Preface

CONTEXT AND PURPOSE

With shrinking budgets, advances in technology, rising school enrollments, teacher attrition, and the growing extracurricular demands on K-12 students, it is expected that the current expansion of online learning at the K-12 level will continue to escalate in coming years. In their 2008 book, *Disrupting Class: How Innovation Will Change the Way the World Learns*, Clayton Christensen, Michael Horn, and Curtis Johnson predicted that 25 percent of all high school courses will be online by the year 2016, with that percentage growing to half by the year 2019. While these are ambitious predictions, they illustrate the growth potential of online learning environments in K-12 settings. Many states have already recognized the potential benefits of online teaching and learning to address issues such as: extending course offerings to students beyond those that can typically be offered by a single school; providing accessibility to geographically dispersed students; affording flexible schedules for teachers and students; aligning instructional practices with the needs of 21st century learners; attending to the growing necessity for merging academic content with technology literacy; extending opportunities to at-risk or non-traditional students; providing remediation and supplemental experiences to learners; customizing professional development and community-building experiences for stakeholders; and more. School districts are increasingly viewing online learning as a viable reform tool and innovative solution to issues they are currently facing. However, integrating online and blended learning opportunities into a K-12 setting involves more than a “plug-and-play” approach. It requires a new educational paradigm. What that framework ultimately looks is yet to be determined. Teaching in these new contexts will require an innovative skill set that harnesses effective educational practices in K-12 schools while seamlessly integrating technology to transform learning and educational spaces.

As the trend of online learning in K-12 settings is growing at the elementary, middle, and high school levels, little research has empirically explored the effectiveness of online education in such settings. In this book, we define K-12 online education as technology-mediated learning that moves learning beyond the confines of traditional classroom structures. In these innovative learning environments, students engage in content instruction through both asynchronous and synchronous uses of technology. Technological tools include software and hardware used to facilitate virtual learning. Teachers embrace tools, such as social networking, interactive tools, and other technologies that support the development of an educational community by establishing a cognitive, social, and cultural presence between instructor and pupil and among students. K-12 online learning also includes development of courses and explorations of how content is delivered as well as how this varies across disciplines. Lastly, associations between
online instruction and student achievement are considered. Determining, through data-based decisions, the impact of technology in relation to learning outcomes will examine the new push in contemporary literature that makes quality an essential consideration of K-12 online instruction. Exploring how relationships, communication, and feedback are created in virtual schools is a central focus of this work.

While the ubiquitous nature of emerging technology has afforded innovative applications in teaching and learning, school districts must proceed with caution in designing, developing, and implementing online learning experiences. Although technology has forever changed the ways in which both students and teachers can experience 21st century learning environments, it is evident that current research related to the effectiveness of K-12 online learning environments is sparse. Consequently, there is limited empirical guidance related to the manner in which school districts and K-12 entities should proceed with the implementation of online learning opportunities. It is important to understand the theoretical, pedagogical, technological, financial, and logistical issues, as well as management approaches, instructional delivery options, and policy considerations needed to create effective online K-12 learning opportunities.

One purpose of this book is to present information about current practices and research in online K-12 settings, while also addressing strategies, methods, and potential concerns involved with implementing such opportunities. This book shares a discussion of issues that have arisen when K-12 entities have tackled the design, development, and implementation of online learning environments. More specifically, this book serves: 1) to distribute information about current online practices in K-12 education, 2) to disseminate information about current research related to online practices in K-12 education, 3) to discuss issues related to evidence of student learning and assessment in the context of online aspects of K-12 education, and 4) to disseminate information about policies related to online K-12 instruction and the impact of these policies on stakeholders in K-12 online environments. With the impending growth of online learning in K-12 schools, it is the goal of this book to serve as both a data-based and practical resource to guide decision-making, policy structures, and implementation of online learning in an effort to aid administrators, teachers, and policymakers in developing successful online K-12 courses, programs, and schools that positively impact learning and educational environments.

HOW TO USE THIS BOOK

Each section contains several chapters supporting the section theme. Beginning with issues, challenges, and trends in quality online K-12 education and concluding with an examination of issues of diversity in online K-12 teaching and learning, this book presents research, practical applications, and theoretical guidelines regarding online K-12 teaching and learning.

The Roadmap

This book is organized into five sections. The first section examines “Issues, Challenges, and Trends in Quality K-12 Online Education.” These chapters provide a context for exploring the initial opportunities and challenges related to online education in K-12 environments, as well as growing trends and potential future successes and challenges as online K-12 education continues to grow. As online K-12 learning becomes more ubiquitous, the insights shared by these authors serve as critical considerations to ensure effective online K-12 teaching and learning experiences. In the opening chapter, Anthony Picciano, Jeff Seaman, and Scott Day empirically examine how online learning was utilized as one component of
school reform efforts to address emerging thoughts and concerns of high school principals in Illinois. “Online Learning in Illinois High Schools: The Voices of Principals!” provides a detailed discussion of the potential future impact of online K-12 learning regarding increasing graduation rates, providing more accessible and varied credit recovery, differentiating instruction, and developing foundations for K-12 students’ future college careers. The authors present the results of a statewide survey regarding administrative decision-making about and perceptions of online and blended learning. They make comparisons of their state findings with national CCD data. With the growing national presence of online and blended learning opportunities in high schools, this chapter presents a timely and important study of the motivations and purposes driving this emerging trend. Thus, the purpose of this study is to examine the role that online learning is playing in addressing the thoughts, concerns and issues facing Illinois high school principals. Data, collected from a sample of high school principals who were members of the Illinois Principals Association, provide administrative perspectives with respect to the extent, nature, and reasons for participating in online learning programs. An important aspect of this study was the comparison of the findings in Illinois to those collected from a national sample of high school principals. Picciano, Seaman, and Day document that online learning and blended learning are making inroads into the high schools in Illinois and the prominence of these learning platforms is comparable to those in other parts of the country. The results of this study indicate that online and blended learning are becoming integral to a number of high school reform efforts, especially with regard to improving graduation rates, credit recovery, building connections for students to their future college careers, and differentiating instruction. The authors contend that these policy decisions are not without tradeoffs or concerns. While high schools, especially in rural Illinois, are depending upon online and blended learning for many of their programs, administrators in this study indicated uncertainty about the quality of online instruction. Future study and evaluation should concentrate especially on the efficacy of online credit recovery courses as they continue to evolve into the dominant type of online learning for the students at greatest risk. There need to be assurances that online credit recovery is not being used strictly as a convenient vehicle for improving graduation rates. In sum, the benefits, concerns, and costs related to online and blended learning are prime areas for future research, as they become a significant focus in the dialogue on reforming the American high school at national, state, and local levels. Research concentrating on studying these issues is welcome at all levels. This chapter provides a framework for subsequent chapters to explore other technology initiatives in K-12 schools that have the potential to inform and shape emerging online learning and blended learning trends.

Next, Marius Boboc provides a detailed background of the evolution and application of numerous benefits and challenges associated with online K-12 learning. In “Challenges, Opportunities, and Trends in Quality K-12 Online Environments,” the author discusses the evolution of online K-12 education and presents a theoretical framework identifying numerous dimensions of online K-12 learning that must be appropriately and effectively addressed in order to promote more accessible and effective virtual learning opportunities for K-12 students. Boboc notes that the evolution of virtual learning has led to the current complex landscape that reveals a multitude of trends and models of e-learning. The existing body of research on the effectiveness of K-12 online instruction indicates the need for further study exploring the quality of the virtual learning landscape. An in-depth analysis of the virtual learning landscape reveals the multitude of dimensions by which it could be evaluated, including the range of programs, service provider types, approaches to blended learning, kinds of instruction delivery, as well as levels of interaction within cyberspace. Boboc also reports emerging evidence that virtual learning promotes greater access to equitable, high quality, cost-efficient learning opportunities to students that may not
otherwise benefit from a wider range of formal education options. However, what seems to be missing, according to Boboc, is a theoretical framework for evaluating the various models of e-learning. Boboc’s framework identifies academic programs and curricula, student support services, virtual programs, and virtual school administration as categories that connect relevant research to recommendations intended to inform policy-setting efforts aimed at supporting the further development of high quality K-12 online environments.

Next, Jayme Nixon Linton and Wayne Journell tackle an issue critical to the success of online K-12 teaching and learning—preparation of virtual K-12 teachers. In “Meeting the Demand for Online Education: A Study of a State-Run Program Designed to Train Virtual K-12 Teachers,” Jayme Nixon Linton and Wayne Journell add to the currently limited understanding of how K-12 online teachers are prepared through the analysis of an induction program for prospective K-12 online teachers. The authors present this induction process as an in-service model for educators throughout the United States, while also discussing the growing need of teacher education programs to integrate online pedagogy in order to keep up with the increasing demand for online K-12 educational opportunities. Linton and Journell provide a research-based examination of one state’s established program for preparing teachers for online instruction. Their chapter analyzes a 9-week orientation session that is part of an established, state-run induction program for prospective K-12 online instructors. Overall, they found the program orientation to be a thoughtful model for educating potential online teaching candidates about online pedagogy and modeling best practices for effective online instruction. Linton and Journell encourage leaders in other states that offer state-run virtual high schools to adopt elements of this training program into their current induction efforts, or if no such program exists, use this orientation as a model for creating induction efforts in that state. These authors acknowledge that state-run virtual high schools only constitute a fraction of the K-12 online courses taken by students in any given state. Therefore, they suggest that the training of online instructors become an integrated element in teacher education programs across the United States. Adaptations of this induction-training program could serve to better prepare pre-service and practicing teachers for online instruction. Linton and Journell leave readers with the suggestion that accrediting organizations should consider a more active role in developing a national interest in defining quality online teaching and online teacher preparation. As their research demonstrates, high-quality models for preparing K-12 online teachers exist; however, these have yet to become what is typical and institutionalized. These instead remain only in the realm of possibilities.

This section concludes with a chapter titled, “Unbounded Reading: Why Online Learning for K-12 Students Should Be a Literacy Issue.” One aspect of online learning, reading, deserves special consideration as we examine issues and trends in K-12 virtual contexts. In this chapter, Dixie Massey provides an overview of the limited research related to reading in online K-12 courses, while also presenting an examination of the potential, through bounded and unbounded contexts, of reading in online courses, as well as a call for additional research needed to increase the effectiveness of online K-12 learning and preparing 21st century learners. Given that literacy is a national and international interest and the focus of numerous reports, examining the nature of reading in online learning contexts should be a prominent research topic. Massey notes a gap in research in K-12 distance education and literacy. She suggests that a very limited description of the types of reading that students are asked to do or the students’ abilities to accomplish this reading effectively are present in the literature. As previously mentioned, Massey examines the potential of reading in online courses through bounded and unbounded contexts. She proposes three main arguments. First, we know very little about the reading that takes place in online courses for K-12 students from specific research studies; however, general descriptions from instructors
suggest that most reading is traditional and occurs within bounded text. Second, reading in bounded
text is not identical to reading in unbounded text. While they share several common thinking processes,
reading in unbounded texts requires some novel ways of thinking not observed in reading bounded text.
Third, online courses are well positioned to provide focused instruction within unbounded text, but this
will require greater understanding about the differences in the thinking processes used when reading
bounded vs. unbounded texts. Those differences include understanding how to search and navigate new
kinds of texts. Searching and navigating also requires moving among multiple texts in ways that are
similar but also more complex than moving between traditional bounded texts. Based on these arguments,
Dixie Massey contends that distance learning is at least in part a literacy issue. She recommends that
to better support online learning, a great deal more research in multiple areas and for multiple specific
populations is needed. She suggests that instead of trying to apply studies about college online learners
to K-12 online learners that exploring reading for K-12 students is necessary. Massey concludes that
there is much work to be done to make online learning increasingly effective and to best prepare 21st
century learners in K-12 virtual schools.

In section 2, “K-12 Online Course Development and Instructional Design,” authors suggest numerous
innovative pedagogical approaches and technological applications for designing, developing, and
implementing engaging and effective online learning experiences for K-12 students. In the first chapter,
“Practical Guidelines for Creating Online Courses in K-12 Education,” Wayne Journell provides
an overview of best practices in designing and developing engaging online learning opportunities for
K-12 students. Wayne Journell notes that today’s adolescents experience online learning opportunities
different ways than those of the past. He contends that, however, there are many aspects of online
learning that are similar for all learners. In this chapter, Journell provides a detailed discussion of strategies
designed to provide the groundwork for successful K-12 student experiences in online learning
environments. While the ideas presented in this chapter are not revolutionary, approaches to establishing
an appropriate classroom infrastructure, developing activities that engage the online learner, aligning
assessment tools with course events, and providing timely and substantive feedback to learners are all
hallmarks of good teaching and should be, as Journell contends, implemented throughout online K-12
learning environments. As education evolves, it is important to avoid the pitfall of replicating face-to-
face instructional strategies in online settings. In this chapter, Journell’s overview of best practices is a
starting point to ensure this does not occur.

With increasing accessibility of computer-mediated communication tools, it is important to analyze the
effectiveness of alternative forms of interaction in varied settings. In the second chapter, “Synchronous Text Chat (EduTexting) as an Online Learning Tool,” Tina Heafner and Michelle Plaisance
present results from an exploratory multi-case study of online learners engaged in synchronous text
chat throughout an online course. In an attempt to understand the social and cognitive presence of both
learners and instructors, as well as attitudes toward online learning, the authors examined individual, as
well as collective, applications of synchronous text chat. The authors found that synchronous text chat
unilaterally enriched the learning experience for all participants, and suggest four social and cognitive
functions of its implementation in academic settings: enhancing enjoyment, engagement and noticing,
achieving community and providing interactive immediacy, and bridging of theory to practice. Based on
the results of this study and the congruency of SMS with students’ lives, the authors conclude their chapter
with a discussion of the rationale for the implementation of “EduTexting” in K-12 online environments.
In the final chapter of this section, “Learning Theory and Online Learning in K-12 Education: Instructional Models and Implications,” Alex Kumi-Yeboah avows that, as online learning continues to expand in K-12 schools, we need to look to strategies that maximize the benefits of emerging technologies and innovative instructional approaches to allow for virtual K-12 learning environments that promote both mastery of content as well as deep learning. In doing this, it is important to critically analyze the application of learning theories in K-12 virtual settings and how these applications influence student achievement. Through an examination of trends in online K-12 schools, Kumi-Yeboah addresses ways in which instructional models can be implemented to address the challenges and enhance the prospective benefits of online K-12 environments. More specifically, the author outlines the New Models Using Online and Blended Learning TPAC framework, and how this model can be implemented to minimize the challenges, while maximizing the benefits of online K-12 learning.

The third section, “Instructional Models in K-12 Online Teacher Education,” seeks to offer a foundation for teacher preparation in online classrooms, while offering various instructional models to improve the quality of professional development. In the first chapter, “Effective Online Learning Begins with Effective Teacher Preparation,” Laura Corbin Frazier and Barbara Martin Palmer present four models of professional development for online instruction. These four models include: 1) Teacher Learner as Student Model – the typical course on effective practices; 2) Learn and Co-Teach Model – a teaching mentor who serves as a consultant or co-teaches the first online course with a beginning online instructor; 3) Collaborative Model – expansion of the TPACK framework and facilitation of course development through teacher collaboration as an educational community; and 4) Facilitated Leadership Model – the integration of all components of previous models which engages the novice online instructor in active learning. The Facilitated Leadership Model is presented by Frazier and Palmer. In this chapter, authors analyze each model according to clearly defined domains of effective online instruction including faculty stance, student self-regulation, faculty support, authentic practice, engagement, community development, and cognitive demand. Subsequent to model analysis, a decision model is provided for K-12 and university administrators, teacher educators, and policymakers to guide strategic decision-making in the determination of a model for professional development best suited to the needs and resources of their institution. The authors conclude that any model for professional development should include online experiences as a learner. Through their analyses, they found connections to face-to-face preparation at the K-12 and higher education levels that both provided initial faculty development sessions and introductions to the expectations of the institutions. Effective online learning demands a teaching force that is prepared to teach using delivery mode. Appropriate professional development is essential in preparing online instructors.

In the second chapter, “The Ever-Evolving Educator: Examining K-12 Online Teachers in the United States,” Jean Larson and Leanna Archambault review current research related to the educational, training, and demographic characteristics of those involved in teaching in K-12 online environment. While the number of online courses is increasing in the K-12 setting, little research exists on the level of experience held by K-12 online teachers or how they were prepared to teach in the online domain. Few colleges of education integrate online teaching into the curricula. However, many current research studies focus on the students’ experiences taking online coursework or the quality of online K-12 programs. In this chapter, the authors discuss past and ongoing research which reveals a disconnect between (a) the rapidly expanding expectations for and implementation of online education at the K-12 levels and (b) the surprisingly limited extent to which teachers are actually being educated, trained, and otherwise prepared to function in this virtual environment. As online education continues to grow at both the elementary
and secondary levels, the demand for properly trained teachers will also grow. Training for educators at the K-12 level has historically been provided through colleges of education housed within a university setting. Colleges of education need to expand their curricula to include teaching methodologies in the virtual environment.

In the third chapter of this section, “Online Learning in K-College Classrooms: Students and Teachers Establish Social, Cognitive, and Teaching Presences in Digital Spaces,” S. Michael Putman, Brian Kissel, Jean Vintinner, and Amy Good begin their chapter with a presentation of characteristics of online learning. These include communication within online learning, instructor participation in online learning, and challenges associated with online learning. Since the beginning of online learning, there has been a need for educational stakeholders to examine the types of interactions and related processes within discussions that advance learning objectives associated with coursework. The development of frameworks to guide thinking as instructors seek to develop coursework that advances the benefits associated with this pedagogy has been needed. The Community of Inquiry (CoI) Framework forms the foundation for the principles of the authors’ recommendations for developing and teaching in online environments. In this chapter, the authors discuss how the CoI framework can be used to create an environment conducive to learners’ active engagement with content and with each other. Teaching presence can be enhanced through 1) planning, organizing, and delivering online content, 2) creating a sense of classroom community, and 3) explicit instruction. Social presence can be strengthened by 1) using social networking sites to exert a social presence, 2) using voice, images, and gestures to exert a social presence, and 3) using writing to exert a social presence. Cognitive presence can be improved through 1) planning and facilitating forums with opportunities for reflection, 2) using facilitative prompts within discussion, and 3) designing assignments requiring critical thinking. The chapter concludes with descriptions of specific activities that integrate the three presences, which can be used to facilitate learning in online environments as well as implications for future research in this area.

This section concludes with a chapter titled, “Establishing a Mentoring Relationship Between Pre-Service and Mentor Teachers through Windows into Teaching and Learning.” In this chapter, Teresa Petty, Tina Heafner, Abiola Farinde, and Michelle Plaisance present an innovative method of online mentoring between pre-service and mentor teachers. Windows into Teaching and Learning (WiTL) is a project designed by researchers at one southeastern U.S. university that allowed the facilitation of online clinical experiences for graduate interns during their content area methods course. Originally developed to address challenges in providing meaningful clinical experiences for interns during online summer coursework, WiTL proves to support a mentoring relationship between pre-service and classroom teachers. This chapter explores those relationships and how they were fostered by the unique features of WiTL, which included online threaded discussions, synchronous and asynchronous viewings of classroom instruction, text chat communication, and debriefing sessions. The type of dialogue and collaboration encouraged by WiTL resulted in strong mentoring relationships. WiTL offers the potential to engage K-12 teachers in collaboration and mentoring via an online format. WiTL, grounded in online technologies and the professional development of educators, may serve as a tool in preparing teacher educators and K-12 educators for the 21st century classroom, both face-to-face and online. Different than how most teachers were educated, it could potentially facilitate and maximize experiences in an online learning environment while preparing teachers. This chapter discusses ways to utilize this type of program in K-12 settings.
“Transitioning from Face-to-Face to Virtual K-12 Learning Environments: Emerging Technologies and Promising Pedagogical Practices,” the fourth section of the book, includes five chapters that address technology-mediated instructional approaches and emerging technological tools that can serve as transitional elements as online K-12 learning continues to evolve. These chapters provide a critical analysis of the utilization and viability of a variety of pedagogical approaches and technological tools that support the transition from traditional face-to-face to online K-12 learning environments. In the first chapter, “Providing Elementary and Middle School Science Teachers with Content and Pedagogical Professional Development in an Online Environment,” Mary V. Mawn and Kathleen S. Davis present the utilization of online professional development as an alternative to traditional professional development in K-12 school districts. As a tool to address emerging challenges facing districts, such as budgetary issues, lack of time, and geographical disparities, online programs offer a potential solution to provide innovative methods of preparing teachers. While Mawn and Davis specifically address the professional development of elementary and middle school science teachers, the themes discussed in this chapter are relevant to all subject areas, as well as with both traditional and online teachers. Related specifically to online teaching and learning, themes such as the ability to incorporate inquiry-based teaching and learning, managing discourse and reflection, and directly linking existing learning theory with practice, all resonate quite loudly. Additionally, providing online professional development experiences afford traditional K-12 teachers the opportunities to participate in robust online learning environments, such as those their students might be involved with. Through these experiences, Mawn and Davis report that teachers echoed numerous benefits, including increased active engagement with peers and more in-depth exploration of the content via inquiry-based approaches. This chapter provides promising evidence of the application of online professional development for the preparation of both traditional face-to-face K-12 teachers as well as online K-12 teachers.

In the second chapter, “Challenges and Opportunities in the First Year of a 1:1 iPad Initiative in a High-Poverty, Highly Diverse Urban High School,” Gayle Thieman discusses the opportunities, challenges, successes, and recommendations emerging from the implementation of a 1:1 iPad initiative in a high-poverty, highly diverse urban high school. As the digital divide regarding technology-mediated instructional events continues to be a concern for educators, it is important to examine innovative and emerging ways to reduce the disparity. This chapter reports the results of one such attempt to reduce this disparity. In this chapter, Thieman reports the impact of a 1:1 iPad project on teacher attitudes and experiences, as well as both student use and access to technology in an urban high school. In the chapter, the author reports a number of opportunities afforded by the 1:1 iPad project, including increased blended learning opportunities for students, increased student engagement in online learning experiences, and increased extension of learning activities. These benefits were more evident in students that had the opportunity to take their iPad home for use beyond the traditional school setting. Using iPads resulted in blended learning opportunities for some but not all students. Those who had an individually assigned iPad to use at school and home reported significantly higher satisfaction and proficiency with technology, while also reporting significantly greater use of online iPad applications and technology activities for instruction, both during class and outside of school. Thieman reported that the extension of learning activities was particularly evident for English learners. Continual access to instructional materials allowed students to practice their language skills on demand. Increased student-instructor communication was reported as an additional benefit, which can be extended in future 1:1 iPad initiatives. There were also numerous challenges in the initiative. While one of the intents of this project was to reduce the digital divide, access for some still remained an issue. Access to the iPads was not equivalent among students,
and those who received their own device reported additional benefits. Management, implementation, and logistic issues were also reported. For example, rather than focusing on the potential benefits of iPads as educational tools, stakeholder communications often focused more on legal and financial obligations. Additionally, while numerous professional development activities were provided for teachers, many teachers echoed the desire for additional opportunities. While there were numerous challenges in the first-year of the 1:1 iPad initiative, there were also many successes. This chapter concludes with a discussion of these successes and how we can learn from these challenges in future iterations of 1:1 initiatives.

“Teaching History in the Digital Age,” the third chapter in this section, presents a discussion of authentic, engaging, and virtual ways in which history educators can provide students with opportunities to examine the past. In the chapter, Scott Waring tackles the notion that today’s students are fundamentally different than past generations, and that instructional methods must be adapted to provide appropriate and effective learning experiences for these students. This is particularly an issue in history, as it is typically viewed as a less favorable subject area by K-12 students. Waring presents the C3 framework as a tool to prepare students for college, career, and civic life through inquiry-oriented learning experiences. More specifically, the author provides a detailed discussion of methods in which educators can facilitate student implementation of the four dimensions of the C3 framework in both blended and online learning environments. As online learning opportunities continue to become increasingly prevalent in K-12 settings, Waring posits that it is critical to provide both educators and learners with sound technology-mediated instructional strategies and approaches that aid the transition from traditional face-to-face environments to virtual environments. In this chapter, Waring accomplishes this through his discussion of approaches and tools that will facilitate these transitions in K-12 history instruction.

“3D Multi-User Virtual Environments in Science Education: Potential and Challenges,” the fourth chapter in this section, discusses the impetus for students in the United States to improve science performance in order to more effectively compete at a global level. A first step in improving science performance is through the use of improved science instruction. Yufeng Qian addresses current attempts by researchers to examine the use of Three-Dimensional Multi-User Virtual Environments (3D MUVE) as a tool for increasing student performance in K-12 science. The author begins with a discussion of challenges and successes that have resulted through the implementation of 3D MUVE in science classrooms. Promising results discussed by the author include instructional benefits, such as increasing student motivation and engagement with science topics, enabling more authentic and valid assessments of science education, as well as narrowing gender and racial achievement gaps. Current challenges resulting in reduced integration of 3D MUVE, as with many emerging instructional technological applications, include cost, technological complexity, and lack of pedagogical experience in implementing 3D MUVE in the K-12 science classroom. In closing the chapter, Qian posits a series of strategies to overcome these challenges. As 3D MUVE possesses numerous potential instructional benefits in the K-12 setting, it is important that its utilization continues to evolve and that research regarding its use in K-12 settings expands in coming years. Based on initial successes, the author maintains that 3D MUVE can become a “powerful lever for advancing science teaching and learning in K-12 education.”

In the final chapter of this section, “Online Discussion Boards in the Constructivist Classroom,” Lauren Lunsford, Bonnie Smith Whitehouse, and Jason Lovvorn introduce Online Discussion Boards (ODBs) as a tool to facilitate constructivist learning environments in face-to-face, blended, and online learning environments. ODBs allow for numerous unique instructional applications, and the authors highlight the utility of these pedagogical approaches in varied instructional settings. Lunsford, Whitehouse, and Lovvorn provide an overview of the application of online discussion boards to allow for active
learning environments focus on anchoring knowledge to both content areas and personal experiences. When implementation of ODBs align with constructivist learning principles, they can be excellent tools for facilitating student reflection and allowing for more meaningful and relevant learning experiences. As today’s classrooms need to adapt to address a continually changing learner, the authors are hopeful that using ODBs aligned with a constructivist framework can serve as an effective instructional tool in blended and online learning environments. The authors present a series of strategies for implementing ODBs in varied settings, providing more innovative and engaging learning environments that support curiosity, reflection, and deeper learning.

The final section of the book, “Examining Issues of Diversity in Online K-12 Teaching and Learning,” explores differences that students and teachers bring to the online learning environment and how these differences should inform virtual program, course and instructional design. Three chapters address strategies for harnessing the value of diversity among participants and the perceptions teachers bring into their instruction. In the first chapter, “Best Pedagogical Practices for Acknowledging and Accommodating Diversity in Online Courses,” Christina Nash examines effective online pedagogy for embracing and accommodating diversity. She purports that the most important process of any teacher is reflectivity, which is a central exercise in bridging cultural differences. Since these differences are recognized, Nash contends that teachers need to reflect on not only their practices but also the intentionality behind those practices. She recommends that teachers need to reflect on their learning preferences at the same time as they are considering the learning preferences of their students. She also suggests that teachers need to be open to ideas about diversity and have a commitment to social justice. This sensitivity emerges in the types and structures of assignments that teachers give students. Consideration of the interests of the students themselves and offering opportunities for students to show off their creativity and talents in a non-threatening way are optimal online tasks. Nash comments that teachers should create opportunities for students to apply their life experiences to the content they are learning and that this is imperative to overcome the distance and isolation that online students sometimes feel when their interests or needs appear to be irreverent or unimportant. Once teachers can move from this reflection in practice, they can begin to view the larger issues of social justice that exist not only within their practice but society as well. Teachers need to consider adding social justice, citizenship, and respect for others into their content to continue community building and help students overcome the generalizations and prejudices they may hold. Nash concludes that teachers who are able to build on student diversity and use it as an asset for the online class will find that these students feel empowered and more confident in their work and are more likely to take risks necessary for appreciating and understanding differences.

Next, in “The Integration of Culturally Relevant Pedagogy and Project-Based Learning in a Blended Environment,” Daniel Bullock explores the facets of culture, constructivism, and inquiry in a blended learning environment. The author provides an analysis of findings from a qualitative case study on teacher implementation and effectiveness based on the New Tech Network educational model. The New Tech Network educational model is utilized based on its ability to effectively engage diverse student groups in academic content. The historically narrow and homogenous teaching methods of social studies has formed a barrier for students from diverse backgrounds; thus, these students experience difficulty in applying content to life outside of the classroom. The blend of culturally relevant pedagogy and project-based learning in a blended environment approach offers students and teachers a means of integrating 21st century skills and diversity into academically rich, social studies content. Bullock highlights the concept of authentic instruction as a major theme in online learning. He posits that authentic instruction is crucial to the diversification of social studies content and instructional models. Students from urban or low SES
backgrounds in his study demonstrate significant gains after engaging culturally relevant project-based learning. Bullock recommends the examination of additional measures of student achievement in culturally relevant project-based learning as guides for promoting quality online instruction in K-12 learning.

The final chapter of the book, “High School Teachers’ Gender-Oriented Perceptions of Technology Integration,” explores the role gender plays in shaping teachers’ pedagogical epistemologies and perceptions of technology. Heafner, Groce, Bellows, Coffey, and Bjerre suggest that gender is an important factor that influences noticeably different visions for how technology should be used to teach and support student learning in secondary schools. In a qualitative study, authors describe learning opportunities high school teachers provide their students. Study results suggest that technology-mediated learning varies greatly depending on gender of the teacher. Men and women view their teaching roles, as well as technology, differently; yet, both perspectives are equally important. This study supports findings from existing research and offers new interpretations of why gender needs to be a consideration in online learning course design, task orientation, and teacher preparation in online instruction. Heafner and colleagues suggest that men and women are drawn to different attributes of technology and do not share the same interests or ideas for how technology should be utilized. Males and females gravitate to different attributes valued in content-specific, social studies research. The implications for transformative learning mediated by technology and virtual learning experiences are significant. The authors conclude that the online learning opportunities provided for students should embrace and tap into the gender differences in how male and female teachers perceive and utilize technology for understanding content. Given that most social studies teachers have been left to fend for themselves in locating and developing skills in using hardware and software, as well as honing online teaching skills, male and female teachers are likely to select very different applications, seek out different primary sources and Websites, and develop lessons integrating technology or Web-based courses with distinctly different learning outcomes. Heafner and colleagues surmise that gender should be an important consideration when making technology decisions regarding access, training, professional development, and discipline-specific integration initiatives in K-12 online and blended learning.

CONCLUSION

As we are at the beginning of a revolution in the method in which K-12 education is implemented, this book has outlined some of the early research and praxis related to online K-12 learning environments. This collection of chapters captures past, current, and evolving research, pedagogical approaches, instructional models, and emerging technological tools and their application in online K-12 learning environments. Contributing authors have presented both discussions of key issues and trends to be considered as online K-12 education continues to evolve, early research related to the design, development, and implementation of online K-12 learning experiences, and instructional practices that can serve as transitional approaches as K-12 online learning continues to develop. These chapters serve as guidelines for others exploring the possibility of utilizing online K-12 environments, those just embarking on the journey to implement online learning experiences in K-12 settings, as well as more seasoned online K-12 stakeholders seeking to reflect upon their successes and challenges in an effort to strengthen the environment for learners and instructors. An important tenet of this collection of chapters is that authors question both the utility and viability of a number of issues related to online K-12 settings and instruction. While both challenges and successes are highlighted throughout the chapters, the authors agree that online K-12 learning is not only
here to stay but is also and will continue to become increasingly common. Thus, it is critical to explore the expansive issues that influence the effectiveness of online K-12 settings in an effort to provide more robust and effective online learning experiences for K-12 students. As readers move forward, they can use the chapters in this book to begin to shape their online K-12 settings. With the rapid expansion of virtual learning in K-12 settings, it is critical that schools learn from the experiences of others and utilize existing research to design, develop, and implement innovative, effective, and engaging learning experiences for K-12 virtual students. The collective ideas presented in the book provide a solid framework for exploring the new educational paradigm of online learning in K-12 environments.

Tina L. Heafner  
*University of North Carolina at Charlotte, USA*

Richard Hartshorne  
*University of Central Florida, USA*

Teresa M. Petty  
*University of North Carolina at Charlotte, USA*