*Journal of Online Learning Research* (2024) **10**(1), 113-148

# Preparedness of Online General and Special Educators to Teach Diverse Learners: A Study of Online Middle School Teachers' Perceptions

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Diverse learners attending online K-12 schools deserve high quality and accessible educational programs. This research studies the preparation, knowledge, and practices of online middle school general and special education teachers in relation to supporting the needs of diverse learners, namely students with Specific Learning Disabilities (SLD). A study of the literature indicated online teachers need training and development related to meeting the needs of students with disabilities and researchers call for more studies analyzing the preparedness and support of our teachers to meet the needs of diverse learners. This study responds to this need for action through a quantitative approach to examining the perceptions of middle school teachers across nine online public schools seeking to understand their preparedness, knowledge, and pedagogical practices related to teaching students with SLD in online schools. Teachers expressed a lack of preparation when reflecting on their pre-service training programs, in-service new teacher training and ongoing professional learning. In online schooling, it is necessary for teachers to have technological knowledge and skills to effectively teach all students. The findings from this study support an intervention that aims to improve online middle school teachers' knowledge and skills related to teaching students with SLD in online school environments.

*K-12 online schools, Specific Learning Disabilities (SLD), teacher preparation, teacher collaboration, special education, general education*

## INTRODUCTION

Specific Learning Disabilities (SLD) refer to a diverse group of neurodevelopmental disorders wherein students demonstrate challenges in specific academic skills, such as reading, writing, and math, despite having average to above-average intelligence (Grigorenko et al., 2020; Kranzler et al., 2019; Öğülmüş et al., 2021). Although students with SLD comprise a significant percentage of the special education school population, research of online schools often broadly addresses students with disabilities, overlooking the unique needs and experiences of those with SLD. Research has given little focus to students with SLD attending online schools with respect to studying teacher preparation, knowledge, and practices for effectively supporting them. This study aims to fill this gap in the literature given there is limited research exclusively concentrated on this pivotal category of disability.

Given the historical gap in effective preparation of general education teachers to meet the needs of students with disabilities, studies targeting the integration of inclusive education within online teaching environments are essential (Rice et al., 2015; Smith et al., 2016). Add to this the essential element of technological competence and preparedness required to successfully navigate the digital teaching realm, and it becomes evident that the adequacy of teacher training is paramount.

This research sought to learn more about how online middle school teachers' perceived their preparedness, knowledge, and practices related to teaching students with SLD online. Through this investigation, I aspired to uncover areas for improvement and potential interventions, thereby championing the cause of providing a holistic and accessible online education to all students, irrespective of their learning abilities.

## UNDERPINNING THEORETICAL FRAMEWORK FOR THE LITERATURE REVIEW

This literature review is rooted in the Networked Ecological Systems Theory (NEST), an extension of Bronfenbrenner's Ecological Systems Theory (EST) (1994), which explores the intricate connections between environments and individuals and how these interactions, spanning various systems, shape individual development (Neal & Neal, 2013). NEST aims to organize these connections among environmental contexts, shedding light on their impact on the developing individual (Neal & Neal, 2013). Central to EST are the concepts of heterogeneity and intersectionality, emphasizing that diverse contextual factors influencing students' learning interact with one another and with the individual ultimately impacting their learning (Scholes, 2019). Bronfenbrenner posited that a person's environment shapes their growth, comprising five systems: chronosystem, macrosystem,

exosystem, mesosystem, and microsystem (1994). Although EST traditionally envisions these systems as nested layers, Neal and Neal (2013) propose a networked approach to more accurately depict the fluid and intersecting nature of these relationships. For example, whereas the traditional EST model might depict the family microsystem as embedded within a broader exosystem, such as educational policies or community resources, the NEST perspective acknowledges that the family's influence can intersect directly with various systems without being confined to a single layer. This model allows for a more nuanced understanding that the family's impact on the individual might interact directly with educational systems, rather than being mediated through a series of nested relationships (Neal & Neal, 2013).

In this study, I focus on students with SLD attending online schools as developing individuals. The framework is visually depicted in Figure 1 below (Wall, 2023), with dotted lines representing the systems that encompass the settings, interactions, and environmental patterns surrounding the central individual. Within these dotted lines, each rectangle symbolizes a factor connected by bold lines, illustrating the interactions between these factors that can influence students' learning and achievement. While the bold lines indicate bidirectional interactions, it is crucial to recognize that the central rectangle, representing the individuals under study, in this case, students with SLD, are the ultimate focal point. Further details regarding each factor within the framework are elaborated on in the literature review.

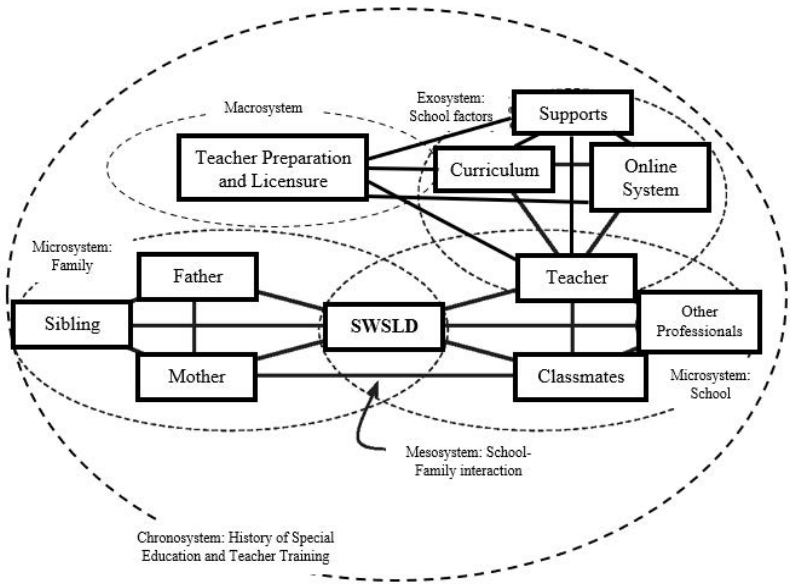


**Figure 1.** Networked Ecological Systems Conceptual Frame for Students with Learning Disabilities (Wall, 2023).

The theoretical frameworks (EST and NEST) used to guide the development of the above conceptual frame for students with SLD should not be generalized to apply to all students with SLD.

### Technological Pedagogical Knowledge – TPK and Universal Design for Learning – UDL

With teachers' preparation, knowledge, and practices as the central contributing factor of student achievement, this study draws from two essential frameworks: Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge (TPCK) and the principles of Universal Design for Learning (UDL; Kennett & Wilson, 2019). These frameworks collectively provide a springboard for enhancing the knowledge and skills of online educators to meet the needs of diverse learners.

Mishra and Koehler's TPACK framework, introduced in 2006, advocates for the seamless integration of technology into teaching methodologies while considering its impact on the learning process (Mishra & Koehler, 2006). TPACK extends Shulman's (1986) Pedagogical Content Knowledge (PCK) theory, interconnecting pedagogical techniques with subject matter expertise. It encompasses multiple knowledge domains, including technological knowledge, pedagogical knowledge, and content knowledge. TPACK acknowledges the dynamic interplay of these domains in effective teaching.

Similarly, Universal Design for Learning (UDL) offers guiding principles to curriculum design and instructional practice. UDL emphasizes the importance of creating flexible learning environments that accommodate the diverse needs of all students, including those with disabilities (CAST, 2023). It recognizes that a one-size-fits-all approach is not suitable for diverse learners and encourages the incorporation of multiple means of representation, engagement, and expression to support individualized learning.

While TPACK and UDL provide critical frameworks to guide this study and aim to enhance educators' abilities to support diverse learners effectively, it is essential to acknowledge that several other factors may play pivotal roles in improving support for diverse learners and educators. These factors may include teacher-student relationships (Franklin et al. (2015), parental involvement (Franklin et al., 2015), access to technology and resources (Soria, 2020), effective implementation of students' accommodations and modifications (Jenkins & Walker, 2021; Mellard et al., 2020), ongoing professional learning opportunities (Crouse et al., 2018; Johnson 2020), and other theoretical underpinnings. There are limitations to these frameworks in the specific context of online education for students with Specific Learning Disabilities. For example, TPACK's emphasis on technologies may oversimplify the nuanced strategies required for effective instruction in the online modality for this student population (Bullock, 2015; Wu, 2013). Similarly,

UDL's assumption of homogeneity among learners and its primary focus on creating inclusive environments may not fully capture the diverse and individualized needs of students with Specific Learning Disabilities in an online setting (Kinash & Judd, 2022).

By integrating TPACK and UDL into this study, I aim to equip educators with valuable frameworks to meet the diverse needs of their students in online learning environments. Nevertheless, we acknowledge that addressing these needs requires a holistic approach that considers the broader context and factors that influence the online education experience for students with disabilities. This balanced perspective emphasizes the strengths of the frameworks while recognizing their limitations, providing a comprehensive foundation for further exploration and refinement in future research.

## LITERATURE REVIEW

The following review of relevant literature is intended to provide a deeper understanding of potentially the most salient factors impacting the academic achievement of students with disabilities, focusing on students with learning disabilities, in online K-12 educational settings. It should be noted, much of the literature referenced in this section involves the brick-and-mortar setting due to the limited empirical evidence regarding the performance of students with learning disabilities, and non-existing literature for students with SLD, in the online setting.

### The History of Teacher Preparation

In this section, I explore factors within teacher preparation programs' macrosystem that may indirectly impact students with learning disabilities' achievement. These factors encompass the curriculum content and instructional strategies taught in these programs, as well as the barriers encountered by both general and special education teacher preparation programs. You will also review evidence linking teacher training with student achievement which relates to the influence categorized as the microsystem where teachers directly interact with students. Notably, contemporary education mandates that both general education and special education teachers assume responsibility for instructing students with disabilities in the Least Restrictive Environment (LRE) (Byrd & Alexander, 2020). The pervasive concept of inclusion, defined as the practice of serving diverse learners with varying abilities or disabilities in the general education classroom with in-class support (Byrd & Alexander, 2020), emphasizes the expectation that all teachers, regardless of their specialization, should receive regular training to effectively support students with unique needs (Byrd & Alexander, 2020). Being prepared as a teacher is defined as possessing the requisite

knowledge, skills, and tools to address students' needs and enhance their academic achievement (Grimsby, 2019). This section comprehensively covers both general and special education teacher preparation programs as it relates to serving students with disabilities.

### Knowledge and Strategies Taught in Teacher Preparation

Despite the growing emphasis on inclusion, significant disparities persist in the preparation of general and special education teachers (Gilmour, 2020). Special education teacher candidates receive comprehensive training covering a wide range of content and pedagogical skills (Gilmour, 2020), whereas their counterparts in general education often lack sufficient exposure to special education coursework and practical experiences (Connor & Cavendish, 2020; McCormack et al., 2018). Despite recent efforts to enhance collaboration and co-teaching between these two groups, there is a noticeable scarcity of research exploring the effective preparation of teacher candidates for such collaborative endeavors (Ricci & Fingon, 2018).

Moreover, educators who hold dual certifications in both special and general education remain relatively uncommon (Gilmour, 2020). Special education certification necessitates participation in specific teacher preparation programs, whether through undergraduate, postgraduate, or alternative pathways (Young, 2018). These special education teacher preparation programs traditionally adhere to the standards set by the Council for Exceptional Children (CEC), emphasizing the importance of equipping teachers to effectively instruct students across various grade levels and subject areas (Bruno et al., 2018). These standards encompass professional development, a profound understanding of individual student needs and development, mastery of curriculum and subject matter content, skillful assessment utilization, effective instructional techniques, the fostering of socio-emotional and behavioral growth, and the promotion of professional collaboration (Bruno et al., 2018). Such standards also delineate the broad domains addressed within special education teacher preparation programs, although they lack specific content area guidance. These gaps in teacher preparation programs have the potential to translate into less-than-ideal practices among practicing educators, potentially impacting the academic achievement of students with learning disabilities.

As aforementioned, general education teacher preparation programs typically prioritize content knowledge over differentiated pedagogical skills (Crouse et al., 2016; Sheppard & Wieman, 2020). In fact, most general education teacher preparation programs mandate only a single special education course for their teacher candidates (McCormack et al., 2018). This lone course generally covers introductory information about common disabilities, the historical context of special education, a general overview of explicit instruction and formative instructional practices, and the identification

of students with disabilities (McCormack et al., 2018). However, it is widely acknowledged that the knowledge and instructional strategies imparted in general education teacher preparation programs are insufficient to address the complex pedagogical needs of students with disabilities (Byrd & Alexander, 2020; Grimsby, 2019; Kang & Martin, 2018; Öğülmüş et al., 2021).

The literature highlights a shortage of key topics and areas in existing teacher preparation programs, including elements and processes of school systems such as UDL and technology (Crouse et al., 2018; Estes et al., 2020; Johnson, 2020; Lightfoot et al., 2018; Oyarzun et al., 2021). The U.S. Congress mandated the use of UDL and technology to support students with disabilities in 2016 (Estes et al., 2020). Kennette and Wilson (2019) provide evidence supporting the use of multiple means of representation and multiple means of action and expression, key principles of UDL, for improving student achievement. However, studies by Lightfoot et al. (2018) and Oyarzun et al. (2021) found that teachers were unfamiliar with UDL concepts and principles. Both studies noted a significant lack of UDL knowledge. Additionally, Moore et al. (2018) found little evidence on how UDL is taught in teacher preparation programs, which reflects poorly on these programs, potentially affecting teacher candidates' practice and, consequently, student achievement (Lightfoot et al., 2018; Oyarzun et al., 2021).

The clear separation between general and special education teacher preparation has raised concerns, particularly considering the increasing presence of students with disabilities in general education classroom settings. These areas for improvement in teacher training have the potential to profoundly influence the academic achievement of students often disabled by educational systems and practices.

### Technological Knowledge and Awareness

In terms of technology, the emergence of K-12 online education represents another significant barrier in teacher preparation programs, which may influence students with disabilities achievement as both teachers and students with disabilities face technological challenges and barriers (Tonks et al., 2020). In Crouse et al.'s (2018) study, participants, who were online teachers, were unaware of assistive technologies aside from the usual technological supports used for general education such as PowerPoint and videos. Such assistive technologies have been found to improve students' academic performance in Tony's (2019) systematic review. Furthermore, the participants reported having little to no preparation for online teaching, and most of them were unaware of online teaching standards such as International Association for K-12 Online Learning Standards (Crouse et al., 2018). Unfortunately, the COVID-19 pandemic necessitated a sudden shift

to the online setting for many schools that previously had not managed online schools, with repercussions on both students with disabilities and teachers who may have been unprepared for such a shift (Jenkins & Walker, 2021; Khumalo et al., 2020; Putman & Walsh, 2021).

In Jenkins and Walker's (2021) mixed methods study involving 111 stakeholders from schools and school districts in Virginia, parents and teachers alike reported they received no guidance on using technology, which led to students receiving inadequate special education services, such as speech therapy. The lack of or inadequate technological preparation in teacher preparation programs thus serves as a barrier, especially considering how quickly technological trends develop and become obsolete (Mishra & Koehler, 2006; Tony, 2019). Overall, these barriers serve as potential weaknesses of the teachers trained in these programs, which may influence the achievement of their future students as discussed in the following subsection.

### Special Education Teacher Shortage

Teacher preparation programs were established to produce knowledgeable and skillful teachers for diverse classrooms. Despite increasing attention given to special education over the years, there continues to be a shortage of special education teachers in the United States (More & Rodgers, 2020; Peyton et al., 2020). An estimated 300,000 special education teachers are needed per year due to increased student enrollment, teacher attrition, and increased class sizes (More & Rodgers, 2020). Peyton et al. (2020) purported that special education teachers still received less favor compared to other careers with similar educational requirements due to the low salary. As such, fewer individuals are enticed to enroll in special education teacher preparation programs (Peyton et al., 2020). Castro et al. (2018) reported a ten percent decline in enrollment rates for teacher preparation programs overall from 2004 to 2012 in the United States, including both special and general education programs. The decline was especially significant in certain states such as California, with a 53% decline from 2008 to 2012. They further noted that schools experiencing teacher shortages displayed lower student achievement (Castro et al., 2018). Kotok and Knight (2020) likewise found that students from schools experiencing teacher shortages scored significantly lower in mathematics and science than those from schools that were well staffed. Considering these findings, teacher shortages may be a potential factor for student achievement, and it is possible improved preparation practices may contribute to higher recruitment and retention rates of special education teachers.

### Teacher Training and its Impact on Student Achievement

Research has investigated connections between teacher training, certification, and student achievement. Stockard's (2020) research highlights well-trained teachers, those with more preparation time and structured schedules, contribute to higher student achievement. Moreover, Gilmour (2020) emphasizes the benefit of dual certification (general and special education) for students with disabilities, as it leads to improved academic performance, particularly in English Language Arts. Practical knowledge and experience, especially in math and English Language Arts, have a positive impact on student achievement (Boyd et al., 2009; Park et al., 2018). Teacher candidates who engage in practical experiences during their preparation programs demonstrate better outcomes during their initial teaching year (Boyd et al., 2009). May et al. (2018) found that preservice teachers with teaching experience produce higher quality lessons and transition plans. Additionally, program coherence and supervisor support enhance teacher readiness to teach students with learning disabilities and promote student achievement (Gottfried & Kirksey, 2020).

Several environmental factors impact teacher preparation programs, and these are typically viewed as influences within the chronosystem. Teacher preparation programs shape teacher candidates' knowledge and strategies for serving students with learning disabilities (Byrd & Alexander, 2020; Kang & Martin, 2018). Core knowledge includes assessment, data-driven education, understanding, and compassion. Essential skills involve adapting curriculum and assignments, as well as effective communication with students' parents and professionals (Byrd & Alexander, 2020). Kang and Martin (2018) demonstrate that a government-mandated course in special education enhances preservice teachers' ability to identify students with disabilities' characteristics and effectively prepare Individualized Education Plans (IEPs).

Given the significant impact of teacher preparation on student achievement, addressing the barriers discussed in this section is crucial for teacher preparation programs. Teacher educators and program designers should consider these aspects as discussed in the following section.

### School Factors

In this section, the school factors within the exosystem are discussed. These factors include the online school system, the curriculum, and other supporting elements of special education. Overall, school factors which are not directly related to the student may hold value over their learning and achievement. The following section is a more microscopic look at the proximate relationships around the students with learning disabilities, which are potential factors that may influence their achievement.

## Online Education and SWD: Opportunities and Challenges

The prevalence of online schooling in the United States is evident, with approximately 400,000 full-time online education students and over 2.25 million K-12 students participating in at least one online class across 25 states and 21 state-run online schools (Beasley & Beck, 2017). This number has since grown tremendously in the past five years. Despite this widespread adoption of online education, there is a notable lack of evidence in the literature regarding the life outcomes of students with disabilities in online school settings (Davis & Garfield, 2021; Lightfoot et al., 2018; Newman et al., 2011).

Online instruction is recognized as substantially different from traditional face-to-face instruction, demanding innovative teaching methods (Khumalo et al., 2020). Mishra and Koehler (2006) introduced the Technological Pedagogical Content Knowledge (TPCK) framework, highlighting the importance of teachers' deep knowledge in integrating technology, pedagogy, and content. Such knowledge is crucial for delivering context-specific content, which can be particularly beneficial for students with learning disabilities who rely on diverse senses for learning (Mishra & Koehler, 2006). Integrating online teaching standards, like those established by iNACOL, can further guide teachers in improving student achievement.

Online schools have been seen as a viable alternative for students with disabilities and their parents, offering a tailored educational approach where traditional schools may fall short (Fitzpatrick et al., 2020). While evidence on the academic differences between students with disabilities in online schools and traditional brick-and-mortar schools is limited, students with disabilities and their parents have reported benefits such as successful learning experiences and increased autonomy in online settings (Fitzpatrick et al., 2020; Rice & Dykman, 2018). Additionally, the online environment can provide a safe space for students with disabilities to practice social skills, further enhancing their educational journey (Fitzpatrick et al., 2020).

It is essential to recognize that online schooling comes with drawbacks. Some research suggests that the online format may not be suitable for the diverse needs of students with disabilities and may negatively impact their academic performance (Fitzpatrick et al., 2020; Jenkins & Walker, 2021; Khumalo et al., 2020; Soria, 2020; Ziadat, 2021). Adaptation to online learning has been a challenge for some students with disabilities, leading to issues like increased disruptions at home, a lack of quiet study spaces, and lengthy online lectures (Soria, 2020). Moreover, the online environment can exacerbate social isolation, increase gadget dependency, and potentially contribute to lower academic achievement (Ziadat, 2021). Nonetheless, there are growing evidence-based strategies that aim to break down barriers to online learning and aim to improve student learning for diverse learners.

### The Role of Curriculum and Supportive Elements in Special Education

Curriculum, IEPs, assistive technology, and assessment practices are critical factors in shaping the educational experience of students with learning disabilities. The curriculum provides a framework for teachers' lessons, but teachers often have limited control over its design which can lead to potential challenges in delivering effective instruction (Crouse et al., 2016, 2018; Glover, 2019). In some cases, teachers find themselves constrained by a rigid curriculum that leaves little room for flexibility (Crouse et al., 2016, 2018). These limitations can result in less time dedicated to essential content areas such as vocabulary and comprehension (Leko et al., 2018), potentially affecting student achievement.

The IEP, a crucial support element, plays a vital role in addressing the specific needs of students with learning disabilities. Collaboration among professionals, parents, and guardians is essential in developing meaningful IEPs (Couvillon et al., 2018). While the direct link between family participation in IEPs and student achievement remains unclear, well-designed IEPs are instrumental in meeting the unique needs of our students (Hott et al., 2020).

Assistive technology holds promise for enhancing student achievement, but its effectiveness often hinges on teacher evaluations and administrative support (Alvarado-Alcantar & Keeley, 2020; Tony, 2019). The absence of suitable assistive technology, such as read-out-loud tools, can limit students' access to education, potentially hindering their learning and achievement (Alvarado-Alcantar & Keeley, 2020).

Assessment practices are another critical factor influencing students with learning disabilities' achievement. Comprehensive assessments including formative, diagnostic, and summative evaluations, are essential for tailoring instruction to students' diverse learning profiles (Beasley & Beck, 2017). Unfortunately, time constraints on teachers, particularly in online and multilevel special education settings, may limit their ability to consistently assess and monitor students' progress (Kranzler et al., 2019; Keesey, 2020; Young, 2018). Effective assessments, however, play a pivotal role in understanding students, adapting interventions, and measuring their achievement.

Within the microsystem of students with learning disabilities, teachers play a pivotal role in their development and academic success (Glover, 2019). Supportive teachers have been identified as a critical factor in students with learning disabilities' learning experiences, characterized by individualized instruction, strong rapport-building, attentive listening, knowledge of disabilities and accommodations, and accessibility (Connor & Cavendish, 2020; Lightfoot et al., 2018). Teachers' expectations and classroom management skills are vital in shaping interactions with students with learn-

ing disabilities and influencing their academic outcomes (Kang & Martin, 2018; Park et al., 2018). Evidence-based strategies and effective classroom management techniques can positively impact student learning, particularly in special education (Heckaman et al., 2018). Conversely, teachers lacking knowledge and awareness of disabilities, potentially due to lack of effective preparation programs, may struggle to meet the needs of their students effectively (Lightfoot et al., 2018; Olechowska, 2020; Sheppard & Wieman, 2020).

Collaboration between teachers and other professionals is necessary for the success of many diverse learners, offering innovative strategies and consistent planning (Crouse et al., 2018; Davis & Garfield, 2021; Tahir et al., 2019). Unfortunately, time constraints often limit such collaboration (Crouse et al., 2018; Grimsby, 2019), underscoring the need for more attention in this area. There are a plethora of resources aiming to improve the collaborative practices of general and special education teachers; however, limited resources are available that address the uniqueness of collaborating virtually.

Interactions with non-disabled peers represent another microsystem factor affecting students with learning disabilities development (Crouse et al., 2016, 2018; Holm et al., 2020). Effective communication with families is essential to keep them informed about their child's progress and ways to support their child (Aktan, 2020; Glover, 2019; Kyzar et al., 2019). Parent involvement is particularly influential in students with learning disabilities achievement, providing valuable insights (Hott et al., 2020; Tahir et al., 2019). However, families of students with learning disabilities often face challenges, including a lack of knowledge about effective strategies, emotional burdens, and financial strains (Ziadat, 2021). Dysfunctional families can pose additional hurdles to student outcomes (Young, 2018). Some researchers suggest that a lack of support can lead to greater independence and personal strength for some students with learning disabilities (Avnet et al., 2019; Lightfoot et al., 2018). The influence of teachers, families, and peers, as well as their interactions, encompasses the microsystem and mesosystem, directly impacting students' achievement. These systems, along with the previously discussed exosystems, macrosystems, and chronosystems, constitute the intricate Ecological Systems Theory (EST) framework guiding this literature review.

Among the factors examined, teachers' preparation, knowledge, and practices emerge as crucial for students' academic achievement, especially in online education (Archambault, 2011; Mishra & Koehler, 2006; Koehler & Mishra, 2009; Smith et al., 2016). Adapting to the needs of students with learning disabilities is a fundamental aspect of effective teaching. In several West coast online schools, inadequate technological expertise and teaching practices among online educators may be linked to lower academic per-

formance and life outcomes for students with learning disabilities (Wall, 2023). It is critical that entrusted school leaders more deeply understand the needs of our educators in efforts to improve the educational progress of our diverse learners. State evaluations have highlighted the importance of addressing the needs of students with disabilities through programmatic improvements (U.S. Department of Education, 2022). Conducting a needs assessment focusing on online teachers' technological proficiency, practices, and readiness might offer valuable insights for enhancing educational strategies.

## METHODOLOGY

Engaging in a quantitative research design affords the opportunity to examine factors influencing students' academic performance. This study investigated the technological pedagogical knowledge and practices of general and special education online middle school teachers, and the experiences and preparation that shaped their expertise. The survey tool utilized in this research is grounded in the constructs of teachers' knowledge, practices, and their sources of knowledge as previously explored by Crouse et al. (2016), serving as the basis for the constructs examined in this study. I obtained permission from the original author to use this tool and adapt it for this study. The complete survey utilized in this study is available in Appendix A. In addition to assessing teachers' perceptions of their pre-service, in-service, and ongoing professional learning, demographic information was gathered to support comparative analysis.

### Measure Design

Cognitive interviews were carried out during the survey refinement phase to enhance both the validity and reliability. Through these two cognitive interviews, I gained insights regarding the teachers' interpretation of the survey items, subsequently leading to enhancement of survey items.

Given the adaptation of the original validated instrument to suit this study's context, additional steps were taken to contribute to the reliability and validity of the adjusted tool. For enhanced validity, two cognitive interviews were conducted with online teachers, one general educator and one special educator. Cognitive interviews are a qualitative technique that deeply examines survey instruments to bolster their credibility and dependability (Desimone & Le Floch, 2004). Desimone and Le Floch (2004) emphasize the relevance of participants' comprehension of survey questions in relation to validity and reliability, advocating for cognitive interviews as a means of refining survey instruments prior to implementation. The endeavor to enhance survey validity holds the potential to yield higher quality data.

### Research Questions

Through the needs assessment, I aimed to answer the following research questions:

1. What technological pedagogical knowledge do teachers have related to teaching students with SLD in an online school environment?
2. What technological pedagogical practices do general and special education teachers use to teach students with SLD in an online school environment?
3. What sources do teachers report as contributing to their current knowledge and practices teaching students with SLD in an online school environment?
4. Is there a significant difference between the pedagogical technological preparation, knowledge and practice of general and special education teachers as it relates to teaching students with SLD online?

### Population

The focus of this study is on teachers within the online middle school environment, encompassing both general and special education instructors. The study took place across nine online public charter middle schools on the West coast of the United States. This spatial distribution allows for a comprehensive perspective. Notably, the middle school phase holds significant importance to students' educational journey as a pivotal period leading up to the transition into high school and the subsequent young adult years.

There were approximately 111 online general education teachers and 19 special education teachers employed full-time across the nine middle schools. A total of 67 teachers chose to participate in the study. This diverse population of teachers brings a wide spectrum of online teaching experiences to the study, coupled with variations in pre-training backgrounds. Their educational qualifications span from bachelor's degrees to doctoral studies, highlighting a comprehensive range of expertise. Furthermore, the population encompasses both male and female educators, ensuring a gender-inclusive representation within the study.

### Participants and Sampling

All online middle school teachers that chose to participate in this study were employed full-time by Jake Online Schools (pseudonym) and held valid teaching credentials at the time the study was conducted. Online general and special education middle school teachers, employed full-time, were sent invitations to participate via email, requesting their voluntary engagement in the study. The communication included a comprehensive informed consent letter (Lochmiller & Lester, 2017), elucidating the nature of their

anonymous participation, the study's objectives, and the designated timeframe within which the survey would remain accessible.

While I had access to teachers spanning grades K-12, a conscious recognition was made that middle school teachers experienced a heightened degree of turnover among both staff and students, in contrast to their counterparts in elementary and high school levels. Moreover, given the critical stage in development middle-school age students experience, it becomes imperative to study the preparedness of educators concerning the instruction of students with SLD in online middle schools.

Concentrating solely on grades 6-8 enabled me to dive deeper into the requirements of this specific cohort of teachers. While the findings derived from this needs assessment analysis may have relevance beyond middle school, potentially extending to elementary and high school teachers within Jake Online Schools, it's important to acknowledge the potential for generalization, as articulated by Palinkas et al. (2015), as a fundamental facet of the purposeful criterion sample strategy. Purposeful sampling entails the deliberate selection by the researcher of specific individuals or groups to be included as participants (Lochmiller & Lester, 2017). This approach is categorized as a form of nonprobability sampling, as it rests on factors such as research objectives, participant availability, and the researcher's subjective judgment (Pettus-Davis, 2011). Through the application of purposeful sampling, the study's specificity is heightened, albeit at the risk of introducing biases. Selecting particular teacher groups may inadvertently tilt the findings toward the traits of those selected.

### Data Analysis

To analyze the data collected, I conducted a descriptive statistics analysis (Lochmiller & Lester, 2017). The assumption of equal variance was assessed, and t-tests were conducted to compare mean scores based on educators' years of teaching experience as well as responses between special and general educators. By conducting this comprehensive analysis, I sought to uncover valuable insights into the technological pedagogical preparedness, knowledge, and practices of online educators.

The Levene's test was utilized to determine whether variances between two samples are approximately equal. A non-rejected null hypothesis suggests no significant difference in average responses based on teaching experience, whereas a rejected null hypothesis indicates a meaningful disparity in responses. The adherence to the null hypothesis, which assumes uniform variance, supports the prerequisites for conducting a t-test analysis which is an inferential statistical technique. This analysis enables a comparison of knowledge, knowledge sources, and practices between educators with under two years of experience and those with three or more years of online

teaching. Additionally, I studied potential distinctions between general and special educators.

For educators with less than three years of online teaching, the null hypothesis posits an equivalence in average response scores with educators having three or more years of experience. The alternative hypothesis, on the other hand, implies a discernible variance between these two groups. In the context of general educators versus special educators, the null hypothesis assumes no substantial difference, while the alternative hypothesis assumes a significant dissimilarity.

## FINDINGS

One hundred thirty online middle school teachers were invited to participate in the electronic survey and of those invited 67 teachers consented to and completed the survey. It is worth noting, one of the 67 respondents started and did not finish the survey. When considering teacher credentials, all participants held a credential with the state of Californiarelevant to their position at the schools. Fifty-five respondents were general educators and 12 were special educators. Out of 55 general education credentialed teachers, two of them also held an administrative credential. Out of the special educators in the sample, two of them held general and special education credentials and two others held three types of credentials - special education, general education, and administrative. Most respondents (N=52) earned their credentials through a degree from a university, which is one of the pathways described on the Western coast state's teacher credentialing website. Eleven teachers earned their credentials through a university or college internship program and two others through a school district internship program. The remaining two respondents earned their credentials through a private school experience (*N*=1) and the other (*N*=1) through a Peace Corps program.

## DEMOGRAPHIC FINDINGS

The sample overwhelmingly included female participants, with only three respondents identifying as male and 63 identifying as female. One respondent did not indicate themselves male or female, the question was left unanswered. It should be noted that binary was an option to select related to this survey item. The entire middle school teaching population, inclusive of those who did not participate in the survey, is primarily female educators and this sample is also representative of that population. Table 1 highlights the demographic information collected from the respondents.

**Table 1**

**Participant Demographic Information**

| Participant Demographic Information | 67 |
|---|---|
| **Total # of Participants** | 67 |
| **Gender** | |
| Male | 3 |
| Female | 63 |
| Non-Binary | 0 |
| **Type of Teacher** | |
| General Education | 55 |
| Special Education | 12 |
| **Path to Earning California Teaching** | |
| **Credential** | |
| Credentialed by a degree program | 52 |
| Credentialed by a college/university | 11 |
| internship program | |
| Credentialed by a district internship program | 2 |
| Credentialed by private school experience | 1 |
| Credentialed through Peace Corps experience | 1 |
| **Yrs. of Exp. Teaching in Online Schools** | |
| 0-1 Years of experience | 16 |
| 1-2 Years of experience | 12 |
| 3-5 Years of experience | 17 |
| 6-10 Years of experience | 15 |
| 11-15 Years of experience | 6 |
| 16+ Years of experience | 1 |
| **Yrs. of Exp. Teaching in Brick-& -Mortar Schools** | |
| 0-1 Years of experience | 11 |
| 1-2 Years of experience | 13 |
| 3-5 Years of experience | 15 |
| 6-10 Years of experience | 16 |
| 11-15 Years of experience | 7 |
| 16+ Years of experience | 5 |

### Teachers' Knowledge, Practices, and Preparation

When evaluating educators' proficiency and implementation of strategies to cater to the needs of students with SLD in online school settings, the survey outcomes reveal a prevailing belief among most teachers. Specifically, 75% of teachers are confident in their ability, their knowledge, to adapt classroom materials and 73.2% feel adept at utilizing student assessment data for the purpose of these adaptations. While most teachers describe existing knowledge in these areas only 31% of teachers reported that the modification of class materials and the utilization of student assessment data are routine practices in their teaching methodology and 22.4% stated these practices are not integrated into their pedagogical approaches in support of students with SLD.

The Likert-Scale survey affords online teachers the opportunity to express agreement, uncertainty, or disagreement as to their knowledge, practices, and sources of knowledge (preparation). It is noteworthy to highlight 25% of instructors expressed uncertainty or disagreement regarding their competence to modify teaching materials. Similarly, 26.3% of teachers indicated a lack of confidence in their ability to utilize student assessment data effectively to inform their instructional approaches for addressing the needs of students with SLD.

When assessing teachers' specific knowledge pertaining to Universal Design for Learning (UDL), the findings from the survey emphasize that 40.3% of educators possess a grasp of UDL principles, while a mere 31.3% are familiar with the means to access UDL tools. These figures highlight a prevailing trend among most online middle school teachers who exhibit uncertainty or lack of awareness concerning UDL principles and the avenues for accessing associated tools.

Parallel observations were made when gauging teachers' implementation of UDL practices. Approximately 32.9% of teachers conveyed their non-utilization of UDL principles during online synchronous sessions and a comparable 31.4% acknowledged their omission of UDL principles when crafting asynchronous assignments. Roughly 29% of teachers ($N$=20) indicated a lack of certainty regarding their integration of UDL principles within synchronous sessions, potentially attributable to lack of professional learning experiences related to UDL. Furthermore, around 37% of teachers ($N$=25) confirmed their deliberate exclusion of such tools during synchronous interactions with students. This collective data indicates a significant number (67.2%) of respondents are not harnessing UDL principles to maximize accessibility during live class sessions.

Parallel conclusions emerge when considering the incorporation of UDL principles into asynchronous assignments. Within this context, 31.3% (*N*=21) expressed uncertainty regarding their utilization, while an additional 37.3% (*N*=25) confirmed their non-adoption of UDL strategies pertaining to asynchronous tasks. See Table 2 for a detailed overview of the needs related to UDL.

In the context of teacher preparation, an exploration of educators' understanding of UDL principles reveals noteworthy insights. The survey findings emphasize that less than half (40.3%) of educators have acquired a comprehensive understanding of UDL principles and a mere 31.3% are acquainted with the avenues to access UDL tools. These statistics cast a spotlight on a prevailing trend among most online middle school teachers, many of whom grapple with uncertainty or a lack of awareness regarding UDL principles and the tools that could complement them. Principles of UDL have the potential to positively influence teachers' pedagogical practices and this data indicates a lack of professional learning experiences for teachers regarding UDL principles.

A significant proportion of educators highlighted the efficacy of various sources of knowledge (preparation) in equipping them to teach students with SLD within an online school context. More than fifty percent of teachers expressed their pre-service teacher preparation, the initial in-service training during their first year at their current online school, and the continuous professional development offered by their current school did not effectively prepare them for this endeavor. Notably, approximately 15% of educators conveyed uncertainty regarding the impact of their training experiences on their preparedness to teach students with SLD in the online school environment. This leaves only a quarter of all respondents having agreed their teacher training experiences effectively prepared them to teach students with SLD in online schools, emphasizing the need for continued enhancement of teacher preparation methods and ongoing professional learning experiences. Below, Table 2 offers a summary of the survey results.

**Table 2**

**Teachers' Knowledge, Practices and Sources of Knowledge (N=67)**

| | Strongly Disagree (1) | Disagree (2) | Unsure (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|
| I have knowledge of the UDL principles. | 13.4% | 26.9% | 19.4% | 25.4% | 14.9% |
| I know how to access UDL tools. | 16.4% | 32.8% | 19.4% | 16.4% | 14.9% |
| I utilize principles of UDL within my online synchronous classroom. | 16.4% | 20.9% | 29.9% | 25.4% | 7.5% |
| I utilize principles of UDL when assigning asynchronous assignments. | 16.4% | 20.9% | 31.3% | 25.4% | 6% |
| I utilize principles of UDL in my online teachings. | 17.9% | 20.9% | 28.4% | 25.4% | 7.5% |
| I am proficient in my abilities to implement instructional activities to meet the needs of students with SLD in an online school environment. | 1.5% | 14.9% | 13.4% | 46.3% | 23.9% |
| My teacher preparation program prepared me to teach students with SLD in an online school environment. | 11.9% | 41.8% | 14.9% | 23% | 7.5% |
| The in-service trainings I received during my first year as an online teacher, in my current placement, prepared me to teach students with SLD in an online school environment. | 20.9% | 40.3% | 17.9 | 19.4% | 1.5% |
| The ongoing professional development I received, thus far, in my current placement has prepared me to teach students with SLD in an online school environment. | 14.9% | 44.8% | 14.9% | 19.4% | 6% |
| I know that teacher collaboration, between general and special education, can inform my instructional practices for meeting the needs of SWSLD in an online school environment. | 1.49% | 0% | 1.49% | 23.88% | 73.13% |
| I collaborate with special education teachers to inform my instructional practices to meet the needs of students with specific learning disabilities in an online school environment. | 1.49% | 14.93% | 13.43% | 46.27% | 23.88% |
| I collaborate with general education teachers to inform my instructional practices to meet the needs of students with specific learning disabilities in an online school environment. | 1.49% | 8.96% | 16.42% | 44.78% | 28.36% |

Results indicate more than 50% of respondents were unsure, disagreed, or strongly disagreed with the statements attempting to measure their pedagogical technological preparation, knowledge, and skills as it relates to teaching students with SLD online. An overwhelming number of respondents indicate they were either unsure, disagreed, or strongly disagreed on whether they received preservice preparation (69.5%), in-service training (79.1%) and online professional development (74.6%) related to teaching students with SLD in online school environments. It is evident respondents lacked training in these areas and there is a potential such lack of training impacts their current knowledge and pratice as it relates to effectively teaching students with Specific Learning Disabilities in online schools.

## POSITIVE GENERALIZABILITY

The use of quantitative research methods stands as a notable strength. These methods offer precise statistical insights and empower us to analyze extensive datasets, thereby reinforcing the reliability of the findings and the robustness of the conclusions. Despite its inherent limitations, purposeful sampling aligns remarkably well with the research objectives which focus on online teachers' perspectives regarding their preparation, knowledge, and practices for students with learning disabilities. This approach allowed me to delve deeply into this specific participant group's experiences and perceptions. Slightly over 50% of the invited teachers willingly participated in this study, demonstrating their engagement in particular research.

Furthermore, the decision to concentrate solely on middle school teachers provides a unique opportunity to explore the distinctive requirements and challenges faced by this group comprehensively. This in-depth exploration enriches understanding of the intricacies of online education for students with learning disabilities, which might not be attainable through a more extensive study encompassing all grade levels.

Additionally, recognizing the heightened staff and student turnover in these particular online middle schools emphasizes the relevance of this specific context. It implies that middle school teachers may encounter distinct challenges while adapting to online education environments, rendering them a pertinent group to study. Moreover, middle school represents a critical phase in students' development marked by significant transitions and transformations. The focus on educators during this pivotal period yields valuable insights into how online instruction can optimally support students with SLD during a crucial developmental phase.

In a noteworthy collaboration, I obtained permission from one of the survey creators/authors, Crouse et al. (2016), to amend their well-validated survey. This collaboration streamlines the data collection process effectively, permitting me to concentrate on the research questions herein without the

need to develop a survey from scratch. It remains imperative to transparently acknowledge these limitations and elucidate their potential impact on the applicability of the findings. As delineated in Table 1, the sample population exhibits diversity in terms of credentials, years of experience, and perspectives. Therefore, it is essential to consider all facets of this study when generalizing the findings.

## LIMITATIONS

One limitation of this study lies in the exclusive use of quantitative research methods. While these methods provide precise numerical insights, they may not capture the nuanced qualitative aspects of teachers' experiences and perceptions. This focus on quantifiable data restricts the ability to delve deeply into the richness of their qualitative experiences.

Another potential limitation is the modification of an existing quantitative survey, a time-saving strategy that could introduce measurement error or bias. Is it possible the questions added may lack the same level of validation and reliability as the original survey, which could raise a concern about the accuracy of the results.

Furthermore, narrowing the study's scope exclusively to middle school teachers presents another limitation. The experiences, challenges, and needs of middle school educators may differ significantly from their counterparts in elementary or high school levels. This restriction limits the applicability of this study's findings to a broader educational context.

Lastly, the sample composition introduces additional limitations. Approximately 18% of the sample comprises online special education teachers, reflecting the distribution across the nine online public charter schools. Only three out of the 67 participants were males, a proportion roughly consistent with the gender distribution in the middle school population studied. These imbalances within the sample may affect the generalizability of the findings to a wider population.

## DISCUSSION

### Study Findings in the Context of Existing Literature

#### *Teacher Preparation and Knowledge*

The literature underscores disparities in the training of general and special education teachers, highlighting that special education candidates tend to receive more comprehensive preparation (Crouse et al., 2016; McCormack et al., 2018). This scarcity emphasizes the imperative for further development to effectively address the unique needs of students with SLD.

This study brings forth a noteworthy revelation, indicating that over 50% of respondents expressed uncertainty or disagreement regarding their pedagogical technological preparation related to teaching students with SLD in an online setting. This finding resonates strongly with the literature's stress on the pivotal role of teacher preparation programs and ongoing professional learning (Byrd & Alexander, 2020; Bruno et al., 2018; Grimsby, 2019). It emphasizes the need for educators to acquire the requisite knowledge and skills and participate in continuous professional development, especially in the context of online education, to ensure optimal support for students with SLD.

### *Technological Knowledge and Awareness*

The literature review discusses the challenges posed by the integration of online education, emphasizing the significance of teacher awareness regarding assistive technologies and online teaching standards (Crouse et al., 2018). The abrupt transition to online learning during the COVID-19 pandemic is noteworthy and may have further exacerbated these challenges (Russ & Hamidi, 2021).

This study's findings complement the literature's concerns, pointing out that online teachers may confront inadequacies in their preparation for the unique challenges of online education (Crouse et al., 2018). The reported lack of guidance on teaching in an online school setting, as highlighted by the study's respondents, aligns with the literature's investigations about potential weaknesses in teachers' training programs. Insufficient focus on technological aspects may impede the effective implementation of education services, particularly in an online learning environment.

### *Collaboration and Training Gaps*

The exploration of existing literature highlights the pivotal role of collaboration between general and special education teachers, emphasizing the ongoing need for professional development (Rice et al., 2015; Smith et al., 2016). Identified gaps in teacher training programs, particularly the separation between general and special education preparation, were also made apparent.

This study unveils substantial gaps in collaboration and training, with the data illuminating a concerning trend among respondents who expressed uncertainty or disagreement about the adequacy of their preparation and ongoing training for teaching students with SLD in online school environments. This echoes literature's call for a continuous evolution of teacher preparation approaches and sustained professional learning experiences.

### *Special Education Teacher Shortage*

Existing literature highlights the persistent shortage of special education teachers and contemplates its potential ramifications on student achievement. It proposed that improved preparation practices could contribute to higher recruitment and retention rates.

Acknowledging the existing shortage of special education teachers (More & Rodgers, 2020; Peyton et al., 2020), the study advocates for programs that aim to enhance their knowledge and skills. This aligns seamlessly with literature's recognition of the imperative to address teacher shortages as a means to positively influence student achievement.

### *General and Special Education Perspectives*

Evidence from the needs assessment indicates there is a significant difference in the knowledge, skills, and preparation of special education teachers compared to general education teachers ($p$-value = .031). While a significant difference is indicated, it is essential to know the sample size of the special education teachers ($N$=12) when considering generalizing this data point. This sample may not be representative of the whole special education teacher population; however, it is representative of the schools' population that is represented in this study. Special education teachers make up about 20% of the schools' staff population and make up about 22% of the sample population. Furthermore, both samples, general and special education teachers, indicate a need for additional development to effectively meet the needs of students with SLD. Therefore, a program attempting to improve their knowledge and skills is warranted. The unique professional needs of each teacher should be considered when planning professional learning.

## Recommendations for Practice

This study provides evidence that collaboration between special and general education teachers significantly enhances student achievement which has historically been noted by educational researchers. (Crouse et al., 2018; Davis & Garfield, 2021; Tahir et al., 2019). Nearly all participants (97.01%) agree they perceive teacher collaboration and only an average of 25% of all teachers strongly agreed they collaborated to inform their instruction. between general and special education, can inform their instructional practices for meeting the needs of students with SLD in an online school environment, yet many of them (about 25%) are not practicing collaboration. Improving teachers' knowledge and skills has the potential of impacting students' academic progress. Co-teaching and co-planning strategies should be explored as potential strategies that will enhance the educational experi-

ences of our students with SLD.

### Implications for Research

The present findings emphasize the necessity for continued research aimed at further investigating the methods by which educators are equipped to effectively teach diverse learners within the digital landscape of K-12 online schooling. Such investigations should include educators from all K-12 grade levels and explore perspectives of practicing teachers from across the United States. Furthermore, researchers should consider studying the preparation, knowledge, and practice of online middle school teachers practicing outside of the United States.

It is imperative to undertake additional inquiry into the potential ramifications of educators' readiness on the educational experiences of their online students. Within this context, pertinent research inquiries may encompass the following:

A. Use of qualitative and mixed research methodologies

B. Evaluation of essential training requirements distinct from those for traditional in-person instruction and student support.

C. Exploration of the lived experiences of current elementary and secondary online educators.

D. Enhancement of collaborative teacher preparation approaches to adeptly equip teachers for effective in-service collaboration.

E. Identification and consideration of efficacious strategies for augmenting and refining teacher training initiatives.

In conjunction with this research focus, it is equally imperative to investigate the role of school leaders within the context of preparing educators for effective online teaching in K-12 settings, especially for students with Specific Learning Disabilities (SLD). School leaders, including principals, administrators, instructional coordinators, and the like, play a pivotal role in shaping the educational landscape and facilitating conducive environments for both teachers and students.

A research agenda that incorporates the study of school leaders could encompass the following key areas:

A. An exploration of the leadership strategies, policies, and practices that foster a conducive atmosphere for preparing teachers to address the diverse learning needs of online K-12 students with Specific Learning Disabilities.

B. An examination of the support mechanisms implemented by school leaders to facilitate teacher preparedness in online instruction. This could involve investigating how leaders provide resources, guidance, and mentorship to educators embarking on online teaching endeavors, particularly in relation to supporting diverse learners.

C. Investigation into the strategies employed by school leaders to promote effective collaboration and communication between teachers, both within their institutions and across the broader educational landscape.

D. An analysis of the institutional culture fostered by school leaders that emphasizes the value of inclusive online education for students with Specific Learning Disabilities

The comprehensive examination of these aspects of education can provide valuable insights into the optimization of teacher preparedness for online teaching, and school leaders' effect on teacher preparedness ultimately enriching the educational encounters of K-12 students in online school settings.

## CONCLUSION

This assessment explored factors influencing the achievement of students with Specific Learning Disabilities (SLD) in online education, emphasizing the need for teachers' technological proficiency (Archambault, 2011; Mishra & Koehler, 2006; Koehler & Mishra, 2009; Smith et al., 2016). Conducted with 67 online middle school teachers, this study reveals critical insights into the teaching challenges and opportunities for students with SLD, suggesting a need for enhanced teacher training in online K-12 schools.

While teachers expressed confidence in adapting materials for students with SLD, a notable gap exists in applying these adaptations consistently, pointing to deficiencies in current teacher preparation programs. This study highlights a significant technological gap, advocating for integrated technology-focused training within teacher education to better prepare educators for online teaching environments.

A considerable portion of participants indicated dissatisfaction with their preparation for online teaching of students with SLD, underscoring the demand for tailored teacher training that addresses the unique challenges of online education. Furthermore, the research stresses the importance of fostering collaboration between general and special education teachers and suggests that professional development programs should include training on collaborative skills to effectively meet the needs of students with SLD in online formats.

This study also touches on the critical issue of special education teacher shortages, suggesting broader implications for online education efficacy and student achievement. Although this research focused on nine online middle schools, the findings are relevant for K-12 teacher training, advocating for a comprehensive approach to enhance teacher preparedness, technological

capabilities, and collaborative efforts. These recommendations aim to improve the inclusivity and effectiveness of online learning environments for students with SLD, contributing to the broader dialogue on inclusive online education.

## DECLARATIONS

The authors declare no funding associated with this research.
All data and materials support the conducted surveyed data.
The author declared no competing interests.
The author declared that permission for obtaining data from research subjects was obtained from Johns Hopkins University.

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## APPENDIX A
## A SURVEY OF ONLINE MIDDLE SCHOOL TEACHERS: KNOWLEDGE, PRACTICES AND PREPARATION FOR TEACHING STUDENTS WITH SPECIFIC LEARNING DISABILITIES

**Directions: Please answer the following demographic questions.**

1. What content domain do you teach?
   General Education ELA
   General Education Math
   Other General Education Content
   Multiple General Education Subjects
   Special Education

2. What are your total years of experience teaching online?
   0-1, 1-2, 3-5, 6-10, 11-15, 16+

3. How many years, if applicable, did you teach in a traditional face-to-face classroom prior to your current online teaching assignment?
   0-1, 1-2, 3-5, 6-10, 11-15, 16+

4. Please identify your gender.
   Male, Female, Non-binary

5. Which of the following best describes your current teaching credential?
   General education
   Special education
   Administration
   General and Special Education
   General Education and Administration
   Special Education and Administration
   Administration, General Education and Special Education

6. In the space provided, please list your current active credentials held with the California Commission on Teacher Credentialing.
   OPEN-ENDED

7. Which path to licensure best describes the path you took?
   Teaching credential earned through a school district internship program
   Teaching credential earned through a university or college internship program
   Teaching credential earned through degree from a college or university
   Teaching credential earned with experience from a private school
   Teaching credential earned with Peace Corps experience
   Other, not listed

**Technological Pedagogical Knowledge, Practices and Sources of Knowledge and Practices**

Scale:
1= Strongly disagree
2 = Disagree
3 = Neither agree nor disagree
4 = Agree
5 = Strongly agree

**Technological Pedagogical Knowledge**

Children with Specific Learning Disabilities, also known as learning disabilities, are identified as having significantly lower performance than their same-aged peers in reading, writing and/or math that is unexplainable by external factors nor by their learning potential (p.76). These students have average or above average general intelligence (IQ) with a discrepancy between their IQ and academic achievement score(s) (Buttner & Hasselhorn, 2011). Knowledge and practices that support meeting the needs of students with SLD may also benefit meeting the needs of other diverse learners.

Directions: The following statements aim to learn about your knowledge of technological teaching practices for teaching students with specific learning disabilities (SLD). Please rate your level of agreement with each statement.

1. I know how to modify online class materials in order to meet the needs of students with specific learning disabilities.
2. I know how to use online student assessment data, that either I have collected in my class or was collected through school-wide measures, to modify instruction to meet the needs of students with specific learning disabilities.
3. I have knowledge of the Universal Design for Learning (UDL) principles.
4. I know how to access Universal Design for Learning (UDL) tools.
5. I know that teacher collaboration, between general and special education, can inform my instructional practices for meeting the needs of students with specific learning disabilities in an online school environment.
6. I know different instructional strategies to support online learning for students with specific learning disabilities in an online environment.

**Technological Pedagogical Practices**

Directions: The following statements aim to learn about your technological teaching practices for teaching students with specific learning disabilities (SLD). Please rate your level of agreement with each statement.

7. I modify the online class materials in order to meet the needs of students with specific learning disabilities.
8. I use online student assessment data, that either I have collected in my class or was collected through school-wide measures, to modify instruction to meet the needs of students with specific learning disabilities in an online school environment.
9. I utilize the principles of Universal Design for Learning (UDL) within my online synchronous classroom.
10. I utilize the principles of Universal Design for Learning (UDL) when assigning asynchronous assignments.
11. I utilize Universal Design for Learning (UDL) tools in my online teaching.
12. I collaborate with general education teachers to inform my instructional practices to meet the needs of students with specific learning disabilities in an online school environment.
13. I collaborate with special education teachers to inform my instructional practices to meet the needs of students with specific learning disabilities in an online school environment.
14. I am proficient in my ability to implement instructional activities to meets the needs of students with specific learning disabilities in an online school environment.

**Sources of Knowledge and Practices**

Directions: The following statements aim to learn about the sources that you attribute to your current knowledge and practices for teaching students with specific learning disabilities (SLD). Please rate your level of agreement with each statement.

15. My teacher preparation program prepared me to teach students with spec ific learning disabilities in an online school environment.
16. The in-service training/s I received during my first year as an online teacher, in my current placement, prepared me to teach students with specific learning disabilities in an online school environment.
17. The ongoing professional development I received, thus far, in my current placement has prepared me to teach students with specific learning disabilities in an online school environment.

18. My relationships with past and/or current students and their families prepared me to teach students with specific learning disabilities in an online school environment.
19. Collaboration with past and/or current special education peers has prepared me to teach students with specific learning disabilities in an online school environment.
20. Collaboration with past and/or current general education peers has prepared me to teach students with specific learning disabilities in an online school environment.
21. Consultation with past and/or current administration has prepared me to teach students with specific learning disabilities in an online school environment.
22. The curricular resources I have access to are enough to support my instructional practices for teaching students with specific learning disabilities in an online school environment.