Dear CLD Colleagues,

I hope that you had a wonderful spring break and are enjoying the change in seasons! I want to thank everyone for their continued work to support individuals with learning disabilities, their families, and our community. Thank you to everyone who proposed to present their work at our next conference in Charlotte, North Carolina, this fall. Thank you to all of you who agreed to review proposals as well. Your hard work makes the conference a meaningful venue for sharing impactful work for the benefit of all who attend as well as the individuals they serve.

There are several exciting opportunities that will be announced this spring and early summer. There are annual awards nominations for the Early Career Research Award, Outstanding Educator Awards, and the Floyd G. Hudson Award. Please nominate individuals who represent the best of our field through research, instruction for students with learning disabilities, or service to our profession. Watch for ways to become involved with CLD through the Leadership Institute. This pre-conference workshop is a great way to meet other early career professionals, learn about the organization, and network with others who share your research and career interests.

We have exciting news about our newly–elected Executive Committee members. Congratulations to Alyson Collins, who will be the next vice president. Alyson is an associate professor at Texas State University and the current CLD secretary. Congratulations to Maria Peterson-Ahmad, who will be our next secretary. She is an associate professor and associate dean for Research, Inclusion, and Innovation at Texas Women’s University. We look forward to adding their vision and leadership to our Executive Committee in the upcoming year! We also welcome a new co-chair to the Information Communications and Technology Committee, Mikyung Shin. She is an assistant professor at West Texas A&M University. Thank you for your service to CLD!

In related news, you approved a change in membership dues to include a practitioner rate of $65. This is a great change that will make CLD membership more accessible to practitioners. We hope that our state chapter members will be pleased that their required membership at the national level will be more affordable.

Finally, I encourage you to continue your involvement with CLD. Our committee chairs are always looking for new members to ensure that their work reflects the diversity of our membership. Share your expertise through our different platforms by submitting a manuscript to LD Forum or the Research to Practice Corner. These are great ways to engage with our diverse community of professionals and improve services for individuals with learning disabilities and their families. Another way to continue your involvement is by renewing your membership. Things are busy in the spring and summer months. If you receive an email reminder that your membership is about to expire, please take a few minutes and renew. I wish you all continued success and professional growth!

Margaret M. Flores
2023–2024 CLD President
The CLD Board of Trustees and past presidents are committed to building the leadership capacity of professionals within CLD and in the field of learning disabilities overall.

In an effort to build capacity, the CLD Leadership Development Committee is pleased to announce the 8th CLD Leadership Institute, to be held on October 16, 2024. The Leadership Institute will be held in Charlotte, North Carolina, the day before the 46th International Conference on October 17–18, 2024. Doctoral students and early career faculty who have not previously attended the institute are eligible to apply for this free CLD event. Applicants should have an interest in becoming involved in CLD activities.

Those who have attended the Leadership Institute are then able to apply for the Leadership Academy, which is a two-year commitment. These professionals may be in the first or second year of a university position or in the dissertation phase of their PhD program. Participation in the Leadership Academy provides the opportunity to network and receive mentoring from some of the most highly regarded leaders in the field of learning disabilities in the first year. In the second year, the cohort creates a group project that enriches the field of learning disabilities.

The Leadership Institute is partially funded by the Hammill Institute on Disabilities. CLD is thankful for their commitment to this program.

Applications are available through the CLD website and due May 31, 2024. Visit these links to apply for the Leadership Institute and the Leadership Academy.

Come explore Charlotte, North Carolina, the “Queen City,” for CLD’s 46th Annual International Conference on Learning Disabilities. This year’s conference will be held at the University of North Carolina Charlotte Marriott Hotel and Conference Center. Charlotte offers a number of attractions along with great restaurants. Learn more and plan your trip to Charlotte by exploring Charlotte’s Got a Lot!

For conference updates, visit the CLD Website, follow @CLDIntl on X (formerly Twitter), and “like” CLD on Facebook. For questions regarding the conference, please contact Dr. Apryl Poch, Conference Program chair and CLD vice president, at apoch@unomaha.edu.
Students with specific learning disabilities (SLD) are often supported through assistive and instructional technologies (AT/IT). The Individuals with Disabilities Education Act (IDEA) requires the implementation of evidence-based practices (EBPs) for students with disabilities and an assistive technology evaluation during the development of an Individualized Education Program (IEP) [IDEA, 2004]. With the emphasis on 21st-century skills and the influx of available apps and resources, identifying evidence-based strategies to enhance the use of technology for students with disabilities is critical (Evmenova et al., 2018).

Perelmutter and colleagues (2017) showed that the use of AT/IT improves educational outcomes and increases satisfaction with learning for students with SLD, but that the impact differs based on individual needs. This discrepancy is mediated by direct, explicit, and individualized instructions on the use of AT/ITs (Perelmutter et al., 2017). Special and general education teachers should consider how well these methods can be generalized to other classes and contexts to enhance educational outcomes for students with SLD (Boyle & Joyce, 2019; Brady et al., 2022). Understanding the research in interventions using AT/IT can increase understanding of how to use these interventions specifically to promote effective student learning.

In 2018, at the CLD National Conference, the Information and Communications Technology Committee presented its findings from a research database of published interventions spanning from 1990–2018 related to AT/IT for students with SLD. Findings showed that (a) focus on technology-based supports for students with SLD in literacy was consistently predominant across time, and (b) interest in AT/IT to support students in math increased in the most recent five years (Evmenova et al., 2018). It is critical to continue the previous research by including additional studies related to AT/IT conducted during/after the COVID-19 pandemic and to help understand the impact of technology use on students with SLD. This project aimed to extend the work completed by the 2018 CLD Information and Communications Technology Committee through January 2023 by identifying studies conducted from 2017–2023 that explored the use of technology to support learning for students with SLD. Key results obtained in this project answer the following research questions:

(a) What are the characteristics of assistive and instructional technology interventions for students with learning disabilities?
(b) How have these characteristics evolved in the last 5 years?

**Methods**

In this systematic review, the authors followed a three-step method to identify the articles based on the following inclusion criteria: (a) intervention studies, (b) peer-reviewed, (c) written in the English language, (d) published between 2017–2023, and (e) included at least one participant with SLD (see Figure 1). The first step involved a collaborative electronic database search conducted in two rounds. In the initial round, three databases (i.e., ERIC, APA PsychINFO, EBSCO) were explored using the following queries:

- “technology” OR “assistive technology” OR “instructional technology” OR “accessible materials,” AND
- “technology” OR “assistive technology” OR “LD” OR “Students with learning disabilities.”

Subsequently, a second round of searches was conducted on the Web of Science, employing the same key terms, except for “LD,” as during the first search, “LD” returned

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multiple studies regarding “learning design” that were not eligible for the study. In the second search field, the following set of words was entered: “learning disabilities, LD, student with LD, or Students with Learning Disabilities.” This initial search resulted in a total of 373 studies before duplicates were removed.

After removing duplicates, the titles and abstracts of 173 articles were reviewed, eliminating studies that did not meet inclusion criteria. Lastly, the articles were randomly sent to coders pre-trained by the authors using a sample study. The coders populated a spreadsheet using codes from the previous study that were determined by the authors to be most useful for researchers and rejected articles that did not meet the eligibility criteria. Sixteen articles were identified for eligibility (see Table 1). To assure reliability, the third author randomly selected and coded six of the final 16 studies (37%). The research team reviewed and compared 20 different coded

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Table 1. Characteristics of Included Studies

<table>
<thead>
<tr>
<th>Authors/Date</th>
<th>Technology Usage</th>
<th>Grade Level</th>
<th>Study Design</th>
<th>Subject Matter</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahuja et al., 2022</td>
<td>Addition of augmented reality into computer-based learning system</td>
<td>Mixed</td>
<td>Mixed Methods</td>
<td>Other</td>
<td>Positive Results</td>
</tr>
<tr>
<td>Boyle &amp; Joyce, 2019</td>
<td>Smartpen to take lecture notes</td>
<td>High School</td>
<td>Experimental</td>
<td>Writing</td>
<td>Improved Results</td>
</tr>
<tr>
<td>Brady et al., 2022</td>
<td>Technology-based graphic organizer</td>
<td>High School</td>
<td>Single Case</td>
<td>Writing</td>
<td>Mixed Results</td>
</tr>
<tr>
<td>Crawford et al., 2019</td>
<td>Paper versus iPad-based fractions intervention and note-taking for mathematical reasoning</td>
<td>Mixed</td>
<td>Quasi Experimental</td>
<td>Math</td>
<td>Mixed Results</td>
</tr>
<tr>
<td>Dahlstrom-Hakki &amp; Wallace, 2022</td>
<td>Using visual representations to examine traits of statistical data</td>
<td>Post-Secondary</td>
<td>Quasi Experimental</td>
<td>Math</td>
<td>No Significant Differences</td>
</tr>
<tr>
<td>Dhingra et al., 2022</td>
<td>Mathlete used as a computer-based intervention specific to individual participants’ needs</td>
<td>Elementary</td>
<td>Quasi Experimental</td>
<td>Math</td>
<td>Improved Results</td>
</tr>
<tr>
<td>Evmenova et al., 2020</td>
<td>Elements of self-regulated strategy development used in a technology-based program to improve paragraph writing skills</td>
<td>Middle School</td>
<td>Quasi Experimental</td>
<td>Writing</td>
<td>Improved Results</td>
</tr>
<tr>
<td>Kaczorowski et al., 2019</td>
<td>Math workbook converted to interactive, technology-based practice</td>
<td>Elementary</td>
<td>Mixed Methods</td>
<td>Math</td>
<td>Positive Results</td>
</tr>
<tr>
<td>Kert et al., 2022</td>
<td>Participating in the robot development process to teach computational reasoning skills</td>
<td>Mixed</td>
<td>Single Case</td>
<td>Other</td>
<td>Positive Results</td>
</tr>
<tr>
<td>Satsangi et al., 2018</td>
<td>Virtual manipulatives</td>
<td>High School</td>
<td>Single Case</td>
<td>Math</td>
<td>Positive Results</td>
</tr>
<tr>
<td>Schmitt et al., 2019</td>
<td>Continuous versus discontinuous text-to-speech</td>
<td>Middle School</td>
<td>Single Case</td>
<td>Reading</td>
<td>Mixed Results</td>
</tr>
<tr>
<td>Slemrod et al., 2022</td>
<td>Technology-based science vocabulary instruction compared to pen and paper</td>
<td>High School</td>
<td>Single Case</td>
<td>Science</td>
<td>Positive Results</td>
</tr>
<tr>
<td>Thompson et al., 2017</td>
<td>Hunt &amp; peck with a stylus versus touch typing with a Groovy pencil</td>
<td>Mixed</td>
<td>Randomized Control Trial</td>
<td>Writing</td>
<td>Mixed Results</td>
</tr>
<tr>
<td>Weber et al., 2022</td>
<td>Understanding digital activities to elucidate communication</td>
<td>Mixed</td>
<td>Qualitative</td>
<td>Social Skills</td>
<td>Positive Results</td>
</tr>
<tr>
<td>Weiser et al., 2019</td>
<td>Technology based versus face-to-face teacher coaching</td>
<td>Mixed</td>
<td>Quasi Experimental</td>
<td>Reading</td>
<td>Improved Results</td>
</tr>
<tr>
<td>Yang, 2022</td>
<td>Artificial intelligence</td>
<td>Elementary</td>
<td>Single Case</td>
<td>Reading</td>
<td>No Significant Differences</td>
</tr>
</tbody>
</table>
variables, determining inter-rater-reliability (IRR) to be 82% by dividing the total number of correctly coded variables by the total number of compared codes in the six studies. Articles rejected by coders were reviewed by the research team, and the agreement was 100%. Below are the basic findings of the research team and implications for researchers and practitioners.

Findings

Analyses of sixteen research studies conducted between 2017 and 2023 revealed that the technology was utilized to (a) supplement instruction (n = 5), (b) replace instruction (n = 1), (c) reinforce previous instructions (n = 1), (d) provide accommodations (n = 6), or (e) provide support in areas such as problem-solving and creativity (n = 3). Group studies and single-subject designs were the most common, with very few studies utilizing qualitative or mixed methods. However, there was an increase in the use of mixed method designs from the previous study (see Table 1). Most studies were conducted in high and elementary schools, with fewer in middle schools and post-secondary settings (see Table 1). The 810 participants had reported ethnicities of Caucasian, African American, biracial, Hispanic, and Asian. However, only seven of the 16 studies reported the ethnicity of students. Since the majority of studies did not report ethnicity, it is difficult to report exact percentages of participants by ethnicity.

In the past five years, interest in using AT/IT to support students in math increased from 21% to 31%, while studies in reading decreased from 26% to 19%. AT/IT to support science and social studies is the least commonly studied area in the last five years and has declined from 15% in 2018 to 6.35% in 2023. Regarding the use of AT/IT content areas, text-to-speech and smartpen technologies, as well as a researcher-designed technology-based graphic organizer with embedded supports and strategies, were used to support reading and writing. Computer-based drill and practice technology, virtual manipulatives (e.g., blocks used to solve algebraic equations), and iPad applications embedded with multi-use tools (e.g., flashcard designer, mathematics notetaking support) were employed to assist students with practice and conceptual understanding of mathematics. Other areas studied included tech-based science vocabulary options, brainstorming, and notetaking.

Discussion and Implications for Researchers and Practitioners

Below, we discuss study implications, including (a) the need for more qualitative and mixed-method studies, (b) the lack of data available on the impact of findings on diverse students, and (c) the increased use of technology to support students’ higher-level thinking skills.

Qualitative and Mixed Methods Studies

Most studies utilized group designs, providing quantitative data describing the effects of interventions. However, qualitative and mixed methods research is needed to provide useful context, such as the implications of appropriate training and support, as well as differences due to social and cultural interactions (Klinger & Boardman, 2011). For instance, Kaczorowski, Hachley, and Di Cesare (2019) studied the use of multi-media supports in mathematics using a mixed method design and showed that the use of multi-media supports increased accuracy. In addition, student interviews were valuable in demonstrating why specific supports were more likely to work effectively and why some students had difficulty in using the software. For example, a student explained that using the drag-and-drop feature was difficult due to the size of the items, providing valuable information for researchers and teachers as to aspects of technology that need to be considered for individual students.

Implication of Findings for Diverse Students

Only about half of the studies reported the ethnicity of participants, even though over 50% of the children served under IDEA are reported as culturally and linguistically diverse students (OSEP Fast Facts, 2021). Due to the lack of information about the diversity of the participants, there is little knowledge about how diverse students with disabilities use AT/IT and its impact on their learning. Educators should be aware of this gap in research and make necessary adjustments based on their students’ diverse needs. This area of research should be explored to understand the needs and perspectives of diverse students.

Function of AT/IT Expanding

The findings of this study indicate a broader use of technology to provide support with conceptual understanding and problem-solving as compared to the 2018 study. While AT/IT has often been used to remove barriers for students (e.g., speech-to-text removes the barrier of handwriting while spell checkers decrease misspelled words), the use of instructional technologies to support student understanding (e.g., graphic organizers) is increasing. Specifically in mathematics, virtual manipulatives and iPad applications help students with SLD not only learn to compute but also to deepen their mathematics conceptually. Additionally, the most recent studies include applications that are embedded with multiple tools, such as technology-based graphic organizers, and smartpen notetaking and processing. This increase in efforts to improve higher-level thinking skills is a positive step in assuring students with SLD make meaningful progress toward IEP goals and grade level standards.

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Conclusions

This research explored intervention studies utilizing AT/IT for students with SLD from 2018–2023. Interventions using AT/IT for students with SLD continue to be investigated across several academic domains and grade levels. Promising trends include the increase in mixed methods studies and the increase in the use of AT/IT to support students’ higher-level thinking skills. The dearth of research, specifically including culturally and linguistically diverse students, and the low number of mixed methods and qualitative studies indicate an important gap in the research that needs to be filled.

References


*Included Studies, see Table 1
Mission Statement: The Council for Learning Disabilities (CLD), an international organization composed of professionals who represent diverse disciplines, is committed to enhancing the education and quality of life for individuals with learning disabilities across the life span. CLD accomplishes this by promoting and disseminating evidence-based research and practices related to the education of individuals with learning disabilities. In addition, CLD fosters (a) collaboration among professionals; (b) development of leaders in the field; and (c) advocacy for policies that support individuals with learning disabilities at local, state, and national levels.

Vision Statement: All individuals with learning disabilities are empowered to achieve their potential.