CHAPTER 1

Teaching at Its Best, No Matter What the Environment

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Abundant research shows that excellent teaching rests on the same principles across all platforms. Drawing on these principles, we identify best practices gleaned from the face-to-face teaching literature and argue for their applicability in all other modes. However, distance education in its hyflex, remote, hybrid (blended), and fully online forms holds special challenges that stem from both students and instructors—challenges that classroom teaching does not present. Sometimes the emphasis on technology and the pressure of time distract faculty and instructional designers from integrating the best teaching practices in their courses. Different readerships for the body of teaching and learning research and that of instructional design exacerbate the challenge of keeping best teaching practices at the forefront. This book aims to integrate these two literatures.

Any given instructional strategy can be supported by a number of contrasting technologies (old and new), just as any given technology might support different instructional strategies. But for any given instructional strategy, some technologies are better than others: Better to turn a screw with a screwdriver than a hammer—a dime may also do the trick, but a screwdriver is usually better.

—Arthur W. Chickering and Stephen C. Ehrmann (1996)

TEACHING QUALITY AS KEY TO LEARNING

Like Chickering and Ehrmann (1996), we start from the premise that excellent teaching is excellent teaching—and, conversely, ineffective teaching is ineffective teaching—whether the environment is classroom-based, online, hybrid, remote, or hyflex. Why? Because in terms of the mind, learning is learning, and what matters most in learning is good teaching, not the technology (Jackson & Anagnostopoulou, 2018; Lederman, 2020c; Simonson & Schlosser, 2009).

Best Practices from the Classroom Teaching Literature

To identify proven principles of teaching and learning, we have to turn first to the face-to-face teaching literature. Being the oldest type, this teaching mode has led the way in defining best practices, so we first examine these practices. We also feature a few of the parallels with instructional design. We began with the classic seven principles of good practice identified by Chickering and Gamson (1987) and based on a review of almost forty scholarly publications:

1. Encourage contact between students and faculty
2. Develop reciprocity and cooperation among students
3. Encourage active learning
4. Give prompt feedback
5. Emphasize time on task
6. Communicate high expectations
7. Respect diverse talents and ways of learning

Nine years later, Chickering and Ehrmann (1996) explained how these seven principles can easily translate from the classroom to the online environment using various instructional technologies. Instructors have gradually integrated these principles into classroom practices and teaching with technology, including some online courses (Chickering & Gamson, 1999; Hathaway, 2014; Johnson, 2014; Lai & Savage, 2013; Mehall, 2020; Tanis, 2020).

Based on research in education and educational psychology, Bransford, Brown, and Cocking (1999) wrote a seminal work about how people learn, but they focused on memory issues in school children and did not propose learning principles. However, later books about college-level teaching and learning adopted some of their major points as general principles applicable to everyone—for example, on the importance of learners practicing metacognition, structuring knowledge, and having valid prior knowledge on which to connect new knowledge.

The first of these later books, by Ambrose, Bridges, DiPietro, Lovett, and Norman (2010), lays out seven principles of learning with implications for effective teaching:

1. The amount of students' prior knowledge on a subject affects their learning and performance—the more prior knowledge, the easier and better the learning and the stronger the performance. However, inaccurate, inert, or insufficient prior knowledge can hinder learning and performance.
   Teaching implications: Instructors should find out what that prior knowledge is, remediate or activate it in students, have students self-assess their familiarity with it, and try to identify errors and misconceptions in that knowledge. Instructors should then address these misconceptions explicitly and find ways to discredit them.
2. The way students organize their prior knowledge also affects their learning and performance.
   Teaching implications: Instructors should help ensure that the organization of their students' knowledge is valid and rich with connections between important and meaningful features—major concepts, principles, and categories, for example.
3. Students' motivation determines how much effort and persistence they will put toward their learning.
   Teaching implications: Instructors should enhance the value of the material for students and create a supportive environment for learning. To enhance the value, they should show enthusiasm, reward students for achieving outcomes, and demonstrate the relevance of the material to real-world applications and students' current and future lives. To increase support for learning, they should do things like develop a course that aligns outcomes, learning activities, and assessments; incorporate early assessments that build student confidence; help students learn how to learn the material; clearly explain expectations for performance; and provide prompt feedback accordingly. Building in choice and reflection on the learning also increases both the value of the learning and the support for it.

4. Students develop mastery only when they can competently perform and integrate the component skills and apply them in the appropriate circumstances.
   Teaching implications: Instructors should decompose complex tasks into component skills, diagnose and provide practice for students in their weaker skills in different contexts, include the integration of skills in assessments, have students link contextual learning experiences to general principles, and give them practice in deciding where different skills and knowledge apply in various contexts.
5. Students need sufficient practice in meeting specific performance criteria at the desired level of competency, coupled with timely feedback targeted to improving performance on the specific criteria.
   Teaching implications: Instructors should start a course by assessing their students' performance level and adjusting the level of their practice to a reasonable level. Then instructors should make their performance goals, criteria, and standards explicit; scaffold complex tasks in decreasing detail over time; provide plenty of practice opportunities; supply models of strong and weak performances; incorporate instructor and peer feedback to groups as well as individuals; and have students explain how they use feedback in later work.
6. Students' learning is affected by the interactions of their level of social, emotional, and intellectual development with the climate of the course on the same dimensions. Faculty cannot influence the level of development that students bring into a course, but they do have control over the course climate. The more positive the climate, the more students are likely to learn.
   Teaching implications: Instructors should foster the safe expression of different points of views, answers to questions, and approaches to a problem, in part by posing questions and problems that are open to multiple respectable responses. In addition, instructors should choose inclusive content and examples, model inclusive behavior and language, personalize the class as much as possible, have students generate ground rules for interaction, require them to provide evidence to back up their claims, encourage and model active listening, turn tensions and disagreements into learning opportunities, and obtain and respond to student feedback on class climate.
7. Students need to practice self-regulated learning before they can become self-directed learners. That is, they must plan, monitor, and evaluate their learning and modify their strategies accordingly to optimize their learning.
   Teaching implications: Instructors should provide opportunities for students to analyze assignments, assessment rubrics, and examples of both excellent and poor products. Instructors should also model metacognition and have students reflect on and answer questions that direct them to self-assess and self-correct their work, assess their peers' work, assess their learning, and assess the effectiveness of their study strategies. Of course, these activities take on higher value when instructors explain at least a little about the ability of the brain to change with learning (brain plasticity) and the effort, self-awareness, and persistence that learning requires.

We can identify considerable overlap among these principles, especially principles 1, 2, 4, and 7, and Bransford et al.'s (1999) main points about learning. We can also see parallels with instructional design perspectives, which emphasize identifying student entry-level and prerequisite skills, relating outcomes to the structure and substance of students' mental models, ensuring student support and motivation, providing relevant practice and informative feedback, and varying the learning context to support retention and transfer (Dick, Carey, & Carey, 2015; Gagné, Wager, Golas, & Keller, 2005; Smith & Ragan, 2005a, 2005b).

While Chickering and Gamson's (1987) principles of good practice do not appear among Ambrose et al.'s (2010), some of the latter's principles do imply active learning, student–faculty contact, and student–student reciprocity and cooperation, and principle 5 mentions "prompt feedback," but only as one aspect of the best kind of feedback to give students. This scant overlap testifies to the progress we have made in understanding teaching and learning since the late 1980s.

Davis and Arend (2013) slice the pie somewhat differently, positing primary "ways of learning" for each of seven categories of learning outcomes and tying each category to particularly effective teaching methods, as shown in Table 1.1.

Table 1.1 Davis and Arend's (2013) Model of Learning Outcomes, Ways of Learning, and Teaching Methods

Intended Learning Outcomes: What Students Learn	Ways of Learning: Origins and Theory	Common Methods: What the Teacher Provides
Building skills Physical and procedural skills where accuracy, precision, and efficiency are important	*Behavioral learning* Behavioral psychology, operant conditioning	Tasks and procedures Practice exercises
Acquiring knowledge Basic information, concepts, and terminology in a discipline or field of study	*Cognitive learning* Cognitive psychology, attention, information processing, memory	Presentations Explanations
Developing critical, creative, and dialogical thinking Improved thinking and reasoning processes	*Learning through inquiry* Logic, critical, and creative thinking theory, classical philosophy	Question-driven inquiries Discussions
Cultivating problem-solving and decision-making abilities Mental strategies for finding solutions and making choices	*Learning with mental models* Gestalt psychology, problem-solving, and decision theory	Problems Case studies Labs Projects
Exploring attitudes, feelings, and perspectives Awareness of attitudes, biases, and other perspectives; ability to collaborate	*Learning through groups and teams* Human communication theory; group counseling theory	Group activities Team projects
Practicing professional judgment Sound judgment and appropriate professional action in complex, context-dependent situations	*Learning through virtual realities* Psychodrama, sociodrama, gaming theory	Role playing Simulations Dramatic scenarios Games
Reflecting on experience Self-discovery and personal growth from real-world experience	*Experiential learning* Experiential learning, cognitive neuroscience, constructivism	Internships Service-learning Study abroad

Source: Davis, J. R., & Arend, B. D. (2013). *Facilitating seven ways of learning: A resource for more purposeful, effective, and enjoyable college teaching*. Sterling, VA: Stylus, p. 38. Reprinted with permission from the publisher.

According to Ambrose et al. (2010), students need practice in skills to acquire and refine them, whatever those skills may be. But Davis and Arend (2013) maintain that the context for the most effective practice will vary by the type of skill. If, for example, the skills involve precise procedures or psychomotor operations, the principles of behaviorism applied to practice exercises will most efficiently yield the best results. For another example, instructors can most effectively provide practice in exercising sound professional judgment and action in real-world-like situations, the kind that simulations, games, dramatic scenarios, and role plays afford.

Davis and Arend (2013) recommend flexibility in using their framework, however. They readily point out that feedback in any context borrows from behavioristic principles and would regard case studies, laboratories, and internships as suitable methods for teaching professional judgment. But they wisely alert us to the fact that case studies, simulations, service-learning, discussions, and group activities are ill suited to students who are acquiring procedural skills and basic disciplinary knowledge. By the same token, presentations, practice exercises, role plays, and labs will do much less to help students develop critical thinking skills or an open-minded awareness of multiple perspectives than will discussions, question-driven inquiries, and group work.

Although Ambrose et al. include teaching strategies and student activities to help instructors implement all seven of their best-practice principles, additional refinement proves its worth when it comes time to apply a given principle to a real course. Davis and Arend's model helps you determine what teaching strategies best align with your

specific outcomes. Similarly, Nilson (2013) refines Ambrose et al.'s principle of self-regulated learning by linking a wide range of planning, monitoring, and self-assessment activities and assignments to various course components and times during the term.

Davis and Arend's perspective and the instructional design literature overlap in several ways. Instructional designers also emphasize the wisdom of providing students with practice and using different strategies to teach different kinds of knowledge and skills (Dick et al., 2015; Gagné et al., 2010; Jonassen, 2004, 2014; Smith & Ragan, 2005a, 2005b). For example, they identify best strategies for implementing project-, problem-, case-, and inquiry-based learning and for teaching these cognitive and social skills: memorization and recall; understanding; application of concepts; learning in a social context; collaborative creativity; and strategic thinking (Dabbagh, 2019; Merrill, 2018; Reigeluth, 2018; Savery, 2018, 2019; Savin-Baden & Bhakta, 2019; Spielman et al., 2018; Watson & Reigeluth, 2018; West, 2018). For teaching adult learners, expert instructional designers recommend demonstrating empathy (Vann, 2017). For helping students acquire motor skills, they explicitly focus on lowering cognitive load with visualization, verbalization, demonstration, repetitive practice, and error correction strategies (Nicholls, Sweet, Muller, & Hyett, 2016).

Table 1.2 matches various intended learning outcomes with different conditions of learning (recommended teaching strategies) drawn from multiple instructional design resources, primarily Dick et al. (2015), Gagné et al. (2010), Martin and Briggs (1986), and Smith and Ragan (2005a, 2005b), with a few elaborations from Jonassen (2000) and Merrill (2002, 2018).

Table 1.2 Intended Learning Outcomes and Recommended Teaching Strategies

Intended Learning Outcomes	Recommended Teaching Strategies
Motor skills The student executes muscular movements with standards of speed, accuracy, force, and smoothness.	Introduce whole- and part-task routines. Explain and demonstrate, supplementing with visualization of performance and memory aids such as mnemonics. Guide retrieval and use of mental map for performance. Provide continued practice with informative feedback and opportunities to adjust performance of part skills, connecting skills, and whole skills to desired proficiency level.
Verbal information The student articulates acquired knowledge such as labels or names, facts, and organized knowledge.	Introduce with emotional or novel information or event. Cue retrieval of related larger network. Elaborate relationship of new knowledge to larger network. Provide meaningful context. Segment content into learnable chunks. Represent new knowledge in structure, cases, logical relationships, and memory aids. Arrange active, spaced practice and informative feedback in using new knowledge.
Conceptual understanding The student classifies a concept according to physical, sensory, or defined attributes.	Present a concept with an inquiry approach or something interesting about the concept; add definition. Cue retrieval of component concepts or information. Progress from familiar to unfamiliar, simple to complex, and best examples to fuzzy examples and nonexamples. Draw attention to distinguishing attributes and reasons for fit or nonfit (use questions and explanations). Point out common classification errors. Include concept maps, analogies, images (as appropriate). Arrange spaced practice and informative feedback in classifying examples and nonexamples.

(Continued)

Table 1.2 (Continued)

Intended Learning Outcomes	Recommended Teaching Strategies
Use of lower-order rules The student uses two or more concepts connected as a rule to solve simple routine problems.	Introduce a rule with inquiry, a novel problem, or interesting use of rule. Preview what student will be able to do with the rule, as in future problem-solving. Draw attention to related concepts in the rule. Guide learning with demonstration and application. Point out common errors to avoid, including misconceptions, overgeneralization, or undergeneralization. Arrange spaced practice and informative feedback in applying the rule. Provide varied situations for application to enhance transfer.
Use of higher-order rules The student uses two or more rules connected as a problem-solving strategy to solve more complex problems.	Provide authentic meaningful relevant tasks, goal-directed activity (multiple representations of problem and structure). Compare and relate to larger task or problem and role of strategic thinking in problem-solving. Prompt recall of related previous experiences. Differentiate strategies for types of problems (logical, algorithmic, story, rule using, decision making, troubleshooting, diagnostic, case analysis, design, strategic performance, and dilemma). Bridge from worked example(s) to problem task. Align practice with type of problem and strategy. Progress from simple to complex with varied new and relevant problems. Encourage reflection on solutions, provide feedback, and fade out coaching (scaffolding).
Cognitive strategies (self-regulated learning) The student will plan, monitor, and control personal ways of thinking and learning.	Introduce benefits of cognitive strategies. Prompt recall of ways of thinking and results. Explain strategy(ies) and purpose(s). Provide opportunities for inventing and practicing strategies, and experience results.
Attitude (dispositions) The student will voluntarily express a disposition to make a desired choice among alternatives.	Provide relevant choices, pros and cons, and their consequences. Relate choices to larger set of values. Stimulate empathy related to choices. Provide a respected model who advocates or shows the desired choice and positive results. Provide role-playing opportunities. Provide situations for making the choice and reinforcement for the desired choice.

In representing learning outcomes and conditions, you can see that this table shows more similarities than differences with Davis and Arend's framework. Davis and Arend offer more specific examples of methods, whereas the instructional design literature gives a broad strategy that encompasses such examples. For instance, simulations and dramatic scenarios can help develop problem-solving. Davis and Arend also include *practicing professional judgment* and *reflecting on experience* as additional outcomes.

One more set of teaching and learning principles, one that overlaps very little with those mentioned thus far, deserves recognition. In their concise, literature-packed volume, Persellin and Daniels (2014) derive six principles, the first three of which come from cognitive psychology and the fourth of which hails from multimedia research. After each principle, they list instructional applications:

1. Desirable difficulties enhance long-term retention.
   Instructional applications: Quizzes; opportunities for students to generate and apply material; spaced and interleaved practice sessions; occasions for students to work through confusion and frustration; challenging (but comprehensible) readings; extended wait time after posing questions; concept mapping.

2. Meaningful spaced repetition enhances retention.
   Instructional applications: Regular and frequent quizzes; division of a skill into component parts and occasions for students to practice the weaker parts; encouraging students to study the material daily and to create their own review tools.
3. Emotional intensity and relevance deepen learning.
   Instructional applications: Personalized and positive classroom environment; dramatic, surprising, and humorous instructor behavior; opportunities for students to react to material emotionally; frequent, low-stakes feedback; oral presentation of emotional material; actions and words to increase student self-efficacy; hooks to capture student attention; games for reviewing material; storytelling; examples of the relevance of the material from current events, popular media, and students' lives both now and potentially in the future.
4. Multisensory learning deepens learning.
   Instructional applications: Assignments and activities in which students experience the materials in at least a few of the following ways: reading, seeing, drawing, hearing, writing about, talking about, thinking about, acting out, reenacting, and touching; use of PowerPoint for images; students' reaction to controversial material in a human agree–disagree spectrum, integrated with debate; student presentations in the style of a micro-TED talk or PechaKucha (twenty slides each shown for twenty seconds) with emphasis on graphics, followed by discussion.
5. Small group work engages students.
   Instructional applications: Any of a wide variety of structured cooperative learning activities (e.g., think–pair–share, jigsaw, fishbowl, send a problem, numbered heads together); document-sharing with collaborative editing; peer review of writing; team-based learning; problem-based learning; process-oriented guided-inquiry learning (POGIL).
6. Low-stakes formative assessment enhances retention.
   Instructional applications: Any of a wide variety of structured classroom assessment techniques (e.g., minute paper, muddiest point, and background knowledge probe); knowledge surveys (of students' confidence in their ability to perform tasks or answer questions on course material); lecture notes exchange between student pairs, followed by fill-ins and corrections; student-created flash cards; prelesson and postlesson quizzes; survey of student mis/preconceptions; student-generated test questions; extended wait time after posing questions; ConcepTests (multiple-choice items followed by a round of anonymous individual responses, then small-group discussion, and finally another round of anonymous individual responses using low-tech or high-tech response collection systems).

Principles 1, 3, and 4 are relatively new to the literature on teaching and learning principles. However, even in these, we see some overlap with Ambrose et al. (2010): the relevance of the material as a key motivator and the decomposition of complex skills into component parts, with practice opportunities for students in their weaker subskills. In addition, multisensory learning bears partial similarity to Chickering and Gamson's (1987) best practice of appealing to different ways of learning.

Persellin and Daniels's (2014) principles 2, 4, and 6 all pertain to practice. Principle 6 on formative assessment translates into the kind of practice with feedback that Ambrose et al. (2010) emphasize. Of the other principles, principle 2, on the best schedule for practice, hails from cognitive psychology and instructional design, which also draws on cognitive psychology. Principle 4, on the efficiency of multisensory practice, identifies learning factors not mentioned before in the face-to-face teaching literature and hails from instructional design.

Principle 5 makes the claim that group work engages students, which is not the same as improving retention or deepening learning, but it recalls Chickering and Gamson's (1987) best practice about ensuring cooperative interaction among students. Davis and Arend (2013) also mention group work but only as an especially effective method for broadening students' awareness and understanding of different perspectives and attitudes, which should further develop their social and collaborative skills.

A Synthetic List of Best Practices

So let's put all the principles together into one list of best teaching practices for faculty:

1. Interact with students as much as possible.
2. Give students opportunities to work in small groups.
3. Build in active learning.
4. Provide students with plenty of practice in the desired performances, spacing and interleaving that practice, and varying the sense or modality in which students get it. Of course, the teaching methods that afford the most effective practice will vary by the type of performance outcome.
5. Give students feedback that is prompt and targeted toward improving their competency in the desired performance.
6. Ensure students spend as much time as possible learning the material (time on task).
7. Set and communicate high expectations of students.
8. Find out students' course-related prior knowledge, remediate or activate it, have them self-assess their familiarity with it, and correct their errors and misconceptions.
9. Ensure that the organization of students' prior knowledge is valid. If it is valid, help students make more interconnections between important and meaningful features such as concepts and principles. If it is not valid, devise ways to make students' faulty mental model look inferior to your discipline's (see chapter 4).
10. Build desirable difficulties into student learning with challenging assignments and activities, spaced and interleaved practice sessions, and extended wait time after questions.
11. To motivate students, enhance the value of the material by displaying enthusiasm for it, rewarding students for achieving outcomes, and demonstrating the relevance of the material to real-world applications and students' current and future lives.
12. Create a supportive environment for learning by aligning outcomes, learning activities, and assessments, incorporating early assessments that build student confidence, teaching students how to learn the material, clearly explaining expectations for performance, and building choice and reflection into the learning process.
13. Help develop mastery by decomposing complex tasks into component skills, giving students practice and assessments in their weaker skills in different contexts, challenging students to link contextual learning experiences to general principles, and giving them practice in deciding where different skills and knowledge apply in various contexts.
14. Create a positive, inclusive, personalized course climate that allows different points of view, answers to questions, and approaches to a problem, but also requires evidence and honors ground rules for interaction.
15. Engage students in activities and assignments in which they practice self-regulated learning: planning, monitoring, and evaluating their learning and modifying their strategies to optimize it. These activities and assignments may involve goal setting, task analysis, rubric analysis, analysis of excellent and poor models, self-assessment, self-correction, assessment of peers' work, or assessment of study strategies.
16. Educate students about brain plasticity and the effort, self-awareness, and persistence that learning requires.
17. Inject emotions into presentations, activities, assignments, and reflections, and help students become more aware of their emotions by having them talk and write about them.

THE MANY MODES OF TEACHING TODAY

Several trends and events have been pushing more traditional colleges and universities to move an increasing number of their courses and programs wholly or partially online. This means that faculty must be prepared to teach in a variety of modalities beyond face-to-face—specifically, hybrid, remote, hyflex, and fully online. We will start with the most obvious event.

Trend 1. COVID-19. The virus made face-to-face classroom meetings dangerous and forced institutions to adopt alternative course delivery methods, all of which rely on web-based learning to a greater or lesser extent. Institutions of all types—public universities, Ivy League and other private institutions, community colleges, and others—moved all or most of their face-to-face classes wholly or partially online, including laboratory and experiential learning activities, and the number of institutions doing so increased through the fall of 2020. Institutions announced temporary sources of free online access through Comcast, Charter, Spectrum, AT&T, and other carriers. They also developed more online student support services for library resources, learning assistance, career services, health services, housing, and the like (Hodges, Moore, Lockee, Trust, & Bond, 2020; Online learning, 2020).

Even before COVID-19 entered the North American lexicon, a survey of 398 school administrators and 1,500 students conducted by BestColleges found that online programs continued to be in high demand. Ninety-nine percent of administrators reported a stable number or an increase in online students since the previous year. Furthermore, over 94 percent of the students claimed high satisfaction with their online courses (BestColleges, 2020). These students, of course, consciously selected an online learning course of study.

Relatedly, another report indicated that traditional public four-year institutions had slightly lower enrollment (1.4 percent), as did private nonprofit ones (2 percent), but those that were predominantly online before the pandemic actually experienced growing enrollments for both undergraduate (6.8 percent) and graduate students (7.2 percent) (St. Amour, 2020, ¶44). Several other studies showed that, regardless of campus type, students taking one or more online classes enjoyed higher undergraduate degree completion rates (Wavle & Ozogul, 2019).

Two additional trends have contributed to the popularity of fully online learning specifically:

Trend 2. Increasing nontraditional student population, for which online education is a scalable strategy (Brown, McCormack, Reeves, Brooks, & Grajek, 2020)

Trend 3. Climate change, which will pressure institutions to expand their online curriculum as a more sustainable, lower carbon-footprint model (Brown et al., 2020)

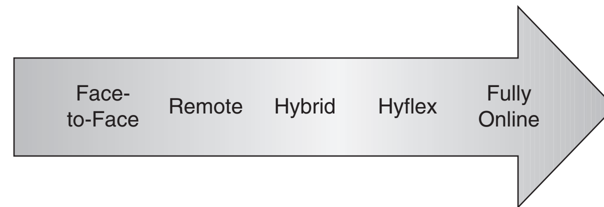
Because fully online learning offers a long-term solution to all these challenges and demographic realities, we will devote most of this book to online learning, as we did the first edition. However, we will also give attention to the other latest course delivery methods.

A Continuum of Different Teaching Modes

We call course delivery options *teaching modes* and see them on a continuum from more to less synchronous anchored by face-to-face on one end (the most synchronous) and fully online (the least synchronous) on the other, as Figure 1.1 shows. The differences among these modes reside in the place and spaces of teaching and learning, not in the pedagogy. Let's begin with the modes on each end of the continuum—"face-to-face" and "fully online."

- *Face-to-face* designates courses where students meet with their instructors at the same time in the same place, typically a campus classroom. These traditional classes often are supported with some forms of technology, such as clickers, online polling or surveys, some mobile learning activities, flipped classroom activities, and the learning management system (LMS) or another website for posting class materials. Not all instructors take advantage of these optional technologies, but many do.
- *Fully online* designates courses in which students access all the learning materials and activities through the Internet, whether within an LMS or a course website. Because the distinguishing advantage of online learning is the ability of anyone, anywhere to take the course, it is designed to be primarily asynchronous yet may include scheduled real-time chats or web conferences. Many LMSs, including Canvas and Blackboard Learn, integrate such synchronous-learning options.

Figure 1.1 A Continuum of Course Delivery Options or "Teaching Modes"



Next, we have variations between face-to-face and online—remote, hybrid, and hyflex—that sometimes use the same technology tools—most commonly, the LMS.

- *Remote* has more than one meaning in the world of education. Some institutions define it simply as learning that takes place outside of the physical classroom, made possible by using synchronous or asynchronous technology to connect instructors with their students. A few places consider "remote" as a temporary mode of instruction on the faculty's way to improving their courses from face-to-face to fully online, such as Memorial University in Newfoundland, Canada (https://blog.citl.mun.ca/instructionalresources/remote-vs-online-instruction/) and Randolph Macon College in Virginia (https://library.rmc.edu/remote-teaching). Some show "remote" as synonymous with "online" such as Walsh College in Michigan (https://www.walshcollege.edu/blog/are-remote-learning-and-online-classes-the-same). Most, however, rely on web conferencing to implement remote learning (Lederman, 2020a). For example, from the University of Colorado Boulder Learning Design Group (2020):

> In a remote course, faculty usually have a synchronous component during a designated time which usually corresponds to the time the course would be offered face-to-face. Additional course content is also available in an online format and is in the university's Learning Management System (LMS) . . . (p. 2).

A May 2020 survey of 308 chief online officers found that all universities and colleges used web conferencing—about 90 percent using it "universally" or "widely" as well as making extensive use of the LMS, which the report cited as the "workhorse of remote teaching" for spring 2020 (Garrett, Legon, Fredericksen, & Simunich, 2020, p. 26). Of course, most faculty were using the LMS to a greater or lesser degree before the pandemic.

- *Hybrid*, also called blended, designates courses that combine face-to-face classroom meetings with asynchronous online learning. They take advantage of the same technologies and active-learning strategies used in both face-to-face and online spaces. The number of classroom versus online sessions varies. On some campuses, a course with more than 50 percent of the sessions online will be called an online course rather than hybrid or blended.
- *Hyflex* designates a hybrid-flexible (hyflex) mode, sometimes called blend-flex. Hyflex has a flexible participation policy that allows students to take courses by attending on-campus classes, participating online, doing both, or viewing the video of the class later. Course content, structure, and activities must work equally well face-to-face and online. Each institution determines the structure and the students' degree of flexibility. Typically, in a hyflex course, the same faculty member teaches both in person and online at the same time (Kim & Maloney, 2020). Beatty (2019c) provides practical guidelines on how to manage course design and teaching and sums up the hyflex challenge this way:

> You want to be able create a fully online version and a fully face-to-face version and find ways to bring them together into a single course experience that has multiple participation paths . . . (quoted in Lederman, 2020b, ¶15)

Although the few students experienced with virtual high school may be comfortable with technology-supported teaching and learning, the vast majority of students accustomed to a face-to-face education feel that not all modes are equal. For example, Carnegie Dartlet conducted a survey of 2,800 high-school seniors in early May 2020. A full 95 percent of these prospective students said that even partially online courses were not worth as much to them as face-to-face courses. Therefore, many of them and their parents demanded a tuition reduction in fall 2020. About a third expected a slight reduction and another third, a significant reduction; one quarter just wanted the fees associated with residing on campus to be eliminated. However, remote, hyflex, and hybrid courses were more tolerable to all except 3 percent of students. Those from economically disadvantaged homes objected more than any other demographic group to fully online courses without a cost reduction (Carnegie Dartlet, 2020, p. 11). While 42 percent planned to start college in the fall no matter what the mode, one third said that they intended to cancel or at least defer college attendance in the fall if they could enroll only in fully online classes (Carnegie Dartlet, 2020, pp. 3, 7).

In spite of COVID-19 health concerns, these strong student preferences placed enormous pressure on institutions for face-to-face and hyflex courses, often over faculty objections. Fortunately, only a 2.5 percent undergraduate attendance drop materialized in the fall of 2020 (June, 2020). Then, before and during the fall term, COVID-19 flare-ups forced institutions to move more courses to remote and fully online modes.

The Effectiveness of Different Modes

Fortunately, online learning has attracted a huge body of knowledge about what works and what doesn't in increasing student achievement. We know that e-learning improves when pedagogy drives the technology and when faculty implement best practices (Jackson & Anagnostopoulou, 2018; Simonson, Smaldino, & Zvacek, 2015; Smith, 2014; Xu & Jaggars, 2013). As expected, the quality of course design also changes the odds of students' course completion (Baum & McPherson, 2019; Funk, 2007; Lee & Choi, 2010; Miller, 2012; Monteiro et al., 2017; Xavier & Meneses, 2020). So does instructor engagement (see chapter 6). Among the most powerful best practices across environments are opportunities for student collaboration, self-reflection, and self-monitoring (Hattie, 2017; Means, Toyama, Murphy, Bakia, & Jones, 2010).

In actuality, for more than a decade now, we have known that when online faculty follow good teaching practices, their students can learn a little more than in a comparable face-to-face course (Elkilany, 2015; Guidera, 2003; Means et al., 2010; Shachar & Neumann, 2010). We also have evidence that well-designed hybrid courses can match or slightly exceed both face-to-face and online courses in fostering both student learning and satisfaction (Aly, 2013; Barker, 2015; Beatty, 2019b; Bowen, Chingos, Lack, & Nygren, 2014; Broida, n.d.; Corgan Monto, 2016; Dziuban, Graham, Moskal, Norberg, & Sicilia, 2018; Gerbic, 2011; Quarless & Nieto, 2013; Yuen, 2011). Synchronous hybrid classes may be more engaging than fully face-to-face or fully online (Raes, Detienne, Windey, & Depaepe, 2019). For performance learning, such as lab, clinical, and medical procedures, research tells us that virtual and hybrid learning can produce equal or better learning outcomes (Bortnik, Stozhko, Pervukhina, Tchernysheva, & Belysheva, 2017; Darby-White, 2016; Kyaw, Saxena, Posadzki, Všetečková, Nikolaou et al., 2019; McCutcheon, O'Halloran, & Lohan, 2018; Stieff, Werner, Fink, & Meador, 2018). It is likely that the instructors of online and hybrid courses take greater advantage of the wealth of online instructional resources than do those teaching face-to-face courses. These resources encompass rich multimedia learning objects and simulations, the always available community of learners in the course, the 24/7 access to content and instructions, and the reflection time built into asynchronous discussion (discussion forums) (Conrad & Donaldson, 2012; de Lima, Gerosa, Conte, & de M. Netto, 2019; Price, Arthur, & Pauli, 2016; Riggs & Linder, 2016; Verenikina, Jones, & Delahunty, 2017).

We also have some crucial information about remote learning. First, while student learning suffered in the spring 2020 shift from face-to-face to remote, incorporating peer instruction (e.g., group work during and outside of web conferences, group exams) made up for a significant portion of the loss, while polling had no effect (Orlov et al., 2020). Second, students feel socially closer to the instructor when viewing a live online lecture than a pre-recorded one (Al Amer, 2018). Third, applying some of the best teaching practices enhances student satisfaction. These best practices include lecturing less, making regular use of breakout rooms for short group discussions, and

taking measures to ensure that students prepare for meetings. Hersh (2020) found that his students recommended and expressed satisfaction with these practices. Two nationally representative surveys of over 1,000 undergraduates from 1,500 colleges echoed Hersh's experience and validated other best practices as well: using web conferences for discussing and asking questions, giving real-world examples, administering frequent quizzes, reaching out to students with personal messages, making assignments that let students express their learning, segmenting activities into shorter pieces, and assigning group projects (Lederman, 2020c).

However, only about one fifth of instructors relied on these best practices, and more than 60 percent of the almost 4,800 faculty respondents in one of the surveys cited their biggest problem as keeping their students engaged (Lederman, 2020c, ¶20, ¶22). Indeed, relatively few students and instructors were satisfied with the spring of 2020.

When the COVID pandemic hit, many institutions had "only a week or two to convert over 500 courses to remote instruction," more than "900 at the typical regional public university, and over 2,000 at enterprise institutions and research universities" (Garrett et al., p. 8). It is not surprising that many faculty, students, and institutions were unprepared for how to manage this new mode of instruction. Instructors accustomed only to the face-to-face mode shifted *en masse* to remote because it most resembled the live classroom and enabled them to use their spring 2020 lesson plans with minimal modification.

In addition to the lack of preparation time, the shift to remote offered too little instructional design support, few technology resources, insufficient faculty training, inadequate institutional infrastructure, and a lack of coordination. Yet, looking back on this monumental challenge, 78 percent of the online administrators in the CHLOE 5 2020 survey judged the pivot to remote teaching as at least "largely successful" (p. 5). They reported that more than half of their campus-based students felt neutral or positive about the change, with only 20 to 25 percent feeling unfavorable (p. 6). Schools with previous online instruction experience offered a stronger technology toolkit to support their faculty, and those instructors who had already taught online courses were better prepared.

San Francisco State began considering the hyflex mode in 2005 because it couldn't establish a fully online program at the time, faculty had little online teaching experience, and although the institution wanted more online instruction, it did not want to give up on-campus classes (Beatty, 2019a). The research base for hyflex design included principles of design for hybrid classes and methods of remote participation. A prepandemic review of research since 2007 indicated that students had positive feelings and satisfaction with the hyflex mode, but little is known about the impact on student learning (Beatty, 2019b).

The safety precautions that resulted from the coronavirus affected face-to-face, hybrid, and hyflex modes the most. The first two modes were almost eliminated, and hyflex became troublesome. Students attending face-to-face had to sit socially distanced in relatively large classrooms and wear masks. This means that, during group work, students couldn't huddle together and speak quietly, nor did they have the benefit of reading each other's lips while listening. They had to speak more loudly, which increased the overall noise level in the room and further inhibited hearing (McLoon & Berke, 2020; McMurtie, 2020; Wang, Huang, & Quek, 2018). In addition, these students had trouble hearing the remote students unless they too used laptops, possibly straining the classroom Wi-Fi, or the instructor had to repeat everything the remote students said (McLoon & Berke, 2020; McMurtie, 2020; Wang et al., 2018). In turn, the remote students struggled with hearing their classroom peers, unless the room came well-equipped with high-quality, noninterfering microphones. The remote students also encountered problems with inadequate technology or bandwidth at home, unstable audio and video, the distraction of a rapidly scrolling chat box, and the failure of the webcam to fully capture the instructor's nonverbal communication or the demonstrations (Franklin, 2020; McLoon & Berke, 2020; McMurtie, 2020; Wang et al., 2018). Finally, the instructor had to toggle eye contact and attention between the two groups, try to keep up with questions and comments in the chat box, and work with both microphones and the web conference technology, plus any other presentation-related technology. All these "subactivities" distracted faculty from actual teaching and caused undue stress (Franklin, 2020; McLoon & Berke, 2020; McMurtie, 2020; Wang et al., 2018). In addition, an instructor's planning work in a hyflex course doubled or tripled (Eyler quoted in McMurtie, 2020). Some of these problems have solutions. The faculty may surmount their own challenges with practice and training, and the administration can invest in stronger Wi-Fi

and top-quality microphones. But unless the instructor simply relies on lectures, most of the students' problems are more difficult or impossible to solve during this pandemic.

Unsurprisingly, choice affects how students react to a teaching mode, we have some evidence that they feel that they learn better and are more satisfied when they select the learning mode, but in the study by Rhoads (2020) the choice was only between hybrid and hyflex.

THE SPECIAL CHALLENGES OF ONLINE LEARNING

Online education has been growing for decades and at a faster rate than on-campus courses. The Babson Survey Report from 2018 indicated a steady increase for the previous fourteen years and a faster rate of growth in the most recent years (Seaman, Allen, & Seaman, 2018). By 2016, the number of students enrolled in a distance education course was 4,380,420 at public institutions, 1,147,028 in private-for-profit ones, and 831,673 at for-profit institutions. Data from multiple sources recorded 6.1 million students enrolled in distance education/online learning by 2017 (Bastrikin, 2020). Correspondingly, the number of faculty teaching online courses also increased. According to a Gallup survey of 1,967 faculty and 178 digital learning leaders, the number of faculty teaching online continues to increase each year (Jaschik & Lederman, 2020). Additionally, most faculty members indicated they converted a face-to-face course to an online course (74 percent) and a face-to-face course to a hybrid one (77 percent) (p. 12). Still, the learning curve may be a challenge with only 25 percent having taught online classes for over ten years and 41 percent having taught online classes for under five years (p. 9).

Perhaps college pedagogy has not yet had enough time to catch up with this rapid expansion because online learning encounters challenges from two sources: the students who take these courses and the faculty—both those teaching online courses and those who are not teaching them yet. We first examine the stubbornly lower completion rates of online versus face-to-face courses and then address the challenges that faculty face in moving to online teaching. For faculty, these go beyond the technological to encompass social and pedagogical as well.

Challenges from the Students

Despite these impressive figures of students' participation, their completion of online courses remains a problem. According to diverse sources, the overall retention rates for online courses are 10 to 20 percent below those for face-to-face courses (Bawa, 2016). Barshay (2015) summarizes the results of five recent studies, all of which found that community college students are less likely to do well in online courses than in the comparable traditional courses. The most recent study she describes shows that although the stronger California students tend to enroll in the online version of a community college course, they are 11 percent less likely to complete, pass, or get an A or a B, regardless of their economic and academic background. Admittedly, the gap has almost disappeared at the more elite institutions that accept the most motivated and best academically prepared students (Barshay, 2015).

Through these murky figures, it is still clear that many students need more than the convenience of online learning and more than an online collection of content, activities, assignments, and assessments. They need support and motivation to persist and succeed. An instructor's social presence, clear directions and expectations, good course design, relevant course materials, and engaging assignments all help students learn and complete their courses (Baldwin & Ching, 2019; Ley & Gannon-Cook, 2014; Martin, Ritzhaupt, Kumar, & Budhrani, 2019; Monteiro et al., 2017; Sheridan & Kelly, 2010; York & Richardson, 2012).

Challenges from the Faculty

According to the *2019 Survey of Faculty Attitudes on Technology: A Study by Inside Higher Ed and Gallup* (Jaschik & Lederman, 2020), faculty members feel more favorably about online learning than they did in the past. Fifty-seven

percent of instructors said that they believe students learn better when engaged with effective technology tools, and almost as many (54 percent) like experimenting and have had instructional success with these tools. More than three-quarters of those with experience teaching online (77 percent) additionally reported that this experience helped them improve their teaching in general, such as reflecting more deeply on ways to engage their students. Fifty-five percent of faculty who have taught online believe that online instruction is just as effective as face-to-face teaching, although only 44 percent of experienced online faculty agree. Instructors who have never taught online courses feel less sanguine about the prospect that online courses can achieve the same outcomes (p. 26). Yet, the push for faculty to develop more and more online courses as quickly as possible can leave inadequate time to learn how best to use the technology (Meyer & Murrell, 2014). Further, in the 2020 rush to remote learning, many faculty aired their negative experiences with unfamiliar technology, inexperience, and too little support.

Technology tools and ways to use them are the specialties of technology administrators, not faculty or teaching and learning scholars. It is not surprising that technology administrators provide faculty training for online courses that emphasize what and how to use the technology tools. As a result of faculty reservations and thin pedagogical training, many online instructors have not yet incorporated the best teaching practices throughout their courses. When building online materials and dealing with technical issues, they tend to give more attention to getting the technology right than getting the teaching right, even overlooking the strategies they already use in their traditional courses. In fact, long before 2020 they had admitted to inconsistently applying and often omitting one or more of the seven principles of good practice in undergraduate education (Zhang & Walls, 2009).

It is not the faculty's fault. Left with little time and mental resources to move beyond the technology, faculty put pedagogy in the background. Too few institutions give them the pedagogical support to integrate best teaching practices with the technology tools they use. Technologies *can* fit well with the teaching methods that would work best for a course. However, the mix of technology training, the absence of pedagogy in online course design standards, and the high cognitive load in using the technology create a context in which faculty have trouble discerning the "best fit."

INTERWEAVING TWO UNCONNECTED LITERATURES

In earlier years, there were few empirical data on what constitutes good pedagogy online (Newlin & Wang, 2002). More recently, some research studies put good pedagogy into practice with positive results.

Much of the online learning literature informs technologists and instructional designers but offers little help to faculty who tend to miss out on the research and strategies featured in such publications. Likewise, instructional designers tend to miss out on the college teaching and learning literature. This body of literature, often called the scholarship of teaching and learning (SoTL), provides a well-researched tool kit for faculty who teach. Instructional designers also have their own well-researched tool kit (e.g., Dick et al., 2015; Gagné et al., 2005; Smith & Ragan, 2005a, 2005b; Spector, Merrill, Elen, & Bishop, 2014). Yet these bodies of literature tend to reside on separate sides of the canyon.

As an example, Smith and Ragan (2005a, 2005b) do a fine job of explaining instructional design theory and procedures, but they do not integrate SoTL evidence-based teaching practices from the higher education teaching and learning community, nor do they speak to the needs of those on the online frontline, the faculty who most often design and teach these courses. Similarly, the Dick et al. book (2015) on systematic design of instruction excellently covers instructional analysis, the types of assessments for different levels of learning, and formative evaluation, but it limits pedagogy to constructivist strategies (e.g., Pelech & Pieper, 2010). Sponsored by the Association for Educational Communications and Technology (AECT), the fourth edition of the *Handbook of Research on Educational Communications and Technology* (Spector et al., 2014) includes some evidence-based pedagogy, including discipline-specific teaching strategies, but its primary audience is instructional designers and technologists.

SoTL-based pedagogy is also rare in other books on online teaching. For example, *25 Years of Ed Tech: Issues in Distance Education* (Weller, 2020) provides a useful historical reference for technologies through 2018 but not approaches for online course design and teaching. *Best Practices for Teaching with Emerging Technologies* (Pacansky-Brock, 2017) is another technology-oriented resource. *Meaningful Online Learning: Integrating Strategies, Activities, and Learning Technologies for Effective Designs* (Dabbagh, Marra, & Howland, 2019) incorporates several basic instructional strategies and technologies for K–12, higher education, corporate, government, and healthcare learning but has a limited concept of meaningful learning. *The Perfect Online Course: Best Practices for Design and Teaching* (Orellana, Hudgins, & Simonson, 2009) provides a mosaic of research and framework perspectives in a collection of articles, only a few of which address pedagogical issues. Dooley, Lindner, and Dooley (2005) and Jia (2012) take similar approaches. So do Stavredes and Herder (2014), whose guide for online course design limits instructional strategies to cognitive presence, teaching presence, and scaffolding.

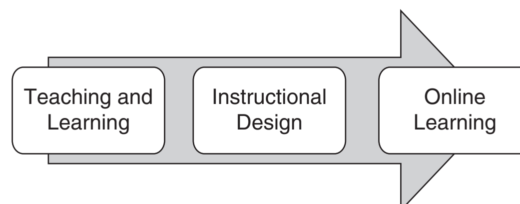
By the same token, faculty, educational developers, and SoTL advocates seem unaware of the instructional design literature. Their research focuses on classroom teaching and learning. The technologies it integrates fit best into face-to-face settings (e.g., clickers and mobile learning) and hybrid courses (e.g., online quizzes and videos for the flipped classroom). Yet the instructional design literature addresses the conditions of learning in ways that are applicable to traditional classroom as well as online courses and would complement, even extend, many of the findings in the SoTL literature.

For example, instructional design research offers evidence-based recommendations about fostering learning with visuals, including what types of visuals to use, how to place text on them, how to sequence text or narration with them, and whether to use text or narration to explain them (e.g., Clark & Mayer, 2016; Mayer, 2014). Its findings dovetail neatly with those in cognitive psychology. Other aspects also are deeply connected. For example, teachers of science courses use inquiry methods that originated with Gagné, a scholar and leader in instructional design. Indeed, Gagné's conception of science processes and methods of learning furnish the foundation for science curricula and instruction (Finley, 1983; Iatradis, 1993; Mewhinney, 2009).

Without a bridge to connect SoTL pedagogy, instructional design, and online learning (see Figure 1.2), it is no wonder that technology trumps pedagogy. Yet when good practices lead course design, online learning can be more effective than classroom learning and can produce better learning outcomes (Elkilany, 2015; Guidera, 2003; Means et al., 2010; Shachar & Neumann, 2010). Placing teaching and learning, rather than the technology, at the center of online courses could shift faculty expectations and raise the status and value that faculty accord to online teaching—in other words:

> An effective transition to online learning requires two key types of support: *increasing the value of online learning by enhancing faculty understanding of the pedagogical value* of technology and increasing competence in online learning, including faculty knowledge of specific technology-based skills. (italics added; Lu, Todd, & Miller, 2011, ¶6)

Figure 1.2 Bridging the Domains of Research and Applications



This book interweaves the findings from the most valid teaching and learning research with those from the instructional design and online learning literature. We believe that this integrated approach will make the most sense to faculty and will enable them to make reasoned choices about how to use technology for teaching and transfer best pedagogical practices into designing, teaching, and assessing in their online courses. Their decisions will more closely reflect the broad-based principles for good practice in undergraduate education, which we laid out at the beginning of this chapter in the section "Teaching Quality as Key to Learning," as well as research-backed ways to leverage those principles when using technology and designing online courses.

The principles of undergraduate education derive mainly from these sources:

- Principles for good practice in undergraduate education (Chickering & Gamson, 1987)
- Brain, mind, and school experiences (Bransford et al., 1999)
- Research-based principles for smart teaching (Ambrose et al., 2010)
- Evidence-based principles for improving student learning (Persellin & Daniels, 2014)

Later in this book we look at ways to leverage technology for online courses—for example:

- Technology for implementing the principles of undergraduate education (Chickering & Ehrmann, 1996)
- The science of instruction for multimedia design (Clark & Mayer, 2016)
- Transactional distance theory for design of online instruction (Koslow & Piña, 2015)
- Presentation design to facilitate online learning (Lumadue & Waller, 2014)
- Methods of technology-enabled learning (Moller, Robison, & Huett, 2012)
- Ways of establishing teacher presence in online courses (Shea, Vickers, & Hayes, 2010)

We also draw on bedrock principles of instructional design:

- Principles of instructional design (Gagné et al., 2005; Smith & Ragan, 2005a, 2005b)
- Systematic design of instruction (Dick et al., 2015)
- Instructional design for learning to solve problems (Jonassen, 2004)
- First principles of instruction (Merrill, 2002, 2018)
- Affective and cognitive instruction (Martin & Briggs, 1986)
- Theoretical foundations of learning environments (Jonassen & Land, 2012)
- Constructivist teaching (Pelech & Pieper, 2010)
- Instructional design knowledge base (Richey, Klein, & Tracey, 2011)

To these perspectives, we add factors associated with successful online courses (Means et al., 2010) and models of faculty development for online teaching (e.g., Meyer, 2014; Meyer & Murrell, 2014).

The online environment does not preclude faculty from respecting any of these principles, even if scholars developed them with the traditional classroom in mind. In fact, most of the practices and principles that appear in the instructional design literature can transfer to online courses. The specific ways that faculty can make this transfer, however, are not obvious because some kind of technology mediates the interactions with and among students, as well as the communications, practice opportunities, discussions, feedback, assessments, and motivational elements.

Indeed, in the candid words of several future-oriented instructional designers, adding "intellectual nutrition" to online courses will take us beyond "snake-oil salesmen and hucksters who favor style over substance" and generate principles for the next generation in online learning (Moller et al., 2012, p. 1). We will not have simply Internet-based courses, they write, but will create "technology-enabled learning environments" (p. 2).

The works summarized in this chapter make critical contributions to both the classroom and online teaching literature, but none provides a comprehensive compendium of all the universally applicable teaching and learning principles. We add more principles and apply them to online learning as we proceed through this book. We offer a coherent evidence-backed picture of pedagogically based, high-quality online teaching for the continuum of remote, hybrid, hyflex, and fully online teaching and the pedagogical considerations for each. This information will help administrators and faculty make informed choices and allow institutions to thrive not only during a pandemic but also after meteorological and geological disasters in the future.

Each of chapters 2 through 7 addresses a best teaching practice—really a number of related best practices—and how faculty can build remote, hybrid, hyflex, and especially online courses around them. Some of these have received little mention in the lists of learning principles and best teaching practices we've examined here. Two of the lists do acknowledge the importance of content relevance, but this is only one aspect of significant learning outcomes, the focus of chapter 2. Similarly, Ambrose et al. (2010) recommend alignment among learning outcomes, activities, and assessment as one way (among many) to foster student motivation through supporting learning, but we regard coherent course design as a much more central best practice, one that the online learning literature skims over. So we devote all of chapter 3 to it. We just as strongly endorse informing your teaching with the cognitive science research on learning, and we assemble the findings with an eye toward online application in chapter 4. We share with Ambrose et al. (2010) the conviction that student motivation underpins learning and so provide a more comprehensive list of motivators in chapter 5, along with ways to incorporate them into different modes of courses. Chapter 6 addresses the various forms of interaction—student–instructor, student–student, student–content, and student–technology—that have profound impacts on student success and satisfaction in all teaching modes. Accessibility isn't on any of the lists we have presented, and some would argue that it is only a design feature, but we consider it a best practice worthy of its own chapter (chapter 7).

Reflections

At the end of each chapter in this book, we list questions for faculty, instructional designers, and administrators to reflect upon. This section also serves as a summary of the knowledge to be applied from this chapter. Our intent is to facilitate application.

For Instructors

- What is the target course you wish to design online?
- What learning principles do you already use in your classroom or online teaching?
- What kinds of learning activities will fit well with your learning outcomes, content, and the principles of learning you want to apply in your course?
- How do you envision students' progression through learning activities from week to week (such as simple-to-complex, cause–effect, or some other progression)?

For Instructional Designers

- Where in the stages of instructional design would you begin to integrate the principles of learning with the events and conditions of learning?
- What preliminary course map could you develop from answers to the questions asked of instructors?

For Administrators

- How do you encourage the integration of principles of learning with technology training?
- What culture of faculty development would you like to create to support online course design and teaching?

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