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Revisiting Readiness for K–12 Online Teaching: What Teachers Reveal About Students, Preparation, and Policy Through a Graduate Online Learning Curriculum

RESEARCH ARTICLES

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ABSTRACT

This five-year action research study focuses on the continuous improvement of a graduate educational technology course focused on K-12 online learning. Researchers analyzed reflections, projects, blog posts and responses, and student evaluations of teaching from the in-service teachers who were enrolled in the course to understand their evolving perspectives of K-12 online learning (and in earlier cycles potential course changes). In this final cycle four key themes emerged: teachers emphasized that students need explicit instruction in self-regulation and readiness skills rather than possessing them innately; successful online learning requires intentional course design promoting interpersonal connection and interaction; effective online teaching demands specialized preparation beyond traditional teacher education, including technical skills and positive dispositions toward technology; and the implementation of K-12 online learning raises critical concerns about equity, access, and policy decisions that may prioritize cost-efficiency over educational quality. The findings challenge assumptions about K-12 online teaching as merely transferring face-to-face practices to digital environments, highlighting instead the need for developmental, practice-based teacher preparation that addresses pedagogical, relational, and systemic dimensions of digital learning.

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INTRODUCTION

While millions of students now participate in digital learning environments (Digital Learning Collaborative, 2024), research consistently demonstrates that effective online instruction requires specialized competencies distinct from traditional classroom teaching (DiPietro et al., 2008; Graziano & Bryans-Bongey, 2018; Lowes, 2007). These include facilitating asynchronous communication, managing student engagement without physical presence, and fostering meaningful digital interactions while mitigating student isolation (Barbour, 2012a; Friend & Johnston, 2005). The expansion of K-12 online learning over recent decades has created a critical mismatch between what teachers need to know and what their preparation programs provide (Franko, 2021; Johnson et al., 2023). This gap became particularly evident during the COVID-19 pandemic, when teachers scrambled for resources to support emergency remote instruction (Cavanaugh & DeWeese, 2020). Yet teacher education programs have been slow to integrate these essential skills into their curricula, leaving many educators underprepared when they enter online teaching roles (Archibald et al., 2020; Siko et al., 2024). The persistence of this preparation deficit, despite decades of documented need, threatens the quality and equity of online learning experiences for K-12 students.

Over the years there have been isolated efforts to address this deficit. The most common model has been the creation of a Graduate Certificate in Online Teaching, which many universities have embarked on (Barbour, 2012b; Kennedy & Archambault, 2012a; Yang & Rice, 2015). However, these are infrequent enough that a comprehensive listing is of all of the certificates available in the US could be created. Another common strategy is to permit or even partner with online programs or schools to provide field experiences in K-12 online learning environments (Compton & Davis, 2010; Compton et al., 2009). Unfortunately, as it will be discussed below, this model is still quite uncommon. A third common model has been for the K-12 online programs and schools to provide their own professional development after a teacher is hired (Archambault & Crippen, 2009; Hinson & Sellers, 2004; Kennedy & Archambault, 2012b; Pape et al., 2005; Rice & Dawley, 2009). But this would exclude the vast majority of K-12 teachers who will never be directly employed by one of these programs or schools.

This article describes an action research study that examine how in-service teachers perceptions of K-12 online learning evolved while completing a graduate-level educational technology course focused on digital pedagogy. The initial redevelopment of this course came in response to the state introducing three new educational technology standards related to K-12 online learning, largely in response to the state's online learning graduate requirement for high school students. This iteration is the eighth and final cycle of a five-year research program designed to analyze themes across student participation in the course (Azukas & Barbour, 2021, 2024; Barbour & Siko, 2020; Barbour & Unger-Harrison, 2016; Siko & Barbour, 2022, 2026), along with evaluating cyclical curriculum revisions.

LITERATURE REVIEW

The effectiveness of K-12 online learning depends on teachers who possess specialized skills distinct from those required in traditional classrooms, yet teacher preparation programs have consistently failed to equip educators with these essential competencies. In this section we describe the long-established research supporting the notion that successful online instruction demands unique abilities. We explore existing models and promising practices that have emerged to address preparation needs. Finally, we outline the use of distance and online learning tools and pedagogies during historic, recent COVID-induced, and future disruptions, and the need for teachers to be prepared for these kinds of events.

DIFFERENCES BETWEEN TEACHING MODALITIES

The rapid expansion of K-12 online learning over the past three decades has created an urgent need for teachers equipped with the specialized skills required for digital instruction. Despite this growth, with millions of students now participating in online or blended learning formats (Digital Learning Collaborative, 2024), teacher preparation programs have been remarkably slow to adapt their curricula to address the unique demands of online teaching environments (Franko, 2021; Johnson et al., 2023). Research has consistently demonstrated that effective

online teaching requires skills and competencies that differ significantly from those needed in traditional classroom environments (DiPietro et al., 2008; Lowes, 2007). For example, Wood (2005) captured this distinction by noting there was a "persistent opinion that people who have never taught in this medium [i.e., online] can jump in and teach a class" (p. 36), while citing Robert Blomeyer's assertion that "a good classroom teacher is not necessarily a good online teacher" (p. 36). This fundamental misunderstanding about the transferability of in person teaching skills into the online environment has contributed to inadequate preparation for teachers to handle new demands being placed upon them.

Online teachers must develop proficiency in areas that are largely absent from the face-to-face classroom. These include facilitating asynchronous communication, managing student engagement without physical presence, and fostering meaningful digital interactions while mitigating student isolation (Barbour, 2012a; Friend & Johnston, 2005). Further, Morris (2002) identified that teachers in digital learning environments required an understanding of the curriculum, significant technology skills, strong organizational skills, good communication habits, and an inherent interest in the teaching medium. Additionally, teaching online requires what Easton (2003) described a fundamental change in teachers' understanding of temporal and physical learning environments, their approach to organizing lessons and evaluations, and their methods for involving students in the learning process. Perhaps most significantly, many online teaching practices represent modified versions of traditional approaches rather than methodologies specifically developed for digital learning contexts (Moore-Adams et al., 2016).

EXISTING MODELS AND PROMISING PRACTICES

Despite these documented challenges, several models and initiatives have emerged to address online teaching preparation. The most comprehensive early effort was the Teacher Education Goes into Virtual Schooling (TEGIVS) project at Iowa State University (Davis & Roblyer, 2005). This initiative, developed in collaboration with multiple institutions, introduced pre-service teachers to three distinct roles in virtual school environments: virtual school designer (i.e., course development), virtual school teacher (i.e., pedagogy and class management), and virtual school site facilitator (i.e., mentoring and advocating) (Davis et al., 2007a). The TEGIVS project utilized five web-based scenarios designed to reflect four aspects of virtual schooling: pedagogy, technology, assessment, and management. As Davis and Rose (2007) noted, the use of scenarios provides meaningful contexts for teacher learning, though they cautioned that "simply viewing any online course cannot provide a rigorous experience. Quality teacher preparation requires careful selection of field experience and student teaching in the students' content areas and grade levels" (p. 11).

Building on this foundation, several states have developed endorsement programs for online teaching. For example, Georgia was the first state to allow teachers to obtain an online teaching endorsement, with three university programs currently offering graduate-level certificates leading to this credential (Barbour et al., 2012). Idaho followed with Boise State University providing multiple pathways to online teaching endorsement, including both coursework and portfolio-based approaches (Yang & Rice, 2015). More recent research has explored additional approaches to teacher preparation. Luo et al. (2017) conducted design-based research incorporating video observations and guest speakers to increase pre-service teachers' exposure to online learning, finding that increased exposure improved overall perceptions of online teaching. Cooper et al. (2020) outlined a three-semester sequence designed to increase pre-service educators' efficacy in online teaching, with instruction aligned to standards from multiple professional organizations.

In an effort to bridge this gap, K-12 online learning programs themselves began to create their own professional development models that teachers were required to complete before teaching online. For example, the Virtual High School Global Consortium (VHS) required prospective teachers to complete online courses in both online pedagogy and course design, as well as expanding their offerings to five separate courses addressing various aspects of online instruction (Pape et al., 2005). These VHS professional development courses served as the basis for a partnership with several universities that allowed learners to receive graduate credits for completion of these courses, and even a graduate certificate on online teaching for completion of all five courses. Similarly, early in their development both the Illinois Virtual High

School and Michigan Virtual School offered similar six to eight-week courses focused on online course design and online pedagogy that its teachers could – in some cases were required – to complete (Barbour et al., 2009; Davis et al., 2007b). The experiences of these three K-12 online learning programs was quite common in the early development of the field, but continues to persist because of the gap in teacher preparation for teaching online.

GAP BETWEEN NEED AND PRACTICE

Unfortunately, the literature also reveals a persistent and troubling gap between the growth of online learning and the preparation of teachers to deliver such instruction effectively. Multiple studies spanning over a decade have documented the inadequate state of teacher preparation for online environments (Archibald et al., 2020; Graziano & Bryans-Bongey, 2018; Siko et al., 2024). For example, Kennedy and Archambault (2012c) found that only 1.3% of teacher education programs offered field experience opportunities in K-12 online learning programs, a figure that increased only modestly to 4.1% in a follow-up study by Archambault et al. (2016). Following the pandemic, an event that showed the necessity for all teachers to have some familiarity with the ability to teach in flexible learning environment, Woo et al. (2025) replicated these earlier studies and found that the percentage of teacher education programs providing online field experiences had only increased to 14% of institutions who responded. Even more concerning, Rice and Dawley (2007) reported that less than 40% of all online K-12 teachers in the United States received any professional development before beginning their online teaching careers. Further, as Barbour (2012b) noted, the majority of online teachers who did receive professional development reported that training concentrated on how to use the learning management system, as opposed to how to teach online. This emphasis on technical skills over how to effectively design, deliver, and support online learning leaves teachers unprepared for the complex challenges of the digital environment.

The inadequacy of current preparation became starkly evident during the COVID-19 pandemic. Cavanaugh and DeWeese (2020) documented the dramatic increase in internet searches for online teaching resources, from approximately 100,000 in February 2020 to nearly 4 million in March 2020, reflecting educators' desperate scramble for guidance when forced into emergency remote teaching situations. Studies during this period found that many teachers struggled considerably with the adaptation to remote and online teaching (Donnelly & Patrinos, 2022; Engzell et al., 2021; Howard et al., 2021; Moscoviz & Evans, 2022; Trust & Whalen, 2021). However, the COVID-19 pandemic wasn't the first time that schools struggled to maintain learning continuity when forced to close unexpectedly, despite having access to distance learning technologies. During the 1918–19 Spanish flu pandemic, students in California resorted to telephone-based instruction (McCracken, 2020), while a 1937 polio outbreak led to 325,000 Chicago elementary students receiving daily lessons through coordinated radio broadcasts (Foss, 2020). More recently, the 2003 SARS outbreak in Toronto resulted only in the posting of supplementary learning links online rather than a comprehensive virtual learning program, even though Ontario school districts had been experimenting with online education since the mid-1990s (Borja, 2003). The experience in Ontario was somewhat consistent with experiences in several Asian nations during both the SARS and H1N1 pandemics (Alpert, 2011; Barbour et al., 2011; Latchem & Jung, 2009).

Simply put, future school closures remain a distinct possibility due to emerging new infectious diseases, climate-related natural disasters, or unexpected events of political unrest or violence; and education systems need to be prepared. And even if these disruptions and the need for short- or long-term remote learning does not materialize, the need for preparation would still be amplified by the continued growth and evolution of online learning. The Digital Learning Collaborative (2024) reported that enrollment in online learning and participation in digital learning activities continue to increase, suggesting that the demand for qualified online teachers will only grow.

METHODOLOGY

This study employed an action research approach to investigate how in-service teachers in a graduate education course characterized their understanding of online learning after engaging with a targeted curriculum. The nature of the study was well-suited to action research because

it involved a systematic process of gathering and examining data with the goal making iterative improvements to enhance teaching and learning over time (Craig, 2009; Stringer & Aragón, 2020). This research is part of an ongoing 5-year program of inquiry examining teacher development related to online instruction, with each cycle contributing to the understanding of teacher learning and informing course refinements.

In particular, the inquiry was guided by Stringer and Aragón's (2020) action research framework, which conceptualizes action research as iterative cycles of *look*, *think*, and *act*. In this study the *look* phase involved examining participant-generated course artifacts and instructional experiences, the *think* phase focused on reflective analysis of emerging patterns in teachers' sense-making, and the *act* phase involved using those insights to inform instructional and curricular decisions across successive course offerings. This framework provided a coherent organizing logic for the multi-year inquiry.

The current analysis was guided by the following research questions:

1. In what ways did participants perceptions of K-12 online learning evolved during the course?
2. What insights from participant reflections might inform future revisions to the online learning curriculum?

This study represents the eighth and final cycle of this five-year action research program.

CONTEXT, PARTICIPANTS, AND RESEARCHER POSITIONALITY

The participants were enrolled in a graduate-level educational technology course at a midwestern public university. The course was redesigned in response to changes in state standards that were implemented to prepare educators to better understand and implement effective online teaching practices following the introduction of a requirement that secondary students needed to complete an online learning experience in order to graduate. The course was open to in-service teachers. During this cycle, four students were enrolled, and three consented to participate in the study. To protect their identities, they are referred to using pseudonyms. All three participants were female practicing K-12 educators at the time of the course and brought classroom experience to their engagement with the curriculum. None of the participants had prior experience serving as the instructor of record for fully online K-12 courses, although some had observed or interacted with online curricular materials in other professional contexts. While the small number of participants limits generalizability, it enables a deep exploration of how experienced educators interpret and apply online teaching concepts through engagement with a K-12 online learning curriculum.

Consistent with the collaborative and evolving nature of action research, instructional and research roles shifted over the duration of the broader research program. During earlier cycles, the primary investigator served in an instructional role; however, as the project continued, the primary investigator no longer held instructional responsibility for the course. In this cycle, instruction was led by other faculty members, and the primary investigator's role was primarily advisory with resect to the research. This separation of instructional and analytic roles helped mitigate potential influence on participants' responses while still allowing for informed interpretation grounded in sustained engagement with the curriculum.

DATA SOURCES

Data sources included three types of student-generated course artifacts completed during the course: individual projects, group projects, and reflective blog posts (Mertler, 2020). Each participant submitted an individual final project in which they synthesized key course concepts and applied them to a specific issue or context related to online learning. Two collaborative group projects were also completed during the semester; both were included in the analysis since the three participants contributed to them. In addition, participants wrote blog posts in response to course readings and prompts, offering more informal and personal reflections on online learning. Blog prompts were intentionally open-ended and designed to encourage participants to connect course concepts to their own professional experiences, rather than to elicit predetermined responses. Blog posts varied in length, ranging from brief reflections to more extended multi-paragraph entries. Participants also responded to one another's blog

posts, resulting in on-going dialogic exchanges that unfolded across the duration of the course. As such, the blog data reflect both individual sense-making and socially-mediated meaning-making over time. Together, these data sources provided insight into participants' developing understandings and perceptions of K–12 online learning.

DATA ANALYSIS

Data were analyzed using inductive thematic analysis following Braun & Clarke's (2006) six-phase approach. Analysis was interpretive in nature and oriented toward understanding how participants articulated meaning through their course-based reflections, rather than treating meaning as self-evident within the data. The analytic process began with multiple close readings of the data to develop familiarity and identify emerging ideas. First-cycle coding included both in vivo codes, to preserve the language used by participants, and descriptive codes to summarize key topics and ideas (Saldaña, 2016). Coding was conducted primarily at the semantic level, attending to participnats' explicit language and descriptions rather than inferring underlying or latent assumptions. These were then refined through second-cycle pattern coding, grouping similar ideas across participants and artifact types. Themes that surfaced repeatedly were then developed into analytic assertions, representing interpretive claims about what participants' reflections reveal regarding their experiences with the curriculum and their understandings of online learning. These assertions were developed inductively through iterative engagement with the data and reflect the researchers' analytic interpretation of patterns across artifacts. They reflect the shared and individual meanings participants constructed while engaging with the course, situated in the broader aim of preparing teachers for effective practice in digital learning environments.

ETHICAL CONSIDERATIONS

This study received approval from the authors' institutional review board prior to data analysis. Students enrolled in the course were informed about the study and invited to provide consent for the use of their course artifacts for research purposes. Of the five students enrolled in the course during this cycle, four consented to participate; only data from consenting participants were included in the analysis. Participation or non-participation had no impact on course grades. All data were anonymized, and pseudonyms were used to protect participant identities.

RESULTS

This study explored how in-service teachers enrolled in a graduate-level course made meaning of K-12 online learning after engaging with an online learning curriculum. Analysis of participants' blog posts, individual assignments, and group projects led to the development of four core assertions. First, participants emphasized the importance of self-regulation and readiness for online learning as foundational to student success. Second, they highlighted the need for course design to promote meaningful interpersonal interaction environments. Third, they identified communication and organization as critical competencies for online teachers. Finally, participants raised broader concerns about equity, access, and the broader role of online learning in K-12 education. What follows is a discussion of each assertion, presented with supporting evidence drawn directly from participants' coursework, cited by author and assignment type. It should be noted that there were fewer than five students and according to institutional policy the student evaluations of teaching were not made available. Additionally, as this iteration was planned as the final cycle of this action research study, the researchers decided not to address the research question related to informing future revisions to the K-12 online learning curriculum.

STUDENTS REQUIRE EXPLICIT DEVELOPMENT OF SELF-REGULATION AND ONLINE READINESS SKILLS

Participants asserted that students require explicit development of self-regulation and online readiness skills to succeed in digital environments. Success in online learning depends not only on access to technology and curriculum, but also on students' ability to self-regulate, which includes managing their time, motivation, and ability to complete tasks independently. These skills were described as essential to online learning readiness, yet often underdeveloped

among K-12 learners. Rather than viewing readiness as a given, participants framed it as a set of competencies that must be explicitly taught and continually reinforced. One example was when Megan questioned the developmental readiness of adolescents for online learning stating in her blog, "Independent thinking and self-motivating… are by no means traits of middle school students. It barely describes the students in high school." Dana echoed this concern in her blog post, writing that. "…younger students… have not mastered organization. Between sports, extracurricular activities, and joining the job world, they struggle to manage it all." She went on to argue that younger learners should take a prerequisite course focused on study skills, time management, and navigation of online course platforms.

Others shared this perspective. For example, Rachel expanded on this notion by suggesting that readiness is not solely a function of age but of work ethic and support. She wrote, "I don't know that age exactly is a determinant of success in online learning. What I really think it comes down to is work ethic and time management." Taken together, these reflections suggested the participants viewed self-regulation as a learned capacity rather than an innate trait. They argued that readiness for online learning should not be assumed, but cultivated through targeted support, particularly in K–12 settings.

SUCCESSFUL ONLINE LEARNING DEPENDS ON INSTRUCTIONAL DESIGN THAT FOSTERS PERSONAL CONNECTION AND INTERACTION

All of the participants emphasized that successful online learning requires intentional design that fosters interaction between students and teachers as well as among peers. They stressed that successful online learning is not only about content delivery, but also about cultivating connection, dialogue, and human presence; elements they perceived as critical to engagement and student success. For example, Megan, in her individual project, asserted that "students do not learn in isolation," and emphasized the need for "discussion boards, video meetings, and group projects" to promote interaction and feedback. In the group project script, she noted that students often "miss out on the back-and-forth that happens in a traditional classroom," and stressed that educators must build in opportunities for students to "talk to each other and learn together." Rachel similarly observed that "peer interaction helps students to feel like part of a learning community," highlighting its motivational benefits.

Dana added a complementary perspective focused on teacher-student interaction. In her blog, she reflected, "using the Web 2.0 tools has also helped both teacher and student to interact and to get [to] know each other. I feel that teaching an online class can have the same personal features of my classroom." She also emphasized the value of an initial face-to-face meeting to "establish rapport" and help identify "what type of learner the student is," suggesting that teacher awareness and relational trust are foundational to student success. At the same time, she cautioned that certain types of interaction, particularly those related to social-emotional development. may be difficult to replicate online, especially for younger students. "You cannot teach social skills online, especially to students in K-8 where it is most needed." These reflections indicate that participants viewed relational presence and human connection as essential design elements in online learning. Their comments reflect a belief that interaction is not just a pedagogical strategy, but a core condition for meaningful engagement in digital environments. Notably, some participants questioned whether critical social-emotional skills could be effectively developed in online environments, particularly for younger learners, suggesting limited support for fully online learning environments in the early grades.

EFFECTIVE ONLINE LEARNING REQUIRES TEACHERS TO RECEIVE PREPARATION THAT EQUIPS THEM WITH DISTINCT SKILLS AND DISPOSITIONS

Participants emphasized that effective online learning requires preparation beyond traditional teacher education, including organizational, communication, and pedagogical competencies specific to digital environments. Their reflections also suggest that such preparation must also address teachers' professional attitudes toward technology, since these shape both instruction and student engagement. Megan, in her individual project, argued that a prerequisite class for teachers would be valuable to determine whether they are equipped to succeed in online environments:

> I also believe having a prerequisite class for teachers to see if they are capable in teaching an online class. I bet many teachers are not aware of the workload that goes into teaching an online class or the knowledge of technology.

She explained further that, "Many of my digital immigrant teachers (colleagues) have a negative attitude about technology or any change that occurs in school and the students pick up on it." Her comments suggest that without targeted training, teachers may enter online classrooms lacking both the practical skills and the dispositions necessary for effective online instruction.

Rachel, in her individual reflection, noted the importance of mentoring and experiential preparation. Recalling her own induction to the profession, she shared:

> My first year, I was blessed with a teacher mentor to help me with parent questions, planning field trips, behavior problems, the ins and outs of our school, etc. To this day, I still ask her questions and advice. This being said, having a mentor again or a 'student teaching' experience for teaching an online class would be beneficial.

Dana also pointed to experiential learning as essential. In her blog, she stated that, "Shadowing a teacher would definitely give you the hands-on and visual experience to build your confidence." Her perspective highlights the value of observing and practicing under the guidance of experienced educators. Viewed collectively, these reflections highlight participants' belief that preparation for online teaching is a multifaceted process. They emphasized coursework that addresses the unique demands of digital learning, alongside mentoring and shadowing experiences that provide practical grounding. In their view, specialized training must build not only technical and organizational competence but also constructive attitudes toward technology that positively influence student learning.

THE ROLE OF ONLINE LEARNING IN K-12 EDUCATION RAISES CRITICAL ACCESS, EQUITY AND POLICY CONSIDERATIONS THAT EXTEND BEYOND CLASSROOM PRACTICE

Participants raised concerns that the implementation of online learning in K-12 education involves issues of policy, equity and access that extend beyond the day-to-day work of teachers and students. Their reflections suggest that opportunities created by online learning are unevenly distributed, that program quality varies widely, and that state-level decisions may prioritize cost efficiency over educational value.

With respect to access, participants raised concerns that successful online learning depends on adequate technological access at both the individual and institutional levels. In her blog, Dana noted, "Many middle school students I know just have iPads or tablets and share their family's computer. Having a computer on hand is crucial." This observation reflects the digital divide in student device availability, where learners may be technically connected but lack consistent access to the type of computer required for online coursework. Rachel emphasized the importance of infrastructure and policy support, writing, "In order for online learning to be successful, legislators will have to allocate funds to prepare and support instructors, ensure that schools have the technological infrastructure and support, educate students and parents on the issue, and put accountability mechanisms in place to ensure that learning is happening." Her reflection points to the system investments needed to ensure access to online programs. Megan expressed skepticism that equitable access could ever be achieved across all schools, stating, "All high schools will ever have equality in terms of technology and access that will allow online learning across the entire state." These reflections indicate that participants have doubts about whether online learning could be equitably accessible citing both gaps in individual student devices and broader disparities in institutional resources.

In terms of equity, participants described equity in terms of whether the online programs students encountered were of comparable quality. Rachel noted in her individual project that "some online programs are rigorous and well-developed, but others are thrown together and poorly supported." She further emphasized that if a school did not have adequate oversight, "students can fall through the cracks." Megan similarly emphasized in her individual project that online learning, "can promote individualized instruction when used correctly," a statement that implies variation in program design and effectiveness. The participants referred to certain

programs as "poorly designed" or "lacking rigor," suggesting that while some students benefited from well-structured courses, others received markedly weaker educational experiences.

Finally, from a policy perspective, participants also raised concerns about the policy motivations behind online learning. Dana expressed skepticism that state-level decisions were grounded in educational value, writing:

> I feel like the people in our state capitals are making decisions about education, not thinking about the children, but about the bottom line. I fear that virtual education will become a cheaper, more cost-effective solution handed down... by people that have no idea what they are talking about.

Similarly, Megan reflected on her experience with an online program that enrolled students who had been removed from traditional classrooms. She questioned whether the program was designed to meet these students' needs and noted that its operation appeared tied more to maintaining enrollment counts and funding than to ensuring adequate learning opportunities. She further observed that many of these students were no more successful in the online setting than they had been in their previous classrooms. These reflections suggest that participants viewed online learning as shaped by policy decisions that prioritized cost savings or compliance with accountability structures over meaningful educational outcomes.

DISCUSSION

Findings from this study indicate that participants framed readiness as a developmental construct rather than a fixed prerequisite for online success. Teachers described readiness as something that could be explicitly taught through intentional design and support structures, challenging earlier models that positioned it as a set of pre-existing traits required for enrollment (Alem et al., 2014; DiPietro et al., 2008; Roblyer & Marshall, 2002; Roblyer & Davis, 2008; Roblyer et al., 2008). These reflections align with emerging thinking suggesting that readiness should function as a pedagogical goal, facilitated by an intentional focus on self-regulation, metacognition, and learning strategies (Barbour et al., 2025; Siko, 2014). Participants' emphasis on cultivating these capacities through ongoing instructional interactions highlights the need for online curricula, preparation, and professional learning that embed readiness-building as a shared and evolving responsibility among teachers, students, and families, fostering inclusion and sustained support in K-12 digital learning environments.

Participants emphasized the importance of intentional preparation for online teaching, noting that many educators enter digital environments without adequate training. This is consistent with research indicating that educator preparation programs fail to provide instruction focused on digital learning environments (Archambault et al., 2016; Archibald et al., 2020; Hodges et al., 2022; Kennedy & Archambault, 2012c; Lahr & Welch, 2023; Woo et al., 2025). Importantly, participants in the study suggested that readiness for online teaching involves more than technical proficiency; it also includes the beliefs, attitudes, and professional identities that shape how teachers design instruction, build relationships, and sustain engagement in digital settings. Strengthening teacher preparation and ongoing professional learning therefore requires programs that integrate technical, pedagogical, and socio-emotional dimensions of practice, enabling educators to design inclusive, engaging, and human-centered digital learning experiences (Barbour & Hodges, 2024).

Participants in this study consistently emphasized the centrality of human connection in successful online learning, describing interaction as the primary means through which engagement, belonging, and persistence are cultivated. This emphasis aligns with theories of social presence (Garrison et al., 2000) and with relational approaches to digital pedagogy that view connection as a designed, intentional process rather than a spontaneous byproduct of technology (Borup et al., 2020; Martin & Borup, 2022). In the K-12 context, this reflects a broader rethinking of interaction as both a cognitive and emotional construct, where meaningful engagement involves the "hearts, hands, and heads" of learners through affective, behavioral, and cognitive dimensions (Borup et al., 2020, p. 813). Participants' descriptions of designing spaces for dialogue, feedback, and visibility parallel the Academic Communities of Engagement framework's emphasis on course, personal, and institutional communities that collectively sustain engagement. Framing interaction as a design principle rather than a 'soft skill' positions

connection-building as essential to learning outcomes and learner motivation. For practice, this suggests that teacher preparation and professional learning should foreground community-building competencies, helping educators intentionally design for presence, empathy, and authentic engagement across synchronous and asynchronous modalities.

Participants' course work revealed an awareness that the success of K-12 online learning depends as much on systemic policy and resource allocation as on classroom practice. Their concerns about inconsistent program quality, inequitable access to technology, and the perception that policy decisions may prioritize cost efficiency over educational value, echo critiques raised in digital learning research (Battaglio et al., 2012; Molnar et al., 2023). Teacher participants noted that online learning opportunities remain unevenly distributed with program operations and support mechanisms varying widely scores programs, a pattern also reflected in state and national analyses of K-12 digital learning (Barbour & Reeves, 2009; Guo & West 2025; Molnar et al., 2015; Molnar et al., 2023; National Forum on Education Statistics, 2021). Participants' skepticism toward state-level motives highlights the need for policy environments that foreground learning quality, inclusion, and teacher support rather than fiscal expedience.

CONCLUSIONS AND IMPLICATIONS

This study examined teachers' perceptions of K–12 online learning after completing a graduate-level curriculum focused on digital pedagogy. Participants' reflections revealed that readiness for online teaching is not a fixed set of technical skills, but an evolving professional capacity shaped through experience, reflection, and institutional support. Their insights extend existing research by illustrating how teachers conceptualize effective online instruction as relational, iterative, and context-dependent rather than purely procedural. In doing so, the study highlights a need to reconceptualize teacher preparation and professional learning for online environments as developmental and practice-based processes situated within broader systems of equity and policy. These findings contribute to a growing understanding that sustaining quality and inclusion in K-12 digital learning requires coherent connections among teacher education, instructional design, and the policy structures that govern them.

This study's findings should be interpreted in light of several limitations. The reflections analyzed were drawn from a small sample of teacher candidates within a single preparation program, limiting the transferability of insights across broader K–12 contexts. The data were based on participants' self-reported perceptions rather than observed practice, which may emphasize intention and belief more than enacted behaviors. Additionally, the focus on teacher preparation necessarily foregrounded instructional perspectives and did not capture the voices of students, administrators, or policymakers who also shape online learning ecosystems. These constraints do not diminish the study's value but rather situate its findings as a window into teachers' evolving conceptions of readiness, connection, and equity in digital instruction.

Future research should build on these insights through multi-site, mixed-method, and longitudinal designs that trace how readiness-building and relational pedagogies develop across time and contexts. Scholars could examine how educator preparation, program architecture, and proximal support systems intersect to shape equitable student outcomes in K-12 digital learning (Barbour et al., 2025). Further work is also needed to investigate how policies and funding structures either enable or constrain teachers' efforts to design inclusive and high-quality online learning environments. Collaborative research – practice partnerships may be especially valuable for generating actionable evidence that bridges teacher preparation, instructional design, and systemic policy reform.

DATA ACCESSIBILITY STATEMENT

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

This study is linked to the following SDG(s): Quality education (SDG 4).

ETHICS AND CONSENT

Ethical approval was obtained for the work described in this article.

COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS (CRediT)

M. Elizabeth Azukas: Formal analysis, writing – original draft/review & editing. Michael K. Barbour: Conceptualization, data curation, methodology, writing – original draft/review & editing. All authors have read and agreed to the published version of the manuscript.

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