Chapter 3
Ensuring Virtual Success:
Graduate Preparation to Teach Online in the K–12 Context

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ABSTRACT

Very few academic programs in pre-service teacher education include opportunities for current and future K-12 educators to develop the necessary skills to teach in an online setting. While limited research has been done related to the preparation of teachers for online instruction, the evidence-based best practices in the field of instructional design and technology can inform graduate curriculum development in this area. This chapter presents a current review of academic programming and trends related to preparing K-12 educators to be effective teachers in online and blended learning environments. Additionally, essential skills and knowledge for teaching online in the K-12 context will be explored and recommendations made for curricular planning to meet these necessary competencies.

INTRODUCTION

Though online and blended forms of instruction have demonstrated consistent growth in K-12 contexts around the world for the past two decades, the preparation of educators to teach using such delivery modes has consistently lagged behind this growing trend. In the early days of K-12 online programs, Kearsley and Blomeyer (2004) offered a prescient insight regarding the need for online teaching proficiency to be addressed through academic curricula, stating that, "Ultimately, teachers may receive adequate training to teach online as part of their basic preparation (i.e. schools of education); however, this is not likely to be

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true in the near future" (p. 52). Kennedy and Archambault repeated this call to action in 2012, claiming that, "Teacher education programs need to recognize this need and begin preparing candidates for 21st century teaching and learning environments, providing them the necessary skills and dispositions for the ever-evolving field of education" (p. 198). Additional scholars have more recently highlighted the need for pre-service teachers (PSTs) to be prepared to teach in online and blended environments (OBL) (Barbour, 2019; McAllister & Graham, 2016; Moore-Adams, Jones, & Cohen, 2016).

In March of 2020, the COVID-19 pandemic shifted this unmet need to a matter of urgency. Schools around the world transitioned to virtual delivery of instruction in a matter of weeks, with most teachers have little to no prior experience (Koenig, 2020). Barnett (2020) emphasized the impact on educational systems, describing the emergence of two eras—Before COVID (BC) and After COVID (AC). Educators at all levels were impacted by this sudden shift to emergency remote teaching (Hodges, Moore, Lockee, Trust, & Bond), including pre-service teachers, teacher educators, and practicing K-12 educators. At this After-COVID juncture, the imperative exists to prepare educators at each level—pre-service, in-service, and teacher educators—to effectively design and implement online and blended learning solutions. This chapter addresses the current state of pre-service teacher education for online and blended teaching, as well as proposes content and strategies to facilitate the development of this critical, and now ubiquitous, educational delivery approach.

Current Preparation of K-12 Educators to Teach Online

While technology integration skills and knowledge have become expected outcomes throughout teacher education programs around the world, opportunities for pre-service teachers to prepare to teach in online and blended K-12 learning environments are not commonly available in graduate teacher education programs. Over the past decade, an increasing number of states in the U.S. began requiring K-12 students to take at least one online course prior to graduation in order to become familiar with the educational modality (DeNisco, 2013).

A number of scholars have conducted extensive reviews regarding the preparation of PSTs to develop and facilitate OBL from both curricular and content perspectives (Barbour, Siko, Gross, & Wadde, 2013; Ferdig, Cavanaugh, DiPietro, Black & Dawson, 2009; McAllister & Graham, 2016; Moore-Adams, Jones, & Cohen, 2016). As noted by Barbour (2019), much of the scholarship related to this topic is focused within the U.S. context, with growing international contributions from around the world (Barbour, 2018a). Given that caveat, the following curricular strategies have been identified in the literature in supporting the development of PST skills and knowledge related to OBL.

A recent survey of teacher education leaders indicating the most common provision of preparation approach is an instructional design for online learning course at the graduate level (33.5%). Such courses were identified as standalone, but were also commonly included as part of a graduate certificate program in online teaching (23.7%) (Graziano & Bryans-Bongey, 2018). Innovative examples of online teaching and learning opportunities within teacher education have been offered as potential models for more than two decades (Cifuentes & Shih, 1999; Shepherd, Bolliger, Dousay, & Persichitte, 2016). Additional opportunities are offered through add-on endorsements for online teaching, each comprised of sets of courses, ranging from 6 to 20 hours and often requiring an online teaching field experience. One interesting note is that six states in the U.S. require PSTs to have experience as an online teacher, or learner, or both (McAllister & Graham, 2016).

As teaching OBL is inherently different than F2F instruction, it is important to identify the necessary skills and knowledge that teacher education programs should target for their students. A number of resources exist for the identification of such competencies. The International Society for Technology in Education (ISTE) maintains widely used standards for the integration of technology into classroom settings, serving as a useful starting point for the planning and creation of mediated instruction (Crompton, 2017). Standards for such competencies have formed and evolved over the years, from organizations such as the Southern Region Electronic Board (2003), iNACOL (2011), and more recently, Quality Matters and the Virtual Learning Leadership Alliance (2019). Some scholars note the establishment of online and blended instructional skillsets are not typically grounded in empirical research, but more so on best practices (Barbour, 2019; Moore-Adams et al., 2016). The authors of this chapter agree with Barbour (2019) regarding the usefulness of a conceptual framework to underpin decision-making regarding the targeted pre-service educator skills and knowledge for teaching in online and blended environments.

Online Teaching Competencies for K-12 Contexts

As pre-service teaching programs consider strategies for preparing their students to be effective online educators, especially in light of the current COVID-19 pandemic, it will be critical for key online and blended teaching competencies to be identified as the basis for curricular planning. As colleges and schools of education consider what skills, knowledge, and attitudinal outcomes should be targeted in developing such competencies, assistance can be found in the standards and best practices identified earlier, as well as the evidence-based process of instructional design as a guiding framework.

In their comprehensive review of teaching endorsements in online education in the U.S.

McAllister and Graham (2016) identified the following six global thematic areas as common components in these endorsements: technical skills, instructional design (ID), online pedagogy, ethics, online/blended learning general knowledge, and online practical experience. The authors of this chapter concur that these topic areas comprise important strategic knowledge and skill outcomes in supporting PST preparation to teach in OBL settings. These key competency areas are discussed in detail as follows, sequenced to initially address general knowledge and moving in a logical progression toward the development and application of specific skills. The inclusion and emphasis on ID as a basis for OBL course design would help address prior concerns regarding the absence of empirical guidance on which to base the effective planning, development, implementation of OBL in K-12 settings.

(1) Online/Blended Learning General Knowledge

The role of context is important in helping learners connect new concepts and skills to existing knowledge (Tessmer & Richey, 1997). As such, general knowledge about online and blended learning would provide a helpful basis on which PSTs could build their OBL teaching skills. Essential background knowledge would be largely conceptual in nature and would include several key categories, including definitions and models, historical evolution of DE and OBL, the relationship between instructional design and technology, teacher education, and OBL, and professional resources for further learning.

Definitions and Models

Awareness of standard definitions of distance education, online learning, and blended learning would be essential in helping future teachers to be conversant about various options for instructional delivery, as well as impact their ability to communicate these distinctions to different stakeholders, including students, parents, colleagues, and administrators. Though variance exists across such definitions, PSTs would benefit from awareness of primary sources of such definitions (Gunawardena & McIsaac, 1996; Simonson & Seepersaud, 2018). Exploration of each model would benefit from including considerations of the differences between F2F and online learning, as well as blended and/or hybrid models of learning. Additionally, identification of potential advantages and disadvantages of each modality could help PSTs be prepared to leverage features and address challenges head-on prior to implementation.

Historical Evolution of DE and OBL

Distance education (DE) and OBL in K-12 contexts are not new, and as such, lessons learned from their histories could inform current and future practice. Changes in audiences, purposes, models, and delivery systems are featured in scholarship that focuses on historical periods and perspectives in the United States (Barbour, 2019; Schwirzke, Vashaw, & Watson, 2018), as well as international settings (Barbour, 2018b). An awareness of trends and transitions across time to differing approaches and systems would build on conceptual knowledge about unique attributes of specific eras and models, as well as persistent issues and challenges across time. Tracing the evolution would end with current trends and issues in DE and OBL practices, forming a foundational schema for contemporary practices.

Instructional Design & Technology and OBL

The presence of technology in PST curricula is typically related to technology integration skills, referring more so to hardware and software, as opposed to IDT as a process or field. Historically, the relationship between IDT and teacher education has been a tenuous one. Hoffman (2014) concurs, stating that, "Despite the fact that most IDT programs are housed in schools, departments, or colleges of education where teachers are prepared, the relationship between teacher education and the field of instructional design and technology has often been contentious, as well as poorly defined" (p. 897). As such, PSTs would benefit from an enhanced understanding of the field of IDT, how it relates to teacher education, and how it is connected to the creation of effective OBL. An appreciation for the relationship among these fields and their interconnectedness can situate the process of instructional design as a guiding OBL framework, as well as help PSTs connect to professional resources to inform their design and implementation efforts.

Professional Resources for Further Learning

An opportunity for PSTs to connect with a variety of professional resources related to DE and OBL in K-12 contexts can provide support both during their academic experience and their role as a practicing educator post-graduation. Professional communities can be found in associations such as the Association for Educational Communications and Technology, the Online Learning Consortium, the International Association for K-12 Online Learning (now called The Aurora Institute) and the International Society for Technology in Education. Each of these societies host conferences, sponsor scholarly and practitioner-oriented journals, and provide continuing education opportunities to support continuous learning about DE and OBL emerging trends and best practices.

(2) Instructional Design

In their exploration of the intersection of e-learning and instructional design, Dempsey & Van Eck (2018) claim that, "Learning, as instructional designers have long argued, is the result of good instructional design, regardless of the modality, although the modality certainly imbeds itself in the instruction" (p. 282). This statement reflects the underlying rationale for PST learning of the ID process in order to effectively create and teach what Neelen & Kirschner call *evidence-informed learning experiences* (2020, p. 1). ID is sometimes taught as a core requirement within teacher education program, but academic program areas often require discipline-specific methods classes instead. Some research has indicated that the learning of ID process has an encouraging effect on professional practice. In her review of research related to the teaching of ID in teacher education programs, Hoffman (2014) identifies the primary themes of research related to the influence of PST learning of ID on teacher planning processes and classroom technology integration, supported by studies that demonstrate the positive impact of instructional design in both areas.

A unique aspect of K-12 OBL, largely different than in higher education contexts, is that off-the-shelf instructional content and coursework is widely available through private providers, such as K-12, Inc., Edison Learning, Inc., Red Comet, and Pearson Online and Blended Learning, to name a few. Teachers must be ready to either incorporate such existing content or fully-developed coursework into their curricula or develop their own OBL instruction, underscoring the differing roles that educators must be prepared (Ferdig, Cavanaugh, DiPietro, Black & Dawson, 2009). The systematic process of instructional design will prepare PSTs for each of these situations, stepping them through each phase and supporting decision-making through the use of data. Several ID models have been identified as aligning with classroom-based implementation, (Branch & Dousay, 2015), the general ADDIE approach [Analysis-Design-Develop-Implement-Evaluate] described as follows provides a generalized framework that can be applied across contexts, including K-12 settings (Branch, 2009; Larson & Lockee, 2020).

Analysis

The collection and examination of data to inform the design process for online instruction, including information about the learning context, the learners, the learning task, and assessing learning from instruction (Smith & Ragan, 2005) is a critical skillset, as evidenced in the COVID-19 pandemic. Decision-making related to the planning of OBL should also be informed by what is known about the learners, such as their demographic data, physiological characteristics, cognitive abilities, prior knowledge, motivation, and other socio-emotional characteristics (Larson & Lockee, 2020). While some learners who have strong levels of self-regulation and motivation may fare well in more independent, asynchronous environments, others with less OBL experience, motivational challenges, or differing abilities may struggle without substantial support from teachers and parents as well. Information gleaned from preliminary data collection about the learners, their environment, and learning needs can be used to inform decision-making for the remaining phases of the ID process. For example, in the COVID-19 shift to online instruction, many K-12 students faced challenges with access to technology and the necessary network connections at home, making their participation difficult, particularly during synchronously conducted lessons (Schwartz, Ahmed, Leschitz, Uzicanin, & Uscher-Pines, 2020).

Design

PSTs may likely recognize activities in the Design phase, such as establishing targeted learning outcomes, selecting instructional strategies, and selecting instructional media, as familiar steps related to content-specific lesson planning efforts addressed elsewhere in their curriculum. Theoretical perspectives held by the designer (or the school as the content provider) will influence the overarching pedagogical approaches (instructivist, constructivist, connectivist) that will also inform methods and materials development in this phase (Larson & Lockee, 2020).

Another important distinction that PSTs could benefit from learning in detail relates to the difference between teaching methods and delivery modes for OBL. Online and blended instruction is often referred to as a teaching method (or instructional strategy), when in fact it is the mode of delivery that facilitates the chosen method. Developing a sense of which features, or media attributes, of the delivery mode can support chosen teaching methods will help create more effective OBL experiences for learners (Head, Lockee, & Oliver, 2000). Many scholars and practitioners have devised recommended instructional strategies, based on the kinds of learning outcomes and the delivery modes by which learners will participate (Barrett, Zajchowski, & Zinn, 2020; Holden & Westfall, 2007; Shank, 2011)

Develop

Production of OBL content can take many forms, depending on decisions made in the Design phase. In this step, PSTs will utilize relevant technical skills (described as follows) to create teaching plans and supporting instructional materials that target the selected teaching method(s) and media affordances that can be leveraged for development of the final product or lesson. For example, blended learning development tasks could include creation of multimedia presentations, compilation of readings and supplemental resources, preparation of discussion board activities, establishment of assignments and assessments within the learning management system, and logistical planning for synchronous learning events (Larson & Lockee, 2020).

Implement

In this phase the teacher, students, and learning environment are all prepared and the instructional events are carried out (Branch, 2009). Within some teacher education programs that include preparation for online teaching, opportunities for implementation of OBL have been afforded through virtual field placements or some form of experiential learning (Archambault, Kennedy, Shelton, Dalal, McAllister, & Huyett, 2016; Luo, Hibbard, Franklin, & Moore, 2017)

Evaluate

How can the effectiveness of the OBL experience be determined? Evaluation efforts will provide insights in response to this question. Branch (2009) states, “The purpose of the Evaluate phase is to assess the quality of the instructional products and processes, both before and after implementation” (p. 152). Hodges et al. (2020) emphasize that learner performance should not be compared between different delivery modes, but instead examined with regard to learner attainment of intended learning outcomes. Additionally, factors such as assignment/course completion, technical infrastructure issues, logistical and policy issues can be examined through a variety of stakeholder feedback, including students, parents, and teachers. Determining the evaluation criteria and mechanisms, carrying out the data collection and

analysis, and developing a summative report comprise the activities within this final phase of ADDIE (Larson & Lockee, 2020). PST attainment of evaluation skills can also provide a useful, generalizable skillset that is applicable in other areas of teaching and learning.

Experience in the design of OBL based on the data-informed processes of ID can provide PSTs with an easy-to-follow structure with which to address targeted learner instructional needs across any learning context, F2F, technology-mediated, or blended combinations of each. Knowledge and experience with the ID process, combined with the remaining competencies, will help ensure future success for rising educators.

(3) Technical Skills

Through a comprehensive review of K-12 online teaching competencies, Archambault and Kennedy compiled a list of minimal recommendations to prepare pre-service teachers for creation and facilitation of online learning (2014). The minimal recommendations insist that teacher preparation curriculum should seek to ensure online and blended teaching competence with tools for communication and feedback, word processing and presentation software, multimedia and visual media development tools, the components within learning management systems (LMS), and other emerging technologies to enhance learning in digital environments (Archambault & Kennedy, 2014). To address the growing need for online ready teachers, Foulger, et al. (2017) co-created a set of teacher educator competencies to help teacher educators model use of technology and online tools in teacher education programs and curriculum. Modeling technology use in online learning environments may lead to teachers ready for online teaching. PST and TE competencies can help provide recommendations on how teacher preparation programs can prepare pre-service teachers to use technology to teach online and blended environments.

One of the fundamental roles of online technologies is to enable connections and interactions between three constituents: students, teachers and content (Anderson, 2003). In the online or blended classroom, technology should facilitate such interactions. Technology can also help with classroom management strategies, such as grading, attendance, and organization. Pre-service teachers need to develop an awareness of what tools are available to support which aspects of OBL, as well as develop skills in the use and application of such tools for learning.

Learning Management Systems

The home for most online and blended courses is the learning management system (LMS). Often also referred to as content management systems (CMS), the LMS often has a variety of tools embedded in one place to help teachers manage learning. The ability to host instruction, measure student progress, and communicate with students in a centralized location has made the adoption of such tools an important part of K-12 technological solutions. In a review of distance learning literature, Pulham and Graham (2018) found the LMS as the most frequently cited technology skill for an online or blended learning teacher. Since much of the learning in an online or blended classroom takes place in the LMS, how to effectively use the LMS should be a major component of teacher preparation curriculum. Understanding how the many tools within a typical LMS are similar can help teacher educators prepare pre-service teachers to adapt to any LMS.

LMS Communication and Interaction Tools. Communication management is a critical part of online and blended learning (Brooks & Young, 2016). Students expect timely and regular communication

with teachers. In the online environment, technology can seem like a barrier to regular communication. Tools like the syllabus, announcements, messages and chat, and discussion boards help manage communication, foster teacher-student and student-teacher interactions, and provide a space for students to learn from one another.

LMS Organization Tools. Tools for online organization help mitigate the cognitive load often caused by ineffective structure (Chen, Woolcott, & Sweller, 2017). Teacher educators can help future teachers develop effective structures and organization in online environments. Learning management systems vary in the way content is structured and tools are presented in the internal navigation menus, but most provide file folder structures and module creation tools to help with organization and structure of content, assignments, and assessments.

Other Tools for Online/Blended Teaching and Learning

Though the learning management system is the heart of the course, there are many instructional interventions that require additional tools and resources not found in many learning management systems. Though the LMS is a great place to store and manage course content, rarely are robust content authoring tools included in the suite of tools. Likewise, many of the interventions provided by the LMS are asynchronous and do not provide a space for live presentation or lecture tools. Future teachers should be familiar with additional instructional technologies to fill this gap. It is important to remember that no matter the technology employed, there should always be a pedagogical need for implementing additional tools. Interacting with another student, the instructor, or content though any tool causes extraneous cognitive load. Too many technological interactions may be detrimental to knowledge acquisition (Martin, 2014). Though there are many technologies in the marketplace, the additional categories presented here are meant to supplement gaps in a typical LMS and are purposely not an exhaustive list.

Content Authoring Tools. These tools are used to create multimedia presentations, video lectures, interactive learning objects, and other artifacts to help with providing online instruction. Free or low-cost tools such as FlipGrid, EduPuzzle, and Educreations have become widely used during the COVID-19 pandemic in support of both teacher and student content creation. An awareness of tools specific to the design and development of online assessments, such as Kahoot!, Nearpod, Google Forms, and others is also important. Providing pre-service teachers with the opportunity to develop content, and to support learner content creation, is a fundamental skill to be developed within their academic program, especially given the uncertainty related to the kinds of technology resources and infrastructure that will be available to them at the time of their employment.

Synchronous Presentation Tools. Blended and online courses can be enhanced by real-time class meetings, delivered though web-based video conferencing. Web-based video lecture allows teachers and students virtually in real-time. Technology provides a place for content presentation, whole class and small group discussions, individual help sessions, live demonstrations, and other activities found in traditional class interactions (Lowenthal, Dunlap, & Snelson, 2017). Like the LMS, most web-based video conferencing platforms are similar enough to allow teachers to seamlessly move from one platform to another without much re-training. Common tools include:

- audio and video communication to allow participants to hear and see one another
- screen sharing to allow for software demonstrations, presentation of instructor content housed on one's computer, and for student presentations

- breakout rooms for small group discussion or group work
- whiteboard space for drawing or writing out examples
- recording capabilities to share the learning experience with students unavailable for the live event or for those present to revisit the session later
- chat features to allow text-based communication and sharing of resources

The COVID-19 pandemic has proliferated the use of web-conferencing tools throughout schools and workplaces across the globe. Teachers can incorporate these tools in online and blended curriculum to approximate kinds of instructional activities and real time interactions in the F2F classroom experience, as well as give learners a chance to engage with each other for social purposes. In their exploration of the intersection of e-learning and instructional design, Dempsey & Van Eck (2014) claim, "Convergence, virtual social learning communities, and personal technologies are and will continue to be primary drivers in e-learning, but to focus on any technology alone is myopic" (p. 229). It will be important for PSTs to be aware of the technologies that serve as online and blended delivery modes, as well as those that are integrated within such systems and their potential to support learning goals.

(4) Online Pedagogy

When introducing online professional teaching practices and pedagogy to pre-service teachers, it is important to not present them as separate and apart from the typical pre-service teaching coursework. Research shows there are more similarities than differences in the competencies, roles (Bawane & Spector, 2009) and practices (Cavanaugh, 2001; Nilson & Goodson, 2018) of skilled online instructors and those of their face-to-face (F2F) counterparts. In Bawane and Spector's (2009) study on prioritizing of online instructional roles, of the eight roles their investigation identified, the "pedagogical role received the most priority, followed by the professional, evaluator, social, and technologist roles" (p. 392). Steele and colleagues (2019) define pedagogy as "virtually any strategy that enhances the learning experience (including instructional strategies, interaction with technology, vehicles for content delivery, etc.), and emphasizes the content and interactions of the teaching and learning dynamic" (Steele, et al., 2019, p. 5). Pre-service teacher programs include pedagogical practices in their coursework and content areas. They must be able to "acquire the key component skills, [have] practice in integrating them effectively, and knowledge of when to apply what they have learned" (Ambrose, et al., p. 99). How pre-service teachers are taught online teaching skills will make the difference in a teacher's ability to transfer this knowledge into real-world online teaching (Scheeler, 2007). Discussed in this section are the various interactions that online teachers will need to learn and practice before teaching online.

Online Teaching Interactions and Communication Strategies

Effective communication interactions underpin the knowledge and skills required to successfully teach online. Communication practices for online teachers are different from F2F teachers because most must be designed in advance (Cui, Lockee, & Meng, 2013; Nilsen & Goodson, 2018). The typical prompts afforded by classroom interactions are not readily observable in computer-mediated environments (Gunawardena, 1995; Nilson & Goodson, 2018). The following discusses the types of interactions that should be included in pre-service teacher online teaching curricula because they are essential to the success of online teaching.

Interactions with Colleagues. In many K-12 schools across the country teachers can communicate with colleagues by running to the classroom next door, meeting in halls between classes, in the copy room, teacher's lounge, lunchtime, etc.) Encourage pre-service teachers to create or join a community of practice (COP) of online K-12 instructors. COP's can be explained as "Members of a community are informally bound by what they do together—from engaging in lunchtime discussions to solving difficult problems—and by what they have learned through their mutual engagement in these activities" (Wenger, 1998, para. 7). Encourage students to find a safe group of online teachers to communicate freely with (e.g. closed Facebook group, etc.), share ideas, successes, problems, and solutions. Professional organizations such as the International Society for Technology in Education (ISTE) (an organization that focuses on educators interested in the use of technology in instruction and learning) can be helpful communities to engage with at any stage of the pre-service learning process. These types of communities can be joined as pre-service teachers to see what those in the K-12 online teaching field are talking about over time. Encourage student to reach out and interact with colleagues as a practice.

Interactions with Students. Communication practices with students change somewhat in the move from F2F teaching to online teaching. Whether the online teaching is synchronous (students and teacher meet at the same day/time) or asynchronous (students and teacher meet infrequently or not at all and students complete their coursework based on their own schedule) communication practices must adapt to the new mediated environment. Teaching pre-service teachers to "communicate" with online students, is not adequate, as communication is defined differently from person to person and culture to culture (Richey, et al., 2011). The International Association for K-12 Online Learning' (iNACOL) research committee brief reported "Distance-learning research indicates that this instructor-learner interaction is the most important ingredient in student success" (Cavanaugh, et al., 2009, p. 3). In the computer-mediated interactions in online learning environments the construct of "social presence" provides more context to the idea of communication. Social presence is "the degree of salience (i.e., quality or state of being there) between two communicators using a communication medium" (Lowenthal, 2010, p. 125). Different types of interactions and media choices can help build social presence in online learning environments but they need to be designed into the instruction. Online learners rely heavily on social presence and it affects student achievement (especially those new to online learning) (Steele et al., 2019, p. 6). Social presence is "the most important perception that occurs in social context and it is fundamental to person-to-person communication" (Cui, Lockee, & Meng, 2013, p. 663). Moore's (2019) transactional distance theory suggests when dialogue decreases between student and teacher, the transactional distance increases (p. 37). In DiPietro and colleagues' (2008) study on K-12 online teaching best practices they interviewed 16 virtual school teachers with 3+ years of experience in online K-12 teaching. All participants reported the practice of using "multiple strategies to form relationships that support rich interactions with students" (DePietro, et al. 2008, p. 22). This aligns with the iNACOL (2009) brief describing effective online teachers as those who have the ability "to make individual connections with students. Such an effective teacher would be seen as a motivator, a guide, a mentor, and a listener" (Cavanaugh, et al., 2009, p. 5).

In addition to building more opportunities for teacher/student communication into the online learning environment, PST's will need additional instruction on the types of student/teacher interactions that should be avoided. The National Association of State Directors of teacher Education and Certification (NASDTEC) suggest in their Model Code of Ethics for Educators that teachers avoid "multiple relationships" with students (personal relationships) as a professional practice (NASDTEC, 2015). In online courses all communication with students is *outside* of the "classroom" so special care must be taken to

ensure pre-service teachers understand how to practice communication in a way that protects both them and the student (Kimmons, 2020).

Interactions with Parents. Teacher/Parent interactions are often guided by policies which vary from district to district and school to school. However, if online courses are designed with the parent in mind, they will be more transparent in their structure. Schools experienced firsthand as a result of the emergency remote teaching (ERT) due to COVID-19 pandemic how important it is for teachers to have pre-service training that includes communication strategies between teachers, students and families (Clausen, et al., 2020, p. 444). For online courses the need is there to partner with parents as well. In Curtis and Werth's (2015) qualitative study of parents of secondary full-time online students, the found that, "Parents are critical to the success of their children by being available to monitor, mentor, and motivate on a daily basis" (p. 187). Participants believed having access to resources and transparency in the course design (via the LMS) led to academic success for their online students (Curtis & Worth, 2015). If courses are designed with transparency in mind, parents/teacher communication may be enhanced and a partnership for student success may be achieved. The iNACOL (2009) brief states, "Developing a disciplined approach to keeping the lines of communication open is part of the daily routine of an online teacher" (Cavanaugh, et al., 2009, p. 5).

Facilitating student-to-student interactions. A purposeful inclusion of how and why to facilitate student/student interactions in K-12 online teaching should be part of PST online learning curricula. Decades of educational research supports the social aspect of learning (Salomon & Perkins, 1998), however, much of the research in the area of online social learning focuses on online students in the higher education setting (Cavanaugh, 2001). Online K-12 students will experience their online social interactions differently even if only for the broad range of cognitive development ranges K-12 students represent. Such policies will guide technology choices and student interaction practices. Following mediated communication mandates and designing for student/student interactions when appropriate, is a necessary skill for K-12 online teachers. Research in K-12 online student perceptions of online interactions find online interactions (teacher/student, student/student) important to student success and motivation (Borup, et al., 2012; Hawkins, et al., 2013). A general practice to follow when designing online instruction is to "focus on the types of social interactions that foster the desired learning" (Larson & Lockee, 2020, p. 145).

Finally, in Heath & Segal's (2020) recent report of K-12 pre-service teachers' experiences during the move to ERT as a result of the COVID-19 pandemic, they noted teacher candidates struggled with transferring "their understandings of pedagogy, content, and technology to this new online learning environment" (p. 827). Pre-service teaching programs can help prepare teachers to be student-focused designers and teachers of K-12 online students throughout their graduate programs. An expansion of what is considered foundational teaching practices will help future teachers to successfully teach in a variety of modalities and a variety of contexts.

(5) Ethics

This discussion about ethics as a required competency for online and blended instruction is to encourage the inclusion of ethical considerations for online teaching practices *in addition to* or as *part of* current pre-service teaching curricula focused on preparing pre-service teachers (PST) for online teaching. Although it should not be difficult to expand typical *ethics* discussions within pre-service teaching programs, it will be necessary to broaden the discussions and provide teachers with ample opportunities to engage with the type of ethical considerations online instructors face in the design, development,

and implementation of online instruction. A discussion of ethics includes both legal issues and ethical practices. Sometimes they overlap. The following are a few of the ethical considerations that should be part of any pre-service instruction for online teaching.

Accessibility. Nilsen (2018) in her book *Online Teaching at Its Best: Merging Instructional Design with Teaching and Learning Research* frames the topic of "Accessibility" in online instruction as a student-centered approach to online teaching. Although she presents the push for "compliance with laws" (p. 165) as understandable, relevant, and necessary, she also points out "Compliance, however, is hardly the most noble motive for student-centered design" (p. 166) as most teachers would not intentionally want to create barriers for their learners. Although there are legal mandates on design and technology choices for online learning in Section 504 of the Rehabilitation Act of 1973 (DEH, 2010) and the Americans with Disabilities Act of 1990 (and associated 2008 Amendments) (ADA, 2009) that *must* be followed by educational institutions, there are also many benefits Accessible Design affords individuals without disabilities (Burgstahler, 2017). Pre-service teachers learning about online instruction should have time to reflect on how technology can both include and exclude their learners. Learning and following accessibility mandates are just *one* way to be student-centered online teachers. Accessibility concerns should become an online course design practice over and above the mandates. For example, using Universal Design for Learning (UDL) practices can enhance student accessibility.

UDL is an ethical design choice that promotes student-centered design and teaching relevant for any K-12 teacher and especially an online teacher. Consider UDL as extension of the previous discussion on accessibility practices but it also incorporates "accessibility in the service of increasing student achievement" (Ayala, et a., 2012). Universal Design for Learning (UDL) is a framework created by the Center for Applied Special Technology (CAST). UDL is researched based and is purposed to "ensure comprehensiveness, and to ensure that the instructional designs will address the full range of learning abilities and disabilities present in any group of students" (Hall, et al., 2012, p. 6). The Higher Education Opportunity Act (HEOA) legislation includes several specific references to how UDL should be incorporated "into preservice preparation of teachers, in-service teacher training, and in postsecondary instruction" (CAST, 2020). Using this student-centered approach to designing courses and content will enhance accessibility to a broader range of students.

By including student-centered and ethically motivated topics in teacher education programs, PSTs will be headed in the right direction in providing future online teachers "knowledge, skills, and dispositions to make ethically responsible decisions in professional practice" (Maxwell & Schwimmer, 2016, p. 359). Many of the UDL practices align with the International Society for Technology in Education (ISTE) Standards for Educators (Crompton, 2017). ISTE is a non-profit organization that has been serving educators interested in using technology in instruction for over 40 years.

Digital Literacy. Digital literacy is included under the ethics heading not because all digital literacies include ethical elements, but because some of the literacies do. There are many definitions in the literature describing digital literacy (Meyers, et al., 2013). It is a fairly new concept (1997) focusing on education and a perceived skillset needed to skillfully and ethically wade through and interact with the large amounts of information and media available as the result of the internet. Calvani, Fini and Ranieri (2009) summarize digital literacy as

being able to explore and face new technological situations in a flexible way, to analyze, select and critically evaluate data and information, to exploit technological potentials in order to represent and solve problems and build shared and collaborative knowledge,

while fostering awareness of one's own personal responsibilities and the respect of reciprocal rights/obligations (p. 160-161).

Not only do pre-service teachers need to master digital literacies, they must have enough experience with them that they can include them as skills to teach their students. Digital literacy not only includes knowledge of Copyright and Fair Use practices (discussed below) but they also include practices that help students navigate in society, participate in digital communication and collaboration, and keep students safe in online environments. These types of skills enhance an online teacher's ability to select relevant content and benefit students as they interact in both formal and informal online environments. Teachers will want to embed digital literacy practices into their courses so their students will create quality content, perform skillful research (Buckingham, 20150, practice good ethics and etiquette on the internet (Burniske, 2017) and practice online safety (Woodham & Lokey-Vega, 2017).

Privacy. Learning how to protect students in the online learning environment is a skill that online teachers not only must model but also be able teach their learners, no matter the subject or modality. For online teachers to be able to model E-safety to their online students, instruction on how to best implement practices protecting student privacy must be included in curricula for pre-service teachers. There are student privacy practices mandated through the Children's Online Privacy Protection Act (COPPA) (FTC, 2013), The Family Educational and Privacy Rights Act (FERPA) (FCO, 2018), and state-specific children's privacy laws. COPPA provides guidance to those who operate commercial websites, online services, and mobile apps (Edweek, 2017). These businesses often contract with school systems and are obliged to follow COPPA guidance. Online teachers should be able evaluate educational technology for student safety and also effectiveness and not rely on a company's self-reported COPPA compliance. FERPA provides guidance to schools and educators about what student information can be collected and shared.

These legal mandates may guide teacher practices to protect student privacy, however, they should not be considered the whole of instructional content on what teachers need to know to be able to successfully protect and educate their students (at every level) in their personal online privacy practices both in and out of school. Cyberbullying, online sexual exploitation (Bryce & Klang, 2009), teen sexting, digital date abuse, and online predators are all privacy and safety-related issues (Patchin, 2019). Pre-service teacher programs will want to include opportunities for PSTs to establish online course safety practices to include in their courses that not only attempt to regulate online student behavior but also to educate online students about privacy considerations for themselves and their classmates, digital identity, and digital footprint management (Dennen, 2015). Online teachers are well-placed to guide their students through preventative practices (Shin, 2015) and therefore should be instructed on ways to both protect and educate their students.

Copyright/Fair Use. Copyright and Fair Use practices are often confusing and unclear (DuBoff, 2007). However, a practical understanding of how they affect online instruction is necessary to stay within the law and model best practices for students. Fair Use is a set of limited rights to use portions of copyrighted materials without permission for journalistic (commentary), parody, and educational purposes (Leary & Parker, 2011). Although there are special Fair Use rules for education, they are very specific and would not apply to K-12 students outside of the school environment. This means while an online teacher may be following good copyright practices under Fair Use in a closed online course, students may be inadvertently learning how to use the creative works of others incorrectly outside of the closed online learning environment. Teachers should be exposed to Copyright and Fair Use practices in

an PST online teaching program, but also practices surrounding Open Educational Resources (OER) and other online resources using free licensing practices (e.g. Creative Commons). PST's can then practice using online creative works of others ethically and legally and ultimately be more prepared to teach and model to their students the same practice. The international Center for Academic Integrity (ICAI) suggests teachers "Be a model of integrity; cite your sources and images" (Barnerena, 2020, np) as on way to enhance student academic integrity.

Cheating. There is a belief that there is more cheating in online courses. Some research, however, shows it is about the same as in face-2-face courses (Beck, 2010; Watson & Sottile, 2010). The best approach for PST programs to prepare teachers for online instruction is to help them to be able to teach their future students about copyright, fair use, and plagiarism, and teach them how to use a variety of assessment strategies (Lederman, 2020) that help reduce cheating. Strategies such as scaffolding, multiple formative assessments, mini-assignments that make-up the content of the final exam, meaningful assessments (relevant to students), etc. are typical strategies taught to PSTs, however, in an online learning environment they are essential for learner engagement and they can also discourage cheating (Darby, 2020). Again, this type of PST preparation for online instruction should be included in their regular coursework as they are practices that benefit both the online student and the typical classroom student.

(6) Online and blended field experiences

Field experiences are a key component of teacher preparation, and as such are critical for the application of the aforementioned online teaching knowledge and skills in a real world context. Grounded in situated cognition and cognitive apprenticeship research, the field experience provides the pre-service teacher the opportunity to learn and interact in authentic settings with the support of an experienced teacher (Brown, Collins, & Duguid, 1989; Kennedy & Archambault, 2012). Traditional field experiences provide pre-service teachers the opportunity get practical experience with teaching, classroom management, grading, and other job-related tasks, under the close supervision of a current classroom teacher. As there is a difference in skillsets teaching F2F and online, there is a need for to offer such field experiences in online and blended learning experiences for pre-service teachers to help prepare them to meet the challenges of teaching in virtual classrooms (Archambault & Kennedy, 2014; Compton, Davis, & Mackey, 2009). As K-12 learning environments evolve, providing pre-service teachers the opportunity to get practical experience in the online environment will become a priority.

A well-designed field experience can better prepare future teachers by allowing for authentic practice and cognitive apprenticeship with cooperating teachers (Kennedy and Archambault, 2012). Field experiences can be designed to promote skills needed to teach online. It is important to acknowledge that blended or online classrooms require different pedagogical and classroom management strategies. Adolescents have specialized needs such as lower metacognitive skills that require teachers be prepared to effectively guide online instruction (Borup, West, Graham, & Davies 2014). Different approaches to instructional, communication, and motivation strategies are also required. Online or blended field experiences can provide pre-service teachers practice with nontraditional classroom skills like content creation, instruction, assessment, and student interaction. Kennedy and Archambault (2012) suggest that activities in field experiences in online and blended environment might include "…grading student work, facilitating discussions, practicing time management skills in the online environment, creating course content and other resources, collaborating and co-teaching with a content team, and planning and hosting synchronous teaching sessions via video conferencing software."(p. 46). As a major form

of experiential learning in teacher preparation programs, the field experience should be expanded to include online and blended learning environments.

CONCLUSION

Recent efforts to continue education in the face of the global COVID-19 pandemic has prompted the call for change in teacher preparation programs to train teachers to effectively teach in online and blended environments (Hartshorne, et al., 2020). As colleges and schools of education consider curricular and instructional strategies to prepare PSTs for their almost certain future engagement in online and blended educational programming, an opportunity arises to benefit from lessons learned related to technology integration skills and knowledge in teacher education curricula. These initiatives began with a single "technology" course, typically disconnected from the PST curriculum. The National Education Technology Plan reflects this disposition in stating,

It is inaccurate to assume that because pre-service teachers are tech savvy in their personal lives they will understand how to use technology effectively to support learning without specific training and practice. This expertise does not come through the completion of one educational technology course separate from other methods courses but through the inclusion of experiences with educational technology in all courses modeled by the faculty in teacher preparation programs (NETP, 2017).

Similarly, Foulger et al. (2017) posit in their article regarding the establishment of competencies for teacher educators, "The ultimate goal for teacher education programs should be a technology-infused program that provides a more concerted to address teaching with technology throughout the curriculum" (p. 416). Recent research indicates the growing prevalence of such experiences embedded withing existing courses (Graziano & Bryans-Bongey, 2018).

The authors of this chapter hold a shared perspective with regard to the incorporation of OBL competencies with PST academic programs, especially in light of the current global pandemic and the immediate, universal need to shift to remote teaching and learning at all levels earlier this year. This required transition underscores the importance of preparing educators (and teacher educators) with necessary skills and knowledge for effective online instruction, strategies that are inherently different from those required to teach in face-to-face settings (Hodges, Moore, Lockee, Trust, & Bond, 2020). At a minimum, the inclusion of a semester-long course will provide the time necessary to address the aforementioned competencies in depth. However, additional opportunities to engage both as an online educator and learner will be essential in developing a sense of K-12 student and teacher perspectives. Recent trends in workplace learning within the corporate sector can be leveraged for the provision of innovative instructional approaches for PST learning of OBL skills and knowledge. For example, promising models have been demonstrated in the use of micro-learning, a delivery strategy that organizes instructional events into smaller units that may be more focused in content, as well as more easily completed due to the reduced time requirements (Hug, 2012). Semingson, Crosslin, & Dellinger (2015) contextualize this innovation with guidance for K-12 micro-learning implementation in OBL environments. In order to formalize credit for completion of such learning experiences, micro-credentials can be awarded to recognizing a distinct skill or accomplishment. Clements, West, & Hunsaker indicate that, "Microcredentials come in a variety of formats including certificates, nano-degrees, digital badges, and open badges" (2020, p.

158). The adoption of these strategies that focus on the use of smaller instructional units and embedded learning experiences can serve to infuse OBL competency development experiences across the teacher education curriculum in more feasible and strategic ways.

Related to the COVID-19 pandemic, a variety of creative approaches have been explored to support both pre-service and in-service opportunities for learning and application of OBL skills development in response to the current global health crisis (Ferdig, Baumgartner, Hartshorne, Kaplan-Rakowski, & Mouza, 2020; Hartshorne, Baumgartner, Kaplan-Rakowski, Mouza, & Ferdig, 2020). OBL skills and knowledge have become an immediate requirement for all stakeholders in the educational system. Leveraging social learning to address the universal need for OBL competencies, communities of practice for distance educators (Bond & Lockee, 2014) can be formed within K-12 contexts, providing a mechanism for pre-service teachers, teacher educators, and practicing professional educators to learn together in formal and informal ways. It is hopeful that by offering both integrated and collaborative learning opportunities as those described herein will help shape the next generation of educators to be successful in any learning environment.

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