Chapter 10
Empowering Early Childhood Teachers for Program Completion Through the Integration of Technology

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ABSTRACT

Political and social pressures, influenced by research on the importance of early learning experiences, are putting pressure on the early childhood workforce to go back to school to complete required certification or degrees. Online programs are effective solutions when they include a multi-layered system of supports. This chapter showcases how one university has built and maintained an early childhood program that allows fully online and face-to-face delivery options for completing bachelor's degrees or certification. Lessons learned will help other early childhood teacher education programs know how to (1) build the technological infrastructure behind successful online programs to ensure student persistence and completion; (2) provide instructor and course supports for successful online course completion, including field-based courses and student teaching; and (3) incorporate student supports that enable early childhood teachers to utilize technology successfully to complete their program. Adjustments and technological supports during the COVID-19 pandemic will also be addressed.

INTRODUCTION

Political agendas and research highlighting the value and impact of early educational experiences are pressuring the early childhood workforce to go back to school to complete the required certification or degrees to maintain employment. These teachers find it difficult to navigate traditional face-to-face programs due to logistical, time, and geographical barriers; however, they have found online professional development programs effective (Kyzar et al., 2014; Zinsser et al., 2019), more achievable, and more accessible than face-to-face options (Dede et al., 2009). Although some early childhood teachers have sufficient technology skills, others need additional supports, and all appreciate quality feedback to help them be successful. (Stone-MacDonald & Douglass, 2014). Online programs then, need sufficient technological supports to enable these teachers to navigate the higher educational system, enroll in classes, persist, and complete coursework, and successfully finish the program.

In this chapter, the Background outlines the pressures driving teachers to go back to school to complete required certification and degrees and why online programs are important. The E-Learning Environment section specifies the challenges teachers face in completing degrees and how institutions can build the technological infrastructure for online programs and enhance institutional supports for the admissions, enrollment, and advising process via technology to keep students on track. The Instructor, Course, and Student Supports section elaborates on how institutional student supports and instructor-based supports can be expanded to meet online student needs and what types of e-learning training and supports prepare instructors to provide student supports. The COVID-19 Implications and Remote Learning section highlights the university's remote learning experience and how the integration of face-to-face and online learning environments informed effective remote learning to meet the specific needs of early childhood teachers in the program. A summary of the lessons learned and directions for future research are also addressed.

BACKGROUND

Early childhood care and education programs in the U.S. evolved from multiple, diverse historical streams that funneled into two primary developments: (1) day nurseries focused on custodial childcare, and (2) the nursery school-kindergarten movements focused on development and educational learning. Different societal values, policies, expectations, and funding streams for these developments have created a fragmented system with varying degrees of quality, access, and supports (Kamerman & Gatenio-Gabel, 2007). However, as research has demonstrated the impact of early educational experiences (Camilli et al., 2010; Engle et al., 2011) and policy makers have seen the value of quality early education as a smart investment (Heckman, 2011; Bivens et al., 2016), systems are moving to integrate early care and education into a unified field (NAEYC, n.d).

Given the strong association of teacher qualifications with the quality of the early childhood environment (Manning et al., 2019) experts suggest early childhood teachers hold bachelor's degrees with specialized knowledge and competencies in child development and pedagogy (Institute of Medicine and National Research Council, 2015). However, paths to degree attainment are not equal. While kindergarten teachers complete bachelor level teaching degrees and teach in an integrated school system with their elementary education counterparts, preschool teachers work in a variety of early childhood settings where educational requirements vary and may not require more than a high school diploma (Center

for the Study of Child Care Employment, 2017). Nationally, 52.5% of center-based lead teachers have Associates degrees or higher, while only 38.2% have post-secondary experience with a major in Early Childhood Education (National Survey of Early Care and Education Project Team, 2015). Many early childhood teachers enter the workforce with little or no pre-service training.

With state-funded preschools on the rise (Friedman-Krauus et al., 2018), the demand for early childhood teachers has also increased, creating a national shortage (Gelfer & Nguyen, 2017). Both pre-service and in-service teachers are drawn to these jobs and are going to college to complete early childhood teaching degrees (Mollenkopf et al., 2020). However, while these institutions are prepared to serve students ages 18-24 years of age who enter post-secondary schooling directly from high school, they are not well designed to accommodate early childhood teachers in the workforce with family obligations (Zinsser et al., 2019). A large percentage are non-traditional students who are older, married or in long-term relationships, raising children or taking care of family members, and working full time while attending school (Van Rhijn et al., 2016). They are usually mature learners attending school part- or full-time while balancing multiple responsibilities (Silverman et al., 2009). These life factors make it difficult to access college programs during the school day.

THE E-LEARNING ENVIRONMENT

Online programs offer greater flexibility than face-to-face programs, prompting more non-traditional students to pursue online degrees (Woods & Frogge, 2017). Regardless of what course delivery method they prefer, non-traditional students are more likely to enroll in online courses because of lifestyle factors (Clayton et al., 2010). Many early childhood teachers prefer online professional development (Byington & Tannock, 2011) and an increasing number professional development online (Sheridan & Wen, 2021; Gelfer & Nguyen, 2017; Bondi, 2015) which enables them to complete programs they may not otherwise have been able to achieve due to geography, time, or other limitations (Gelfer et al., 2021). However, online programs provide their own learning challenges. Program quality impacts students' ability to persist and complete online programs (Meyer et al., 2009). Quality online programs must have sufficient institutional support, which ensure that: (a) university-owned software and tools, along with technical assistance and support, are readily available to students, (b) designated staff familiar with the necessary technology support students in the admissions, enrollment, and advising process, and (c) instructors have resources to keep up with educational technologies and research so they can maintain quality courses that maximize learning for students (Yang et al, 2017). These supports become particularly important for early childhood teachers who may have limited reliable Internet access (Stone-MacDonald & Douglass, 2015).

Instructor supports for students are also critical to their success. Online learning requires instructors to learn about their students through technological means, match delivery modes to their needs, build in resources so students can be independent learners, build meaningful assignments students can access and accomplish via technology, provide sufficient opportunities so students master intended skills, and communicate clear feedback and positive interactions (Linder-VanBershot & Summers, 2015). Instructors must also establish presence using various technologies in ways that differ from what they use in face-to-face classes (Ladell-Thomas, 2012), while making content meaningful and relevant to students.

Students also must shift how they study and manage their time, which can be a learning curve for those new to online formats. Granted, students gain flexibility and convenience, but the trade-off is a higher responsibility to access course content, manage time, and be accountable for their own learning

(Hoskins, 2011). Online students may not be prepared for the fluid nature of these courses and may underestimate the workload volume and level of involvement required (Bawa, 2016). They often lack skills to navigate and analyze online resources or self-regulate to manage their own learning (Greene at al., 2014). They must also process large amounts of information before they can learn and apply these to assignments, which puts pressure on cognitive load (McClendon et al., 2010). One study found that even though most early childhood teachers surveyed reported being comfortable with technology and online learning, their familiarity with technology for personal use did not guarantee they were able to apply learning technologies to the online learning environment (Stone-MacDonald & Douglass, 2014), a phenomenon noted with online students in general (Greene, Yu & Copeland, 2014). Consequently, instructors must build in instructional supports, so students learn both pedagogical content and digital literacy.

Creating a quality online program that meets students' ever-changing needs requires institutional flexibility and supports while enabling early childhood teachers to successfully use technology to complete their degrees. This is not an easy task. However, one mid-western university early childhood teacher education program has been able to successfully build and maintain a fully online program for completing bachelor's degrees or post-baccalaureate initial certification and additional endorsements. Lessons learned from the ten-year project will help other early childhood teacher educators know how to: (a) build the technological infrastructure to ensure student persistence and completion, (b) provide instructor and course level supports for successful online course completion, including field-based courses and student teaching, and (c) incorporate student supports that help early childhood teachers utilize technology successfully to complete their degrees. Adjustments and technological supports developed and used during the COVID-19 pandemic will also be addressed.

Building the Infrastructure for Online Programs

Developing a Cross-Departmental Online Program

The University of Nebraska at Kearney is a midsized university serving over 6,300 undergraduate and graduate students, many who are rural. The Early Childhood Inclusive (ECI) Endorsement program averages 250 students with roughly 40% on campus and 60% online. The ECI Endorsement is a Teacher Certification program which prepares graduates to work in regular education settings with children ages 0-8 and special education settings with children ages 0-5. Because of its dual licensure, state guidelines require 51 credit hours for completion. Students may complete one of three tracks: a Bachelor of Arts in Education, post-baccalaureate level Initial Certification, or Additional Endorsement. About half of the bachelor program students are online. All the Initial Certification and Additional Endorsement students are online. Today the program is relatively robust, even during budget cuts and institutional challenges; however, it began over a decade ago when the campus had graduate programs online, but no undergraduate program offerings.

The ECI Program Director (first author) started the ECI Online program (aka. ECI Online) to help early childhood teachers who could not access the campus program due to time and geographical factors. She first met with other ECI faculty to create a vision of the online program, address logistics, and define a timeline to build the program in stages. They first converted departmental early childhood courses to online formats and then engaged faculty from other departments to convert courses to complete the program. To create an online course, each faculty: (1) completed a standardized online course

development course, (2) submitted a request form to e-learning staff for a stipend to develop the course, (3) met with an assigned instructional designer who helped with development and approved the course using a standardized instructional design checklist, and (4) taught the course. The instructional designers provided one-on-one tutoring and training as needed to troubleshoot technologies regarding course delivery and implementation. This process streamlined course layouts and designs to make it easier for students to navigate. Once they learned the expectations of one course, students could successfully navigate other courses.

Field-based courses were complicated to create because faculty had to arrange placements for students geographically scattered and make sure students had access to technology. Consequently, faculty used a two-step approach, first creating these into blended courses which allowed some face-to-face delivery, and then after the first cohort was through, creating the courses to be fully online for future offerings. In round one, faculty put course content online but met with the cohort to demonstrate pedagogical techniques and methods and help students with the technology to complete computer-based assignments. In the second round, faculty provided lectures and tutorials to replace the instruction given on site. Students also used text entry-based journals available in the course LMS to poste reflections on their teaching which allowed faculty to read and provide feedback for the next teaching sessions. Additionally, the students had their cooperating teachers, directors, supervisors, or in some cases, peers, observe their teaching using the departments' standardized field experience teaching evaluation form and provide feedback to the student. The student scanned and uploaded these onto the course website for the instructor to give additional feedback.

In summary, faculty were successful in creating ECI Online because they created a cohesive vision with a reasonable timeline, and were committed to learning the technology to do so. Although several of the faculty had familiarity with online course development and instruction prior to creating the program, all benefited from taking a standardized course on course development, which provided guidelines and templates that could streamline course formats. This not only made it easier for faculty to develop multiple courses, but it created streamlined course design formats which made it easier for students to navigate online course websites. Faculty who taught cohorts how to use technology learned what digital literacy skills were needed and incorporated these into their courses. Having dedicated e-learning technology staff to help throughout the course development and delivery process, also meant faculty got on-demand assistance which helped them become more proficient in online delivery and student supports. Faculty further benefitted from the campus' commitment to e-learning which included funds for course development stipends.

Faculty wishing to create online programs should consider setting a reasonable timeline of 2-4 years and build the program courses in stages. Courses that are more complicated such as field-based courses, may benefit from a two-step approach. Faculty should also attend professional development session on course development and design and team with e-learning instructional designers who can provide feedback during course development and technology support when faculty teach those courses. If campuses do not have funding built into the system for course development stipends, faculty can advocate for stipends or release time. Finally, streamlining course design elements in a program not only make it easier for faculty to develop multiple courses, but it aids students in learning to navigate courses within the program, thereby supporting their completion and success.

Developing the Technological Infrastructure

Putting a program online does not guarantee early childhood teachers will complete degrees. Students need designated staff to support them in the admissions, enrollment and advising processes and clear road maps through the technological maze of university bureaucracy. To provide designated staff, the ECI Program Director secured grant funds to hire an ECI Online Program Coordinator which funded the position for two years until the Teacher Education Department could permanently fund this position. Then the director and coordinator worked with the Registrar's Office and campus webmaster to create a website page that: (a) informed prospective students of the program and guided them to the right track, (b) provided program expectations on time and financial commitments, field experiences in specific courses, admission to Teacher Education requirements, and procedures for student teaching (c) created a venue to get personal questions answered, and (d) allowed students to upload transcripts to get a proposed plan of study to complete the online degree. Providing an individualized plan of study upfront allowed students to make informed decisions about their level of commitment before enrolling in the program.

Some students needed additional supports, so these were included in the website links. If they were enrolled at a community college and planned to continue there a while before transferring or needed to be co-enrolled with the community college and the university, the website provided the links for transfer credit information and college co-enrollment forms. Also, because Nebraska partners with the T.E.A.C.H. Early Childhood National Center (www.teachecnationalcenter.org, n.d.) to provide scholarships for early childhood teachers to complete degrees debt-free while improving job stability, the website provided links on this scholarship. If students were T.E.A.C.H. recipients, ECI Online Program Coordinator advised them accordingly and provided them the documentation for compliance with T.E.A.C.H. requirements. All inquiries and transcript information were electronically sent to the ECI Online Program Coordinator who served as the primary advisor and contact person for the full length of the students' program. This created a consistent contact system and a familiar face for students.

When students indicated on the website or directly with the ECI Online Program Coordinator that they were ready to apply, the coordinator helped them with the admissions process. Initially the admissions infrastructure failed to properly identify online students, so students ran into several logistical roadblocks in the Admissions System. For example, online students got messages to come to campus for Transfer Day, check in to the Health Clinic and provide immunization records. Some received scholarships that required them to be on campus and full-time. Others did not get assigned to the ECI Online Program Coordinator for advising. However, the ECI Director and ECI Online Program Coordinator were able to work with the Admissions office to resolve issues, so students were identified upfront as online students and campus requirements were automatically waived.

After several technical difficulties in the admissions process were addressed, the ECI Program Director surveyed the 61 students enrolled in the program. Students represented urban, rural, and tribal areas of the state. Students responded to the questions using a five-point rating scale, with 1 being "strongly disagree "and 5 being "strongly agree." A total of 20 students responded for a response rate of 33%. Table 1 Summarizes the results:

Table 1. Percentage of ECI online students who strongly agreed or agreed on support systems in the advising and enrollment process

Survey Questions	N	%
1. I was able to navigate the college admission system easily.	18	90%
2. I received sufficient supports to navigate the admissions process.	17	85%
3. The advising support I received before I registered for classes was sufficient to get into classes.	18	90%
4. The registration process to get into class was relatively successful.	17	85%
5. When I have questions about the ECI Online program I can get them easily answered.	18	90%
6. The advising support I receive each semester helps me progress successfully through my program	16	80%

As seen in Table 1, at least 80% of the students believed that advising and enrollment process supports were meeting their needs. Students' open-ended comments provided information that helped improve the system. The website admissions information has evolved over time to include screenshots, videos, and detailed instructions students can follow to troubleshoot any enrollment problems. Students now complete a short online orientation before they enroll so they understand the expectations for online courses, know the basics for using the university's LMS, and understand the technology requirements needed for courses. (e.g., permit request system with ECO coding system, admissions software tracking system updates for ECI Online students).

The ECI Online Program Coordinator's role has been critical, not only for admissions and enrollments, but for advising throughout the program. The ECI Online program coordinator stays in regular contact each semester with the students to make sure they follow the university website's instructions to register for next semester's classes. She also contacts them about 3-4 weeks prior to the early advising period for face-to-face students to give them extra time to work out their schedules. Advising takes place by email, phone, videoconferencing, or in some cases, in-person visits to campus—whatever method is most needed to support the student. Although the university system regularly sends notices to students on important deadlines via email or alerts in Canvas, the university's LMS system, the ECI Online Program Coordinator also sends reminders about deadlines for program specific tasks such as background checks, student teaching paperwork, or graduation applications. Because the Coordinator has extensive knowledge in the university's admissions and registration system and in the needs of non-traditional students, she can advise to effectively address family, work, financial, and personal needs of these students, which has been a critical part of the students' success. The ECI Program Director works closely with the coordinator and serves as Co-Advisor, so students always have a support person they can reach.

Building a comprehensive advising and enrollment system with technological supports has been critical in helping students navigate the university maze. For faculty wanting to build or enhance their online programs, it is important for them to work with their campus' technology platform systems to address websites, portals, online forms, and processes to ensure that students: (1) get accurate information about the program, (2) have prompt responses to their questions, (3) get sufficient information and supports for application and enrollment, and (4) receive strategic advising. ECI Online has been successful because university infrastructure personnel were willing to adapt the admission, enrollment, and advising system to be user-friendly to online non-traditional students. Staff in each of these layers of the infrastructure became knowledgeable and responsive to these students needs learned to work together to

support students through each stage of the process from admissions to graduation. These infrastructure changes helped provide staff connections that laid the foundation for ongoing student supports.

Instructor, Course, and Student Supports

Institutionally Provided Direct Student Supports

Although infrastructure supports are critical for students to get admitted and enrolled, students also need supports to persist, utilize time management and study skills, and successfully complete their coursework and program. The university had an effective academic student support system, called the Learning Commons, which provided student support services for: (a) disability-related accommodations, (b) tutoring in multiple subject areas, (c) help for successful academic writing, (d) success coach services for students needing to learn time management, academic planning, test taking, note taking, memorization strategies and other study skills, and (e) PRAXIS Core exam preparations for those in Teacher Education. If a student was struggling in class, a faculty member could use the electronic Early Warning Referral system to notify the student and make them aware of these services. However, none of these were initially set up for online students to access. Therefore, the ECI Program Director and the ECI Online Program Coordinator worked with Learning Commons staff, to ensure online students had the same supports.

The Disability Services office staff revised their system so students could fill out applications electronically and meet with advisors by phone, email, or videoconferencing for intake and ongoing support. They provided appropriate accommodations for students with disabilities in online environments and helped faculty know how to accommodate these student as needed. Tutors and success coaches included phone or videoconferencing options in addition to in-person meetings and PRAXIS Core exam preparations were moved to online formats. This allowed the Early Warning Referral System to provide information on how students could access these services even if they were online. Since Learning Commons information was required in every syllabus on campus, this made it easier for all students to know about these resources and how to access them.

Another resource, the university's Technology Help Desk and support center, was originally open only during the day but has expanded staff over time who are accessible 24/7 by email or the online chat service on its website. The Help Desk provides consultation by phone or videoconferencing, which is helpful to online students. The campus has multiple stations, labs, and workspaces with computers and other devices, but it is primarily a "bring your own device" campus; therefore, students are not able to check out a device. Students, however, can purchase at a discount or get free access to multiple university-owned software and tools, and the Canvas LMS allows instructors to embed a variety of technology applications and tools in their courses.

The campus provides incentives for instructors to us Open Educational Resources (OER), which are free to students and accessible through multiple technology devices. OER allows students to use technology to access readings, videos, and follow links to additional online resources for study. Students can also download materials when they have Internet access and read these later offline. In summary, faculty building or enhancing their online programs should work with their campus' student support services to make sure online students have the same supports as campus students and they can access these via multiple technologies (e.g., phone, mobile device, computer, etc.) depending on what they personally have available at the time. Having technology support staff available at extended hours who can connect

using multiple technology options is also critical in supporting early childhood teachers who study in the evening or on weekends.

Although these resources and technology supports meet most student needs, some online students, particularly in rural areas, do not have access to adequate technology or reliable internet at home. Consequently, they work in other locations such as their work environments, library, or community colleges. This requires the instructor to be flexible with deadlines or assignment formats, build in resources for student learning, and incorporate digital literacy into their course instruction.

Instructor Provided Supports for Student Success

When faculty first converted courses to online formats for ECI Online, much of the adaptations were based on experience with early childhood teachers who shared their difficulties with the commuting process and needed temporary accommodations for classes missed. Faculty were used to creating study materials that students could access and complete independently if they were not able to come to a specific class. These experiences helped guide the faculty to develop lessons and study materials they knew students could do successfully online. E-learning technical staff also assisted faculty in building course websites, converting content, developing Power Points and study guides, and converting lectures to digital formats.

Although the online courses followed the semester calendar and assignment due dates were clearly specified, the courses reflected an independent study format (e.g., read the textbook and answer the questions or take a quiz) and focused more on access, than interaction. As these courses have evolved, faculty have incorporated more interactive study options such as internet searches, websites, electronic library resources, e-books, case studies, and YouTube videos. Assignments initially were homogeneous, relying on the electronic paper submission, but over time evolved to include options such as: (1) student postings of audio or videoclips, (2) journal entries, (3) electronic displays of early childhood content using various applications, or (4) interactive google documents. These options have increased the ability of students to not only interact with the content, but also with one another.

Although interactive technology increased engagement, it taxed online students who had inadequate technology resources such as unreliable Internet, or outdated computers which did support newer software applications. Inadequate study places also required some students to study at a location other than home (e.g., library or work location). ECI faculty accommodated by providing a variety of supports, depending on the type of course and assignment. These included: (a) flexible technology options for assignment creation and submission, and (b) functionally equivalent options for assignments when technology became a barrier.

Having multiple technologies options that did not rely on specific software applications or devices was useful because it allowed students to pick whatever option they could access best to complete the assignments. For example, in one class students created posters and were allowed flexible ways to display the poster if the content and design met the assignment rubric. While most students created posters using Power Point, Microsoft word, or Google slides, some hand-created their posters using markers and paper, but then uploaded a photo from their phone. In another class, students interviewed an early childhood professional but had the option of interviewing in-person, by phone, or via videoconferencing such as Face Time or Zoom. Students who could not produce a paper in the required software application were allowed to use other file submission methods.

Students with slow computers or cell phones unable to adequately compress files saved hours when they could create videos directly through the Course's LMS or posted YouTube links of their videos

instead of uploading large files. Some ECI faculty created functionally equivalent assignments to meet the same criteria. For example, students unable to attend in-person home visits watched video-based home visits. Students whose assigned child moved or dropped out of the early childhood program before they could assess and analyze data used an alternate data set from an online case study. These options allowed students to use available technologies to complete assignments without impairing their learning.

Field experiences also evolved to better support online students. Initially field experiences were low-tech. University supervisors in the students' locale would periodically visit and observe, complete the Teacher Education department's standardized carbon copy forms to evaluate performance, and then consult on-site. Students filled out online journal entries in the course LMS as text entry boxes describing their experiences for the week. To document their work with children, students download the required report forms, and either printed off and turned in handwritten forms or electronically typed into the form. Students would upload the electronic forms as an attachment into the course. Students could fax, scan, or postal mail hand-written forms. Today, supervisors use a standardized electronic, downloadable evaluation form, and students use the electronic forms to documents children's work. The few students who still use hand-written forms for child reports upload photos from their cell phones of the forms, along with children's work samples. Because the journal, report, and field evaluation form formats and processes are identical on all courses throughout the program, students generally have no issues with completing these assignments or documenting their work.

Student teaching similarly uses standardized evaluation forms and common lesson- and unit-plan forms which mirror what students have used during their field experiences and are downloadable from the course website. University student teaching supervisors physically visit their assigned students five times per semester. Students upload assignments into the student teaching course much in the same manner as their field experiences. Online students watch a video session to prepare for student teaching rather than attend the in-person sessions that campus students attend. During their student teaching semester, they attend one seminar along with their cooperating teacher via videoconferencing, although this can be waived for extenuating circumstances.

Instructor Presence as an Instructional Support

One challenge of online instruction is ensuring instructor presence since students have limited face-to-face interactions with their instructor, even if the course is synchronous. Because Nebraska serves two time zones and many early childhood teachers work full-day shifts (e.g., 6:00 a.m. to 6:00 p.m. for childcare programs), ECI Online is offered asynchronously which makes instructor presence more challenging. ECI Faculty use a variety of strategies to connect with students. They commonly post frequent announcements in the course website that respond to student questions and concerns and provide specific feedback on assignments. Although written announcement can be very effective, students appreciate video announcements, which allow the instructor to demonstrate information. ECI faculty have used applications embedded in the LMS (i.e., VidGrid, Voice Thread, Vimeo), free downloadable public applications (e.g., Screen Cast-o-Matic), or YouTube videos created from a mobile device such as an iPad or iPhone, or video-conferencing software (e.g. Zoom and Google Meet). Video-conferencing platforms allow the instructor to share their screen while doing demos, explaining complex concepts, or providing step-by-step tutorials.

ECI faculty also establish connections by being accessible. ECI faculty may provide their cell phone number, post virtual office hours, or offer individual conferencing by phone or Zoom. Some post when

they are and are not available. Others respond to emails or text messages within 12-24 hours. ECI faculty routinely check the Canvas course site and if students have stopped logging in, faculty contact the student to follow up prior to issuing Early Warning Referrals to help the student get back on track. ECI faculty also provide clear feedback to students about course expectations and performance. This is important in face-to-face classes, but more critical for online courses where students need to be more independent in their learning and must wait for instructor responses to questions. Consequently, feedback goes beyond what to fix to explain how the student can fix the assignment or address the problem, particularly if this involves digital literacy skills.

Another challenge of online learning is that, in exchange for flexibility and convenience, students shoulder a higher level of responsibility to access course content, manage time, and be accountable for their own learning. They also must process more information while studying before they can learn and apply the content to their assignments, which takes more cognitive energy and time dedicated to studying. Many non-traditional students take online courses because it is their only accessible method, not their preferred one, and they are not familiar with the technological demands. Furthermore, technological knowledge continues to evolve to meet new technologies. Therefore, ECI faculty have had to be more intentional about teaching and incorporating digital literacy into their online instruction.

For example, ECI faculty will create and post a video-tutorial to show students how to navigate websites effectively and what to look for. In one class requiring students to administer a standardized test, the ECI faculty posted a video-tutorial along with screen shots and an example case study of the process so that students can use these references to guide their work. Faculty also offer further individual tutoring by Zoom where students can show their work and get assistance. In another class, students create a board book with adaptations for children who have motor, visual, or speech challenges and post a video on how to create and use the book. Along with written instructions and examples, the instructor has a demonstration video on how to create, use, and present the book and a tutorial video on how to create and upload a video. These extra steps ensure students know how to use the technology and do the assignment.

Students can get lost navigating different technology sources, so ECI faculty simplify the process by embedding links to websites, media, google docs, or other applications directly on the webpage with the assignments so that each assignment webpage acts as a hub. Others use a "getting started" course page with instructions for technology sources and how these will be used in the course. Assignments using these technologies link back to the page. This reduces the number of clicks a student must use to find what they need, which makes it more likely they will persevere and stay on track. Faculty also are sensitive to the types of technology they require in courses, so students can use multiple devices such as a computer, iPad, tablet, or phone. This means that students experiencing technological difficulties with one device can switch to another without falling behind.

For ECI faculty to effectively provide and scaffold quality instruction and technological supports, they need ongoing training. Two strategies have worked well for ECI Online. The first is having dedicated e-learning technical staff and library technicians who faculty learn and keep up with educational technologies to build and maintain quality instruction over time. E-learning staff have been invaluable to the curriculum development and course implementation process. They offer regular webinars and professional development sessions on various topics. If faculty are unable to attend, they can access information online and schedule individual sessions with e-learning for "on-demand" learning. E-learning staff are also on call through the Technology Help Desk to trouble shoot issues with the campus LMS if a faculty member has issues with their Canvas course site. Library technicians also provide individual

supports and training to help faculty access digital literacy and media sources, locate needed materials, and incorporate them into courses.

ECI faculty must also have a solid understanding of the early childhood field, the educational needs of the early childhood workforce, and the technology needed to make these students successful. ECI faculty in the early development and implementation of ECI Online had these qualities; consequently, effective early curriculum development and design was possible. E-learning staff also provided supports for effective teaching in online environments, which further aided faculty to adapt their teaching to this venue. As the program expands, the initial ECI faculty share their expertise with new instructors teaching the same or similar course that the faculty mentor previously designed and taught. Faculty mentors are assigned a co-teaching role to the new instructor's Canvas site. New instructors go through an online orientation and receive supports from the e-learning team, but faculty mentors provide expertise about what has been effective for the students and answer questions as needed throughout the semester. The faculty mentor serves as a sounding board for the instructor and continues the mentor relationship in ongoing semesters until the instructor is comfortable and proficient to teach independently. This ongoing mentorship has allowed the program to maintain quality in curriculum development and teaching, while ensuring new technologies are updated over time.

In summary, instructors can provide several resources in their courses to help online early childhood students be successful. These include: (a) allowing flexible technology options for assignment creation and submission that do not rely on specific software applications or devices, (b) arranging functionally equivalent assignment options, so technology is not a barrier, (c) establishing instructor presence via technology, (d) teaching digital literacy skills so students know how to navigate technology needed to learn material, and (e) ensuring technologies required are not limited to specific software applications or technology devices. In addition, faculty who want to keep online programs current will pursue their own training options and make sure newer faculty teaching for the program receive substantial training and support to become familiar with using the standardized course formats and procedures.

COVID-19 IMPLICATIONS AND REMOTE LEARNING

Although ECI faculty were experienced in online instruction when COVID-19 became a reality, emergency remote learning required adapting strategies to new learning situations with students not planning to be online. Face-to-face students were impacted because they had less exposure to online learning and faced disruption if they had to move home. Some had ample time to study, but others took care of younger siblings while parents worked. Others had technology options at school but were challenged to make this work at home. Working in the community library or local community college during lockdown was not an option. Online early childhood teachers found themselves teaching their own children while managing remote learning for their classroom or center's children. Some lost employment as their schools and childcare programs closed, making it difficult for them to complete field-based experiences.

The university went into lockdown just before spring break 2020, which allowed time for ECI faculty to adjust courses. They incorporated more digital literacy supports and substituted electronic formats for assignments that would have been in-person. For example, they embedded online tutorials, media links, assignment examples, and other materials into course websites to enable students to understand and complete remaining assignments and navigate new technology. Group work moved to electronic formats such as google docs. Written and video announcements, Zoom video-conferencing options,

and frequent emails helped establish instructor presence. Field experiences were challenging because each students' placements and access to children kept shifting and places would go into lockdowns at different times. At any given time in the semester students, family members, or contacts at work had COVID or were in quarantine.

Faculty adapted assignments and deadlines or created alternate options such as: (1) case studies of children, (2) teaching scenarios, (3) videos of teacher interviews, home visits, or classroom teaching, (4) tutoring public school children through Zoom videoconferencing, and (5) teaching family members at home. Although students missed working directly with children, they found these adaptations maximized their learning. Students were able to complete assignments because of the flexibility in the course design, options for completion, and due dates. As remote learning became a reality for multiple semesters, ECI faculty adjusted by incorporating lessons learned from previous semesters. For face-to-face students, many classes became blended or taught synchronously via Zoom. Some faculty had remote learning classes with some students in-person and others on Zoom. Larger classes were split into smaller groups for social distancing and met on different times or days. Online students continued to receive greater flexibility and creativity to complete assignments due to COVID-related factors and increased their use of Zoom to connect with instructors as needed.

Institutional support for faculty and students also helped make remote learning successful. Students had more options to access or check out technology devices and Technology Help Desk staff were able to address student needs in remote locations. The Learning Commons incorporated time management, independent learning, and digital learning strategies to help students with remote learning. The campus Health Clinic ramped up mental health counselling and informational videos to help students and faculty persevere. E-learning technical staff provided faculty supports to transition to remote learning and troubleshot issues so faculty could teach effectively.

In summary, the COVID-19 experience challenged institutional, instructor, and students in ways that blurred lines between online and face-to-face environments and created a technology-infused learning venue more responsive to student demand. In post-pandemic times, early childhood teacher education faculty can apply lessons learned to improve online student learning. Videos, case studies, digital information resources, and learning supports can supplement lessons to ensure students master material. Videoconferencing sessions can increase instructor presence and provide on demand instructional supports to meet individual needs. The pandemic underscored the importance of providing pedagogy of both care and content (Nelson, Mollenkopf, & Gaskill, 2021). Early childhood faculty can provide a pedagogy of care to early childhood teachers trying to master the pedagogy of content to complete degrees. As they encounter new or evolving technologies, faculty can learn these technologies and adapt strategically so students can leverage technology to learn.

Early childhood teachers face multiple challenges in balancing work, family, and school, while serving our nation's youngest children. However, ECI Online has enabled early childhood teachers to successfully complete needed certification or degrees by intentionally integrating technology into the institutional support system, program design and delivery, curricular and instructional supports, and instructor-student interactions. By being responsive to student needs, the ECI program has been able to adapt over time, first by supporting face-to-face students and commuters, then by moving online, and finally by integrating strategies from both delivery options to address student needs during remote learning.

SOLUTIONS AND RECOMMENDATIONS

Several lessons can be learned from the experience of the ECI program and its evolution over time to adapt to the needs of early childhood teachers:

1. First and foremost, building a fully online program takes time and buy-in from people willing to make a long-term commitment. The conversion from face-to-face to online was successful because the ECI Program Director, along with a small group of dedicated faculty and staff, consistently worked with e-learning designers to ensure courses would be available and accessible for early childhood students. Consideration for faculty time, allowing faculty a flexible time frame to develop and roll out courses, and providing faculty supports to protect their workload was also important.

2. Institutional support is needed to make an online program successful. Having dedicated e-learning technical staff to offer on-going supports, professional development, and individual tutoring and assistance for troubleshooting is paramount to empowering faculty who can teach effectively via technology while being responsive to student needs. Library staff also cannot be underestimated in their role to locate resources and help faculty make the curriculum and learning they envision, a reality.

3. It is not enough to put a program online. Students must be able to navigate the application, admissions, and enrollment process and receive quality advising and student supports throughout their program. The ECI program Director and ECI Online Program Coordinator were able to work with staff throughout the institutional system to build awareness for the online student and help them leverage technology to accommodate those needs. As one part of the institutional system was able to accommodate, it allowed other parts of the system to adapt, thereby creating a more seamless system and ensure that online students are integrated into the student organizational framework. Having a dedicated staff person serving as a single face throughout the program has also been critical in ensuring student success.

4. At the micro-level, the quality of the teaching and learning experience is dependent on the instructor-student relationship. Ensuring faculty understand and know how to use technology for course design, development, implementation, and teaching is paramount, and having ongoing support for implementation and professional development to keep up to date is essential. Having successful faculty become part of the mentoring process for new faculty has also been helpful to sustain the program and ensure a consistent, quality learning experience for students.

5. For early childhood teachers to be successful in completing online programs, they must be equipped with the proper strategies and tools to master the digital literacy needed. ECI Faculty achieved this by building instructor supports to guide students on how to learn, not just what to learn. As faculty became adept with technology, they integrated this into their instruction and modeled this for their students. By infusing instructor presence using various technologies and allowing students to study and demonstrate their learning through different technological venues, faculty supported the learning process.

6. COVID-19 challenged educators at all levels to rethink technological delivery and the implementation of remote education created opportunities to adapt strategies from both face-to-face and online learning formats to meet students' needs where they are. This required both institutional and instructor level supports to support student learning in new ways and has also blurred online and face-to-face environments. The adaptability, and the COVID-19 experience in general, is likely to

permanently change how early childhood teachers and teacher educators integrate technology to promote learning.

FUTURE RESEARCH DIRECTIONS

The need for professional development for early childhood teachers is well-documented and a growing body of literature supports online professional development programs as effective for early childhood teachers (Kyzar, Chiu, Kemp, Aldersey, Turnbull, & Lindeman, 2014; Zinsser, Main, Torres, Connor, 2019). However, literature on online professional development is primarily focused on modules, individual courses, or trainings of short duration and research on online programs and what components make these effective is limited. More research is needed to help early childhood teacher educators understand the dynamics in effective online programs and factors needed to ensure student success.

A body of research also addresses best practices for course design, development, teaching, and learning, adult learner needs in online environments, and instructor-student interaction impact on student persistence and completion of online programs. However, limited research exists on the interaction of the institutional and instructional supports on student persistence and learning success, particularly for early childhood teachers who may have limited access to technology while balancing families, work, and financial concerns. Studies document lower retention rates for students in online courses than those in face-to-face courses (Bawa, 2016). As technology continues to play a growing role in instructional design and curriculum delivery, teachers educators need to research how they can better serve and support early childhood teachers while pursuing online degrees and what kinds of guidance and support models would maximize the preparation of the early childhood workforce via digital education.

More research is needed at the macro-level to understand the layers of supports that interact and what factors help these students be successful. More system level efforts are needed to provide equitable supports using predictive analytics that provides essential data on students' needs so gaps can be addressed. Higher education institutions offering online programs should investigate ways to provide support services using data analytics generated by the LMS or other student data systems.

Finally, there is limited research on the maintenance and stability of online programs and how to effectively ensure programs adapt over time. ECI Online evolved because of a need in the early childhood field and was not set up to be a longitudinal study. Even though program evaluation data have been useful for program improvement, more detailed research data is missing. More research is needed on university case studies that integrate technology for early childhood teachers to understand commonalities and differences in their approaches to help teachers succeed.

CONCLUSION

In summary, institutions of higher education are challenged to enable early childhood teachers to efficiently and effectively complete certification or degrees. Online environments are a viable option, but to be successful, they need a well-designed curriculum that integrates best practices in early childhood and technology. They also must be sensitive to the needs of enrolled early childhood teachers and maximize their learning while ensuring access. Institutional supports must align with instructional and student supports, with committed faculty and staff who work together to help students navigate the system and

persist in learning. Instructors must be knowledgeable in early childhood pedagogy, course development and design, adult learning theory, and various technologies to create sufficient supports so students can learn and apply both digital literacy and content skills. The current COVID-19 pandemic has further challenged institutions, faculty, staff, and students to adapt to a remote learning environment that capitalizes on the learning opportunities of both face-to-face and online formats but also applies these in new ways, thereby blurring the lines between formats and creating a continuum of learning options that is more reflective of on-demand learning. Future learning will be based on what institutions learn now from these combined experiences.

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REFERENCES

Bawa, P. (2016). Retention in online courses: Exploring issues and solutions—A literature review. *SAGE Open*, *6*(1). Advance online publication. doi:10.1177/2158244015621777

Bivens, J., Garcia, E., Gould, E., Weiss, E., & Wilson, V. (2016). *It's time for an ambitious national investment in America's children: Investments in early childhood care and education would have enormous benefits for children, families, society, and the economy*. Economic Policy Institute.

Byinton, T., & Tannock, M. (2011). Professional development needs and interests of early childhood education trainers. *Early Childhood Research & Practice*, (13), 2.

Camilli, G., Vargas, S., Ryan, S., & Barnett, W. S. (2010). Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers College Record*, *112*(3), 579–620.

Center for the Study of Child Care Employment. (2017). *Comparison of personnel systems for K-12 and early childhood qualifications and compensation*. University of California.

Clayton, K., Blumberg, F., & Auld, D. (2010). The relationship between motivation, learning strategies, and choice of environment whether traditional or including and online environment. *British Journal of Educational Technology*, *41*(3), 349–364. doi:10.1111/j.1467-8535.2009.00993.x

Dede, C., Jass Ketelhut, D., Whitehouse, P., Breit, L., & McCloskey, E. M. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education*, *60*(1), 8–19. doi:10.1177/0022487108327554

Engle, P. L., Fernald, L., Alderman, H., Behrman, J., O'Gara, C., Yousafzai, A., de Mello, M. C., Hidrobo, M., Ulkuer, N., Ertem, I., & Iltus, S. (2011). Strategies for reducing inequalities and improving developmental outcomes for young children in low-income and middle-income countries. *Lancet*, *378*(9799), 1339–1353. doi:10.1016/S0140-6736(11)60889-1 PMID:21944378

Friedman-Krauus, A., Barnett, S., Weisenfeld, G., Kasmin, R., DiCricchio, N., & Horowitz, M. (2018). *The state of preschool 2017: State preschool yearbook*. National Institute for Early Education Research. https://nieer.org/state-preschool-yearbooks/yearbook2017

Gelfer, J., & Nguyen, N. (2017). An undergraduate inclusive teacher preparation programme in early childhood education: An online delivery approach. *Early Child Development and Care*, *4*(189), 650–658.

Gelfer, J., Nguyen, N., & Oh-Young, C. (2021). An online inclusive early childhood education approach at a Southwestern University: A follow-up graduate programme. *Early Child Development and Care*, *3*(191), 451–460. doi:10.1080/03004430.2019.1622538

Greene, J. A., Yu, S. B., & Copeland, D. Z. (2013). Measuring critical components of digital literacy and their relationships with learning. *Computers & Education*, *76*, 55–69. doi:10.1016/j.compedu.2014.03.008

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, *312*(5782), 1900–1902. doi:10.1126cience.1128898 PMID:16809525

Institute of Medicine and National Research Council. (2015). *Transforming the workforce for children birth through age 8: A unifying foundation*. The National Academies Press.

Kamerman, S. B., & Gatenio-Gabel, S. (2007). Early Childhood Education and Care in the United States: *An Overview of the Current Policy Picture. ICEP*, *1*(1), 23–34. doi:10.1007/2288-6729-1-1-23

Kyzar, K. B., Chiu, C., Kemp, P., Aldersey, H. M., Turnbull, A. P., & Lindeman, D. P. (2014). Feasibility of an online professional development program for early intervention practitioners. *Infants and Young Children*, *27*(2), 174–191. doi:10.1097/IYC.0000000000000007

Ladell-Thomas, J. (2012). Do-it-yourself information literacy: Self-directed learning at a distance. *Journal of Library and Information Services in Distance Learning, 6*(3,4), 376-386. doi:10.1080/1533 290X.2012.705168

Linder-VanBerschot, J. A., & Summers, L. (2015). Designing instruction in the face of technology transience. *Quarterly Review of Distance Education*, *16*(2), 107–117.

Manning, M., Wong, G. T., Fleming, C. M., & Garvis, S. (2019). Is teacher qualification associated with the quality of early childhood education and care environment? *A Meta-analytic review. Review of Educational Research*, *3*(89), 370–415. doi:10.3102/0034654319837540

MeClendon, C., Neugebauer, R.M., & King, A. (2017). Grit, growth mindset, and deliberate practice in online learning. *Journal of Institutional Research*, *6*, 8–17.

Meyer, K. A., & Murrell, V. (2014). A national study of training content and activities for faculty development for online teaching. *Journal of Asynchronous Learning Networks*, *18*(1), 3–18. doi:10.24059/olj.v18i1.355

Mollenkopf, D., & Gaskill, M. (2020). Navigating technological transience in a time of unprecedented change: Student support strategies in college courses for those "suddenly online.". *The Journal of Literacy and Technology*, *21-2*(1), 130–148.

Mollenkopf, D. L., Felton, M. K., Karabon, A., & Westerlin, S. A. (2020). Building higher education community: A lesson from Nebraska. In D. D. Cunningham (Ed.), *Professional and Ethical Consideration for Early Childhood Leaders* (pp. 202–225). IGI Global. doi:10.4018/978-1-7998-5089-2.ch010

NAEYC. (n.d.) *Power to the Profession Unifying Framework for the Early Childhood professions*. http://powertotheprofession.org/

National Survey of Early Care and Education Project Team. (2015). *Measuring predictors of quality in early care and education settings in the National Survey of Early Care and Education* (OPRE Report #2015-93). Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. https://www.acf.hhs.gov/sites/default/files/opre/measuring_predictors_of_quality_mpoq_in_the_nsece_final_092315_b508.pdf

Nelson, R. M., Mollenkopf, D., & Gaskill, M. (2021). The four pillars of digitally infused education: Transcending modalities in a post-COVID learning environment. In R.E. Ferdig & K.E. Pytash (Eds.), What Teacher Educators Should Have Learned From 2020 (pp.79-89). Association for the Advancement of Computing in Education (AACE).

Sheridan, K., & Wen, X. (2021). Evaluation of an online early mathematics professional development program for early childhood teacher. *Early Education and Development*, *1*(32), 98–112. doi:10.1080/10409289.2020.1721402

Silverman, S. C., Alabadi, S., & Stiles, M. R. (2009). Meeting the needs of commuter, part-time, transfer, and returning students. In S. R. Harper & S. J. Quaye (Eds.), *Student engagement in higher education: Theoretical perspectives and practical approaches for diverse populations* (pp. 223–241). Routledge.

Stone-MacDonald, A., & Douglass, A. (2014). Introducing online training in an early childhood professional development system: Lessons learned in one state. *Early Childhood Education Journal*, (43), 241–248.

T.E.A.C.H. Early Childhood National Center. (n.d.). www.teachecnationalcenter.org

T.E.A.C.H. Early Childhood Nebraska, . (2019). *Scholarship Opportunities for Child Care Providers*. Nebraska Association for the Education of Young Children.

Ting, Y. (2015). Tapping into students' digital literacy and designing negotiated learning to promote learner autonomy. *Internet and Higher Education*, *26*, 25–32. doi:10.1016/j.iheduc.2015.04.004

Van Rhijn, T., Lero, D., & Burke, T. (2016). Why go back to school? Investigating the motivations of student parents to pursue post-secondary education. *New Horizons in Adult Education and Human Resource Development*, *28*(2), 14–26. doi:10.1002/nha3.20135

Woods, K., & Frogge, G. (2017). Preferences and experiences of non-traditional and traditional university students. *Association for Continuing Higher Education*, *65*(2), 94–105. doi:10.1080/07377363.2017.1318567

Yang, D., Baldwin, S., & Snelson, C. (2017). Persistence factors revealed: Students' reflection on completing a fully online program. *Distance Education*, *1*(38), 23–36. doi:10.1080/01587919.2017.1299561

Zinsser, K., Main, C., Torres, L., & Connor, K. (2019). Patching the pathway and widening the pipeline: Models for developing a diverse early childhood workforce in Chicago. *American Journal of Community Psychology*, *4*(63), 459–471. doi:10.1002/ajcp.12310 PMID:30664235

KEY TERMS AND DEFINITIONS

Additional Endorsement: A teaching license that allows someone with a teaching degree in one endorsement area (e.g., Elementary Education) to teach in another endorsement area (e.g., Early Childhood).

Asynchronous vs. Synchronous: Asynchronous instruction means that all class instruction occurs independently, while synchronous instruction requires students to attend in person or via technology at a set time.

Certification: A teaching license in an endorsement area, which is completed as initial certification or an additional endorsement.

Digital Literacy: A set of skills students need to know to work with technology in a learning environment. This includes knowing how to use a variety of software applications, navigate websites, read and process electronically presented information, and apply these to learning.

E-Learning: Any electronic learning experience, including remote learning or online instruction.

Early Childhood Workforce: Any adult working in an early childhood program, particularly those serving as the teacher or assistant teacher in a childcare setting with children ages 0-5.

Early Childhood Inclusive (ECI) Endorsement Program: Program that prepares students to hold a teacher license to work with children ages 0-8 in regular education settings and children 0-5 in special education settings. The term, inclusive, according to state certification regulations indicates that the graduate is also certified (licensed) to teach children with disabilities. The program includes the bachelors' degree, initial certification, or additional endorsement.

Field-Based Experiences: Student activities prior to student teaching in a school or early childhood program classroom that involves a set number of contact hours observing, assessing, teaching, or otherwise working with some or all those children.

Initial Certification: Program of study leading to a teaching license in an endorsement area for a student who does not already hold a teaching license. In this chapter, this specifically refers to the student who has completed a non-teaching bachelor's degree but is returning as a post-baccalaureate (after the bachelor's degree, but before a master's) student to complete teacher certification in an endorsement area.

Learning Management System: A software application system that allows a university to administer, track, and deliver courses electronically. It houses faculty's course websites and enables faculty to design and build courses.

Non-Traditional Student: An adult learner generally over the age of 25, who works full or part-time, is more likely to have had a gap between high school and college, and be raising family while going to college full or part-time.

"On-Demand" Teaching or Learning: Instruction available for the learner to access at the point they need it. An example would be a faculty member who accesses a tutorial to learn how to upload a video at the point they are building that into their course.

Remote Learning: A subset of e-learning separate from online learning that allows face-to-face students to attend class and/or work on assignments remotely. Some parts of the class could be synchronous, and some could be online.

T.E.A.C.H. – Teacher Education and Compensation Helps: The T.E.A.C.H. scholarship is housed at the national center and is specifically designed to help the early childhood workforce complete degrees debt-free while also improving their job stability.

Traditional Student: College student between the ages of 18-25 who enrolls directly in college after finishing high school, is usually a full-time student, and is not balancing family and heavy work responsibilities.