Chapter 2

Online Learning: Does It Work?

IS THE TREND toward more technology in teaching is a *good* trend? Does technology degrade or improve learning—or have no real effect at all? In fairness, we should acknowledge that for most of the history of formal higher education, we haven't asked for empirical evidence of the effectiveness of traditional teaching techniques. In that sense, we're holding technologically aided teaching to a higher standard when we ask whether it really does produce the desired results of intellectual mastery, self-awareness, self-management abilities, critical-thinking ability, and all the other goals of a college education.

Even though we have only recently begun to systematically assess traditional college teaching, it makes sense to ask what students get out of fully online and technologically enhanced coursework. This is particularly true given an odd quirk of how faculty in higher education tend to view the effectiveness of online teaching. According to Jeff Seaman, one of the lead researchers in charge of generating the most comprehensive national analyses of online education, the proportion of faculty who believe in the value and legitimacy of online education is relatively low—in the realm of 30 percent—and holding steady, even as the proportion of faculty actively involved in online education exceeds that number and is rising.[1] This means that many of the very same individuals who deliver online learning believe that it's an inferior form of education.

Clearly, there is deep-seated ambivalence among faculty about online teaching and learning, and for faculty to be maximally effective online, this ambivalence has to be addressed. This chapter will weigh the evidence that online teaching is effective, first taking into account how it differs from traditional teaching, as well as some underlying similarities. It will then take on some of the concerns about the integrity of online learning, in particular the risks of cheating and of superficial engagement with course material.

In some fundamental ways, good teaching is the same in any modality. Here are some of the common hallmarks of quality shared by online and traditional teaching:

An Emphasis on Student Effort as the Basis for Success

As Chickering and Ehrmann put it, "time plus energy equals learning."[2] This formula is a bit simplistic, but it highlights the value that academics traditionally place on working hard to achieve success. Unfortunately, there is a growing disconnect between this traditional academic value and how contemporary college students approach learning. Time-use studies indicate that the average number of hours spent by college students on schoolwork has been in steady decline for several decades now and is currently at a record low of twenty-seven hours per week.[3] The widely discussed 2011 book *Academically Adrift* further argued that of the time students do invest, disturbingly little is spent on intellectually demanding work such as writing and critical reading.[4]

As the discussion around student investment continues to develop, there may be a national trend toward deliberately eliciting more effort, and better-quality effort, from college students. Online learning is well situated to take advantage of this trend. Chickering and Ehrmann point out that online learning can encourage increased study time, given the 24/7 access to learning activities.[5] Online activities can also provide more opportunities for effortful practice than are feasible within the confines of face-to-face class meetings, as we touched on in the Preface and will return to in Chapter 4.

Making Students Feel Connected

Two of Chickering and Gamson's principles—encouraging student-faculty contact and encouraging cooperation—both tie into this theme of interpersonal connectedness. Many other writers on teaching and learning have noted the power of social connections in traditional face-to-face learning environments, suggesting that instructors promote connectedness through icebreaker activities, individual office hour meetings, and group work. Online course designers also need to consider the social side of the course. As online teaching expert Judith Boettcher reminds us, "we learn as social beings in a social context," and thus students are acutely sensitive to the presence (or absence) of their instructor and classmates in the online environment.[6] Looking back on the debate over MOOCs, this has been one of the sharpest criticisms of online mega-courses—the impersonal nature of a learning environment where thousands of students may be left to learn mainly on their own.

Frequent, Rapid, Informative Feedback

This traditional "best practice" is widely cited as one of the things instructors should spend as much time and thought on as possible.[7] Teaching experts Eric Mazur and Carl Wieman have been passionate advocates of providing a more dynamic, feedback-rich experience in traditional lecture classes.[8] Similarly, rapid feedback is a key feature of the best online learning experiences.[9] There are myriad ways to accomplish this online, including peer feedback, auto-graded quizzes, and branching lessons that present varying content based on student input.

Taking Students' Current Knowledge and Understanding into Account

This point is emphasized the most among teaching experts who favor cognitively based theories of learning. John Bransford, author of the classic guide *How People Learn: Brain, Mind, Experience, and School*,

foregrounds the role of preexisting knowledge as one of the most important factors teachers should keep in mind when designing learning activities; he advises that the best outcomes happen when teachers first determine what students know, then set about building on that existing foundation.[10] Similarly, researcher Susan Ambrose lists prior knowledge as a major guiding principle for teaching and learning, pointing out that prior knowledge can actively conflict with and thus delay new learning.[11] Teaching lower-division psychology provides a perfect example of this problem. Although they may be unaware of the scientific discipline of psychology, students have been inquiring about human behavior their whole lives, and come to the subject with well-developed—although often incorrect—ideas about why people do what they do. Teaching scientific psychology, therefore, isn't just a matter of feeding students new information, but rather, altering their existing knowledge about human behavior and fitting new ideas into that existing structure.

In the online context, instructors can take prior experience and knowledge into account using techniques for customizing course content or presentation. One method is adaptive testing, a way of presenting test questions whereby the system gradually eliminates items from the test set based on what the student has already correctly answered. For example, if a student has already correctly identified "time on task" as one of Chickering and Gamson's seven principles, the balance of questions will shift to other principles, until all have been correctly answered. This approach is one way in which online instructors can implement the broader "best practice" principle of identifying what learners know, then customizing the course based on that knowledge.[12]

In sum, there is a lot of overlap between the principles of good online teaching and good face-to-face teaching, a position also endorsed by the American Distance Education Consortium (www.adec.edu). Table 2.1 shows this overlap as it appears in "best practices" lists drawn from traditionally oriented and online-oriented teaching resources.

These example "best practices" lists diverge on a few points, but there are several notable recurring themes, which in turn echo the

Table 2.1

Chart of principles for optimal college teaching excerpted from four "best practices" frameworks. Note the high degree of overlap among the different frameworks with respect to the six general principles shown in the chart: peer-to-peer interaction, active student engagement in learning, emphasis on practice and student effort, personalization to the individual student, variety, and emphasis on higher thought processes, i.e., going beyond mere memorization.

	TRADITIONAL FACE-TO-FACE TEACHING		SPECIFICALLY ONLINE TEACHING	
	CHICKERING AND GAMSON	AMBROSE	BOETTCHER	AMERICAN DISTANCE EDUCATION CONSORTIUM
Peer–to-Peer Interaction	Good practice encourages cooperation among students		Create a supportive online course community	Allows group collaboration and cooperative learning
Active Student Engagement in Learning	Good practice encourages active learning	To become self-directed learners, students must learn to monitor and adjust their approaches to learning		Promotes active learning Encourages active participation, knowledge construction
Emphasis on Practice and Student Effort	Good practice emphasizes time on task Good practice communicates high expectations	Goal-directed practice coupled with targeted feedback enhances the quality of students' learning	Share a set of very clear expectations for your students and for yourself as to (1) how you will communicate and (2) how much time students should be working on the course each week	
Personalization to the Individual Student		Students' prior knowledge can help or hinder learning Students' current level of development interacts with the social, emotional, and intellectual climate of the course to impact learning		Is learner-centered Fosters meaning-making, discourse

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Variety	Good practice respects diverse talents and ways of learning		Use a variety of large group, small group, and individual work experiences Use both synchronous and asynchronous activities	Provides multiple levels of interaction
Emphasis on Higher Thought Processes		To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned	Prepare discussion posts that invite questions, discussions, reflections, and responses	Based on higher-level thinking skills—analysis, synthesis, and evaluation Focuses on real world, problem solving

Column 1: *Seven Principles for Good Practice in Undergraduate Education*, by Arthur Chickering and Zelda Gamson

Column 2: *How Learning Works: Seven Research-Based Principles for Smart Teaching*, by Susan Ambrose

Column 3: *A Quick Guide for New Online Faculty*, by J. V. Boettcher (revised 2011 and available at http://www.designingforlearning.info/services/writing/ecoach/tenbest.html)

Column 4: Characteristics of quality web-based teaching and learning from the American Distance Education Consortium, http://www.adec.edu/admin/papers/distance-teaching_principles.html.

points listed earlier in the chapter. They emphasize the role of students as active agents in their own learning and the importance of social interaction between students and between student and instructor. They also suggest that course designs enable good communication between students and instructor, and allow for variety and personalization. Lastly, they remind us to focus on higher-order thinking and skill building, not just assimilation of facts. What these lists tell us is that, broadly speaking, good teaching is good teaching, regardless of technology.

For another perspective on principles of good teaching, consider the techniques used by computer-game designers, who, after all, make their living creating irresistibly motivating virtual experiences. Education researcher Michele Dickey draws intriguing parallels be-

tween the qualities of engaging learning environments and "addicting" computer games, pointing out just how much these two seemingly disparate realms overlap in terms of their essential features.[13] In her analysis, games and engaged learning both offer focused goals, in which standards for performance are clear, and you get lots of rapid feedback about how you're doing in relation to those goals. Tasks and activities are challenging, but—crucially—there is protection from initial failure, so that you get lots of chances to meet those challenges. You operate in an atmosphere of social interactivity, which offers you solidarity with others and affirmation of your successes. And lastly, you have autonomy and a good deal of free choice over what you do and how you do it.

Later in this book (Chapter 8), we will return to the connection between games and learning and consider how to maximize motivation using "gamification" principles. But for now, the take-away message is that there is significant potential for online learning to borrow some of the power that drives games to be so compelling. Encouragingly, this power can be realized through a fairly accessible set of general principles enumerated by Dickey. Note that the qualities Dickey cites aren't superficial features we might associate with computer games, such as music, cute characters, or colorful animation. Rather, they involve deeper aspects of how the game environment works, such as feedback, collaboration, and user autonomy.

The fact that game design principles flow so easily into principles of compelling teaching is another reason to believe that traditional face-to-face and online teaching have deeply rooted similarities. That said, there are some salient differences between the two, mainly with respect to the logistics of setting up learning experiences in virtual space. Here are some important factors that differentiate teaching online from the traditional approach:

Timing and Synchronization of Coursework

Instructional designers use the terms "synchronous" and "asynchronous" to distinguish learning activities that students have to do at a specified time versus at any time of the student's choosing. The

asynchronous model is popular for online coursework, allowing students to finish their work within flexible time windows without being yoked to classmates. Face-to-face coursework, by contrast, tends to favor the synchronous approach, with many of the learning activities taking place during scheduled times in which students are working (or attending lecture) together. Much has been written about the ideal balance of one versus the other in online learning.[14] This issue is one that online instructors need to ponder carefully when they set up their courses, as the introduction of real-time, synchronous activities such as scheduled chat-room discussions comes at the cost of students' flexibility to complete coursework anytime, anywhere—which is, after all, one of the main reasons students choose online learning in the first place.

Student Preparedness to Use the Technology

As noted in Chapter 1, just because students are in their teens or twenties does not mean that they use technology as naturally as they breathe air. Many college students, even traditional-age ones, lack the technical skills needed to do online learning activities—and the fact that they can capably navigate Facebook, Instagram, or Reddit does not mean that they can effortlessly master instructional technology. When I teach, I routinely have to help students with basic tasks such as setting up accounts on third-party web sites or using Track Changes for multiple drafts in Microsoft Word. Online instructors, as well as those who rely on technology to enhance face-to-face classes, need to teach not just their subject material but also computer skills—without needlessly rehashing those basic skills for students who are technically fluent.

To deal with this issue, it helps to see technical skills as domain specific, not one single ability that students either have or don't have, and scaffold each new technology separately. It's true that some individuals seem to gravitate toward technology of all kinds, picking up new applications and techniques relatively quickly; certainly a basic understanding of how computers and the Internet work is also helpful in a wide variety of technical tasks. However, most students will need help when they are learning the ins and

outs of a new technology, be it a learning management system, student response system device, or third-party web site. Incorporating targeted modules into course content about how to use the major technologies is a good practice for fully online courses as well as those that have a heavy technology focus. In NAU's Introduction to Psychology course, for example, we hit on the idea of creating narrated mini-videos that illustrated how to use the online tracking system for signing up for required research studies. Students could watch the videos as many times as needed as they figured out how to set up and access their accounts, which we found much more effective than a rapid-fire, onetime demonstration in the face-to-face class meeting.

Similarly, many institutions have their own "how-to" modules for commonly used features of their learning management system, which faculty can link to in their own course content. Having well-designed modules that show exactly how to use the technology is half the battle, but it's also important to *require* that this content be mastered, much as you would for any other major concepts within the course. This can be accomplished by assigning students to answer test questions on the technology (perhaps as part of a syllabus quiz), or by making the different features part of assignments early in the course (for example, assigning students to access and post on a discussion board, or show proof that they have set up an account on a third-party web site they will need later in the course).

Heavy Reliance on Text

Although online course content ideally incorporates at least some multimedia, for the most part learning online means learning through the written word. As one educator put it, "E-learning requires the student to read course material, post written responses, and interact with fellow students though threaded online text-based discussions. . . . One common element of E-learning is that the primary instructional method is reading text."[15] Online courses *can* be designed with an emphasis on alternating text with other forms of delivery, such as animated narration or Skype conversations, but

it is difficult to get around the need for a great deal of written communication. This contrasts with the typical face-to-face course in which lecture, audiovisual demonstrations, and spoken discussion are a major part of the learning activities.

Students who aren't strong readers, or who just prefer non-text modalities, are at particular risk of falling behind in a text-heavy environment. Unfortunately, we don't have many solutions for these less-proficient readers. Minding the reading level of material, keeping it to the level of a newspaper or lower, is one basic strategy.[16] When using synchronous, fast-paced activities like real-time chatting, it's also important to weigh any potential benefits against potential difficulties for slower readers.[17] Building in lots of those aforementioned alternate forms—narration, audio, and video—can also give a boost to less-proficient readers.

Increased Need to Explain the Course Structure and Requirements

This factor might fade as more students get experience with online coursework and as online-course designers begin to converge on commonly accepted conventions for course structure. In the meantime, though, students often come to online coursework with a less-developed sense of how things work than they would for a traditional course. Traditional courses superficially resemble high school classes, in that they are organized around set times and places for meeting, textbooks, and schedules of deadlines—so even students with little or no college experience can fall back on this familiar script to figure out what to do next. Just showing up for class can assure these less-experienced students that they will probably get by. But how do you "just show up" for an online class? In an online class (or the online parts of a blended or combination online/traditional class), it may not be clear where to start, how to spend one's study time, or when the work is due. Good design, of course, offsets the problem of orienting students to the layout of the assignments—but even in a well-designed online course, students as well as teachers have to work harder to establish a basic understanding of how the course will work.

Social Distance—Especially for Fully Online Courses

Social distance is the flip side of the "social presence" concept first articulated in the early days of telecommunications.[18] It has to do with the exchange of social cues and the feeling that one is authentically interacting with another person in the virtual environment. Creating social presence is another thing that online instructors need to pay special attention to, for example by encouraging students to offer personal information, eliciting supportive communications between students, and using communication tools that transmit facial expressions and vocal tone. Going the extra mile to do this doesn't just make the class more pleasant, but is also an important predictor of success in the course.[19]

The social feedback instructors get from students is also radically altered in an online environment. In a traditional classroom setting, students' faces give you an instant read on confusion, disengagement, and other important problems. Students stop by before or after class to clear up muddy points or talk in-depth about topics that caught their interest, and the give-and-take of an interactive lecture gives you a good grasp of students' level of understanding, at least for the ones who speak up. Online, these interactions are usually heavily time-delayed and mediated by text, particularly e-mail and discussion posts—two communication formats that have a well-known propensity to misrepresent emotional tone. To compensate, online instructors need to make formal inquiries to students about how the class is going, as well as keep a close eye on data such as frequency of log-in, late assignments, and assessment scores so that they can form an accurate picture of how students are faring.

The Potential for Technical Problems to Disrupt or Completely Derail the Course

Even when students have the skills and support needed to navigate online-learning activities, the technology may simply fail to work. Ask any online-teaching veteran and you will hear tales of vanishing assignments, system-wide outages at the worst possible times, and other assorted war stories. University infrastructures have

evolved to provide much more technical support than in the "old days" of online education, and makers of educational technologies have done a lot to eliminate bugs and crashes. But at the same time, advances in what we can do with technology—running programs on mobile devices, streaming audio and video, linking third-party software to our main learning management systems—mean more opportunities for failure of critical course components. Even that most basic driver of technology, reliable electricity, isn't a given in many parts of the world—a sobering thought given the push to extend online learning globally.

The stakes are high for getting the technology to work, as technology problems are one of the main qualms that students have about getting involved in online learning.[20] To head off potential disaster, online instructors have to expend extra effort by pretesting their materials for any glitches, making contingency plans for outages, and cultivating excellent working relationships with their institutions' IT support units.

These factors differentiating online and traditional face-to-face teaching tend to have a logistical or practical flavor to them, rather than pointing to deep qualitative differences in what we can accomplish with the two different approaches. And it isn't as though the face-to-face classroom is free of logistical challenges—those coveted well-illuminated, perfectly temperature-controlled lecture halls with flexible seating arrangements don't come easily either. We simply may not notice these types of challenges as much, given that they are usually the more familiar to us.

The parallels in good teaching across different approaches and technologies can help us feel more confident that the online option doesn't automatically limit our power to teach well. But do these parallels translate into measurable evidence of effectiveness for online teaching, compared to the traditional face-to-face alternative? A number of large-scale empirical research projects have taken aim at that question, and in general, the answer is yes.

The most ambitious among these empirical studies is a widely cited paper published by the U.S. Department of Education, which combined the results from multiple studies in order to assess overall

trends in the data.[21] The result of this multi-study meta-analysis was clear: online delivery produced a statistically significant, small-to-moderate-size *advantage* for learning. The USDE researchers set stringent criteria for the studies they included, keeping only those with rigorous experimental designs directly contrasting online and traditional course delivery, substantial use of the Internet to deliver instruction in the online-learning condition, and statistical controls for differences in prior ability between online and traditional versions of the course. Studies also had to have empirical measures of student learning, not just subjective student or instructor perceptions of effectiveness. Notably, *blended* course designs—i.e., courses that combine online and face-to-face components—produced particularly good outcomes, compared to fully online and completely face-to-face courses.

In their interpretation, the authors explained that the different delivery formats were not identical in terms of the quality and amount of work given, time on task, and other important features. Thus, it may not be the online factor per se that explains why online and blended learning came out ahead. But given that the relevant question for instructors is whether online learning *can* be as effective as traditional—not whether there is something special about computer-mediated learning—these findings offer powerful evidence that online learning can be good for students.

Another meta-analysis investigated how the difference in course grades earned in face-to-face versus online courses changed over the nineteen-year span between 1990 and 2009.[22] Similar to what the USDE researchers found, students earned significantly better grades in online courses overall. Additionally, the study revealed that the online advantage shrank in the mid-1990s and grew again fairly rapidly after 2000—perhaps because in the mid-nineties, there was a fad for so-called "online learning" experiences that consisted of merely converting traditional textbook materials to CDs and mailing those out to students. The researchers pointed out that the resurgence of the online advantage in the 2000s coincides with the rise of more-interactive, more-powerful tools embedded in commonly available learning management systems. This all provides further evidence that—particularly with optimal use of the tools

available—online teaching can produce better rates of course completion.

What about student learning, independent of grades? Learning and grades are notoriously difficult to separate in any practical way, despite being two very distinct concepts. It's not surprising, therefore, that the research literature contains few large-scale, precisely controlled comparisons of learning across different class formats. One exception is a 2012 study of lower-division statistics courses in which researchers compared learning—defined as scores on a nationally standardized test of statistical literacy and scores on common final exams—across traditionally taught, 100 percent face-to-face statistics courses and those that employed an online system to deliver part of the instruction.[23] Students in this nationwide study were randomly assigned to participate in one or the other of the class formats, offsetting any systematic differences in the types of students who tend to choose blended versus face-to-face courses. The results were clear: student learning was virtually identical across the two formats. Students reported liking the blended courses a little less, and also reported spending less time on blended courses, but both groups learned about the same amount of the core course material.

Some caveats about this study are in order. It comprises one rarefied segment of online learning given that it used just one very well-designed and highly regarded system for the online component (Carnegie Mellon's Open Learning Initiative statistics courseware). And it had a very narrow focus—one course within one discipline. Even so, this study does a good job of showing that under tightly controlled conditions, well-designed online learning activities can produce learning gains comparable to those achieved with face-to-face instruction.

These studies—with their heavy if not exclusive focus on student grades—offer important evidence in favor of the online format. But they also conjure up one of the most contentious issues connected to online teaching and learning: the question of cheating. Who are the people earning the superior grades associated with online coursework—our students, or others enticed to do the work? How did these people complete the work—with or without aids that we wouldn't allow in our face-to-face classes? Collaborating illicitly, or

working independently? These questions have dogged online learning for years, and may never be completely put to rest.[24] However, despite all this uncertainty, it is possible to draw some reasonable conclusions about the likely preponderance of cheating in online coursework, and to find ways to design online learning experiences that reduce the risk of cheating.

Without specialized technological aids or elaborate arrangements for in-person proctoring, it may indeed be impossible to verify that a given assignment was completed as directed by a given student. Research on academic dishonesty has focused far more on the traditional classroom than on online coursework.[25] Even so, there is enough relevant work to get a sense of the problem. Based on some theories of why students cheat, we would predict more cheating online because of perceived anonymity and the sense of distance between faculty and students. And according to survey research (as well as typical faculty opinion pieces on the subject), faculty believe that cheating is more common online.[26] Faculty were further sensitized by the high-profile "Shadow Scholar" story that unfolded over 2010–2012, in which disillusioned academic Dave Tomar admitted to selling his services to legions of cheating students for over a decade. Granted, the majority of Tomar's fraudulent work was submitted in traditional face-to-face courses, but he also admitted to taking on a substantial amount of online work, such as required discussion posts.[27] In any case, academic dishonesty is an emotionally fraught and anger-provoking subject for faculty (just view the hundreds of online comments on stories such as the ones on Tomar to get a sense of *how* fraught), and the addition of the online dimension only heightens faculty anger and sense that things are out of control.

Some advocates of online learning retort that cheating is also rampant in face-to-face courses, which is hardly comforting, but makes the online format look a little better by comparison. Advocates also rightly assert that standards for traditional courses rarely meet the stringent criteria needed to satisfy critics of online learning—that if in fact the issue were fully addressed for online courses, they would end up significantly more secure than their traditional counterparts.[28] And as for the distance and anonymity arguments, it may be the case that online interaction is not necessarily any more alienating

than being one among hundreds or thousands of other students in a large face-to-face course—a situation that is quite common at many institutions. It's even conceivable that online courses could be *less* conducive to cheating because of factors such as smaller class sizes and increased interactivity.[29]

Consistent with these theoretical ideas, empirical studies of cheating behavior largely provide a reassuring picture, one in which online learning is *not* plagued with rampant dishonesty. Cheating is secretive behavior, so it's not the easiest thing in the world to study its actual incidence. But it's not impossible—researchers have devised a number of techniques that allow them to make reasonable estimates despite the secrecy and stigma around the subject. The simplest is anonymous self-report, i.e., surveying students as to whether they have committed different forms of academic dishonesty. This approach likely underestimates the actual incidence, given that—even anonymously—people are somewhat loath to admit engaging in behaviors that society disapproves of. However, unless there is some reason why traditional and online students are different with respect to falsifying self-reports, survey responses are still informative as to the relative commonness of cheating in the different class formats. There are other ways to get at the question, such as comparing average grades on proctored versus unproctored exams, or as one research group did, surreptitiously photocopying exams before returning them to students for self-grading, then comparing the self-reported grades to the actual grades.[30]

A particularly clever way to estimate cheating is the "randomized response" method, which promotes honest reporting via an extra layer of anonymity.[31] In a randomized response survey, students get one of two survey questions, one of which targets the behavior of interest (e.g., "have you ever cheated on an exam in this class?") and one of which asks an innocuous, irrelevant question (e.g, "do you prefer vanilla ice cream to chocolate ice cream?") for which the experimenters know the likelihood of different responses. No one knows who got which question, making it completely untraceable who answered "yes" to the target behavior. Researchers then untangle how many people probably said yes to the target question by assessing the difference between the predicted proportion of "yes" responses to the

irrelevant question and the actual proportion they got. For example, if they know ahead of time that 25 percent of people say they prefer vanilla ice cream, but in their survey 50 percent said yes to the "vanilla ice cream or cheating" question, then in all likelihood, around 25 percent cheated.

Using techniques such as these to get at the data, the preponderance of studies report equivalent or even *reduced* rates of cheating for online compared to face-to-face students.[32] In particular, an often-cited study using the randomized response technique found no greater incidence of cheating in online courses.[33] But a minority of studies do show greater incidences of cheating in online courses.[34] Other studies focusing not on actual incidence, but rather perceptions, suggest that students *believe* that cheating is more common online.[35] Given that students have far more exposure and experience to actual incidences of online cheating than do faculty members, this finding is particularly disturbing.

On balance, the research suggests that some concern is warranted, but it's probably not the case that cheating is everywhere—or that the problem would go away if all coursework were transplanted back to the face-to-face setting. It's up to the instructors and institution to decide how they want to balance concerns for academic integrity against other factors, such as expense, instructor time, and flexibility.

It's also important to look at academic honesty not just in terms of catching cheaters, but also in terms of prevention—and indeed, as part of the course's overall plan for promoting student learning. James Lang's book *Cheating Lessons* makes the compelling argument that academic integrity is best addressed by creating classroom environments that support engaged learning.[36] Drawing on behavioral science as well as pedagogical research, Lang observes that cheating is heavily influenced by situational factors. It is most common in the presence of four key characteristics of the learning environment: emphasis on performance, as opposed to mastery; high stakes; external or extrinsic motivations, such as money or grades; and low expectations of success. In other words, we would predict that students would be highly prone to cheat on a test or assignment when a great deal is riding on the outcome, when students mainly care about

performing to earn some external reward, and when they don't believe they have a good shot at succeeding through legitimate effort.

Fortunately, these factors are within the instructor's power to influence, through course design and how requirements are communicated to students. Low-stakes, frequent assessments, as an alternative to the traditional system of having just a couple of major exams or papers per semester, are a particularly good deterrent. Having less riding on any one test or assignment makes the risk of being caught less attractive and makes it more complicated to bring in an accomplice, given that such collusion would have to be done over and over throughout the semester. Having frequent opportunities to succeed also tends to improve students' sense that they have the power to do well through their own effort, a theme we will revisit in Chapter 8. Online tools are particularly useful in courses with a small-stakes/frequent assessment design, making this feature relatively easy to set up and execute compared to purely traditional tools such as in-class pencil-and-paper exams.[37] And as Lang argues, this is one anti-cheating technique that is also good for promoting learning—something we will consider in detail later in this book.

Several other prevention techniques follow Lang's concept and also lend themselves well to online learning. These include designing courses to include a wider array of types of assignments and assessments, including open-ended ones, to get a broader picture of how each individual student is performing across the semester and offer opportunities to note any drastic changes to style that would indicate possible dishonesty.[38] Lang also emphasizes the value of creating specific and/or personalized types of assignments, rather than recycling the same "generic" ones semester to semester, because generic topics make it too tempting (and easy) for students to purchase standard-issue papers on the Internet. According to this reasoning, it's better to assign students to, say, craft a speech to their local city council or write a memo to a hypothetical employer, compared to having them write a standard "compare and contrast" essay.

Another relatively low-cost strategy for preventing cheating in the first place is to make academic dishonesty standards explicit to students.[39] This goes beyond simply putting a policy online or making general announcements such as "cheating will not be tolerated."

It is a near-certainty that students understand less about academic dishonesty than their instructors assume, and furthermore, there are likely to be substantial discrepancies between student and faculty definitions of which specific behaviors constitute cheating. To address this, you can teach the cheating policy the same way you would any other important concept within the course—i.e., giving students clear explanatory materials, pushing them to meaningfully engage with those materials, and holding them accountable for proving that they have mastered them. Requiring that students complete an academic honesty module early in the semester—your institution may have one readily available via the library or e-learning center—is a good practice, and is another technique that works particularly well online. Beyond teaching students what cheating is, the literature on online course design also offers quite a few "best practices" lists and suggestions for discouraging cheating; Baron and Crooks (2005)[40] and Krsak (2007)[41] are two good examples.

Other integrity tools tend to fall more under the category of policing, and less under Lang's concept of preventing dishonesty via learner-centered course design. Nevertheless, these can be a good complement to one's overall plan for promoting integrity within the course. Some to consider include the following:

- Commercial plagiarism detection tools such as Turnitin, SafeAssign, or PlagiarismDetect.[42] The precise way these programs work is proprietary, but in general, they compare coursework to massive databases of student papers, web pages, scholarly journal articles, and other materials that students might be tempted to plagiarize.
- Remote proctoring. Some universities provide remote testing centers, or they require students to travel to campus for proctored testing at university centers. Failing that, there are other creative proctoring solutions, such as allowing a commanding officer, clergy person, or even fire station personnel to serve as a designated proctor.[43]
- High-tech commercial solutions. The development of for-profit test security systems is in full swing, with services that can use facial recognition software, remotely lock down forbidden web

sites, monitor students via web cameras, and more. Technology even exists to identify users through their unique patterns of typing.[44] Kryterion.com and ProctorU are two examples of these types of proprietary systems, and more companies will probably crop up in the coming years as more institutions compete to offer high-integrity online programs. Given the price and complexity of such systems, instructors would have to collaborate with their institution to use them, but if security is a high concern, it is good to know that options are out there.

Let's turn now to a more elusive issue: whether online learning unwittingly encourages minimal, superficial student effort, or what some of my colleagues disparagingly call "just pushing buttons." If students are doing their coursework at home—or at the coffee shop, gym, or who knows where—can we be sure that they are intellectually engaging with material as they would in a face-to-face classroom?

One way to tackle this question is via Bloom's taxonomy, a framework for assessing the intellectual complexity of student learning activities that ranks these cognitive processes from the most routine to the most sophisticated.[45] The taxonomy was significantly revised in 2001[46] to incorporate an added dimension of the type of knowledge students are incorporating into their learning processes, but like the original, the newer version emphasizes the progression from least to most sophisticated intellectual activities. The spectrum of cognitive processes is as follows:[47]

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating

For instructors, the taxonomy provides a practical tool for identifying the different cognitive processes we want students to engage in. It also offers a means for researchers to directly compare intellectual engagement within face-to-face and online courses. One such

study found that in the online version of a course (upper-division histology), student questions were weighted more toward the sophisticated end of the scale taxonomy, compared to the face-to-face course, and furthermore, online students performed better on the assessment of content mastery.[48] The researchers pointed out, in particular, the favorable comparison with respect to faculty-student interactions, noting that these personal exchanges were virtually absent in the traditional lecture-style version of the course. Similarly, a study of online discussion postings in a teacher education course found that student posts significantly improved in terms of Bloom's taxonomy over the course of the semester, and that students also improved on a quantitative measure of critical thinking.[49]

These findings suggest that, broadly speaking, it is possible for online learning environments to elicit intellectual engagement across the spectrum of cognitive processes, from least to most sophisticated. Future research may pinpoint more of the differences in what cognitive processes are foregrounded specifically in online learning. If current trends are any indication, much of this research will focus on online discussion groups, particularly how they can build the thinking skills that make up the top of Bloom's hierarchy. Of all possible online learning activities, discussion seems an unlikely candidate for building the more intellectually hefty skills; as the researchers Xin and Feenberg put it, "Online discussion is paradoxical. It consists in a flow of relatively disorganized improvisational exchanges that somehow achieve highly goal-directed, rational course agendas" (p. 2).[50] Yet, they argue, intellectual engagement is at the heart of a well-run online discussion, as it requires activities such as reasoning from examples, defining terms and concepts, and other central aspects of critical thinking. In Chapter 6, we'll return to the issue of how to best promote learning using online discussions, but for now, they serve as one clear example of how we can promote and document student intellectual growth using online methods.

There is one further practical caveat about intellectual engagement in online learning activities—something that comes back to the time-and-effort factor cited by so many experts on quality undergraduate education. More so than in the traditional classroom, students can seriously underestimate how much time and effort is

required to succeed in online learning. Part of this problem may have to do with the much-vaunted "flexibility" of online coursework. If the idea is that online learning fits in between family time, paid work, travel, child care, and everything else in life, it likely ends up an afterthought tacked on after all those other life activities are addressed. And as we all know, exhausted, distracted, time-pressed students are unlikely to achieve stellar intellectual gains in *any* instructional format. Some experts argue that online learning's tendency to become a "third shift"—i.e., something tackled after work and family duties are done—places a particular burden on female students, given their greater responsibility, on average, for the "second shift" of family work.[51] Furthermore, in face-to-face teaching, you can ensure that some bare minimum of time is devoted to classwork (by policing attendance), and you can schedule classes when students are likely to be fresh (i.e., not in the middle of the night). Neither of these basic strategies for ensuring maximal engagement is easy to do online.

Like many other quality issues, the third-shift problem can be addressed through forethought and savvy design choices. One good place to start is with a heavy dose of socialization at the beginning of the course about your expectations for student time commitment. Simply exhorting students that they will have to work hard and put in time has limited impact, but at least you can get your expectations out into the open early. Following through on your stated expectations, by having some small-stakes work due early in the semester, is another good practice for getting students into the right mindset. Beyond laying out your expectations and following through on them, you can consider scheduling some synchronous-style work if you are concerned that students are just squeezing in little bits of work at odd hours. This approach has costs (such as potentially disadvantaging slower readers, as mentioned previously) and may be perceived as user-unfriendly by students, but it's a clear way to exert more control over the pacing and timing of work.

You can also exploit the student usage data that's tracked within your learning management system to get a better picture of the time students spend on various components of your class. Those data can then help you refine and shape your online learning practices. For

example, I was surprised to learn that my online Introduction to Psychology students were routinely going into discussion forums as their "first stop" upon logging in to the course, and once they were there, they were spending much more time than I originally anticipated. I used that information to better understand the role that discussions played in building the social cohesion and "fun" factor of the course, and as an informal red flag for students who weren't as invested in the course. In another online class (Cognitive Psychology), research collaborators and I found that the number of discussion posts students made were the number one predictor of their overall course grade, even though these made up only a tiny fraction of course points.[52] Based on this information, I built in more choices of discussion topics and began contacting students who weren't participating early on. The online environment presents many such opportunities to get to know your students' work patterns better and spot ways that they can improve—all of which further reinforces the quality of the online learning experience.

So is the trend toward online teaching and learning positive or negative? In other words, is online teaching *quality* teaching? Hallmarks of quality—student effort, frequent and high-quality interaction, active learning, and so forth—appear to be quite similar across modalities. Empirical research on outcomes tends to favor online learning, with some studies even turning up substantial advantages, particularly for designs where online and face-to-face components complement one another. More research is needed on outcomes that emphasize thinking skills—such as those that constitute the top of Bloom's taxonomy—over grades, but there are some encouraging results here too. Lastly, empirical evidence suggests that the much-publicized concerns about cheating on online coursework may be substantially overblown. With all this in mind, it makes sense to conclude that quality online learning experiences are possible—and turn our attention back to maximizing that quality.