head, ultimately forming the basis for further research and understanding in the essay the student prepared. The research on cognitive theory that we have covered in this chapter tells us that this student may remember that idea longer and more fully than anything else he learned in the course. The more opportunities we give to students to rehearse what they have learned in these ways, the less likely they will be to seek easy answers, outside the confines of academic honesty, for what they need to succeed in your course.

## INSTILLING SELF-EFFICACY

As the father of five children, I frequently get roped into serving as the coach or assistant coach on youth sports teams. Despite the fact that I stopped playing all sports except golf and ping pong (do those count?) in my freshman year of high school, I have now imparted my sports-oriented wisdom to young people in the areas of baseball, football, and soccer over the past dozen years or so. As a result, I have become thoroughly familiar with what I call the “good jobbing” of American youth today, and in fact am one of the main practitioners of this dubious coaching technique. No matter what a kid on one of my teams does, I find myself saying “Good job!” to it. Hit a single in baseball? “Good job!” Scored a soccer goal? “Good job!” When the child has actually *not* done a good job, I add some clarification. Dropped a pass in football? “Good job! You really dove well for that ball!” Struck out at the plate? “Good job! Way to swing at that pitch, instead of watching a called third strike!” I can find a reason and language to praise almost anything a child does in a sporting event, as long as they are not sitting in the field picking dandelions in the middle of the game. (Although I am tempted sometimes to congratulate those children on engaging in civil disobedience with their passive protests against the madness that youth sports can sometimes become.) I am quite adept at the skill of “good jobbing,” which is probably why I am in such demand as a coach.

The first technique that might occur to you when you are thinking about helping students overcome self-efficacy prob-

lems, which ranked fourth in our list of factors that might induce students to cheat, is to engage in lots of “good jobbing” in your classroom. But there is a problem with this—one that occurs on a smaller level in children’s sports, but becomes much more intense in higher education. If we do nothing but praise children for their efforts, we give them a false sense of their skill level. This really doesn’t matter much to five-year-olds on a soccer field. Over the course of the next few years, they will gradually be able to see for themselves how they stack up with their peers on the soccer pitch, and no amount of “good jobbing” will cover up the significant and visible differences that begin to emerge between excellent and poor athletes as the children enter middle and high school. But it can create a significant problem for college students, in that poorly gauged *overconfidence* in their knowledge of course material can lead them to *understudy*—and hence might be as likely to induce cheating as a lack of confidence in their abilities.

To help instill a strong but realistic sense of self-efficacy in our students, one that will give them the confidence they need to undertake the challenges we give to them without underestimating the effort it will take, we can look to two very concrete strategies: improving *student metacognition*, and improving *faculty communication*. I will take them up in that order, because I believe that improving student metacognition requires harder thinking about your teaching, and has the potential to inspire deeper changes in the way that you conduct your classes. Once you have made your decision about how—or whether—to make those changes, you can then build more effective communication into just about any course with the strategies I will cover in the final part of the chapter.

I was first introduced to the fancy five-cent notion of metacognition by Stephen Chew, a cognitive psychologist who has pro-

duced a terrific series of YouTube videos for college and university students on how they can learn to study more effectively. When I first discovered these videos, I wrote a profile of Chew and the videos for a *Chronicle of Higher Education* column. I focused especially on the first video in the series, in which he introduces students to the concept of metacognition.<sup>1</sup> Stephen Chew will serve as our guide through this concept and what it means for our students, and his work in the videos and in the interviews I conducted with him stands behind this entire chapter. But Stephen will join us formally only for a few pages, and then I want to introduce you to a group of physicists at MIT who published an essay about how they reduced cheating in their large, introductory physics courses—and did so, at least in my analysis, by giving their students a significant metacognitive boost.

Put as simply as possible, according to Chew, metacognition “is a person’s awareness of his or her own level of knowledge and thought processes. In education, it has to do with students’ awareness of their actual level of understanding of a topic.”<sup>2</sup> Students with excellent metacognitive skills have a clear and accurate picture of how well they know the material they are studying; those with poor metacognitive skills have an inaccurate picture of their learning. Although a small number of students may underestimate their knowledge about the material they are trying to learn (which could result in low self-efficacy), more typically students err in the other direction. Students with poor metacognition, Chew says, are usually “grossly overconfident in their level of understanding. They think they have a good understanding when they really have a shallow, fragmented understanding that is composed of both accurate information and misconceptions.”<sup>3</sup> If you have ever had a distraught student visit your office hours after an exam, lamenting that he thought

he knew the material cold and then bombed an exam, you were likely staring at a student with poor metacognitive skills.

The reason that those poor metacognitive skills cause problems for students is that they lead them to make poor study decisions, which then have consequences for their performances on exams or assignments. As Chew puts it, “once students feel they have mastered material, they will stop studying, usually before they have the depth and breadth of understanding they need to do well. On exams, they will often believe their answers are absolutely correct, only to be shocked when they make a bad grade.”<sup>4</sup> So a student with poor metacognitive skills may imagine that two hours of studying for a major exam has given him complete mastery of the material; a student with excellent metacognitive skills recognizes that two hours of studying has only scratched the surface of what she needs for such an important exam, and will continue working for another six or eight hours. The student with poor metacognitive skills will not realize the depth of his error in judgment, though, until he is sitting in front of the exam and realizing how badly he has miscalculated—or, for those students with especially poor metacognitive skills, until you give them back their failed exam.

In the interview I conducted with Chew, I asked him about the single best strategy that faculty could use in order to help their students improve their metacognitive skills. “The best way to reduce the impact of poor metacognition,” Chew said, “is to use formative assessment during teaching. Formative assessments are brief, low-stakes activities that students do in order to give both themselves and the teacher feedback about their level of understanding. There is a wide assortment of assessments that faculty can use, such as think-pair-share activities, minute papers, and so-called ‘clicker’ questions.”<sup>5</sup> I noted in the last chapter that Michelle Miller’s in-class activities represent a form of

the “minute paper,” and we can now put those activities in the terms described by Chew here as “formative assessments.” The more such opportunities that the students have to test out their knowledge and receive feedback on it in formative assessments like the ones Chew mentioned, the more accurate a picture they will have of their own learning—and the more accurate that picture is, the more they will be able to make good decisions about their studying. The better those study decisions are, the less likely they will be to find themselves stuck behind the eight-ball in the hours before an exam, or in the final weeks of the semester, knowing that their only option for success in the course is an academically dishonest one.

The most effective low-stakes assessments you can give, of course—as we have already reviewed in our chapter on the testing effect—are ones that will reappear in high-stakes form on your exams or assignments. So whatever skills the students will need to succeed on your high-stakes assessments, they should have had multiple opportunities to practice and receive feedback on those skills on prior low-stakes assessments. Doing so will both help them learn the course material more deeply through the testing effect, and will help them gain a clearer picture of their own learning (that is, better metacognition). (And, as a helpful bonus, it will help you gain a clearer picture of what students are learning or not learning in your class, allowing you to modify your teaching accordingly.)

In his class, Chew uses “clickers” in order to provide the students with a better understanding of their knowledge in the course, and to give them practice on the kinds of questions that they will see on the exam:

I present the class with a multiple-choice question similar to ones that will be on the exam. Students select their answers individually, and I poll the class. They can then discuss their answer with

other students, after which I poll the class again. Finally, we discuss the answers as a class. This gives me a sense of how well students understand the material. I can identify and address problem areas. I also emphasize that the question I use is similar in difficulty level to questions they will see on exams, so if they did not answer correctly or were confused, they need to improve their understanding. Formative assessment helps students study and learn more effectively *before* exams, and they are less likely to feel “tricked” by questions they didn’t expect. The actual exam should never be the first time the faculty or the students get feedback about the actual level of student understanding.<sup>6</sup>

Done well, the kind of formative assessment that Chew describes here can help address both ends of the metacognitive spectrum. Students who overestimate their understanding of the topic should see their mistake if they are consistently getting the answers to the questions wrong, or are having to guess at the answers. Students who are underconfident in their learning—and hence have the kind of low self-efficacy that might lead to cheating—should be able to gain confidence by consistently doing well on the clicker questions, especially if they know that those same types of questions will appear on their graded exams.<sup>7</sup> In neither case, as Chew points out, will students feel “tricked” by what they see on an exam, or even anticipate feeling “tricked” by an exam. And as you may remember, one aspect of self-efficacy that made a difference in cheating was whether or not the students felt they would be assessed fairly by their professors. The formative assessments described by Chew give students a very clear picture of how they will be evaluated, reducing any potential feelings they might have of receiving unfair treatment on their exams.

But you don’t need clickers to create formative assessments in your class, as we saw with the example of Michelle Miller; you

can use such assessments in a variety of ways, and you can even attach points to them if you prefer, though you want to keep those stakes as low as possible. To offer another example, suppose that you typically give your students a midterm and a final exam that require them to synthesize concepts or information from your course in several long essay questions. How can you prepare your students to do well on those exams, improve their metacognition, and reduce their incentive to cheat? The additional paper assignments you have for the course won't help, nor will the presentation you also assign. In those cases you are asking the students to do something different, drawing on different skill sets. To help them develop the skills they will need to succeed on your essay exams, you might occasionally ask them to perform concept syntheses in class in ten- or fifteen-minute writing exercises throughout the semester. Once a week, for example, you might begin class by asking your students to write a two-paragraph response to just such a synthesis question. Each of those responses might count for a very small fraction of their final grade. Imagine the difference between a student who has spent the semester gamely reviewing her notes every once in a while and believing that she has the concepts mastered, but who has never attempted a written synthesis of those concepts, and a student who has had a dozen opportunities to practice writing a synthesis and has received feedback on how he has done. Which student will have learned this skill more deeply and effectively? Which student will be less likely to bomb the midterm, become terrified about the final exam, and be motivated to do whatever it takes—honest or otherwise—in order to ace that final exam?

Practicing with short writing exercises to prepare students for essay exams will work only in some disciplines, obviously, so you will have to translate this example into whatever discipline in which you are teaching. The principle is simple enough: take a look at whatever you require of students on your high-stakes

assessments, and break it down into smaller chunks or pieces on which you can give students low-stakes assessments during the intervals between those higher-stakes exams or assignments. Doing so will not only make use of the testing effect in order to reinforce your course content in your student's brains, but it will also help firm up their metacognitive awareness of their knowledge in your course. And doing both of these things will reduce the incentive for students to cheat. To hearken back to the first historical situation we considered, the ancient Olympics, imagine you were the world's fastest sprinter, and you *knew* you were faster than everyone else—why in the world would you bother bribing the judges in order to ensure your victory? The students' knowledge, and their metacognitive awareness of that knowledge, can be one of the best remedies we have against cheating.

The clicker strategy described by Stephen Chew was initially developed by Eric Mazur, a physicist at Harvard University. To help see more clearly how frequent low-stakes assessment activities can both improve metacognitive skills and reduce cheating, I want to turn to a group of four physicists across town from Mazur, at MIT, who published an essay in the January 2010 edition of the online journal *Physics Education Research* about how they reduced cheating on homework assignments and increased learning and course retention in their large, introductory physics courses for nonmajors.<sup>8</sup> Their study focused initially on two large sections of the courses in the fall of 2003. With approximately 215 students in each of those two sections, the courses were taught in traditional lecture-recitation format: the faculty offered three lectures per week, as well as two recitation sessions. Attendance was not required at either the lecture or recitation sessions; unsurprisingly, attendance rates clocked in at a rather low 60 percent. The major assessments for the course, following an initial pretest to check students' knowledge prior

to taking the course, included three in-class examinations and a final exam. But students also had to complete weekly homework assignments: one of them an electronic problem that they solved through an online homework system called MasteringPhysics (worth 10 percent of their total grade in the course), and one of them a written assignment. The physics professors who co-authored the study were concerned about two issues: how much cheating was taking place on those electronic homework assignments, and how many students were either dropping out or doing poorly in the course. They wanted, in part, to understand whether there was a correlation between these two factors—but mostly they wanted to reduce the rates of both cheating and poor performances in the course.

In order to determine how much copying was taking place on the homework assignments, they decided to analyze the amount of time it took students to complete the online homework problems. They estimated that students who were actively and authentically engaged with the homework took ten minutes or more to complete each problem. When they looked at the reports, which indicated how many minutes had elapsed between the time the student opened the problem on a browser and the time it took him to complete the problem, they saw a significant number of students were doing so in a minute or less—less time than it would take to read the problem in its entirety and type in a response, much less actually think about it and work out the answer. Using this time-to-completion factor as their main piece of evidence, they estimated that around 10 percent of the total problems completed in the course had been copied from another source. That gross number of total problems copied breaks down in two important ways. First, the researchers were able to see the number of students who engaged in different rates of copying. They found a small number of students (10 percent) who copied at least half of their homework problems; a

majority of students (51 percent) who copied either not at all or less than 10 percent of the problems; and a messier group of “light” or “moderate” copiers (39 percent) who copied between 10 and 50 percent of the problems. Second, and more interestingly—if perhaps still unsurprisingly—they were able to determine that copying intensified as the deadline for the homework approached, and spiked right around deadline time and slightly afterward. Looking more closely at this, they discovered a primary difference between heavy copiers and those who copied little or not at all. The noncopying group, they reported, “does their work in a timely fashion; working steadily over three days before due time and completing  $\sim\frac{1}{2}$  of their problems two days before they are due”; the heavy copy group “typically does only  $\sim 10\%$  of their work two days early, and leave[s] almost 60% of the assignment to the final six hours, and about 15% until after it is due.” The more work they left until the hours before the deadline, in other words, the more the students were likely to copy.<sup>9</sup>

How does that information square with what we have already learned about cheating? Just as we saw in our opening chapter, we have a small number of students (10 percent) who are cheating regularly, a larger number of students who cheat much less regularly, and a much larger number of students who either do not cheat at all or do so very infrequently. So in that respect what we see in this course matches the basic picture we have of how many of our students engage in academically dishonest behavior. As for the issue of the copying increasing dramatically in the hours before the due date, we can certainly attribute some of that to poor time management on the part of the students—a common enough problem that, as faculty, we have limited ability to help our students overcome. But I think we can also attribute much of this deadline copying to poor metacognition on the students’ part. Metacognition in this case would involve a

recognition of the difficulty of the homework problems and an assessment of their ability to solve the problems in the required time period. Students with sharp metacognitive skills were obviously aware that these were difficult problems that would challenge their understanding, and so began working on them three days in advance, completing over half of them two days before the due date. Students with poor metacognitive skills, by contrast, assumed that they would be able to complete most of the problems within six hours of the due date and time, and so unwisely left most of them until the day they were due. When faced with the realization that they had badly miscalculated the amount of time they needed to complete the problem, many of them resorted to copying.

And many of them, as a result, did increasingly poorly in the course. The authors looked at the student scores on all five exams, from the pretest to the final, and compared them with the amount of copying that the students did. In simplest terms, they explain, “repeated homework copying” correlates sharply with “severely declining performance relative to class average over the five primary assessments.”<sup>10</sup> In other words, the test scores of the heaviest copiers show a mostly steady decline from the beginning of the semester to the final exam. The authors are able to demonstrate that repeated copiers and noncopiers scored in roughly the same range on the pretest. In other words, all students began the course with the same basic set of skills and background knowledge. But as the semester progressed, the students who engaged in repeated copying saw their scores gradually decline from test to test in comparison with noncopiers, culminating in a “copying” final exam score average that was two full standard deviations below the “noncopying” exam score average. The authors make the excellent point, as a result of comparing these averages on the pretest and final exam, that “contrary to the typical belief of American students that innate

ability . . . is the principal determiner of exam success, doing all assigned work is a surer route to exam success than innate physics ability.”<sup>11</sup> As I see it reflected in this sentence, and in other parts of the article, the authors of this study struck me as driven by the admirable desire to address cheating in their course because cheating reduces learning. They wanted as many students as possible to learn physics, and so they wanted as few students as possible to copy the homework problems.

To achieve these goals, the authors revamped the course entirely, shifting it to what they call a “studio model” following the fall of 2003. They continued to tweak the structure of the course through the fall of 2006, the last semester included in their analysis. (In the first year of trying out the new format, students had the option of signing up for the studio model course or the traditional lecture course; by 2006, all sections of the course had shifted to the studio model.) The changes made to shift the course to a studio model included the following:

The course was divided into sections of ~75 students each; each section met for 5 h[ours] total each week with one professor and several teaching assistants. During class periods, students were given minilectures interspersed with questions answered using a personal response system followed by peer instruction, hands-on experiments, and group problem-solving sessions, often at the board. Students were broken into groups of not more than 3 and each student group had access to a computer used to enhance demonstrations and collect their experimental data.<sup>12</sup>

They shifted the nature of the homework slightly as well, moving to two assignments per week from MasteringPhysics and one written homework assignment (more frequent assessments, in other words).

The shift to the studio model helped the authors achieve both of the consequences they desired. The total number of

problems copied fell from around 11 percent in the fall of 2003 to around 3 percent in the fall of 2006. The fall of 2006, the year of the lowest cheating rate seen in the study, had also included a technical shift the authors made to the MasteringPhysics problems, which made it more difficult for students to copy their answers. But even in 2004 and 2005, when they were still using the previous types of questions, the copy rate dropped by nearly half. The number of students who earned D's or F's in the course dropped by an equally dramatic rate from the fall of 2003 to the spring of 2006. Out of 428 students who began the course in the fall of 2003, 38 of them ultimately failed; out of 619 students who took the studio model courses in the spring of 2006, only 10 of them failed. In their laconic and cautious scientific language, the authors state that “[w]e suspect that reduction in homework copying is responsible for a significant part of this reduction in failure rate.”<sup>13</sup> In this quote we arrive once again at the happy juncture that animates Part II of this book, in which we see that the strategies which reduce cheating are precisely the strategies that increase learning. Reducing the amount of students who are copying their homework increases the number of students who are passing the course. I would argue that improved metacognition stands at the heart of this juncture, even though the authors of the study do not specifically address that concept. It seems clear enough to me that when students are completing the homework assignments in class, under the guidance of their professors, they are—in addition to gaining more practice at the skills they will need on the exams—receiving a much clearer picture of their ability to *do physics*. That more accurate picture should help them direct their studying and practice more effectively, and make better decisions about how much time and effort they need to commit to the course.

In the second decade of the twenty-first century, a new set of phrases has emerged for describing the phenomenon of profes-

sors restructuring their classes in the way described by these physics teachers, from traditional lecture models to ones in which students are actively engaged in problem solving or other course-related work: the “flipped” or “inverted” classroom. The basic idea captured by these phrases (and others like them) is that instead of students sitting passively for lectures on the information or concepts they need to know and then going home to try and apply those concepts or information to answer questions or solve problems, the instructor flips or inverts these elements of the course: students get the basic information they need prior to coming to class and then spend class time working on problems or answering questions with the instructor on hand to guide and supervise. In order to get that information to students beforehand, faculty can videotape their lectures, post presentations to a course website, or provide necessary readings. The students study that material in advance of class, and come to class prepared to work instead of simply to listen. This represents an inversion or flipping of the typical lecture-recitation model of science, technology, engineering, and mathematics courses (usually referred to with the acronym STEM), in which instructors might lecture on key concepts or even model problem-solving techniques in class and then expect students to go home and solve homework problems on their own.<sup>14</sup> That is not exactly what was happening in those MIT physics courses in the fall of 2003, since the instructors still presented key concepts to the students during class time through “minilectures,” as they describe them. In a truly flipped classroom, those minilectures would be presented to the students prior to their coming to class, either in videotaped format or through written materials. When these physics instructors shifted to a studio model, though, and had students working on practice problems in class, they were employing at least one of the main strategies of the flipped classroom—having students spend time in class practic-

ing their problem-solving skills and receiving directed feedback from the instructor. And it's that feature of the flipped classroom, I would argue—low-stakes classroom activities with direct feedback from the instructor—that helps students improve their metacognitive skills in the course.

As has been suggested by Derek Bruff, Director of the Center for Teaching Excellence at Vanderbilt University, none of this may seem very revolutionary to humanities or qualitatively oriented social science faculty. In these fields, professors typically assign reading in advance of the day's lecture or discussion and expect students to come prepared to engage in discussions or other interactive activities.<sup>15</sup> But speaking as a humanities professor and drawing upon many conversations I have had with my colleagues on and off campus, as well as observations I have done in their classrooms, I can point out one major problem with assuming that my co-disciplinary colleagues have nothing to learn from the flipped classroom and the improved metacognition it can bring to our students—namely, that in my discipline and many others, students often do not do the reading. During the years I directed the Honors Program at my college, I had an office right next to a lounge area where students congregated and socialized between classes. I was astounded at how many times I heard our best students on campus discussing reading assignments they had skimmed, skipped, or forgotten about. It scared me to think about how many non-Honors students were following their lead. But of course we don't give students much reason to do the reading in advance of class if we step to the front of the room on most days and deliver lectures about the readings we have assigned. In that case, I would have complete sympathy with students who don't bother to do the readings in advance. Why do so, when the professor will simply explain to you in class what you need to know?

The research on the flipped classroom tells us that what makes it such an effective teaching strategy is the fact that students get the opportunity to *practice* and *receive immediate feedback* on the skills that they will need for the course assessments. As Susan Ambrose and her colleagues point out in *How Learning Works*, “[g]enerally speaking, both professors and students underestimate the need for practice” in the acquisition of new intellectual or creative skills. As faculty, we often assume that modeling the techniques for problem solving on the board or having students complete a problem or two in class will provide the students with the skills they need to succeed on their assessments. Ambrose and her colleagues note that faculty typically “move from concept to concept or skill to skill rather quickly, giving students no more than a single opportunity to practice each.”<sup>16</sup> But the research on how students develop mastery of a skill tells us that students need multiple opportunities both to practice any skill they are trying to learn, and they need to receive targeted feedback in order to help them improve those skills from one practice session to the next. The simplest analogy, used by Ambrose and her colleagues, is to learning a musical instrument. Just as novice musicians must spend many hours practicing basic skills like playing scales or mastering difficult passages—and frequently do so in the presence of their teacher, receiving immediate and individualized feedback—so must our students spend many hours practicing the basic intellectual skills of our discipline. The flipped classroom offers precisely this opportunity: instead of sending students away to struggle in their dorm rooms on problems that you have modeled for them once in class, in the absence of any direct guidance or feedback from the instructor, you are giving them those multiple opportunities to practice problem solving (or whatever skill you are teaching) in your presence, and with your direct (one on one) or indirect (whole

class) guidance. That practice time both helps them improve on the skill and gives them a clearer metacognitive picture of their learning.

The language of problem solving might seem more appropriate to STEM disciplines than to humanities or other qualitative courses, but that absolutely does not have to be the case. Whenever I teach a course that involves writing, one of my main objectives is always to help students learn to compose effective introductions to whatever genre of essay they are writing. In my early years of teaching, I would have students read several model essays, and then in class we would look at the first paragraphs of all of those essays, talk about which ones seemed most effective, and categorize them into different strategy types. Then I would let them know that they needed to follow one of those exemplary models and write a great introduction to their next paper, and I sent them away to do so on their own. Gradually, however, I realized that the students' introductions never quite lived up to my expectations. I was not giving them enough help in accomplishing this task. So a few years into my teaching career I started to teach this skill differently. When the students had an assignment due, I still asked them to read the introductions to several different essays, and we still analyzed them (albeit more briefly) and categorized them into different strategy types. But then I asked them to take out a blank piece of paper and write an introduction to a paper with an approaching due date, again following one of the exemplary models we had just read. While they wrote, I circulated around the classroom, giving individual pointers to students. When they had finished, I asked them to turn the paper over and write another introduction, following another one of the models we had studied. Again I walked among them, working with individual students. This single practice session in the classroom probably still does not give

them enough focused practice on this specific skill, but it definitely made a positive impact in the quality of their introductions, and it inspired me to adopt similar studio-style class sessions for teaching skills like incorporating quotations into a sentence and writing concluding paragraphs.

Flipping the classroom helps learning, but it also has tremendous potential to reduce cheating in your courses as well. That happens primarily because of the way in which the flipped classroom improves students' metacognitive awareness of their learning in the course. The benefits extend both to students who are grossly overconfident in their learning and to students who are underconfident, with the kind of low self-efficacy I describe in Chapter 2. First, as we saw in the case of the MIT physics students, cheating students were overconfident and poor judges of how much time and preparation they needed to complete the online homework problems. Most of them waited until the hours immediately prior to the deadline, and cheating levels increased as that witching hour approached. No doubt we should attribute some of that cheating to students who were lazy, had poor time management skills, were inveterate procrastinators, or were planning to cheat all along and just waited until the last minute to do it. But if that accounted for much or even most of the cheating taking place in those final hours, then the change to the course format would not have reduced the cheating in the online assessments. So we can surmise that poor metacognition, especially in the form of overconfidence in their ability to complete the problems within a given time period, accounted for a substantive amount of that homework copying, and that increased time practicing homework problems in class accounted for a substantive reduction in that cheating. Students who had the opportunity to work on the problems in class gained an immediate understanding of how difficult they were, and of how

much time they took to complete. A student who had not had this opportunity would get the first set of problems without that knowledge, and hence could badly miscalculate.

But in the second case, for students who are plagued with low self-efficacy, classroom practice would increase their confidence in their ability to do the homework problems, especially if they are receiving immediate and ongoing feedback from the instructor or teaching assistants in those sessions. As a reminder, we can break down the concept of student self-efficacy into two parts: outcome expectancies, which, as Susan Ambrose and her colleagues explain, “reflect the belief that specific actions will bring about a desired outcome”;<sup>17</sup> and efficacy expectancies, which “represent the belief that one is *capable* of identifying, organizing, initiating, and executing a course of action that will bring about a desired outcome.”<sup>18</sup> Put together, these two expectancies mean that, in order to feel sufficiently motivated to undertake a difficult challenge, “a student must not only believe that doing the assigned work can earn a passing grade, she must also believe that she is capable of doing the work necessary to earn a passing grade.”<sup>19</sup> The first of these beliefs relates to students’ perception of the fairness of the evaluation criteria of the course. We can help students with this perception in the ways that Stephen Chew identified in his description of his clicker activities—by explaining to students that the low-stakes assessments undertaken in class are the same kinds of assessments that they will encounter in their graded work, and by evaluating that work fairly and transparently.

The second belief presents us with a more complex challenge: how do we convince students that they are capable of doing what we ask of them? In their list of recommendations to help faculty members meet this challenge, Ambrose and her colleagues provide the following key suggestion: to “provide early success opportunities.”

Expectations for future performance are influenced by past experiences. Hence, early success can build a sense of efficacy. This strategy is incredibly important in courses that are known as “gateway” or “high-risk” course[s] or for students who come into your course with anxiety for whatever reason. For example, you might incorporate early, shorter assignments that account for a small percentage of the final grade but provide a sense of competence and confidence before you assign a larger project.<sup>20</sup>

This is precisely what problem-solving sessions in the remodeled physics courses accomplished, and what low-stakes assessments in any course will help accomplish as well. Giving students confidence in their ability to successfully meet the challenges of the course, as well as a better awareness of the time and effort they need to expend in order to do so, should go a long way toward improving metacognition in your students—and an equally long way in reducing the kind of cheating through desperation that comes from hopeless or hopelessly lost students.

If you work with students on a regular basis in the classroom, you will gain a clearer and more accurate picture of their knowledge and skills in the course material before the assessment is due. Suppose you give a first assignment of the semester, and you have not had any opportunity to see the students’ work or assess their abilities prior to receiving the assignment. Unless you spot some obvious plagiarism, you have no way of knowing whether the abilities demonstrated by the students on the assignment match what they are capable of. I know that in my discipline we frequently rely on our familiarity with the particular writing style and skill level of each student in order to help us spot possible cheating. Students might suddenly turn in a far more sophisticated essay than they have shown themselves capable of producing, or even far more sophisticated sentences or phrases than they have employed previously, and these tip us off

to the possibility of plagiarism. But this strategy only becomes effective later in the semester, when we become familiar with students' capabilities. Students could easily get around this informal plagiarism detection method by plagiarizing or cheating on their assignments right from the beginning of the course. As long as they kept a low profile in class—so as not to reveal their true abilities in discussion or lecture questions—they could plagiarize or even purchase essays for the course throughout the entire semester. This will *not* work, however, if you have spent time individually supervising and guiding students from the first through the very last class session.

An even better guarantee to ensure that students are doing their own work on your out-of-class assignment is to require them to either begin or complete part of it *during class time*. So let's say I asked my students to turn in those two introductory paragraphs they wrote in class for a writing exercise grade. I would give them a quick glance and ask students to revise one of them and use it as the actual opening of the upcoming paper assignment—and to turn in the original version they wrote in class with the final paper, so I can see how they revised and improved it. I can absolutely guarantee, in that case, that at least one of the paragraphs in that paper will not be plagiarized. But I would also know that, in addition to the introductory paragraph, the main idea for the paper—which they need to have in their heads in order to write their introduction—has come from them as well. (This will only work if I have told them in advance that they will be settling on their paper topic in class that day, since I would not want them to have to improvise a paper topic without time to think about it.) Giving students time to work on pieces of your assignment in class, or asking them to develop the initial or main idea of an assignment, should be compatible with just about any kind of assignment or material. If you are helping

students learn how to write a research paper in your discipline, spend thirty minutes teaching them what they need to write a literature review, and then have them bring in hard copies of three sources and begin writing their literature review in class. If students are working on a group presentation in pairs, spend thirty minutes modeling what an effective presentation slide looks like, and then have them work with their partner to create three slides in class. Ideally, you would hold them accountable for this in-class work in some way: have them turn in the material they wrote in class with their final paper, or have them send you the slides they created. A quick glance at them, when you are grading the final product, will help you identify discrepancies substantive enough to indicate potential cheating.

Many professors might protest that they have only a few hours a week in which to present their course material. If students work on their projects during class time, will you have to gut essential course content? Maybe—but remember that while you may have lots of material to cover in your class, just because you are covering it doesn't mean that students are learning it. Any good lecturer knows that the material will be better absorbed if reduced to a few main ideas that are repeated over and over again. So, likewise, a good teacher should know that simply battering students with as much information as possible over the course of a semester will produce nothing but frustration for both teacher and student. It can be difficult indeed to let go of material that you feel is absolutely essential for a student in your course to have—I understand completely and feel your pain. But you will be doing your students a much greater service by reducing the amount of material that you are covering and actually ensuring that students are learning it, rather than making sure that you are ticking off every checkpoint on your ideal syllabus. Learning comes from practice, and you have to help and teach

your students to practice just as you help and teach them the basic knowledge and skills of your discipline.

Before we conclude this chapter, I want to introduce you to our final guide, who convinced me that the ways in which we communicate with our students can also help them develop an appropriately gauged sense of self-efficacy. Joe Ben Hoyle is an associate professor of accounting at the University of Richmond who has won multiple accolades for his teaching over the course of a career that has lasted more than forty years, including an invitation by the students at the University of Richmond to deliver the school's inaugural "Last Lecture" in the spring of 2009. I first met Joe when he sent me a copy of his self-published book on teaching, and a link to his blog. Although I have an innate—and perhaps unwarranted—suspicion of self-published manuscripts sent to me in the mail, something about this one caught my attention, and I sat down and read it cover to cover. The ways in which Joe Ben Hoyle described helping his students learn were striking and original, and led me to profile Hoyle's reflections on teaching in a column for the *Chronicle of Higher Education*.<sup>21</sup> And although Hoyle has sharp insights into the job of teaching in a wide variety of areas, I believe he offers a truly inspiring model of communicating with his students to foster their self-efficacy and inspire them to learn.<sup>22</sup>

Indeed, what first really grabbed my attention, and continues to strike me as both an excellent reflection of Hoyle's teaching style and a wonderful teaching innovation, is presented at the outset of that book. Hoyle explains that, at the end of each semester, he sends an email to all of the students in his course who received an A. That email contains his congratulations for their effort and success in the course, and then asks a favor of the students: Hoyle asks them to describe the study strategies they used that allowed them to achieve the grade they earned. Although

he uses their responses to help him determine whether he should make any changes to the course—if students are earning A's by all-night cramming, for example, he knows he wants to make changes to the exams—what distinguishes Hoyle's method as an model for building self-efficacy in his students comes next.

All of the [student responses] are . . . cut and pasted into a single document which is distributed to the next class of students on the first day of the following semester. It is one handout that they read with interest and care; they are always inclined to believe the words of their fellow students. These short essays help remove any rumors or mystery associated with my class. From the beginning, I want every student to understand exactly what it takes to earn an excellent grade. In most team sports, the players who are seniors are expected to teach the freshmen what it means to be part of the team. That is what I am seeking: One group of students instructs the next on how to achieve excellence.<sup>23</sup>

I will note without comment that in fifteen years of teaching I have never communicated a congratulations to students who did well in the course or on the final exam, although I have often intended to. That Hoyle makes this a regular part of his teaching practice speaks volumes about his dedication both to his profession and to his students. But, more important, it reflects an awareness on his part that students need both tools and encouragement to succeed. We all work to give them the tools they need to succeed—we hope—in the ways in which we teach our courses, but how many of us think to give them encouragement in the way that this note does? The special genius of this note is not that it says “You can do it!” It says, instead, “You can do it—and I have evidence to show you that. Others just like you have done it before.”

If you scan through Hoyle's writing about teaching, and the articles that have been written about his teaching, I would argue

that you will find three essential threads that characterize his communication with his students, and that I believe can help create the kind of self-efficacy we want in our students. The first of these sentiments relates as much to fostering intrinsic motivation as it does to communication, but it strikes me as an essential piece of the package that we find in Joe Ben Hoyle's work; the second and third thread twine together—and must twine together—to foster the self-efficacy our students need.

### I Have Something Wonderful to Teach You

This sentiment shines through almost every piece of writing Hoyle shares with his students—and, I would imagine, his presence in the classroom as well. I haven't studied formally anything related to mathematics or the business world for a good twenty years now, but reading through Hoyle's descriptions of his discipline to his students makes me want to audit his Intermediate Accounting II class, the course I will focus on for the remainder of the chapter. Remember that, as we saw in Chapter 4, students are both less likely to cheat and more likely to learn when they see the course material as intrinsically fascinating, useful, or beautiful. Hoyle works hard and continually to help his students see his course in this way. In the most recent iteration of the course, for example, he began the process of sharing his genuine love for his course material, and helping his students learn to love it as well, several months before the semester started. In April of 2012, after the students had registered for their fall courses, Hoyle sent an email to all of the students on the roster in the Fall 2012 section of Intermediate Accounting II. His email spends several paragraphs telling the students about what the course will entail, and offering advice about how to succeed by doing some simple review work over the summer. But it moves beyond those simple practical messages. In this

course, he explains to them, “[w]e cover some of the most interesting topics in all of accounting.” That brief phrase prepares the way for a later section of the email, a final piece of advice to the students that encourages them to think about the larger world of business in which the course material exists, both because it will help them in the course and because it is an inherently fascinating topic of study. Over the summer, he exhorts them,

keep up with the world of business. School should not be separate from the real world. (Did you know that Wal-Mart disclosed this morning that it had legal risks because of possible bribery in Mexico—what does that mean to the company?) . . . The study of the business world is like the study of a gigantic game with many interlocking pieces. The people who are successful in business understand the game and play it very well. The more you learn about business the more you realize that there is so much more to learn. It is not just a way to get a first job; being in business should be an adventure. And, the more you learn in college, the better that adventure will be.

The enthusiasm for the world of business and accounting that shines through this paragraph infects everything that Hoyle writes to his students. I love the parenthetical aside about Wal-mart: Here’s something in the daily news that relates to our subject matter—let’s think about what it means! Business as a game, as an adventure, as a context that connects their studies with the world around them—all of these words and phrases and ideas help convince students that, in Hoyle’s course, they are participating in something worth learning.

That attitude continues into the semester when Hoyle actually meets the students for the first time and presents his syllabus to them. I can hardly imagine a course that sounds more like it would induce thoughts of mechanical learning than Intermediate Accounting II. Hoyle makes it very clear to them on his

syllabus that such will not be the case in his course. While naturally they will be doing computations and other seemingly mechanical activities, the real focus of the course lies with thinking about and understanding the practice of accounting. As his syllabus puts it:

Sherlock Holmes would have been a wonderful accountant because he constantly pounded himself with the question “What happened here and why?” 2 plus 2 is 4 is mechanical knowledge that can be learned with little or no thought. Why accounting works in a particular fashion is not mechanical and takes serious contemplation to truly understand. People who don’t do well in Intermediate Accountings tend to be obsessed with the mechanics rather than with the “why.”

Hoyle’s course, by contrast, will always keep that larger picture in view, encouraging students to think about the meanings behind the numbers. They will engage in “serious contemplation.” And, indeed, he explains to them that the main purpose of the course is not learning to crunch numbers, or even really just to understand accounting more thoroughly. The main purpose of this course, like every course he teaches, is much more fundamental:

I feel that you will hold a competitive advantage in life if you obtain a basic understanding of financial accounting. More importantly, I believe you will be more likely to make something of yourself if you learn to think . . . In this class, we use financial accounting simply as a means for stimulating your ability to think and reason.

Maintaining the focus of the students on the larger picture of the business world, and on the fundamental thinking skills that will help them live richer lives, no doubt helps maintain their

interest in the subject matter when they find themselves slog-  
ging through the more mechanical tasks of accounting—or  
of any discipline, for that matter. I tend to assume that the rela-  
tionship of literature to larger questions of meaning and value  
should be apparent in all aspects of my courses, but I suspect  
students might disagree with that when I am holding their noses  
to a poem—or tying it to a chair, in the words of the poet Billy  
Collins—and asking them to identify the various forms of figura-  
tive language they find in there. Hoyle continually asks his stu-  
dents to step back from the smaller mechanical tasks and take a  
look at the complex and fascinating whole—to think about ac-  
counting, about business, and about thinking itself. I love this  
stuff, his messages to the students imply—and you will too!

### I Am Going to Challenge You

In addition to the five times he has won the University of Rich-  
mond’s Distinguished Educator Award, in the spring of 2005  
the senior business majors at the university voted him the “Most  
Feared Professor” on campus. As a result of this interesting dis-  
tinction, the university’s alumni magazine invited him to con-  
tribute an essay on his teaching philosophy. He concludes that  
essay with a remark that captures well his convictions about chal-  
lenging students: “Our students can do amazing things, but if  
we don’t challenge them fully, they will never realize what mar-  
velous talents they truly possess.”<sup>24</sup> In the introductory email to  
his students in the spring, he addresses right away the impres-  
sion students probably already have that his course will prove  
“fully” challenging. Intermediate Accounting II, he says to  
them, “is not a course to be taken lightly.” And that same lan-  
guage continues on the syllabus when students arrive, where  
Hoyle explains to them that good students will achieve much in

his course, but “achievement does not come without sacrifice.” He then explains what that sacrifice will look like, and why he asks it of them:

Proper preparation is the key to achievement whether you are trying to get a team ready to win the World Series or the Super Bowl or earn an A+ in this course. There is just a right way and a wrong way to do things. I expect you to arrive at class every day having thought about the material and being ready to explore it with me. Don’t expect to come to class and just take notes as I pass out pearls of wisdom. That’s not learning—that’s memorization. I’ll ask questions and I’ll expect answers, answers based on your preparation and your ability to think.

This explanation is essential to the structure of the course, which Hoyle teaches in a completely Socratic fashion. He poses at least one question to every student in class every day. Students have to undertake the kind of preparation he describes here in order both for his teaching style to work, and for them to receive the benefits of a Socratic teaching style—engaging with difficult questions, thinking for oneself, challenging and being challenged by the other thinkers in the room. When so many college courses still rely primarily on lectures or discussions in which participation is optional, you can imagine how his teaching style represents a full challenge to today’s college student.

We might expect that a teacher who conducts his class by discussion, and who values it so highly, would include some kind of participation grade in the course, as many of us do. We would be wrong. “I don’t see any reason at all to reward something that’s simply expected,” Hoyle said in an interview about his teaching with *BusinessWeek* magazine. “I don’t reward breathing. I don’t reward participation.” We might also expect that participatory classes like this one allow for plenty of opportunity for the teacher to dish out praise to student comments, reinforc-

ing the “good job” phenomenon I described at the outset of this chapter. But praise comes only to those who earn it. “I say, ‘Good job!’” Hoyle explains in his article in the alumni magazine, “when a student gives me a thoughtful, well-conceived answer.” But, unlike me on the softball field, he does not simply hand out ‘Good job’ praise for any contribution: “I say, ‘Listen, you can do better than that!’ when a student gives me a bad answer.” And when students consistently come to class unprepared, or do not give the kinds of answers he expects from them, they do not get a break either, as he explains in his teaching tips book: “If any students consistently fail to prepare, I call them in and we discuss the advantages of being able to provide and support answers.”<sup>25</sup> Notice the way in which, in the case of students who are not doing the preparatory work they need in order to succeed in class, Hoyle avoids browbeating them, and instead focuses the message on the importance of students continuing to challenge themselves: *you can do better than that*, rather than *you did poorly*; and *here’s why preparation helps you in this course*. And notice as well that, for students who consistently underperform, Hoyle calls them into his office and talks to them about how to succeed in the course, rather than simply giving up on them.

Hoyle’s confidence in his students’ abilities leads us to the second half of the sentence that began this section. *I am going to challenge you*, that sentence began; it finishes like this:

### You Are Capable of Meeting that Challenge

Joe Ben Hoyle may hammer away at this point more than any other in his written and face-to-face communications with students. It appears in every document he sent to me in one form or another. “I honestly want Intermediate Accounting II to be the best course you have ever taken,” he tells them in his pre-course email. “If I do my job really well and if you do your job

really well, we can achieve that goal . . . with a good effort from both of us, you are more than capable of handling that challenge.” His eight-page syllabus concludes with the following exhortation, in all capital letters: “BELIEVE IN YOURSELF—YOU REALLY CAN DO THIS STUFF!!!” In the document that he gives to his new students about how to achieve an A in class, compiled from students who have done so in previous semesters, his introduction to that advice includes the following sentences: “I want to help you ratchet up your game. To me, that is as important as learning accounting. I really do want you to learn how to be successful when faced with a genuine challenge.” Follow the advice of these wise students, Hoyle continues, and “I guarantee you what they say can form a road map for your getting an A.”

Do we really need to offer this kind of cheerleading to our students? If you are not going to challenge them, you probably do not. If you are going to challenge them, you not only need to offer them exhortations like these, but you need to back up the exhortations with concrete advice about how they can meet the challenges you set for them. Hoyle does not rely exclusively on the wisdom of past students to help his current students. The entire second half of Hoyle’s eight-page syllabus provides advice for students on how to do well in the course. It contains the usual material you might find on any syllabus about putting in the time on the reading and homework and so on. But you will also find sharp and interesting comments like these:

A lot of students like to gather in the Atrium 30–45 minutes before my classes just to sit and discuss the handouts. I think that is wonderful. I think that really helps. They always walk into class ready to go. If I could, I would require that. Absolutely!!! However, do me a personal favor. If there are people in the atrium from our class, include everyone in the conversation. Some people are quiet and don’t want to butt in. I want everyone in the

class to become part of the group. Don't be snooty. You make the move to be friendly. Look around—is there anyone there that you can ask to “come on over and help us talk about this accounting nonsense.”

What I think deserves particular notice in this paragraph—aside from the excellent advice for students to engage in these informal study sessions before class—is the fact that Hoyle encourages them to engage with each other in an ethical and generous way. You see this ethic of generosity in everything he writes to his students, or writes about his teaching. We're all in this together, he seems to say—so let's all help each other succeed.

And when Hoyle implies to the students that “we” are all in this together, he casts a wide and generous net. Consider an email that Hoyle sends—brace yourself—to the *parents* of the students who are enrolled in his class. At the beginning of the semester, Hoyle asks the students in his course to give him the email addresses of their parents, if—and only if—they would like to receive occasional updates from him on the course that their son or daughter is taking. (The parents can choose to opt out after the first email.) As Hoyle explains in the email, he began doing this after he sent his own children to college and was distressed at how little he knew about what was happening in their daily educational lives. And while Hoyle's message does provide the parents with information about the course, the bulk of it actually focuses on providing tips for parents on how they can help their son or daughter succeed in the course. “When your child is at home,” he writes, “talk with them about your job or your investments or a business story that you read in the paper or just anything having to do with business.” So the parents get a taste of the same enthusiasm for business and accounting that Hoyle shares with his students. But they also get some friendly advice about parenting any student through a difficult learning experi-

ence: “Never fail to tell your child that you are proud of him/her for doing the work; tell your child that you know there is a lot required but it is only for 3 months or so and that the work will really make them better. One of the hardest jobs that I have is convincing students that the hours of work before each class really are worth the effort—and you can help.” Anyone who has parented a child through multiple levels of education—and I have five of them, so I speak from long and sometimes painful experience—knows how badly they need to hear that message from us sometimes. I wonder whether I ever would have thought to continue speaking it to my soon-to-be-college-aged children without this reflection from Joe Hoyle.

In *How Learning Works*, Susan Ambrose and her colleagues point out that one of the best means we can use to help improve students’ sense of self-efficacy is to provide the kind of strategic advice that Hoyle gives to his students (and their parents!). Especially in challenging classes, they explain, “[s]tudents may not be able to identify ways in which they should appropriately change their study behaviors following failure . . . it is important to discuss effective study strategies to give them alternatives to the behaviors that resulted in poor performance.”<sup>26</sup> When we communicate explicitly with our students about the strategies that will help them learn in our courses, we demystify what students might see as an impossible or baffling challenge. We have all heard students who say they are “bad at math,” or “just can’t write”; those beliefs demotivate students by implying that, no matter how hard they work or study, they will never succeed. Providing them with concrete advice for how to succeed in a course or a discipline—from how to read your notes to how to meet before class—helps them see that learning depends on their effort instead of some innate learning skill that they were blessed with (or not blessed with) at birth. Remember that the MIT physicists also noted that the pathway to success in their

course was not some inborn scientific intelligence, but doing the homework. When we communicate these notions clearly to our students, we are giving them the tools they need to succeed—and in doing so, are removing one more reason they might have to cheat.

