

Teaching at Its Best, No Matter What the Environment

Abundant research shows that excellent teaching rests on the same principles across all platforms—classroom, online, or hybrid. But online education holds special challenges that stem from both students and instructors. Online faculty face challenges that classroom faculty do not. The demands or excitement of technology can easily distract online faculty and instructional designers from developing and 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. To identify these practices, we start with the face-to-face teaching literature and argue for its online applicability.

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

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, or hybrid. Why? Because in terms of the mind, learning is learning. Being the oldest type, face-to-face teaching has led the way in defining best practices, so we examine these practices later in the chapter and consider how smoothly they can transfer to technology-based environments.

The evidence for our claim that excellent teaching transcends the environment abounds. Simonson and Schlosser (2009) cite many sources and examples showing that what matters most in student learning is good teaching, not the technology. Waterhouse (2005) notes that e-learning improves when pedagogy drives the technology. Smith (2014) echoes this same theme, as does Funk (2007), who contends that ineffective online instruction lowers students' odds of course completion. Similarly, after a review of nearly five hundred online courses, Xu and Jaggars (2013) suggest that improvements in online courses would better support student success. After reviewing the research, Simonson, Smaldino, and Zvacek (2015) conclude, "What we know about best practices in education is directly applicable to distance education" (p. 73). Among the most powerful ones across environments are opportunities for student collaboration, as well as self-reflection and self-monitoring (US Department of Education, 2010; Hattie, 2009).

In fact, when online faculty follow good teaching practices, their students can actually learn a little more than in a comparable face-to-face course (Broida, n.d.; Shachar & Neumann, 2010; US Department of Education, 2010). The gain is due at least in part to the greater time on task that online learning typically requires. For example, unlike in a classroom, unprepared students cannot remain invisible if they must participate in a discussion forum (Brewer & Brewer, 2015; Lineweaver, 2010). Online and hybrid learning can offer other advantages over face-to-face, such as the rich multimedia resources available, the always available community of learners in the course, the 24/7 access to content and instructions, and the reflection built into asynchronous discussion (Conrad & Donaldson, 2012; Harlen & Doubler, 2004; Hiltz & Goldman, 2005; Jaffe, Moir, Swanson, & Wheeler, 2006; Rabe-Hemp, Woolen & Humiston, 2009; Riel & Polin, 2004; Schwen & Hara, 2004; Vrasidas & Glass, 2004).

Still, the quality of the teaching makes all the difference. Based on their extensive review of research on online learning, Tallent-Runnels et al. (2006) conclude:

Students' learning in the online environment is affected by the quality of online instruction. Not surprisingly, students in well-designed and well-implemented online courses learned significantly more, and more effectively, than those in online courses where teaching and learning activities were not carefully planned and where the delivery and accessibility were impeded by technology problems. (p. 116)

Online courses do present challenges that classroom courses do not. In the next section, we consider the amazing growth of online education in recent years, as well as the stubbornly lower completion rates of online versus face-to-face courses. Students, instructors, and institutions struggle with the completion challenge for online courses. The subsequent section addresses the challenges that faculty face in moving from exclusively classroom to online teaching. These go beyond the technological to encompass social and pedagogical as well.

■ THE SPECIAL CHALLENGES OF ONLINE LEARNING

Perhaps college pedagogy has not yet had enough time to catch up with the rapid expansion of online learning. The annual reports of institutions throughout North America and beyond document acceleration in the growth of online programs and courses:

- According to Allen and Seamon's *Grade Level: Tracking Online Education in the United States* (2015), 70.7 percent of all currently active, degree-granting institutions that are open to the public have some distance offerings.

- In 2013, the number of students enrolled in a distance education course was 3,750,745 in public institutions, 770,219 in private nonprofit ones, and 736,415 in private for-profit ones.
- The number of students taking at least one online course grew at an annual rate greater than that of the overall higher education student body.
- A 2014 survey by the Instructional Technology Council similarly reports that student enrollment in online courses has continued to grow faster than overall enrollment at colleges and universities (Lokken & Mullins, 2015).
- Besides fully online classes, more educators are turning to hybrid learning, using online course materials and activities to replace forms of face-to-face class time (Johnson, Adams Becker, Estrada, & Freeman, 2015).

As the demand for online learning keeps growing, we also anticipate that more universities will begin adding online course design to their instructional design master's and doctoral programs. Yet in spite of the radical expansion of online courses, they encounter 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.

Challenges from the Students

Despite these impressive figures of student participation, student 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. For example, according to US Department of Education data, the 55 percent average retention rate for first-time, full-time students in online courses was more than 20 percent lower than the national average retention rate of 77 percent in both traditional and online courses (Burnsed, 2010). Completion and retention data are available from the following reports:

- Variable completion rates, some equal to face-to-face classes, some lower, some higher, and differences in course completion rates by discipline (Atchley, Wingenbach, & Akers, 2013; Tallent-Runnels et al., 2006; US Department of Education, 2010)
- Noncompletion rates as high as 47 percent (Tirrell & Quick, 2012)
- Top-ranked online school retention rates ranging from 70 to 87 percent (Stone, 2014), and those at the top-twenty-five colleges hovering at 97 to 99 percent (Best Value Schools, 2014)
- No reports on completion rates for many institutions (US Department of Education, 2010)

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, relevant course materials, and engaging assignments help students learn and complete their courses (Boston et al., 2009; Ley & Gannon-Cook, 2014; Park & Choi, 2009; Sheridan & Kelly, 2010; York & Richardson, 2012).

Challenges from the Faculty

Although more and more faculty are teaching fully online or hybrid courses, many still have reservations about quality. According to the 2016 *Inside Higher Ed* Survey of Faculty Attitudes (Straumsheim, 2016), only 19 percent agree that for-credit online courses can achieve outcomes that are at least equivalent to those achieved in face-to-face courses, and 55 percent disagree or strongly disagree. Even faculty who teach online report doubt about their own courses, with 60 percent believing that student learning in online courses will fail to match that of their live counterparts. Only 4 to 6 percent think that online courses can exceed face-to-face instruction in rigorous student engagement, content delivery, and at-risk student success. These perceptions persist in spite of contrary findings reported in research studies. Perhaps the push for faculty to develop more and more online courses as quickly as possible leaves inadequate time to learn how best to use online technology, thereby keeping these doubts alive (Meyer & Murrell, 2014).

This same survey asked academic technology administrators similar questions and obtained considerably more positive opinions about the effectiveness of educational technology and online courses. For instance, 30 percent of the faculty believe that technology has not improved student learning outcomes at all, versus only 13 percent of the technology administrators. Similarly, 93 percent of the administrators believe that online courses provide the same or better quality of instruction than live ones, in contrast to 46 percent of the faculty, and only 4 percent of the faculty believe the quality of instruction to be better (Straumsheim, 2016).

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 these technology administrators provide faculty training for online courses that emphasizes what and how to use the technology tools. Because of this focus, faculty are left to tackle their online courses with too little teaching guidance for using those tools to actively support learning. When this happens, online student learning fails to measure up to classroom learning. Most likely, if faculty obtained stronger student learning and outcomes achievement in their online courses, their doubts and reservations would disappear.

■ THE SPECIAL CHALLENGES THAT ONLINE FACULTY FACE

Many online faculty 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, in their online courses, they admit to inconsistently applying and often omitting one or more of the seven principles of good practice in undergraduate education (Zhang & Walls, 2009). These principles are (Chickering & Gamson, 1987):

- Encourage contact between students and faculty
- Develop reciprocity and cooperation among students
- Encourage active learning
- Give prompt feedback
- Emphasize time on task
- Communicate high expectations
- Respect diverse talents and ways of learning

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. They focus on what an online course "is supposed to look like" to measure up to minimal technical standards, and too few institutions give them the pedagogical support to integrate best teaching practices with the technology tools they use. Aside from the fact that departments often leave faculty too little time to prepare strong courses, the standards that serve as guideposts for online course design tend to address minimum requirements and bypass both teaching pedagogy and online pedagogy (Hirumi, 2009). 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."

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 such as Barber, King, and Buchanan's (2015) application of problem-based learning in an online class community. But like many other studies, this research appears in a technical journal. The online learning literature informs technologists and instructional designers but offers little help to faculty, especially those beginning to teach online. Just as faculty tend to miss out on the type of research and strategies featured in technical publications, 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, Carey, & Carey, 2015; Gagné, Wager, Golas, & Keller, 2005; Smith & Ragan, 2005a, 2005b; Spector, Merrill, Elen, & Bishop, 2014). Yet these bodies of literature 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 front-line, 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, yet it limits pedagogy to constructivist strategies (e.g., Pelich & 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 more 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, *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 any 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. Unfortunately, none of the books on online learning provide faculty with a coherent picture of pedagogically based, high-quality online teaching.

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., personal response systems 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 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, 2011; 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; Iatrakis, 1993; Mewhinney, 2009).

Without a bridge to connect SoTL pedagogy, instructional design, and online learning (see figure 1.1), it is no wonder that technology trumps pedagogy and that many faculty remain suspicious of online teaching. Yet when good practices lead course design, online learning can be more effective than classroom learning and can produce better learning outcomes (Elkilany, 2014; Guidera, 2003; US Department of Education, 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)

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 examine in the next section, as well as research-backed ways to leverage those principles when using technology and designing online courses.

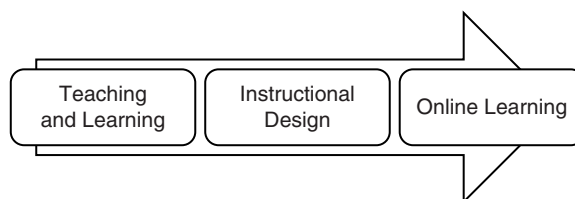
For this purpose, we draw on principles of undergraduate education such as these:

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

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, 2011)

Figure 1.1 Bridging the Domains of Research and Applications



- 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)
- 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 (US Department of Education, 2010) and models of faculty development for online teaching (e.g., Meyer, 2014; Meyer & Murrell, 2014). We also hope to better acquaint instructional designers with the highest standards in classroom teaching and their potential for expression in the online environment. This knowledge should enable them to communicate better with the faculty to whom they consult.

■ TEACHING AND LEARNING ACROSS ENVIRONMENTS

To identify proven principles of teaching and learning, we have to turn first to the face-to-face teaching literature. 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 about student-faculty contact, reciprocity and cooperation, active learning, promptness of feedback, time on task, high expectations, and diverse talents and ways students learn. 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; Koeckeritz, Malkiewicz, & Henderson, 2002; Lai & Savage, 2013; McCabe & Meuter, 2011; Newlin & Wang, 2002; Ritter & Lemke, 2000).

Based on research in education and educational psychology, Bransford et al. (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, some the major points they made—for example, on the importance of learners practicing metacognition, structuring knowledge, and having valid prior knowledge on which to connect new knowledge—have been suggested as principles in later books about college-level teaching and learning.

The first of these later books, by Ambrose et al. (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 study 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 et al., 2015; Gagné et al., 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 (table 1.1).

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

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

to apply a given principle to a real course. Davis and Arend's model helps you determine what teaching strategies are best aligned to 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. They similarly differentiate the effectiveness of different strategies for different purposes (e.g., Dick et al., 2015; Gagné et al., 2010; Jonassen, 2004, 2014; Smith & Ragan, 2005a, 2005b). However, they explicitly focus more on students' use of mental maps to acquire motor skills. Table 1.2 matches various intended learning outcomes with different conditions of

Table 1.2 Intended Learning Outcomes and Recommended Teaching Strategies

Intended Learning Outcomes	Recommended Teaching Strategies
<p>Motor skills The student executes muscular movements with standards of speed, accuracy, force, and smoothness.</p>	<p>Introduce whole- and part-task routines. Explain and demonstrate. Supplement 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 opportunity to adjust performance of part skills, connecting skills, and whole skills to desired proficiency level.</p>
<p>Verbal information The student articulates acquired knowledge such as labels or names, facts, and organized knowledge.</p>	<p>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, memory aids. Arrange active, spaced practice and informative feedback in using new knowledge.</p>
<p>Conceptual understanding The student classifies a concept according to physical, sensory, or defined attributes.</p>	<p>Present 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, best example to fuzzy example 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.</p>
<p>Use of lower-order rules The student uses two or more concepts connected as a rule to solve simple routine problems.</p>	<p>Introduce 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.</p>
<p>Use of higher-order rules The student uses two or more rules connected as a problem-solving strategy to solve more complex problems.</p>	<p>Provide authentic meaningful relevant task, 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, 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).</p>

(Continued)

Table 1.2 (Continued)

Intended Learning Outcomes	Recommended Teaching Strategies
Cognitive strategies (self-regulated learning) The student will monitor, plan, 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 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.

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).

In the representation of learning outcomes and conditions, you can see that there are more similarities than differences with Davis and Arend's framework. Differences include some specifications of the mental models and the examples that Davis and Arend use, whereas instructional design conditions give a broad strategy that could include such examples. For example, simulations and dramatic scenarios can fit with conditions for 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 overlapping 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 and 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 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.

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 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.

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 in choice and reflection on the learning process.
13. Help develop mastery by decomposing complex tasks into component skills, giving students practice in their weaker skills in different contexts, including the integration of skills in assessments, 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 requires evidence in student expression 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, and assessment of study strategies.
16. Educate students about brain plasticity and their 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 online environment does not preclude an instructor from respecting any of these principles, even if scholars developed them with the traditional classroom in mind. In fact, most of 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.

In online courses, some kind of technology mediates the interactions with and among students, as well as the communications, practice opportunities, discussions, feedback, assessments, and motivational elements. But technology doesn't make the students' learning experiences and social relationships with others in the course any less real. Furthermore, 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).

At the moment, faculty are not getting the help they need to translate high-quality classroom pedagogy to the online environment. As a result, student success in online courses lags, and many instructors view online education with skepticism.

The work summarized in this section makes 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.

Each of chapters 2 through 7 addresses a best teaching practice—really a number of related best practices—and how faculty can build 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. 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). We just as strongly endorse informing your teaching with all the cognitive science research on learning possible on best practices, 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 online courses.

Reflections

At the end of each chapter in this book, we list questions for faculty, instructional designers, and administrators to reflect on. 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 is the content structure of your target course?
- 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 support collaboration of faculty with instructional designers or others to integrate principles of learning with technology training?
- What culture of faculty development would you like to create to support online course design and teaching?

■ REFERENCES

- Allen, I. E., & Seamon, J. (2015, February). *Grade level: Tracking online education in the United States*. Babson Survey Research Group and Quahog Research Group. Retrieved from <http://www.onlinelearningsurvey.com/reports/gradelevel.pdf>
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass.
- Atchley, W., Wingenbach, G., & Akers, C. (2013). Comparison of course completion and student performance through online and traditional courses. *International Review of Research in Open and Distance Learning*, 14(4), 104–116. Retrieved from ERIC database. (EJ1017510)
- Barber, W., King, S., & Buchanan, S. (2015). Problem-based learning and authentic assessment in digital pedagogy: Embracing the role of collective communities. *Electronic Journal of E-Learning*, 13(2), 59–67.
- Barshay, J. (2015, April 27). Five studies find online courses are not working well at community colleges. *Hechinger Report*. Retrieved from <http://hechingerreport.org/five-studies-find-online-courses-are-not-working-at-community-colleges/>
- Best Value Schools. (2014, September). *25 colleges with high freshman retention rates*. Retrieved from <http://www.bestvalueschools.com/high-freshman-retention-roi/>
- Boston, W., Diaz, S. R., Gibson, A., Ice, P., Richardson, J., & Swan, K. (2009). An exploration of the relationship between indicators of the community of inquiry framework and retention in online programs. *Journal of Asynchronous Learning Networks*, 13(3), 67–83. Retrieved from ERIC database. (EJ909838)
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- Brewer, P. E., & Brewer, E. C. (2015). Pedagogical perspectives for the online education skeptic. *Journal on Excellence in College Teaching*, 26(1), 29–52.
- Broida, J. (n.d.). *Learner-centered model is cost-effective: Effective practice summary*. Retrieved from http://olc.onlinelearningconsortium.org/effective_practices/learner-centered-model-cost-effective
- Burnsed, B. (2010, October 22). Online universities: Retention rate data. *U.S. News & World Report: Education*. Retrieved from <http://www.usnews.com/education/online-education/articles/2010/10/22/online-universities-retention-rate-data>
- Chickering, A. W., & Ehrmann, S. C. (1996). Implementing the seven principles: Technology as lever. *AAHE Bulletin*, 49(2), 3–6. Retrieved from <https://www.aahea.org/articles/sevenprinciples.htm>
- Chickering, A. W., & Gamson, Z. F. (1987, March). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 39(7), 3–7. Retrieved from <https://www.aahea.org/articles/sevenprinciples1987.htm>
- Chickering, A. W., & Gamson, Z. F. (1999). Development and adaptations of the seven principles for good practice in undergraduate education. *New Directions for Teaching and Learning*, 80, 75–81.
- Clark, R. C., & Mayer, R. E. (2011). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning* (3rd ed.). San Francisco, CA: Jossey-Bass.
- Conrad, R., & Donaldson, J. A. (2012). *Continuing to engage the online learner: More activities and resources for creative instruction*. San Francisco, CA: Jossey-Bass.
- 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.

- Dick, W., Carey, L., & Carey, J. O. (2015). *The systematic design of instruction* (8th ed.). Upper Saddle River, NJ: Pearson.
- Dooley, K. E., Lindner, J. R., & Dooley, L. M. (2005). *Advanced methods in distance education: Applications and practices for educators, administrators, and learners*. Hershey, PA: IGI Global.
- Elkilany, E. A. (2015). The impact of applying instructional design principles on students' attitudes towards the learning content. *Journal of Arab and Muslim Media Research*, 8(2), 147–169. doi:10.1386/jammr.8.2.147_1
- Finley, F. N. (1983). Science processes. *Journal of Research in Science Teaching*, 20(1), 47–54.
- Funk, J. T. (2007). *A descriptive study of retention of adult online learners: A model of interventions to prevent attrition*. (Order No. 3249896). Available from ProQuest Dissertations and Theses Global. (304723480). Retrieved from <http://search.proquest.com/openview/e6183a94ca54e333bab714da3b8d6870/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Gagné, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (2005). *Principles of instructional design* (5th ed.). Belmont, CA: Wadsworth/Thomson Learning.
- Guidera, S. G. (2003). Perceptions of the effectiveness of online instruction in terms of the seven principles of effective undergraduate education. *Journal of Educational Technology Systems*, 32(2/3), 139–178.
- Harlen, W., & Doubler, S. (2004). Can teachers learn through enquiry online? Studying professional development in science delivered online and on-campus. *International Journal of Science Education*, 26(10), 1247–1267.
- Hathaway, K. L. (2014). An application of the seven principles of good practice to online courses. *Research in Higher Education Journal*, 22. Retrieved from <http://www.aabri.com/manuscripts/131676.pdf>
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York, NY: Routledge.
- Hiltz, S. R., & Goldman, R. (Eds.). (2005). *Learning together online: Research on asynchronous learning networks*. Mahwah, NJ: Erlbaum.
- Hirumi, A. (2009). Learning online: Adapting the seven principles of good practice to a web-based instructional environment. In A. Orellana, T. L. Hudgins, & M. Simonson (Eds.), *The perfect online course: Best practices for designing and teaching*. Charlotte, NC: Information Age.
- Iatradis, M. D. (1993). *Teaching science to children* (2nd ed.). New York, NY: Garland.
- Jaffe, R., Moir, E., Swanson, E., & Wheeler, G. (2006). Online mentoring and professional development for new science teachers. In C. Dede (Ed.), *Online teacher professional development: Emerging models and methods* (pp. 89–116). Cambridge, MA: Harvard Education Publishing Group.
- Jia, J. (2012). *Educational stages and interactive learning: From kindergarten to workplace training*. Hershey, PA: IGI Global.
- Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2015). *NMC horizon report: 2015 higher education edition*. Austin, TX: New Media Consortium. Retrieved from <https://net.educause.edu/ir/library/pdf/HR2015.pdf>
- Johnson, S. (2014). Applying the seven principles of good practice: Technology as a lever—in an online research course. *Journal of Interactive Online Learning*, 13(2), 41–50.
- Jonassen, D. H. (2000). Toward a design theory of problem solving. *Educational Technology Research and Development*, 48(4), 63–85.
- Jonassen, D. H. (2004). *Learning to solve problems: An instructional design guide*. San Francisco, CA: Jossey-Bass.
- Jonassen, D. H. (2014). Assessing problem solving. In M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (pp. 269–287). New York, NY: Springer Science & Business Media.
- Jonassen, D., & Land, S. M. (Eds.). (2012). *Theoretical foundations of learning environments* (2nd ed.). London, UK: Routledge.

- Koeckeritz, J., Malkiewicz, J., & Henderson, A. (2002). The seven principles of good practice: Applications for online education in nursing. *Nurse Educator*, 27(6), 283–287.
- Koslow, A., & Piña, A. A. (2015). Using transactional distance theory to inform online instructional design. *International Journal of Instructional Technology and Distance Learning*. Retrieved from http://www.itdl.org/Journal/Oct_15/Oct15.pdf
- Lai, A., & Savage, P. (2013). Learning management systems and principles of good teaching: Instructor and student perspectives. *Canadian Journal of Learning and Technology*, 39(3).
- Ley, K., & Gannon-Cook, R. (2014). Learner-valued interactions: Research into practice. *Quarterly Review of Distance Education*, 15(1), 23–32. Retrieved from http://www.aect.org/pdf/proceedings13/2013/13_16.pdf
- Lineweaver, T. T. (2010). Online discussion assignments improve students' class preparation. *Teaching of Psychology*, 37, 204–209. Retrieved from <http://dx.doi.org/10.1080/00986283.2010.488546>
- Lokken, F., & Mullins, C. (2015, April). *2014 Distance Education Survey results—Trends in e-learning: Tracking the impact of e-learning at community colleges*. Washington, DC: Instructional Technology Council. Retrieved from <http://www.itcnetwork.org/attachments/article/1171/AnnualSurvey2014PublishedApril2015FinalWeb.pdf>
- Lu, M., Todd, A. M., & Miller, M. T. (2011). Creating a supportive culture for online teaching: A case study of a faculty learning community. *Online Journal of Distance Learning Administration*, 14(3). Retrieved from http://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=1009&context=comm_pub
- Lumadue, R., & Waller, R. (2014). *Introduction to presentation design*. Retrieved from <https://itunes.apple.com/us/book/intro.-to-presentation-design/id884768442?mt=13>
- Martin, B. L., & Briggs, L. J. (1986). *The affective and cognitive domains: Integration for instruction and research*. Englewood Cliffs, NJ: Educational Technology Publications.
- Mayer, R. E. (2014). Commentary: Incorporating motivation into multimedia learning. *Learning and Instruction*, 29, 171–173. doi:10.1016/j.learninstruc.2013.04.003
- McCabe, D. B., & Meuter, M. L. (2011). A student view of technology in the classroom: Does it enhance the seven principles of good practice in undergraduate education? *Journal of Marketing Education*, 33(2), 149–159.
- Merrill, D. M. (2002). First principles of instruction. *Educational Technology Research and Development*, 50(3), 43–59.
- Mewhinney, C. (2009). *Interaction of learning approach with concept integration and achievement in a large guided inquiry organic class* (Doctoral dissertation). Retrieved from <http://digital.library.unt.edu/ark:/67531/metadc12163/>
- Meyer, K. A. (2014). An analysis of the research on faculty development for online teaching and identification of new directions. *Journal of Asynchronous Learning Networks*, 17(4), 93–112. Retrieved from <http://sloanconsortium.org/sites/default/files/8-meyer.pdf>
- Meyer, K. A., & Murrell, V. S. (2014). A national study of training content and activities for faculty development for online teaching. *Journal of Asynchronous Learning Networks*, 18(1). Retrieved from <http://files.eric.ed.gov/fulltext/EJ1030527.pdf>
- Moller, L., Robison, D., & Huett, J. B. (2012). Unconstrained learning: Principles for the next generation of distance education. In L. Moller & J. B. Huett (Eds.), *The next generation of distance education: Unconstrained learning* (pp. 1–19). New York, NY: Springer Science and Business Media.
- Newlin, M. H., & Wang, A. Y. (2002). Integrating technology and pedagogy: Web instruction and seven principles of undergraduate education. *Teaching of Psychology*, 29(4), 325–330.
- Nilson, L. B. (2013). *Creating self-regulated learners: Strategies to strengthen students' self-awareness and learning skills*. Sterling, VA: Stylus.

- Orellana, A., Hudgins, T. L., & Simonson, M. (Eds.). (2009). *The perfect online course: Best practices for designing and teaching*. Charlotte, NC: Information Age Publishing.
- Park, J. H., & Choi, H. J. (2009). Factors influencing adult learners' decision to drop out or persist in online learning. *Educational Technology and Society*, 12(4), 207–217.
- Pelech, J., & Pieper, G. (2010). *The comprehensive handbook of constructivist teaching: From theory to practice*. Charlotte, NC: Information Age Publishing.
- Persellin, D. C., & Daniels, M. B. (2014). *A concise guide to improving student learning: Six evidence-based principles and how to apply them*. Sterling, VA: Stylus.
- Rabe-Hemp, C., Woolen, S., & Humiston, G. S. (2009). A comparative analysis of student engagement, learning, and satisfaction in lecture hall and online learning settings. *Quarterly Review of Distance Education*, 10(2), 207–218.
- Richey, R. C., Klein, J. D., & Tracey, M. W. (2011). *The instructional design knowledge base: Theory, research, and practice*. London, UK: Routledge.
- Riel, M., & Polin, L. (2004). Online learning communities: Common ground and critical differences in designing technical environments. In S. A. Barab, R. Kling, & J. H. Gray (Eds.), *Designing for virtual communities in the service of learning* (pp. 16–50). Cambridge, UK: Cambridge University Press.
- Ritter, M. E., & Lemke, K. A. (2000). Addressing the “Seven Principles for Good Practice in Undergraduate Education” with Internet-enhanced education. *Journal of Geography in Higher Education*, 24(1), 100.
- Schwen, T. M., & Hara, N. (2004). In S. A. Barab, R. Kling, & J. H. Gray (Eds.), *Designing for virtual communities in the service of learning* (pp. 16–50). Cambridge, UK: Cambridge University Press.
- Shachar, M., & Neumann, Y. (2010). Twenty years of research on the academic performance differences between traditional and distance learning: Summative meta-analysis and trend examination. *MERLOT Journal of Online Learning and Teaching*, 6(2). Retrieved from http://jolt.merlot.org/vol6no2/shachar_0610.pdf
- Shea, P., Vickers, J., & Hayes, S. (2010). Online instructional effort measured through the lens of teaching presence in the community of inquiry framework: A re-examination of measures and approach. *International Review of Research in Open and Distributed Learning*, 11(3). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/915/1648?>
- Sheridan, K., & Kelly, M. A. (2010). The indicators of instructor presence that are important to students in online courses. *MERLOT Journal of Online Learning and Teaching*, 6(4). Retrieved from http://jolt.merlot.org/vol6no4/sheridan_1210.htm
- Simonson, M., & Schlosser, C. (2009). We need a plan. In A. Orellana, T. L. Hudgins, & M. Simonson (Eds.), *The perfect online course: Best practices for designing and teaching* (pp. 3–21). Charlotte, NC: Information Age Publishing.
- Simonson, M., Smaldino, S., & Zvacek, S. (2015). *Teaching and learning at a distance: Foundations of distance education* (6th ed.). Charlotte, NC: Information Age Publishing.
- Smith, P. L., & Ragan, T. L. (2005a). *Instructional design* (3rd ed.). Hoboken, NJ: Wiley.
- Smith, P. L., & Ragan, T. L. (2005b). *Instructor companion site*. Retrieved from <http://bcs.wiley.com/he-bcs/Books?action=index&itemId=0471393533&itemTypeId=BKS&bcsId=2112>
- Smith, R. M. (2014). *Conquering the content: A blueprint for online course design and development* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Spector, M., Merrill, M. D., Elen, J., & Bishop, M. J. (Eds.). (2014). *Handbook of research on educational communications and technology* (4th ed.). New York, NY: Springer Science & Business Media.
- Stavredes, T., & Herder, T. (2014). *A guide to online course design: Strategies for student success*. San Francisco, CA: Jossey-Bass.

- Stone, I. (2014, December). The 30 best online colleges 2014. *Best Value Schools*. Retrieved from <http://www.bestvalueschools.com/best-online-colleges-2014/>
- Straumsheim, C. (2016, October 24). Doubts about data: 2016 Survey of Faculty Attitudes on Technology. *Inside Higher Ed*. Retrieved from <https://www.insidehighered.com/news/survey/doubts-about-data-2016-survey-faculty-attitudes-technology>
- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1) 93–135.
- Tirrell, T., & Quick, D. (2012). Chickering's seven principles of good practice: Student attrition in community college online courses. *Community College Journal of Research and Practice*, 36(8), 580–590. Retrieved from ERIC database. (EJ971607).
- US Department of Education. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: Author. Retrieved from <http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>
- Vrasidas, C., & Glass, G. V. (Eds.). (2004). *Current perspectives in applied information technologies: Online professional development for teachers*. Greenwich, CT: Information Age Publishing.
- Waterhouse, S. (2005). *The power of e-learning: The essential guide for teaching in the digital age*. Upper Saddle River, NJ: Pearson.
- Xu, D., & Jaggars, S. S. (2013). *Adaptability to online learning: Differences across types of students and academic subject areas* (CCRC Working Paper No. 54). Community College Research Center, Columbia University. Retrieved from <http://ccrc.tc.columbia.edu/media/k2/attachments/adaptability-to-online-learning.pdf>
- York, C. S., & Richardson, J. C. (2012). Interpersonal interaction in online learning: Experienced online instructors' perceptions of influencing factors. *Journal of Asynchronous Learning Networks*, 16(4), 83–98. Retrieved from <http://files.eric.ed.gov/fulltext/EJ982684.pdf>
- Zhang, J., & Walls, R. T. (2009). Instructors' self-perceived pedagogical principle implementation in the online environment. In A. Orellana, T. L. Hudgins, & M. Simonson (Eds.), *The perfect online course: Best practices for designing and teaching* (pp. 87–104). Charlotte, NC: Information Age Publishing.