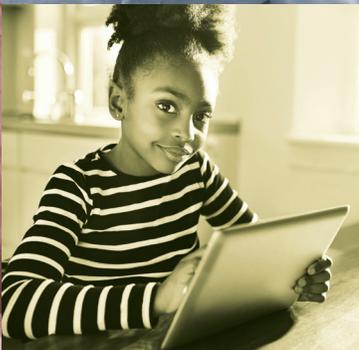
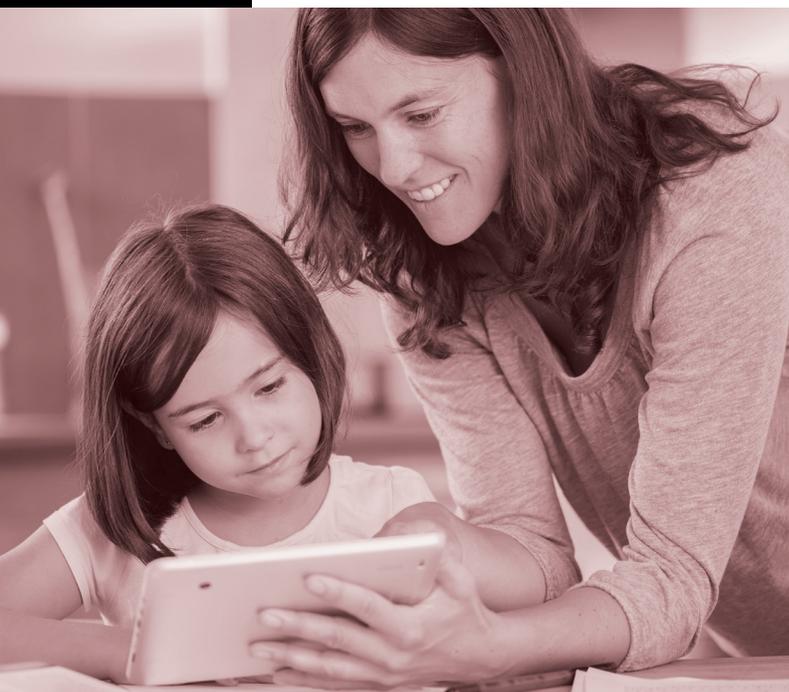

ONLINE TEACHING

in K-12

Models, Methods, and Best Practices
for Teachers and Administrators



Edited by

Sarah Bryans-Bongey & Kevin J. Graziano

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Foreword

Norman Vaughan

The number of K–12 students participating in online courses and programs continues to increase in the United States (Hanover Research 2013). The *Keeping Pace with K–12 Digital Learning: An Annual Review of Policy and Practice Report for 2014* indicates that 30 U.S. states now have fully online schools, and 316,320 students across the country attended these schools in SY 2013–2014, which represents an annual year-to-year increase of 6.2 percent (Watson et al. 2014, p. 5). With this steady rise in the number of K–12 online students, concerns have been raised about the quality of this educational experience. What theoretical and conceptual frameworks should be used to guide a successful online learning experience for K–12 students? How can an ever-increasing diversity of K–12 students be meaningfully engaged and supported in this educational environment? What are the best practices and educational strategies for implementing an online K–12 course or program?

The book *Online Teaching in K–12: Models, Methods, and Best Practices for Teachers and Administrators* addresses these questions and issues head-on. With regards to theoretical frameworks, this book begins with a Foundations section that clearly describes the collaborative-constructivist learning theory that forms the bedrock of a successful online educational experience. From this perspective, a student, in collaboration with a community of learners, takes responsibility to construct and confirm his/her own knowledge (Vaughan et al. 2013). Based on this approach to learning, the book then provides three conceptual frameworks for designing, facilitating, and directing an online course. These include the community of inquiry (CoI), technological pedagogical content knowledge (TPACK), and substitution, augmentation, modification, and redefinition (SAMR) models.

The CoI theoretical framework (Garrison 2011; Garrison et al. 2001) has been instrumental in helping researchers create and sustain collaborative learning communities in the online setting. This is the first framework

developed specifically for the online instructional environment, and there is a growing body of research attesting to its value in guiding the design and implementation of blended and fully online courses that engage and retain students.

Punya Mishra and Matthew J. Koehler's (2007) TPACK model was specifically created as a *blueprint* for integrating technology in K–12 education using a constructivist approach. Another conceptual framework that was developed for K–12 education based on a constructivist approach to learning is the SAMR model (Puentedura 2015). This framework has the potential to act as a catalyst for transforming an online K–12 educational experience by redefining and creating educational tasks and experiences through the use of computer-based technologies.

The second part of the book addresses the question and concern of how to meaningfully engage and support diverse student learning needs in an online course or program. In the K–12 context, this support begins by developing a strong collaborative partnership with parents of online students. It also involves the application of universal design for learning (UDL) principles. The concept of UDL is related to the idea of universal design (UD), which is an architectural concept involving design of physical accessibility for all. Assistive technologies (ATs) such as voice-to-text computer applications can be used to effectively support a UDL approach in an online K–12 course or program.

The third part of the book focuses on implementation strategies that move online K–12 courses and programs from simply delivering content to enabling students to develop metacognitive strategies in order to *learn how to learn*. Mitchell Kapor (2015) states that “getting information off the Internet is like taking a drink from a fire hydrant.” The challenge for online teachers is to focus on educational strategies that effectively make use of this global storehouse of digital content to support student learning. Strategies that are based on a constructivist approach to learning and involve inquiry and project-based activities can help students learn how to solve problems and become critical consumers of internet-based resources. For example, the Stanford mobile inquiry-based learning environment (SMILE; Seol et al. 2011) makes use of mobile devices for collaboration and creativity by tailoring digital content and problem-solving activities to local issues and customs. In addition, assessment strategies should be designed that focus on assessment *for learning* rather than *of learning*. Assessment in a K–12 online context can take on a triad approach where students are receiving feedback from not only teachers,

but also external experts, their peers, and, most importantly, themselves (Vaughan 2015).

Online Teaching in K–12: Models, Methods, and Best Practices for Teachers and Administrators will serve as a key resource for teachers, schools, districts, and states desiring to design, facilitate, and direct online courses and programs that engage and empower K–12 students.

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Introduction

The landscape of K–12 education has changed dramatically in recent decades. Our education system today is seeking to adapt and respond to the demands of a shifting economy as well as the changing structure and demographics of the U.S. family. Emerging technologies are the norm, and the demands to prepare citizens for college and careers continue to be emphasized in the context of standards-based learning.

While we know many students will need to fill roles and careers that do not yet exist, we also know that citizens of all ages will need to constantly learn and retrain themselves for new opportunities and careers that reflect our changing world. This suggests that not only do schools need to prepare students for jobs and college admission and tests as we know them, but that they also need to develop and reinforce skills in collaborating, problem solving, evaluating information, adapting, and innovating. While some of our online learners may initially seem more adept at these roles than others, practical online experiences are essential for students' long-term success in school and after graduation.

Online programs first became popular in higher education, continuing education, and professional development settings. However, blended and fully online courses and programs have now taken hold in K–12 education. Teachers and administrators who may have extensive education and background in face-to-face (f2f) classrooms and schools are now expected to lead and succeed in this new environment. Meanwhile, teacher preparation programs are realizing that online pedagogy comes with its own set of challenges and opportunities. For K–12 teachers to excel in an online setting, there is a learning curve in which new skills are emphasized, and it is not enough to be an outstanding teacher in the f2f classroom alone.

The emergence of professional learning communities and organizations gives testimony to the fact that online programs provide significant opportunities in K–12 education. The Online Learning Consortium (OLC) started out as the Sloan Consortium (Sloan-C) in 1992. Its grant programs and advocacy fueled the early development of blended and online learning in American higher education, and it is now a worldwide organization

dedicated to providing access, advancing online learning, and supporting institutions, individuals, professional societies, and corporations.

Beginning in 2003, the North American Council for Online Learning (NACOL) drew worldwide attention that caused it to expand internationally. In 2008, NACOL evolved to become iNACOL—the International Association for K–12 Online Learning. iNACOL continues to be an active force in online education, as it is dedicated to supporting K–12 quality online and blended programs and practitioners at all grade levels. iNACOL not only brings together a professional community for teachers, but also unites a professional community for school counselors and school administrators.

Likewise, the International Society for Technology in Education (ISTE) hosts a popular and highly valued Online Learning Network dedicated to supporting a professional community of K–12 teachers. The rapid growth of online programs and their appeal to practitioners mean that organizations and other support structures and resources are needed. Professional K–12 teachers are seeking support that will allow them to develop and sustain exceptional online experiences to meet evolving needs of the 21st century learner. This book is dedicated to promoting that goal.

While one might be tempted to view K–12 online programs and schools as discrete and alternative forms of teaching and learning, it is more realistic to view such programs and schools as part of a larger and changing system that is redefining education today. K–12 online programs and schools have become drivers of change. Educational policy and philosophy are also in a state of transition as the changing landscape requires educational leaders to articulate concepts such as the greater role of education and the need to prepare students for collaboration and innovation as well as for success on proficiency tests. With a range of online programs and administrators expressing different goals and values of education, the manner in which online programs and schools continue to develop, grow, and evaluate their own effectiveness could have far-reaching implications on how public education and schools will evolve in the future.

Course quality, the level of personalization, communication options and processes, student interactions, and the types of learning experiences themselves can vary widely from one online program or course to the next, and such programs and courses can be driven by dramatically different and incompatible policies or philosophies of what an online course of study or online program can and should look like.

In their quests to design programs and experiences that are optimal for online learners, teachers and administrators may ask themselves the following questions: Do K–12 online students need or want personal interactions with peers and/or with adults? Are such interactions important, and do they serve a role in a democratic online classroom? What level of freedom should an online teacher have to teach the required content in a creative and authentic way? Is it possible for online teachers to be effective when they host their first class in the virtual environment of the learning management system (LMS)? What kind of preparation do teachers need to teach online? How can new online teachers gain a vision of what creative and effective online courses look like? Are teachers and administrators excited about the potential for a new online format and how it might be used to promote student success? If not, what could this mean for our students and our emerging educational system? How can administrators of online programs stay informed and support teachers, staff, students, and families? What are other experienced online teachers and researchers discovering? This multi-authored book, *Online Teaching in K–12*, explores and helps to answer these and many other questions.

Divided into three parts, the first part of this book covers essential foundations, and delves into technical, pedagogical, and practical elements that form the basis for any successful online course or program. The second part of this book recognizes the diverse needs and skills of students and shares strategies for engaging and supporting diverse learners. The third and final part of this book emphasizes implementation strategies for teacher-created content, project-based learning, assessments, free and open resources, and mobile devices that expand the horizons of online teaching and learning.

Through the collective insights and expertise presented in *Online Teaching in K–12*, new and experienced online teachers and administrators alike have access to a hands-on resource that can expand their knowledge and skills and improve their success in this emerging and challenging environment.

Audience and Purpose

Online Teaching in K–12 is designed for anyone who seeks a role as a well-informed contributor and leader in the changing landscape of K–12 education. Online and mobile approaches to learning and communication are revolutionizing the form and nature of our educational systems in f2f and nontraditional settings. Gaps in understanding the

availability, limitations, and evolving potential for these approaches lead to loss of authority, influence, and advocacy. This book is for those teachers and administrators who want and need to be successful in the design, delivery, and sustainability of K–12 online courses and programs. With the widespread growth of online teaching and learning at all levels of K–12 education, those needing *to know* include policy-makers, program managers, principals, teachers, parents, and faculty members in teacher preparation programs across the country. Here, we have gathered the knowledge and experience of an outstanding team of contributing authors in order to highlight models, methods, and best practices pivotal to quality online programs. Our intent is to present a single volume that will serve as an essential resource for a range of interested stakeholders.

How to Use This book

Online Teaching in K–12 can be used to support teachers and administrators with on-demand essentials, including key models and methods in online teaching and learning. It is also appropriate for use in professional development and teacher preparation programs, as its content includes practical information that can support and enhance the work of the busy professional seeking to get started with online formats or to take online teaching to the next level.

For leaders of K–12 educational policy as well as teachers and administrators in online programs and courses, this book shares expert knowledge, vision, and information designed to communicate capabilities of online programs and systems that may otherwise take time and experience for the uninitiated to discern. Without understanding the capacity of online infrastructures, programs, and methods, teachers and administrators coming into online education are at risk of confining themselves to that which is known, anticipated, or dictated as opposed to striving for the best of what is currently or potentially possible.

Readers may wish to read the chapters in the context of each part or to refer to them as specific questions or needs arise. The index provides a useful launching point from which to locate information on a specific topic of interest. In addition, readers will find a glossary of abbreviations and acronyms, and an *About the Contributors* section to learn about the various contributors. The chapters themselves include a wealth of practical strategies and examples, along with pointers to dozens of online

resources including free and low-cost teaching, management, and communications tools.

About the Chapters

Written by experts and practitioners in the field, this book's chapters are organized within three parts: (1) Foundations, (2) Supporting Diverse Learners, and (3) Implementation Strategies. This thematic organization aside, each chapter stands on its own in providing expert consultation on the topic at hand.

The seven chapters that comprise Part 1 present foundational information relating to systems and environments, the teacher-learner experience, models and standards, and training programs that prepare teachers and schools for success in online teaching and learning. In Chapter 1, "The Online Course Environment: Learning Management Systems (LMSs)," Xavier Gomez shares need-to-know information on the LMS—the central software and system used to support online teaching and learning.

Building upon Gomez's discussion of the technical infrastructure comes Chapter 2, "The Online Teacher: Skills and Qualities to be Successful" by Steven C. Moskowitz. The author describes unique communication demands and the human angle of what teachers need to know to succeed in an online course. His research on the dispositions and strategies used by successful online teachers provides useful advice and support.

While Chapter 2 emphasizes the changing demands and expanded role of the online teacher, Chapter 3 by Sarah Bryans-Bongey provides a vision to help teachers meet those demands. Entitled "Building Community in K–12 Online Courses: The Community of Inquiry (CoI)," the chapter shares specific suggestions as to how online teachers can use cognitive and social approaches to engage, satisfy, and retain online students.

Whereas the CoI model was developed specifically for online and blended learning, the next three chapters share more general or long-standing learning theories in the context of K–12 online classrooms. Written by Michael Kosloski and Diane Carver, Chapter 4, "Online Constructivism: Tools and Techniques for Student Engagement and Learning," provides teachers with guidance on how to maximize active and compelling constructivist approaches in the K–12 online setting.

Chapter 5—"TPACK as Mediated Practice"—describes a technology integration framework that builds upon earlier work by educational psychologist Lee Shulman. Authors Rolin Moe and Linda Polin

share practical examples that allow teachers to apply the technological pedagogical content knowledge (TPACK) framework in the online course environment.

Another model that continues to guide teachers in the best practice integration of technology is substitution, augmentation, modification, and redefinition (SAMR). This model is described by Chery Takkunen-Lucarelli in Chapter 6, “Captivating the Online Learner: Frameworks and Standards for Effective Technology Integration.” Here, readers explore the SAMR model, discover key standards, and plan effective and engaging technology integration in online teaching and learning.

Chapter 7 is entitled “Online Student Teaching: From Planning to Implementation.” Written by Lori Feher and Kevin J. Graziano, the chapter concludes the Foundations section by covering an essential human resource issue in K–12 online programs: the readiness and training of pre-service teachers to skillfully educate the online student. Feher and Graziano describe the overall status of online student teaching, and they share preliminary research on how one college is addressing this need.

Students in online programs represent diverse backgrounds, interests, and needs. Given the entirely new setting of the online environment, schools need to rethink traditional programs, services, and environments and find ways to support the new generation of K–12 online learners. Part 2, Supporting Diverse Learners, aims to survey resources and strategies that allow educators to support, engage, and motivate learners. Chapter 8, “Flipped Learning: Making the Connections and Finding the Balance,” discusses the flipped classroom as a research-based gateway to online teaching and learning. Written by Kevin J. Graziano, the chapter helps teachers understand and get started with online approaches through the use of flipped learning. Graziano shares significant data on the model’s success, and explains how this web-enhanced approach can support a wide range of students.

Chapters 9 and 10 delve more deeply into the realm of online teaching and learning, and, as with Chapter 8, these chapters provide strategies that capitalize on web-based and asynchronous approaches as well as the use of multimedia to help students comprehend, revisit, or retain information.

In Chapter 9, “Virtual School-Home Communication,” experienced K–12 online teacher Dianne Tetreault shares success strategies to establish and maintain communication between and among teachers, learners, parents, and coaches. As with the varied tools and approaches described in connection with Graziano’s flipped classroom, Tetreault discusses the creative

use of asynchronous, synchronous, and even social media communication tools to support the home–school connection for the online classroom.

Chapter 10, by Luis Pérez, Kendra Grant, and Elizabeth Dalton, is entitled “Universal Design for Learning (UDL) and Online Learning.” The authors describe a multifaceted approach that involves varied representation of content, numerous options for student action and expression, and choices that encourage student engagement. By making the most of rich opportunities within the online environment and available multimedia web tools that can serve as a resource or an outlet for expression, the chapter describes an approach geared to bolstering the success of diverse learners.

While UDL aims to support a wide range of learners, it does not totally eliminate the need for support from special educators and/or the use of assistive technology (AT). Chapters 11 and 12 complete the second part of this book on support for diverse learners by covering those essential topics.

Chapter 11, by Richard Allen Carter, Jr., James D. Basham, and Mary Frances Rice, is entitled “Helping Special Education Teachers Transition to K–12 Online Learning.” The chapter shares important information that can be used by special education teachers and principals seeking direct and indirect approaches to supporting the significant population of K–12 online students with special needs.

As is the case with the need for special education teachers, AT can be a key component in a K–12 student’s ability to participate in an online program. In Chapter 12, “Assistive Technology in the 21st Century Online Classroom,” Jacqueline Knight defines assistive technology and provides a wealth of information and resources relating to AT’s unique use in the online setting.

Taken together, the chapters in Part 2 provide approaches to anticipate and address the needs of diverse learners. These chapters explore the use of flipped learning, AT, universal design, and promote the use of services, methods, and tools that are conducive to student learning and success.

In the third and final part of this book, Implementation Strategies, five chapters delve into implementation strategies that describe teacher-created content, student-centered and project-based learning, the curation of free and open educational resources, assessment challenges and solutions, and mobile learning approaches. Contributing authors round out earlier sections on foundations and diverse learners with a range of approaches for implementing online teaching and learning.

Chapter 13 covers “Teacher-Created Online Content: Two Teachers’ Tech Tales.” Here, Chris Rozitis, a secondary online teacher, and Heidi Weber, an elementary teacher, collaborate to share tried-and-true content strategies that are relevant to online teachers and learners across all grade levels. Their collective wisdom emphasizes strategies teachers can use to build content for students at all grade levels.

Next, Chapter 14 provides additional ideas and approaches to guide online teachers in their quest to help students learn. In “Student-Centered Digital Learning Through Project-Based Learning,” Andrew Miller shares ideas, considerations, and procedures needed to create and facilitate an authentic project-based learning experience for students in the online environment.

Throughout various chapters of this book, authors have reflected and shared their own online teaching experiences, favorite websites, tools, and resources. Chapter 15, “Open and Free Educational Resources for K–12 Online and Face-to-Face Classrooms,” provides readers with starting points that will allow them to locate useful multimedia resources that supplement and enrich the teaching and learning process. As experts in the creation of a specialized form of multimedia teaching tool, authors John Elwood Romig, Wendy Rodgers, Kat Alves, and Michael J. Kennedy also share research and how-to information needed for teachers to create and contribute their own content to the growing database of open educational resources (OERs).

Following on the heels of the three previous chapters that emphasize content creation, student-centered learning, and content curation, Chapter 16 provides important information on how such content and project-based approaches can be assessed in the online environment. Written by Kim Livengood and Lesley Casarez, “Tools and Strategies for Assessment in an Online Environment” discusses various types of assessments, free and low-cost tools for implementation, and industry standards that influence technology integration and online learning. By sharing tools to support the essential role of assessment, this chapter supports information provided elsewhere in this section on implementation strategies.

Chapter 17 imagines the possibilities of “Mobile Apps and Technology Integration for Virtual and Hybrid Learning Spaces.” Author Gregory Shepherd explores exciting ways by which mobile learning (M-learning) can enhance and enrich the online course experience and sharing of ideas, information, and resources to allow teachers to implement M-learning. This final chapter of Part 3 on implementing the teaching and learning

process recognizes that online learning does not simply take place in front of a computer. Exciting opportunities exist for students to research, collaborate, discover, document, learn, and even teach in the larger community and environment. The final chapters of this book as a whole are dedicated to helping teachers and administrators rethink the possible and tap the vast potential of the online format.

Why You Need This Book

Based on prolific growth of K–12 online programs, data suggest an immediate and widespread need to design and implement online courses and programs. *Online Teaching Methods in K–12* is intended for preservice teachers who are just learning about online teaching as well as for in-service teachers who may need to transform their classroom from an f2f to online or blended format and need ideas, resources, or assistance to get started. Those already working in online programs as teachers or administrators will also find value in this book.

The demand is expanding for online programs and courses that meet the needs of learners who may be in high school, middle school, or elementary school. This book is dedicated to supporting those with a vision and ambition to become expert teachers, facilitators, and leaders, including those who are being called upon to develop (or quickly adapt) to fully online formats. It provides practical and easy access to essential foundations, differentiation and support strategies, and effective approaches to implementing successful online programs and courses.

Written by 28 experts and practitioners, *Online Teaching in K–12: Models, Methods, and Best Practices for Teachers and Administrators* is here to support teachers and administrators with creative, research-based, and expert information on the wide-ranging aspects of online teaching and learning.

Teachers today are faced with a changing landscape and constant demands on their time and creativity. In face-to-face situations, it is often enough for an experienced teacher to rely on his or her background knowledge and ability to make a lesson engaging and effective. Likewise, principals and other school administrators can often move from one brick-and-mortar setting to the next with ease. However, the online setting requires an entirely new set of skills and experience and brings with it great opportunities along with challenges. We hope this book will support administrators and teachers in the quest to build, reinvent, and sustain dynamic and responsive schools of the 21st century.

Captivating the Online Learner: Frameworks and Standards for Effective Technology Integration

Chery Takkunen-Lucarelli

Abstract

Online learning, like any educational environment, requires careful and intentional instructional planning. Online learning provides many opportunities to engage students in 21st century skills and in ways that were not possible before, and online teachers should ensure that virtual learning spaces take full advantage of those opportunities. This chapter provides K–12 online teachers with an opportunity to understand how technology integration can be leveraged to optimize the learning environment in ways that engage learners. This chapter also examines frameworks such as the substitution, augmentation, modification, and redefinition (SAMR) model, 21st century skills, the International Society for Technology in Education (ISTE) standards, and the International Association for K–12 Online Learning (iNACOL) standards to help guide planning for effective technology integration in online learning.

Introduction

The online learning environment requires that students access material and interact with their teachers through web-based systems; however, because students are working *online*, teachers may falsely assume that students are engaging with technology in meaningful ways. This false assumption can lead to poorly designed online courses that do not take full advantage of

the transformative opportunities that technological advances offer. It is true that navigating through the learning management system (LMS) environment can create opportunities for students to increase their technological skills. However, taking an online course does not mean that the student is utilizing technology in ways that are meaningful, empowering, and engaging. Online courses provide exciting opportunities for teachers to create engaging student activities and assessments if teachers and instructional designers are intentional in planning for these experiences, however.

Consider the following scenarios:

Becca, a high school sophomore, is taking an online American Literature class. Her current reading assignment is to read Chapter Two of *The Scarlet Letter* by Nathaniel Hawthorne. After completing her reading assignment, she logs into her online class and reviews what she needs to complete. She responds to a discussion post on what she thought about Chapter Two. In addition, she takes an online vocabulary quiz. As she is required to respond to two of her peer's posts each week, she reads a few of the other student posts and offers comments. She reviews the requirements for an assignment and sees that she will need to write a paper on specific character traits for a character of her choosing. Since the paper isn't due for several weeks, she decides to wait to begin the assignment.

Cooper is also a sophomore taking an online American Literature class and is also reading *The Scarlet Letter*. He begins his weekly session by viewing a video from his teacher on VoiceThread. She provides big ideas from the reading and asks the students to consider some critical concepts. She also reminds students of what they are required to do for the rest of the week. Cooper is required to provide a video response with his own ideas, questions, or comments. He can comment to the teacher or to another student's ideas. As part of his tasks for the week, he is also required to begin creating a plan for a video documentary on the setting of the story with another student. He must create a Google Doc to share his planning with other students and invite the teacher to comment. The teacher encourages Cooper to seek out primary sources on the time period for *The Scarlet Letter*. In addition, she asks him to document how he is going to

delegate the tasks to complete the project. He begins to create a timeline and planning sheet for the documentary. He also needs to write his weekly journal where he blogs as if he is a character from the story. He skims the blog entries of a few other students and then begins to write his own entry.

Which of these two scenarios demonstrates an online learning environment that most engages the students in collaboration, research, and creativity while utilizing digital tools? Which student do you think is having a richer experience interacting with the teacher and other students? Most would agree that Cooper, the student in the second scenario, is utilizing technology in a much more effective manner. Most would also agree that the second scenario provides more opportunities for learners to collaborate, create new material, and think in complex ways. The use of the technology in the second scenario demonstrates how teachers can create online learning experiences that are engaging and empowering.

Teachers in any setting should be focused on practices that can increase student learning, and effective technology integration provides an opportunity to do so (Loertscher and Koechlin 2013). While distance and online learning have been in practice for many years in a variety of formats, recent technological advances provide exciting opportunities for online teachers to create learning activities that were not possible before. Consider how exciting it would be for students who are studying another country as part of a social studies assignment to participate in a live interview with other students from that country via Skype. Virtual learning can provide natural opportunities to engage students with technology in ways that are more difficult in onsite settings. If designed with student engagement in mind, teachers can take advantage of online collaborative tools such as Google Docs, wikis, or video hosting sites such as YouTube or virtual simulations and web-based video conferencing. The possibilities are endless.

At the core of instructional practices should be *why* and *how*. The online environment presents exciting opportunities and challenges to effectively incorporate technology. One challenge facing many online teachers is that they may have had very little experience learning online; therefore, they lack models for planning online learning experiences (Yuzer and Gulsun 2014). Another challenge noted by Volkan Yuzer and Eby Gulsun (2014) is the newness of the K–12 online learning landscape. There may be fewer colleagues who teach online to share ideas with or to collaborate with to create learning experiences. However, frameworks, standards, and

other conceptual ideas, grounded in research, can provide a roadmap for effective instruction that can address these challenges. The frameworks and standards provide a rationale and guidance for what that technological integration should look like.

Effective technology use can impact student achievement. Many researchers have found strong links between effective technology use in classrooms and student achievement (Green and Siegle 2002; Noeth and Volkov 2004; Valdez et al. 2000). Gilbert Valdez along with several colleagues (2000) conducted a meta-analysis of more than 800 studies involving technology and student achievement in the early 1990s. Each of these studies showed a positive impact on student learning. At every level, from preschool to higher education, a positive correlation between effective technology use and student achievement has been routinely identified (Valdez et al. 2000). In fact, in most cases, this gain in student achievement could be measured by using standardized achievement tests. In 2001, in its report to President Bush, the RAND Group stated that its studies also showed “that educational technology has begun to improve student performance and holds the potential for enabling far greater improvement” (Kirby et al. 2004, p. 20).

It has been argued that *how* technology is used is the key to improved student achievement, and expecting technology usage to increase student achievement without giving thought to *how* the technology is used in the learning environment is misguided (Green and Siegle 2002). In a study of all fourth- and eighth-grade students in Idaho, the researchers found an increase in student achievement for those students whose teachers used technology in ways that empowered students to solve programs and think critically (Green and Siegle 2002). Richard Noeth and Boris Volkov (2004) found many positive correlations between effective technology use and student achievement. For example, Noeth and Volkov (2004) found that students were more motivated when using computer technology, learned more efficiently when using computers, and were more likely to retain information. It is critical to note that simply providing access to technology (e.g., working online in an LMS) will not be enough to address low student achievement (Noeth and Volkov 2004).

As teachers design learning environments for K–12 students, they should think about their learners and the types of activities and assessments that will engage and empower them. Marc Prensky (2001), an international leader in education, discussed the possible digital disconnect between K-college learners and their teachers. Prensky labeled these K-college learners “digital

natives” (p. 1) and teachers “digital immigrants” (p. 2) in part to demonstrate the different approaches to using technology. Computer technology and all of its supports such as video games, cell phones, MP3 players, and more have been around since these students were born. Prensky discussed how this digital environment has impacted the learning processes of these learners. Prensky stressed that students have typically spent more than 10,000 hours playing video games and over 20,000 hours watching television, while they have spent just 5,000 hours reading: “Computer games, e-mail, the Internet, cell phones and instant messaging are integral parts of their lives” (2001, p. 1). Prensky points out that learners, due to these experiences with the digital media, think and process information differently than past students, and teachers who have not grown up with these digital experiences typically teach in ways that do not embrace these different ways of thinking. Worse yet, is the fact that teachers do not appreciate or understand these new and different skills that their students possess. For example, digitally native learners enjoy random learning experiences and can more quickly make digital connections between tools in comparison with their teachers. Knowing this, online teachers need to carefully think about their instructional planning, keeping their *digital native* students in mind.

Some models of online learning encourage the creation of a course that is designed once and then can be taught again and again with little insight from the teacher and with little opportunity to empower students (Loertscher and Koechlin 2013). Predictability is the selling point of these types of courses, but as David Loertscher and Carol Koechlin (2013) point out, these courses can also be “deadly boring” (p. 50). In these types of courses, students have little opportunity to create content, collaborate with their peers, or work in creative and innovative ways.

In any educational setting, good instruction allows students to demonstrate their learning in a variety of formats. For example, sometimes online courses overutilize text-based discussion forums as the primary way to communicate with students, which can be limiting for some students and provides only one way of engaging with students. However, allowing students to communicate and collaborate with a peer or peers can be accomplished with different tools such as Google Docs or web conferencing programs such as Google Hangouts, Skype, and other tools such as Adobe Connect.

As stated earlier, online teachers may have the false belief that technology is integrated into the course because students are working *online* and accessing content through computers or mobile devices. By its very nature, online learning incorporates the use of technology. However, like

any educational setting, the use of technology can be poor or rich. It can engage or bore. It can provide opportunities for students to be creators of new information or products, or support environments where students are merely consumers of technology. To help online teachers create compelling and powerful instructional learning environments that meet student needs and interests, research-based frameworks and standards can be leveraged to provide guidance for how to best implement technology. There are many frameworks to guide the planning of effective technology use. They have many overlapping and similar ideas and concepts that support each other. In this chapter, we examine two conceptual frameworks: the substitution, augmentation, modification, and redefinition (SAMR) model and the 21st century skills framework. We also review two sets of national education standards that provide guidance for effective technology integration: the International Society for Technology in Education (ISTE) student standards and the International Association for K12 Online Learning (iNACOL) quality online course standards.

Conceptual Frameworks

In this section, we examine two frameworks: the Four Cs from the 21st century skills framework and SAMR. These frameworks can help teachers and instructional designers think about effectively integrating technology in ways that optimize the learning environment. John Dewey (1916) stated that the “Social environment forms the mental and emotional disposition of behavior in individuals by engaging them in activities that arouse and strengthen certain impulses” (p. 13). Dewey suggests that teachers never educate directly, but indirectly by means of environment. Dewey explained this issue when he wrote, “Whether we permit chance environments to do the work, or whether we design environments for the purpose makes a great difference” (p. 15). Teachers can be intentional in their planning so that the online learning environment can capitalize on this phenomenon. When online courses are planned with intentionality to integrate technology in ways that put students in the *driver’s seat* and utilize technology to create community and collaboration, there is a much higher chance for student achievement.

21st Century Skills Framework: The Four Cs

The 21st century skills framework articulated by the National Education Association (NEA) from 2012 along with the more recent version by the Partnership for 21st Century Skills (P21) from 2015, both developed by

teachers, education experts, and business leaders, provides an architecture that addresses the essential skills and knowledge that students need to be successful as future citizens and students. This group of individuals formed the P21 and provides guidance and advocacy for the essential skills in the framework. The 21st century skills framework is a massive document that provides guidance for teachers and student outcomes in several areas including content knowledge, global awareness, life and career skills, as well as information literacy skills and competence with digital tools. Of these skills, Daniel Pink (2006) writes, “The future belongs to a very different kind of person with a very different kind of mind—creators and empathizers, pattern recognizers and meaning makers. These people...will now reap society’s richest rewards and share its greatest joys” (p. 1). Pink, a bestselling author, has written on several topics that address the changing landscape of the future work environment. His work reinforces the need for teachers to embrace teaching in ways that empower students to think critically and to understand that the world is interconnected. His work reinforces the need for teachers to think about the skills laid out in the 21st century skills framework. Several themes strand through the 21st century skills framework. These strands include global awareness, leadership, and responsibility.

At the core of the 21st century skills framework are the Four Cs. The NEA (2012) noted that the Four Cs are the most important of the 21st century skills in preparing students for future success. They include the following:

- critical thinking
- communication
- collaboration
- creativity

The NEA (2012) writes that the Four Cs are critical to supporting students as they enter an ever-changing and more complicated work environment. Therefore, it is critical that online learning environments do not revert to *skill and drill* and lower level thinking activities. Instead, online courses should take advantage of new technological advances such as shared web spaces that include applications like wikis and blogs. These applications allow students to communicate and collaborate in asynchronous fashion across space and time, and online learning environments are positioned well for these types of rich experiences that can address the Four Cs.

A brief description of the Four Cs with an example of how this could be applied in an online learning environment follows.

Critical thinking: Critical thinking, as defined by P21 (2015), requires that students engage in problem-solving and a deep analysis of concepts and reflection. Students should solve complex problems that have multiple solutions. They should ask questions and provide different points of view on issues. For example, music students might listen to a musical passage and provide an individual interpretation. Students would then listen to the interpretations of their peers and provide a synthesis of what they believe is meant by the passage (NEA 2012).

Communication: NEA (2012) writes that communication skills for the 21st century include many of the same skills that have always been important (e.g., public speaking, writing, listening, and nonverbal communication). However, added to these core skills is also the need to have the skills to communicate through and with digital tools and with people from all over the world. For example, using a Google Doc, small groups of students in an online science class might create a list of interview questions for an archeologist on a dig site. They would then share their questions with the scientist and participate in a live Skype session with the scientist.

Collaboration: Collaboration for students can be defined as the ability to work effectively in teams with a willingness to be flexible (NEA 2012). Students working in effective collaborative teams share the goals of the project and take the responsibility to address their role in the project. For example, students working in small groups might investigate an environmental issue in their community and come up with a plan to share what they learned and to advocate for a solution. To help raise awareness of the issue, the students might create an email or social media campaign (NEA 2012).

Creativity: Students should be encouraged to develop, elaborate, analyze, and provide original work (NEA 2012). As part of creativity, students may need to work collaboratively with other students and may need to be open to hearing new perspectives (P21 2015). For example, students can apply and synthesize their learning on topics using web tools such as Smores or Prezi. They could create a demonstration or simulation to synthesize the content of a unit of study utilizing Google Slides or by creating a digital story. Students could then share their work on a class blog or in small groups to receive feedback and then refine and resubmit their work.

Thinking about the Four Cs can provide a powerful and compelling way to help teachers effectively integrate technology into the online

learning activities. In fact, online environments may be better positioned than onsite classroom settings to incorporate information technology that allows students to simulate the types of activities that students might encounter in future workplace settings. Consider the growth of web-based video conferencing to host meetings and collaborative activities in the workplace, for example. Students in online courses could have many opportunities to experience participating in web-conference video sessions. They might be tasked with setting an agenda and leading a session on a collaborative project, or they may be asked to create a presentation and present their work live to a small group of their peers. In each of these cases, students are learning about how working in web-based meetings work.

David Loertscher and Carol Koeshlin (2013) point out that virtual learning yields exciting opportunities for students that are not possible in traditional face-to-face (f2f) environments. The ideas of *collaborative intelligence*, for example, where learners from across different settings help to create something new, is an exciting idea that can transform the online learning environment. Teachers can plan for learning activities that go beyond the virtual classroom walls and instead find opportunities to interact with individuals around the world.

SAMR Model

The SAMR model, developed by Ruben Puentedura (2015), provides another way to examine educational technology use. SAMR is an acronym that stands for *substitution*, *augmentation*, *modification*, and *redefinition*. At the heart of the model is the idea that, when properly used, technology can help to transform educational experiences and have a positive impact on student achievement (Puentedura 2015). What does it mean to use technology in ways that *transform* the educationally experience? Each of the four levels describes how educational technology may be used. Puentedura points out that teachers can plan instruction with technology that either *enhances* or *transforms* the educational experience with transformation being an important goal.

The bottom level, substitution, identifies technology used in ways that do not transform teaching but rather serve as a *substitute* for tasks that could be performed in other ways. For example, a student might use an iPad to take notes on a presentation. As you can see, this task could be substituted with a nontechnical tool like a pad of paper and a pen.

As you move up each level, the educational experiences of the students move towards transformation. Redefinition, the top of the four levels, describes educational tasks and experiences that would not be possible without the technological advances. For example, a group of online students might create a collaborative digital presentation using Google Slides that includes music, hyperlinks, videos, images, and recorded narration. This task cannot be substituted with a nontechnical approach.

When teachers discuss the SAMR model and instructional planning, they may use the phrase *teaching above the line* (Puentedura 2015). Teaching *above the line* means that the students are working at the modification or redefinition levels. At these levels, the educational experience is moving towards transformation. There is a significant shift in the way that the technology can be used to enhance learning when moving above the substitution and augmentation levels to modification and redefinition (Jacobs-Israel and Moorhead-Lang 2013). This *line* shifts the student to the creator rather than just the consumer of technology. The tasks that occur above the line would be impossible without the use of the technology (see Figure 6.1).

A brief explanation of each level and how this might be demonstrated in an online learning experience is provided in the following section.

Substitution: A student working in this level might complete a task that uses technology but could be substituted with nontechnical materials.

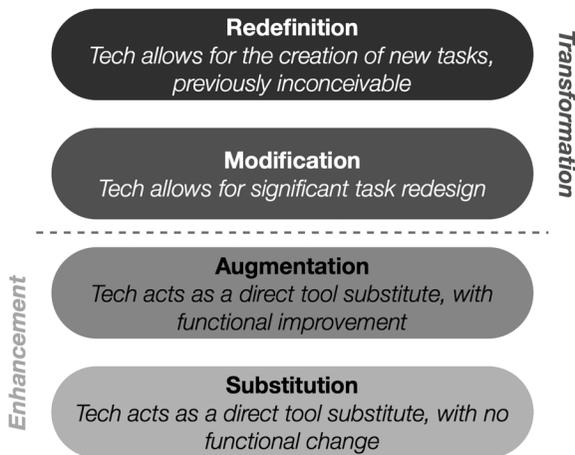


Figure 6.1 The SAMR model. hippasus.com/rrpweblog

A question a teacher could ask is, “Could the task be completed without technology?” (Puentedura 2013). If so, the technology task would be categorized as substitution. For example, a student listens to a presentation and takes notes on his laptop.

Augmentation: At this level, the technology acts as a “direct tool substitute, with functional improvement” (Puentedura 2015, p. 6). A question a teacher could ask is, “Have I added an improvement to the task process that could not be accomplished with the technology at the fundamental level?” (Puentedura 2013). In this scenario, a student might add an image and a hyperlink to a set of notes from the presentation (Jacobs-Israel and Moorhead-Lang 2013).

Modification: At this level, the tasks are “significantly redesigned.” Multiple applications are normally involved in this level (Puentedura 2015, p. 6). A question a teacher could ask is, “Does this modification fundamentally depend on the new technology?” (Puentedura 2013) Melissa Jacobs-Israel and Heather Moorhead-Lang (2013) describe how students working at the modification level might create a collaborative presentation about their favorite books using Animoto. The students’ slide shows could then be shared in a virtual book fair.

Redefinition: The technology provides for “the creation of new tasks, previously inconceivable” (Puentedura 2015, p. 6). A question a teacher could ask is, “How is the new task uniquely made possible by the new technology?” (Puentedura 2013). Jacobs-Israel and Moorhead-Lang (2013) give an example of students using apps such as Toontastic, which allows students to act as the creators of content as they can design their own animated films. These digital stories could then be shared with others online where they receive feedback. In this example, the task is not possible without the technological application. In another example, students could work collaboratively online to design and create their own app to solve a problem faced by society. The Mobile CSP (2015) project utilizes App Inventor, a free web-based application developed by MIT, to help students learn computer science principles as students create real apps that work on Android devices.

The tools may change, but the framework and models provide guidance. SAMR provides another way to think about technology integration in online learning environments. Teachers should intentionally plan for experiences that are above the line. In doing so, they have a better chance to engage learners and support student achievement goals.

Standards: ISTE and iNACOL

Organizations such as the ISTE and iNACOL provide a set of standards to guide effective technology integration. While the standards go beyond technology integration efforts, these standards provide a foundation to guide this aspect of instruction. What is now possible in the virtual world would not have been possible even a few years ago, and these standards can guide teachers to make the most of these new technologies. In this section, an overview of each set of standards is provided along with ideas on how they can help teachers plan for effective technology integration.

ISTE

ISTE's (2007) standards for students are organized into six categories. As you review the six categories of the ISTE standards for students, you may want to think about the ways that the standards align with the Four Cs and SAMR. You will see many similarities on how each of the models support each other.

The six categories of the ISTE (2007) standards for students are as follows:

1. Creativity and innovation: Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
2. Communication and collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. Research and information fluency: Students apply digital tools to gather, evaluate, and use information.
4. Critical thinking, problem-solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
5. Digital citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
6. Technology operations and concepts: Students demonstrate a sound understanding of technology concepts, systems, and operations.

A review of the six broad categories of the ISTE student standards shows that they reinforce the Four Cs as well as the SAMR model. Students engaged in online collaboration can be taught to apply the ideas of digital citizenship, as noted in ISTE Standard Five (digital citizenship). Students working online have the opportunities to work with others across the country and the world, interacting with other individuals and groups of people. James Banks (2014), an international leader in multicultural education, reinforces the need for students to understand the cultural and social issues that are required to do this well. He highlights in his book, *An Introduction to Multicultural Education*, a set of changing demographics, trends in global migration, and rapid globalization that are transforming the world and the way that we interact with each other. He writes, “Citizen education should help students acquire the knowledge, attitudes, and skills needed to function in their nation-states as well as in a diverse world society” (Banks 2014, p. 28).

Online courses that require students to collaborate with others in other locations and provide support for this work can help students achieve this goal. The ISTE standards underlie the importance of creating learning environments that can best prepare students for their future.

iNACOL Standards

iNACOL is an organization devoted to the quality of online courses and programs. They have done extensive work to create evaluation criteria to help teachers and other stakeholders of online courses and programs understand the critical components of effective online courses. The criteria are thorough, extensive, and focus on 11 broad areas as noted in the 2012 publication, *National Standards for Quality Online Teaching*. These 11 standards, organized A-K, provide guidance for online teachers to design courses that engage students and create rich learning experiences.

Each category (A-K) has several areas that reinforce each of the frameworks as well as the ISTE standards highlighted and discussed in this chapter. Several of the criteria presented here are perfectly aligned with the ideas discussed earlier and reinforce the idea that how technology use matters. For example, criteria under several of the A-K categories support collaboration, digital citizenship, communication, and use of emerging technologies. In the following section, samples of these criteria from the broad categories A-K that are directly related are highlighted. As you review these sample criteria, consider how these ideas support the other frameworks and standards previously reviewed.

From Standard A:

The online teacher knows and understands the role of online learning in preparing students for the global community they live in, both now and in the future (iNACOL 2011, p. 4).

From Standard B:

The online teacher knows and understands the use of an array of grade-appropriate online tools for communication, productivity, collaboration, analysis, presentation, research, and content delivery (iNACOL 2011, p. 5).

The online teacher knows and understands the use of emerging technologies in a variety of mediums for teaching and learning, based on student needs (iNACOL 2011, p. 5).

From Standard C:

The online teacher knows and understands the techniques and applications of online instructional strategies, based on current research and practice (e.g., discussion, student-directed learning, collaborative learning, lecture, project-based learning, forum, small group work) (iNACOL 2011, p. 6).

The online teacher knows and understands the process for facilitating and monitoring online instruction groups that are goal-oriented, focused, project-based, and inquiry-oriented to promote learning through group interaction (iNACOL 2011, p. 6).

From Standard E:

The online teacher knows and understands the responsibilities of digital citizenship and techniques to facilitate student investigations of the legal and ethical issues related to technology and society (iNACOL 2011, p. 9).

From Standard H:

The online teacher knows and understands the reach of authentic assessments (i.e., the opportunity to demonstrate understanding of acquired knowledge and skills, as opposed

to testing isolated skills or retained facts) are part of the evaluation process (iNACOL 2011, p. 12).

From Standard I:

The online teacher knows and understands the role of student empowerment in online learning (iNACOL 2011, p. 14).

From Standard K:

The online teacher knows and understands critical digital literacies and 21st century skills (iNACOL 2011, p. 16).

The online teacher knows and understands appropriate use of technologies to enhance learning (iNACOL 2011, p. 16).

iNACOL's (2011) mission states, "The International Association for K–12 Online Learning (iNACOL) is to ensure all students have access to a world-class education and quality online learning opportunities that prepare them for a lifetime of success" (p. 2). Clearly, the iNACOL standards support this mission and reinforce the Four Cs from the 21st century skills framework, the SAMR model, and the ISTE standards for students highlighted in this chapter. These sample iNACOL standards criteria provide a compelling mandate for online teachers to design online learning experiences and courses that are rooted in effective technology use.

Conclusion

Effective online learning design takes time, creativity, and hard work. Like all good teaching practices, online instructional planning must focus on student learning and requires effort backed by research. What is now possible in the virtual world would not have been possible even a few years ago. These technological advances should be harvested and optimized to incorporate the very best of online teaching and learning. The frameworks and standards highlighted in this chapter provide guidance and offer a way to examine the level of technology use to support student learning. Loertscher and Koeshlin (2013) reinforce this point:

If "learning" is what we are after, whether blended or totally online, then a move must be initiated from locked-in, content-driven packages to participatory knowledge-building

experiences. Learners need to be free to work individually, cooperatively, and collaboratively, with the best information available in technology-rich learning environments. (p. 53)

Online teachers should do their best to plan for and teach in ways that empower and engage learners. They should provide opportunities for students to prepare for an ever-changing world. Harnessing the power of emerging technologies provides new and exciting methods to transform online learning and therefore helps students reach their potential.

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Kat D. Alves is a doctoral student in the Curry School of Education at the University of Virginia. Before beginning her doctoral program, Ms. Alves spent 7 years as an elementary school special education teacher in the Charlottesville area. Ms. Alves has a master's degree in special education and a bachelor's degree in psychology, both from the University of Virginia. Ms. Alves's research interests include improving literacy outcomes for students with high incidence disabilities. Specifically, she is interested in reading comprehension and vocabulary at the upper elementary and middle school levels. Ms. Alves's primary program of research at the University of Virginia focuses on training preservice and in-service teachers to use evidence-based practice (EBP) for vocabulary and reading comprehension.

James D. Basham, PhD is an Associate Professor in the Department of Special Education at the University of Kansas. He earned his doctorate at the University of Illinois Urbana-Champaign. Dr. Basham's research foci include the implementation of universal design for learning (UDL), learner-centered design, innovation, and technology as it relates to cognition, learning, and behavior. Individually and as part of a team, he has been awarded more than \$12 million in research funding. Currently, he is a co-principal investigator at the Center on Online Learning and Students with Disabilities (COLSD). Dr. Basham has consulted several school districts, universities, state agencies, foundations, and corporate entities regarding educational technological innovation. Finally, Dr. Basham is the co-founder and executive director of the Universal Design for Learning Implementation and Research Network (UDL-IRN), an organization that promotes research into UDL practices across the range of educational settings.

Richard Allen Carter Jr. is a doctoral student in the Department of Special Education at the University of Kansas. Prior to initiating his doctoral work, Mr. Carter worked with learners with disabilities in elementary

school settings in Kansas and his home state of North Carolina. His current research focuses on the implementation of self-regulation practices for students with disabilities in both fully online and blended learning environments. He has also conducted work that looks at disability accommodation and individualized education program (IEP) development and implementation in online schools. In addition, Mr. Carter assists with studies that examine a broad range of effects of online instruction for students with disabilities for the Center on Online Learning and Students with Disabilities (COLSD). He is currently part of a research team that is implementing technology-enabled personalization for students with disabilities in public elementary schools.

Diane Carver, PhD is the director of career and college readiness for the Bethel School District in western Washington. She previously taught business education at the high school and postsecondary levels and served as the state supervisor for business and marketing education in the Office of Superintendent of Public Instruction for the state of Washington. She has worked extensively with career and technical educators providing professional development in curriculum integration, instructional techniques, and student engagement strategies. Dr. Carver has published articles in journals such as *Business Education Forum*, *Techniques*, and *the International Review of Research in Open and Distributed Learning*. Her research interests include career and technical education, online learning, and alternative learning experiences.

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Elizabeth Dalton, PhD is adjunct professor at the University of Rhode Island, Communication Disorders Dept., senior consultant for Dalton Education Services International (DESI), and director emeritus of development and research for TechACCESS of Rhode Island. She holds a PhD

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Lori Feher, MS earned her MS in Education and BA in Physical Education and Health from the University of Nevada, Las Vegas. Ms. Feher has worked as a teacher, learning strategist, coordinator of student teaching, and curriculum developer over the past 30 years. Ms. Feher spends a great deal of time researching information to keep current in what she is teaching and is familiar with the best techniques for presenting information and engaging audiences. Ms. Feher has always believed that the key to happiness and success in life is rooted in mental, physical, social, and intellectual well-being. Her personal well-being is strengthened by spending time with her family and friends, exercising, eating right, acquiring knowledge, and devoting time each day to being grateful.

Xavier Gomez, MEd has been an instructional designer for over 10 years. Though he dabbled in corporate training, he has worked in higher education for the majority of his career. He was a member of the core group responsible for expanding instructional design for online delivery at University of California Berkeley Extension, the group that now functions as Berkeley Resource Center for Online Education. At the University of San Francisco (USF), he was chosen by the director of online education as the first instructional designer to help build an instructional design team and to establish a culture of online education at USF. Now as senior instructional designer, he provides guidance to the instructional design team in matters of pedagogy, technology, and best practices.

Kendra Grant, MET is an educational consultant working with a variety of companies and institutions on the design and delivery of eLearning,

as well as product and business development. Prior to this, she was co-founder and chief education officer of a professional learning company delivering large-scale technology implementation across North America. Prior to that, Ms. Grant was a teacher, district SpEd coordinator and assistive technology (AT) specialist in a large school district. Her ongoing interest in universal design for learning (UDL) began as a teacher in 2004 when she integrated UDL principles and technology into her library-media program. Ms. Grant recently completed her masters of educational technology at the University of British Columbia with a focus on professional learning, eLearning (K–20), and the application of UDL to both. Ms. Grant is also an EdTech start-up advisor at the MaRS Discovery District in Toronto and at the Genesis Centre in Newfoundland, Canada. She is the president (2015–2016) of the Inclusive Learning Network of the International Society for Technology in Education (ISTE) and recently codesigned (with her two esteemed writing partners) a small-short-supported-social open online course (SOOC) on UDL and Apps.

Michael J. Kennedy, PhD is an assistant professor of Special Education at the University of Virginia's Curry School of Education. Dr. Kennedy's research interests include the use of multimedia to support teaching and learning for preservice and in-service teachers as well as students with disabilities enrolled in content area courses.

Jacqueline Knight, MA received her bachelor's degree from the University of California, Santa Cruz. After living abroad, she returned to the United States to work on her master's degree and Education Specialist Teaching Credential at Pacific Oaks College. In 2011, Ms. Knight received a postgraduate Assistive Technology Applications Certificate from Cal State Northridge's Center on Disabilities. Currently, Ms. Knight is an assistive technology (AT) specialist and individualized education program (IEP) coordinator for a small school dedicated to students with learning differences. Additionally, she teaches as an adjunct faculty member at a liberal arts college, specifically with undergraduate and graduate level students working on their teaching credentials. She has presented at a variety of special education conferences and co-authored a recent article in *Preventing School Failure: Alternative Education for Children and Youth*.

Michael Kosloski, PhD is an assistant professor at Old Dominion University (ODU) in the Department of STEM Education and Professional

Studies. Dr. Kosloski holds a PhD in education with an emphasis in career in technical education, leads the career and technical education teacher preparation program at ODU, and has prepared numerous high school teachers throughout his 15 years in teacher preparation. As a former Virginia DECA state advisor, he also works closely with career and technical education teachers throughout the state. He developed the first internet marketing course for the State of Virginia's public schools along with similar courses at ODU. He has numerous publications, including a textbook entitled *Retailing and E-tailing* that focuses on how businesses utilize the web in industry. His research interests include career and technical education curriculum and technology, online learning, student organizations, and teacher recruitment and retention.

Kim Livengood, PhD is an associate professor in the Department of Curriculum and Instruction at Angelo State University. She earned her doctorate in curriculum and instruction with an emphasis on multicultural education from Texas A&M University, a master of science in secondary education from Texas A&M-Corpus Christi, and a bachelor of science in chemistry from Texas Tech University. She developed and now manages the online MA program in curriculum & instruction. She was honored with the 2011 Texas Tech University System Chancellor's Award for Excellence in Teaching, and her online course has earned the Blackboard Exemplary Course Award for 2014. Additionally, she earned an Advanced Online Teaching Certificate through the Online Learning Consortium.

Andrew Miller, MAT is a former teacher and currently an educational consultant. He has taught in traditional secondary schools as well as innovative project-based learning (PBL) schools. He has implemented PBL in online and blended learning environments in the courses of English, social studies, computer literacy, and game design. Mr. Miller has presented his work and ideas at many conferences including the International Association for K-12 Online Learning (iNACOL) Virtual School Symposium, the Association for Supervision and Curriculum Development's (ASCD) conference, the International Society for Technology in Education (ISTE's) conference, and the Internal Literacy Association's (formerly IRA) conference. He is affiliated with the Buck Institute for Education, a nonprofit with a focus on PBL, and with ASCD, which publishes work and provides professional development to educators around the world. He has worked with teachers throughout the United States, Canada, Australia, Mexico, China, India, and the Dominican

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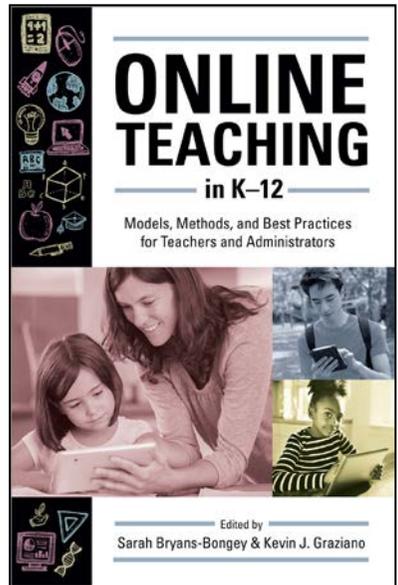
Dianne L. Tetreault, MET has been in the field of education for 28 years. Ms. Tetreault has taught both reading and language arts at the middle school and high school levels. She currently works for the School District of Palm Beach County where she teaches online learners in grades K–12. In addition to teaching online, she has developed online courses in both reading and creative writing. She holds a bachelor's degree in education and a master's degree in educational technology from Central Michigan University and is currently pursuing a doctorate. Ms. Tetreault is also an adjunct professor for Barry University where she instructs students pursuing their master's degree in reading education. Ms. Tetreault is a strong proponent for online learning, reaching today's students, anywhere, anyplace, and anytime.

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