Preface

CONTEXT AND PURPOSE

Over the past decade, the World Wide Web has become a critical tool for educators to utilize in their teaching and learning experiences. National efforts have been made to encourage technology integration in teacher preparation with expectations for frequent and successful applications with K–12 learners. One consequence of this is that there has been a growing trend in K–12 education to provide students with more online and blended educational opportunities. In their 2008 book, *Disrupting Class: How Innovation Will Change the Way the World Learns*, Clayton Christensen, Michael Horn, and Curtis Johnson predicted that twenty-five percent of all high school courses will be online by the year 2016, with that percentage growing to half by the year 2019. Although these were ambitious predictions, they illustrate the growth potential of online learning environments in K–12 settings.

While online and blended learning has become pervasive in many fields in education, other than for a few states, it has been somewhat slow to catch on in K–12 settings. However, for a variety of reasons (e.g., technological advances, budgeting concerns, technological expectations of students, diversity of course offerings, addressing individualized and specialized student needs, charter school movement), online and blended learning in K–12 settings is becoming increasingly available at the elementary, middle, and high school levels. States have begun to recognize the benefits of online and blended 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 looking to online and blended learning as a viable reform tool and innovative solution to issues they are currently facing. Additionally, districts and states are turning to online and blended learning for teacher professional training, development, and growth. While this trend is growing, little research has empirically explored the effectiveness of online and blended education in K–12 settings.

Each year, over $13 billion is spent on educational technologies (The Jefferson Education Exchange, 2018), which has made technology a pervasive learning tool in K–12 classrooms. Beyond the accessibility of digital resources, technology offers transformative opportunities for innovative knowledge generation, collaboration and communication across borders and cultures, and virtual experiences that bring the world to the user. Technology has forever changed the ways in which both students and teachers can

experience 21ˢᵗ century learning environments. So far, K–12 school districts continue to unquestionably embrace technology and online and blended learning. While the ubiquitous nature of online and blended learning has afforded innovative applications in teaching and learning, the outcomes of these changes and investments in technology remain mostly untested. Not only do K–12 educators need research-informed models of effective technology to operationalize technology in meaningful ways, district and state leaders charged with technology purchasing decisions need evidence of the effectiveness of K–12 online and blended learning.

Despite annual expenditures on educational technologies, the promise of technology to revolutionize K–12 learning has yet to be realized. Of the $13 billion annual technology spending, nearly 65 percent of those resources are completely or nearly unused, an additional 30 percent are materially underused, and only 5 percent are considered to be used properly (The Jefferson Education Exchange, 2018). 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 also requires an innovative skillset, which harnesses effective educational practices in K–12 schools while seamlessly integrating technology to transform learning and educational spaces. Regretfully, the limited investment in professional learning for educators to leverage these technologies to their full capacity further exacerbates the underutilization problem.

As technological innovation continually presents these new opportunities, environments, and challenges for teaching and learning, the field of educational technology, dedicated to the improvement of online and blended learning, seems particularly well positioned to offer research-informed insights into how these technology expenditures are being used to advance K–12 teaching and learning as well as provide recommendations for how teacher education can responsively address shifting pedagogical demands. Nevertheless, there is limited empirical guidance related to the manner in which school districts and K–12 entities should proceed with the implementation of online and blended learning opportunities. Understanding the theoretical, pedagogical, technological, financial, and logistical issues, as well as management approaches, instructional delivery options, and policy considerations are essential considerations for creating effective online and blended K–12 learning opportunities.

Given the limited scope of research in K–12 online and blended learning, we sought to understand the current landscape of online and blended learning practices and how these tools and practices were associated educational outcomes. Thus, this book aims to promote high-quality research by bringing together researchers and practitioners from academia and industry. This book presents emerging research and practice related to the unique and complex challenges facing K–12 online and blended teaching and learning. Readers will find research-informed strategies for designing, developing, and implementing online and blended learning experiences. Chapters comprise original and invited works, as well as, enhanced, expanded, and updated versions of chapters previously published in *Exploring the Effectiveness of Online Education in K–12 Environments* and *Teacher Education Programs and Online Learning Tools: Innovations in Teacher Preparation*. These new and enhanced chapters highlight the advances in emerging practices and methods in K–12 online and blended learning. This book also examines how online and blended learning supports current educational initiatives such as Common Core State Standards (http://www.corestandards.org/), the Partnership for 21st Century Skills (http://www.p21.org/), and ISTE standards (https://www.iste.org/standards). Additional topics found within the subsequent chapters are the creation of online and blended K–12 schools and learning communities and how these are affecting both teacher education and K–12 students. Examples of such programs and educational environments

are described and explored. Associations between online and blended instruction and student achievement is also a primary focus.

We define K–12 online and blended learning as technology-mediated learning that augments learning beyond traditional classroom structures and cultivates students as knowledgeable and skilled digital citizens. Teachers in these learning environments create authentic, digital-age learning experiences, which help students understand their roles as digital citizens and employ research-informed strategies to develop students as intentional and skilled digital citizens. In these innovative educational settings, students engage with academic disciplines and content instruction through both asynchronous and synchronous uses of technological tools, including both software and hardware, to facilitate virtual learning. Educators and learners embrace social networking, interactive tools, and other technologies that support the development of a community of inquiry by establishing a cognitive, social, and cultural presence between instructor, pupil, peers, and the community at large. K–12 online and blended learning also includes development of courses and explorations of how content is delivered, as well as how this varies across disciplines.

The target audience for this book includes university faculty, university administrators, researchers, and practitioners considering online, blended, and technologically innovative teaching and learning issues K–12 settings. This book serves as a reference for individuals in teacher education programs or state departments of education, a resource for online and blended course developers and instructors, as well as a text for courses related to online and blended teaching and learning and other higher education issues. Further, this book is designed to support decision-making related to launching and developing online, blended, and technologically innovative teacher education programs.

The purpose of this book is to present information about current practices and research in online and blended 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 and blended learning environments. More specifically, this book serves: 1) to distribute information about current online and blended learning practices in K–12 education, 2) to disseminate information about current research related to online and blended learning practices in K–12 education, 3) discuss issues related to evidence of student learning and assessment in the context of online and blended aspects of K–12 education, and 4) to disseminate information about policies related to K–12 online and blended learning and the impact of these policies on stakeholders in K–12 online and blended environments. With the impending growth of online and blended 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 and blended learning in an effort to aid administrators, teachers, and policy makers in developing successful online and blended 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/blended K–12 education and concluding with an examination of online/blended course development and instructional design, this book presents research, practical applications, and theoretical guidelines regarding online and blended K–12 teaching and learning.

The Roadmap

This book is organized into four sections: 1) Issues, Challenges, and Trends in Quality Online/Blended K–12 Education, 2) Supporting Engagement and Collaboration in Online/Blended K–12 Teaching and Learning, 3) Innovative Online/Blended Teaching and Learning Practices in K–12 Teacher Education, and 4) Online/Blended Course Development and Instructional Design: Emerging Technologies and Promising Pedagogical Practices.

Section 1: Issues, Challenges, and Trends in Quality Online/Blended K–12 Education

In the opening chapter Marius Boboc offers a theoretical framework introduced to identify academic programs/curricula, student support services, and virtual program/school administration to inform policy-setting efforts aimed at supporting the further development of high quality K–12 online environments. "Continuity and Developments in Terms of Challenges, Opportunities, and Trends in Quality K–12 Online Environments" provides updated background information related to K–12 online education, ranging from definitions to benefits and challenges, based on an earlier version of the document. The author discusses the evolution of online K–12 education and identifies 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. Boboc's framework creates a comparative analyses of the virtual learning landscape to reveal the increasingly complex parameters 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.

In the second chapter, Vassiliki Zygouris-Coe, responds to the increasing demand for online learning. The author contends that learning does not occur in a vacuum; students learn independently and collaboratively. Yet, the author questions the collaborative space for discourse and engagement facilitated in online education. In "Benefits and Challenges of Collaborative Learning in Online Teacher Education," Zygouris-Coe presents information on teacher educator designed and implemented collaborative learning in a developmental reading online course for preservice and inservice educators in grades P-12. The author presents details related to course design issues, instructional practices, benefits and challenges associated with collaborative learning in this online course, and implications for further development and evaluation of collaborative learning in teacher preparation programs. Zygouris-Coe also provides recommendations from lessons learned for promoting collaboration in online teacher education courses. While flexibility and convenience still remain top reasons for students' enrollment in online courses, according to findings presented in this chapter, time spent in active and meaningful learning can be another time saver, in the long run. The author suggests that teacher education and other online courses presented in interactive, collaborative, authentic, and relevant project-based formats can be both enjoyable and productive experiences in students' academic lives when attending to collaboration and engagement. Participating in collaborative learning experiences online helps teacher candidates and other educators to not only use collaboration as a learning tool for them as learners, but to also use it as a learning tool for developing their students' 21st century skills.

In the third chapter, "The Extent of K–12 Online Teacher Development: A Disconnect Between Preparation and Practice," 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 few teacher education programs integrate any aspect of online teaching into their coursework or field experiences, existing programs are discussed. Limited, but notable progress is being made with respect to K–12 online teacher preparation. However, there continues to be gaps in the literature examining the extent to which teachers are being educated, trained, and otherwise prepared to function in online settings. Over the past decade, the need for teacher education programs and current K–12 online schools to work together to prepare teachers has become increasingly clear. In this chapter, Larson and Archambault argue that effective online teaching techniques must be defined, empirically proven, and then efficiently implemented by both future and current K–12 online teachers to ensure quality online educational experiences and outcomes for students. While training for educators at the K–12 level has historically been provided through colleges of education housed within a university setting, the authors contend that colleges of education have yet to expand their curricula to include teaching methodologies in the virtual environment.

One aspect of online learning, reading, deserves special consideration as we examine issues and trends in K–12 virtual contexts. The next chapter, titled "Texts and Tasks: Why Reading Matters in Online Courses," explores the role of literacy in online learning. 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. The subject of students' reading abilities and achievement are the focus national and international comparisons (National Assessment of Educational Progress, 2018; National Center for Educational Statistics, 2018), and such a broad audience makes reading content, activities, and assessments the subject of great scrutiny. At the same time, Massey notes the limited knowledge of reading within the quickly expanding market of K–12 distance education. 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. In this chapter, the author describes the types of reading students do in online K–12 courses and offers a review of the limited research about reading in online courses. Based 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. Massey concludes with instructional implications for teachers of online courses and possibilities for future research.

The fifth chapter in this section, "Digital Learning Challenges in Rural K–12 Settings: A Survey of Challenges and Progress in the United States," provides an overview of rural education and the ways in which online learning can fill gaps in supporting students, teachers, and families in rural education settings. Authors describe the sharp contrast to contemporary perspectives of rural America, which highlight unemployment, entrenched poverty, economic decline, and geophysical isolation with aesthetic appeal of pastoral farmland, country roads, and close-knit communities. They contend this dichotomy converges around a belief that a high-quality education can open a world of opportunities for rural children. From their qualitative study, authors identify the challenges faced by rural schools and explore the digital learning strategies used to meet these limitations and barriers. Authors suggest promising practices

which are expanding Internet access across the nation, addressing teacher shortages, and increasing course offerings, which have in turn contributed to the academic achievement and future prosperity of today's rural students.

This section concludes with a chapter titled "The Effects of Formative Supports in Online and Face-to-Face Teacher Preparation Programs." The author, Tina Heafner, utilizes performance outcome data from a nationally accepted measure of educator classroom readiness, edTPA, to explore the association between formative learning supports and candidate preparation for teaching. This chapter examines differences in two program delivery modes: online and face-to-face (F2F). Heafner's mixed methods analysis study suggests that online program delivery modes support greater candidate independence and self-efficacy in teaching preparation skills; whereas, F2F programs create contexts in which candidates are more dependent upon instructors and formative supports to ensure teaching success. Heafner concludes that online learning offers a different teacher preparation context than F2F training. When examining the learning outcomes of candidates without formative edTPA supports, online candidates outperformed F2F candidates on all edTPA rubrics. These results suggest that when no formative supports are available, online learning may be a more effective platform to support teacher readiness preparation as measured by edTPA.

Section 2: Supporting Engagement and Collaboration in Online/Blended K–12 Teaching and Learning

The first chapter in this section, "K–12 Online Student Engagement: New Construct or Extension to Existing Construct?" explores student engagement in K–12 online learning. Elizabeth Anderson describes links between student engagement and improved academic achievement leading to increasing high school graduation rates, lower dropout rates, and in the development of research-based best practices for K–12 education. This chapter explores student engagement in the K–12 online learning environment and examines how student engagement is similar to but also very different from student engagement in a traditional K–12 brick-and-mortar environment. Anderson finds that the K–12 online learning environment has contextual considerations that should be taken into account when conducting research on student engagement. The author offers the following contextual considerations and discusses these in detail in the chapter: range of online participation—how much time are students spending in the online learning environment for learning purposes?; reasons for selecting an online learning environment—what are the reasons students and families are selecting the online learning environment?; and amount of asynchronous and synchronous instruction—do these types of instruction change student engagement? Anderson claims that contextual considerations for student engagement may be more critical in K–12 online learning environments than in traditional F2F settings.

Kristen Kipp and Kerry Rice extend dialogue-examining engagement in K–12 online and blended learning. They define engagement as a learner's interest in their own learning and suggest that engagement is associated with increases in time committed to coursework and extensions of content, e.g. learning beyond what is required. They contend that learner engagement leads to increased achievement in a course and also increased satisfaction with the learning experience. "Building Engagement in K–12 Online Learning" explores elements of engagement from both a researcher and practitioner perspective. The authors explore the definition of engagement along with an explanation of the most influential theories of engagement. They also explain what classroom practices are most likely to build engagement and suggest future research directions. Kipp and Rice conclude that online programs should seek to support all

of the stakeholders in the engagement process: the student, the teacher, and the parent. These programs, according to the authors, should also seek to design high-quality courses that build engagement through discussions, collaborative learning, instructor support, synchronous options, and academic challenge. Authors call for the use of analytics to examine how certain activities, such as student logins, page views, and time on a page, influence learner engagement. Authors conjecture this kind of research may provide more reliable measures of what students find engaging, especially at the K–12 level.

Jean Keikel, Serena Flores, and Nicole McZeal Walters examine another attribute of engagement—student-teacher relationships. In the chapter titled "Engaging Online K–12 Students: Using Instant Messaging to Foster Teacher-Student Relationships," the authors observe that K–12 students increasingly miss valuable interactions present in F2F classes and, as such, engaging students in online courses can be difficult. The authors suggest that forgoing the relational aspect of learning for the touted benefits afforded by online learning, such as access to courses for college and career readiness, world languages, science, technology, engineering and math (STEM), including electives that might otherwise be unavailable, may overlook a critical learning attribute that may hinder or even inhibit K–12 student academic success. For this reason, Keikel, Flores, and McZeal argue that teachers in an online setting must be flexible and creative and find approaches to make the online classroom feel more like a F2F classroom. They suggest finding ways to decrease the cognitive and emotional distance often associated with not seeing a teacher or fellow students is a necessity for K–12 learners. The chapter also presents the case of the need for school leadership need to exercise caution while implementing school policy to encourage appropriate social media behaviors when engagement is afforded.

In "Let's Riff Off RIFS (Relevant, Interesting, Fun, and Social): Best Practices for Engaging the Online Mind," Steve Joordens, Aakriti Kapoor, and Bob Hofman, describe how online learning enables students to escape traditional constraints, and supports teachers in creating learning experiences that allow interactions, and support learning, that would be difficult or impossible in brick and mortar contexts. In this chapter, the authors present a new RIFS taxonomy (Relevance, Interestingness, Fun, & Sociality) to highlight the factors that can make a learning experience especially engaging. They discuss what they want students to learn when they are engaged, in support of twenty-first century learning. This chapter begins with the argument that online learning allows creative educators to do to education what the power of animation has done to movies. Free of the typical constraints of a brick-and-mortar learning context, educators, according to the authors, could create new and unique contexts of learning. Authors further argue that, as educators do so, educators should keep two things strongly in mind; first, via the factors described within the RIFS framework, they should try to create learning experiences that students find engaging, and second, once engaged they should ensure that the learning experience includes effective practice with core 21st-century/transferable skills, as these are the skills most predictive of future success for our students. Within this context, Joordens, Kapoor, and Hofman describe an initiative called The Global Teenager Project as a concrete example of how, with heavy support from online technologies, these factors can be combined to produce deep learning that students find truly meaningful.

Elizabeth Anderson presents a study of online latent constructs, such as student engagement. In "Measurement of K–12 Online Learning Environments: Measurement of Student Engagement and Other Latent Constructs," Anderson suggests that measurement in an online learning environment has different accessibility and data collection requirements as compared to brick-and-mortar K–12 schools. For example, the author argues that an online learning environment lends itself to the use of student behaviors to measure latent constructs, including student behaviors documented within online learning environment research. This chapter delves into the ways latent constructs, using student engagement

as an example/case study, are currently being measured in the K–12 online learning environment and alternatives to these measures mimicking traditional brick-and-mortar measures. Anderson concludes there are very few measures of latent constructs that are designed and developed specifically for the K–12 online learning environment. However, by understanding the necessary steps to the design of latent construct measures, educational researchers can begin to better understand the necessary measures needed to advance K–12 online educational research. Anderson also suggests there is promise in the use of log file data and online tracked student behaviors as indicators for measures of latent constructs in the K–12 online learning environment. These latent constructs, such as student engagement, are what Anderson suggests will help researchers understand how to promote change and propose best practices in the K–12 online learning environment.

In the final chapter in this section, "Moving Beyond Trial and Error: Exploring Case Studies of Professional Development Models in K–12 Blended Learning," Aimee L. Whiteside, Amy Garrett Dikkers, and Frederick W. Baker III examine fifteen years of research on social presence, examining the level of connectedness among students and instructors and uncovered a recurring theme: the need for districts to provide better support for professional development in online and blended K–12 settings. Whiteside, Dikkers, and Baker III take a deep dive in exploring some of the challenges in implementing online professional development, describing and explaining the social presence model, providing evidence from multiple case studies, and summarizing key findings. Their research espoused that, while online and blended teachers often recognize the need for continued support and its role in helping them be more effective educators, they often moved forward without adequate support and professional development. Because the passion and perseverance of these teachers predict long-term success for students, districts need to have a plan in place to help them get the support and professional development needed in order to maximize their experience and have the most significant impact on student learning. Whiteside, Dikkers, and Baker III close by presenting a robust description of micro-communities as one deep, socially-present, easy-to-implement, and budget-conscious solution to providing a long-term plan for online and blended teacher support and professional development.

Section 3: Innovative Online/Blended Teaching and Learning Practices in K–12 Teacher Education

Drew Polly and Amanda Casto examine the use of vignettes in elementary and middle schools as tools to explore the role of blending learning in mathematics. Although the term blended learning continues to gain momentum in K–12 classrooms around the United States, authors suggest that implementation of blended learning varies in school contexts. They recommend examining how these environments look and how they influence student learning. This chapter, "Blended Learning in Mathematics: Examining Vignettes From Elementary and Middle Schools," takes a step in that direction by examining four instances of blended learning in mathematics classrooms, described as vignettes that examine the model of blended learning, shifts in teachers' instruction while trying to implement blended learning, as well as teachers' reported benefits and barriers to teaching mathematics in this way. This chapter shows that blended learning environments have the potential to provide multiple benefits for middle school students and their teachers. Authors suggest blended learning offers more equitable learning opportunities in the classroom, as students have access to technology even if they experience a digital divide related to socioeconomic status or technology access at home. Beyond access, blended learning models, such as the flex model, also achieve equity through the personalization and differentiation of assignments.

Polly and Casto recommend focusing on the quality of mathematical tasks posed by teachers as well as in technology-rich environments and call for more in depth examination about teachers' instructional decisions and rationales related to blended learning and how those decisions influence student learning.

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 "Taking Responsibility for the Future: A Case Study of a State-Run Program to Train K–12 Online Teachers," Linton and 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 inservice 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 preservice 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.

In the next chapter, "Using Video Capture and Annotation Technology to Strengthen Reflective Practices and Feedback in Educator Preparation," the authors share the history of a video capture and annotation technology (VCAT) implementation. Christina Tschida, Jennifer L. Gallagher, Kimberly L. Anderson, Caitlin L. Ryan, Joy Stapleton, and Karen D. Jones provide summaries of research findings to support the use of video capture and VCAT's continued use and refinement. The chapter details the multiple uses and particular objectives the authors aimed to meet with the technology across different content areas and even across multiple educator preparation programs, including a collaboration between a teacher education program and principal preparation program that was enabled by the technology. Authors found that increasing familiarity with the tool—both their own familiarity and the teacher candidates' who have now used the tool for multiple semesters—has smoothed out the initial technical issues they faced. This familiarity, as authors report, lessened the cognitive/emotional load that often accompanies using new technology, allowing us to deepen our engagement with the tool's possibilities. Anecdotal evidence, as well as the initial research findings summarized, provided authors with a number of lessons learned, which they share in this chapter. These lessons have cultivated new ideas for directions, which authors recommend for future use of the VCAT tool.

In "E-Coaching to Support University-Public School Partnerships: Disrupting Power Dynamics in Teacher Education," Elizabeth Bellows, Aftynne Cheek, and Morgan Blanton partnered with a high school

to pilot an eCoaching model with secondary social studies pre-service teachers. Findings presented in this chapter reveal an eCoaching supervisory model can nurture relationships between university and public schools to support pre-service teacher (PST) development, can increase a PST's independence and confidence, and can support creation of a third space where power dynamics between university and public schools are disrupted and potentially leveled. Using this coaching model, PSTs have multiple opportunities to learn before, during, and after a teaching experience with the support of their *e*Coach. It also provides an opportunity to leverage the expertise that the mentor teacher, PST, and *e*Coach bring to the feedback loop, as well as the teacher education relationship to improve teacher development. Bellows, Cheek, and Blanton recommend eCoaching as a means of supervising field experiences in rural teacher education, and they suggest that in the role of *supportive other* instead of *big brother*, *e*Coaching may be the avenue through which quality feedback can be delivered "on the spot" during instruction resulting in positive impacts on both the PST's and the *e*Coach's pedagogical development. Authors contend this *supportive other* role can help blur the lines between *e*Coach and PST by actively engaging each in the lesson as co-teachers, therefore reducing the hierarchical relationship previously imposed by a more traditional approach to coaching. Through immediate feedback, *e*Coaching allows the PST and *e*Coach to work collaboratively and simultaneously toward common teaching and learning goals.

In "Models for Implementing Effective Online Learning," Laura Corbin Frazier and Barbara Martin Palmer present four models of professional development for online instruction. These five 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, and 5) Iterative Learning - couples and extends models. 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 policy-makers 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 F2F 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.

Amani Bin Jwair in "Challenges and New Trends in the Design and Implementation of Flipped Learning in K–12 Education: A Critical Analysis," the final chapter in this section, explores the quality of learning found when using the flipped learning (FL) approach in K–12 education to promote academic achievement and critical thinking skills, reduce seat time, and improve self-efficacy. The author contends that the benefits of this approach are controversial, but counters that no clear findings have demonstrated the superiority of learning in a traditional classroom over flipped learning. Bin Jwair suggests there are several benefits to using flipped learning in K–12, and many educators and experts assume use of this approach in traditional classrooms could show great improvements in student outcomes. As a second perspective, Bin Jwair points out that some educators and specialists have doubts about using

flipped methods in traditional classrooms, drawing attention to the challenges K–12 education might face in implementing this approach. Overall findings of this chapter lead the author to conclude that the benefits of the flipped learning approach supersede the potential challenges. According to Bin Jwair, the flipped learning approach has positively influenced the education system, particularly in K–12, as it can increase academic achievement, improve critical thinking skills, reduce seat time, and improve self-efficacy. The author also argues that flipped learning methods help engage students in all aspects of lifelong learning. Although interaction between the instructor and students may be limited in the initial stages of implementation, the author contends that the flipped learning model eventually encourages two-way communication and more effective application of learned skills during class time, and there is little evidence this approach negatively impacts learning. The chapter ends with new trends in the design and implementation of flipped learning in K–12 education.

Section 4: Online/Blended Course Development and Instructional Design – Emerging Technologies and Promising Pedagogical Practices

In section four, authors suggest numerous innovative pedagogical approaches and technological applications for designing, developing, and implementing engaging and effective online and blended learning experiences for K–12 students. In the first chapter, "Inclusive Pedagogical Practices 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 that 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 contends 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.

In "Engaging Teachers in Science Practices and Discourse Through Online Professional Development**,"** 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 F2F K–12 teachers, as well as online K–12 teachers.

"Framing Historical Thinking 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 K–12 students typically view it as a less favorable subject area. 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 F2F 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.

In the next chapter of this section, "Dialogism in the Digital Age: Online Discussion Boards as Constructivist Platforms," Lauren Lunsford, Bonnie Smith-Whitehouse, and Jason Lovvorn provide pre-service and practicing teachers a constructivist lens for viewing how they use technology, specifically online discussion boards, in their classrooms. They examine online discussion boards as a tool to facilitate constructivist learning environments in F2F, blended, and online learning environments. Lunsford, Smith-Whitehouse, and Lovvorn explore the way that student-focused and constructivist teachers can utilize technology in ways that remain consistent with maintaining important student relationships, which are so central to paradigm and student success overall. They suggest that online discussion boards allow for numerous unique instructional applications, and highlight the utility of these pedagogical approaches in varied instructional settings. Authors explore the role of dialogism in a student-centered classroom and provide several specific and practical strategies for ways to use discussion boards in the classroom. They suggest each of these strategies connects to the roots of constructivist beliefs. Thus, this chapter highlights the role that writing can play in facilitating student reflection and allowing for more meaningful and relevant learning experiences when using this technology. As today's classrooms need to adapt to address a continually changing learner, the authors are hopeful that using online discussion boards aligned with a constructivist framework can serve as an effective instructional tool in blended and online learning environments.

In "Moving K–12 Coursework Online: Considerations and Strategies," Wayne Journell and David Schouweiler provide an overview of best practices in designing and developing engaging online learning opportunities for K–12 students. Journell notes that today's adolescents experience online learning opportunities in different ways than those of the past. Authors contend that there are many aspects of online

learning that are the same regardless of the age of the students taking the courses, but adolescents often experience online instruction differently than university students or adult learners. Although far from comprehensive, this chapter describes basic guidelines and offers recommendations for K–12 educators wishing to create engaging online learning opportunities for their students. Journell and Schouweiler 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 and Schouweiler suggest, implemented throughout online K–12 learning environments.

While the growth of blended learning environments in higher education and non-educational settings has continued to increase in recent years, this has not been the case in K–12 settings. Recently, in an effort to explore the viability and effectiveness of K–12 blended learning environments, Florida Virtual School (FLVS) has been piloting blended learning communities in a number of their schools, providing opportunities to explore factors that influence the effectiveness of K–12 blended learning communities In "Investigating Student Perceptions and the Effectiveness of K–12 Blended Learning Communities," Gina Tovine, April Fleetwood, Andrew Shepherd, Colton Tapoler, Richard Hartshorne and Raquel Pesce report the results of a study designed to assess conditions that influence the effectiveness of K–12 blended learning communities, and to explore learner, instructor, course, and other factors important to successful blended learning communities. Findings shared in this chapter will inform the design, development, and implementation of future K–12 blended teaching and learning environments in an effort to support and strengthen student achievement, the preparation of teachers to facilitate effective blended learning environments. This study opens opportunities for additional conversations and research into other factors that may impact learner satisfaction and, in turn, teacher practice. Authors suggest learner satisfaction is an important element of blended learning courses and recommend a need for continued attention to course and environmental factors that impact blended learning communities.

CONCLUSION

As we are at the beginning of a significant shift in the method in which K–12 education is implemented, this book has outlined some of the preliminary research and praxis related to online and blended 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 and blended K–12 learning environments. Contributing authors have presented both discussions of key issues and trends to be considered as online and blended K–12 education continues to evolve; early research related to the design, development, and implementation of online/blended K–12 learning experiences; and instructional practices that can serve as transitional approaches as K–12 online and blended learning continues to develop. These chapters serve as guidelines for others exploring the possibility of utilizing online and blended K–12 environments; those just embarking on the journey to implement online and blended learning experiences in K–12 settings; as well as more seasoned online and blended 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 and blended K–12 settings

and instruction. While both challenges and successes are highlighted throughout the chapters, the authors agree that online and blended K–12 learning is not only here to stay, but is, and will continue, to become increasingly common. Thus, it is critical to explore the expansive issues that influence the effectiveness of online and blended K–12 settings in an effort to provide more robust and effective online and blended learning experiences for K–12 students. As readers move forward, they can use the chapters in this book to begin to shape their online and blended K–12 settings. With the rapid expansion of virtual learning in K–12 settings, it is critical that schools learn from past 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 and blended learning in K–12 environments.

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