

Integrating CITES and MTSS Frameworks for Inclusive Education: A Comprehensive Approach



**Center on
Inclusive Technology
& Education Systems**
cites.cast.org



U.S. Office of Special
Education Programs

This content was developed under a grant from the US Department of Education, #H327T230001. However, the contents do not necessarily represent the policy of the US Department of Education, and you should not assume endorsement by the Federal Government. Project Officer: Anita Vermeer, M.Ed.



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International license.

Table of Contents

Purpose	3
Methods	4
Findings.....	4
The Role of Leadership, Technology, and Collaboration in MTSS and CITES Integration.....	5
Creating Infrastructure that Supports Inclusive Technology and MTSS.....	6
Fostering Inclusive Teaching Practices with MTSS and CITES.....	7
Promoting Learning Through Technology and MTSS Interventions.....	9
Integrating Assessment Practices with Inclusive Technology and MTSS.....	10
Implications for Practice.....	10
Conclusion	11
References.....	13

Schools and districts in the United States are increasingly exploring ways to meet the needs of their diverse and highly variable student populations. Inclusive technology is a key component of honoring and addressing learner variability. Districts need to consider the design of systems – including structures and processes – that support the implementation of inclusive technology for administrators, teachers, and students within diverse educational contexts. The Center on Inclusive Technology and Education Systems (CITES) framework and Multi-Tiered System of Supports (MTSS) have the potential to offer schools a comprehensive approach to both design and implementation of inclusive technology systems. CITES ensures that all learners, especially those with disabilities, have equitable access to instruction and interventions that align with their needs through the development and maintenance of inclusive technology. MTSS is a proactive framework that integrates data-driven practices to support student achievement across academic, social, and behavioral domains (American Institute for Research, 2024). This article explores the potential of integrating the CITES and MTSS frameworks, and how, by leveraging the two, schools can strengthen their inclusive technology systems, and promote accessibility, equity, and improved learning outcomes (State Leaders of Inclusive Technology in Education, 2024).

The CITES framework provides a process for “identifying and removing systemic barriers to the implementation of inclusive technology” in schools and districts (CITES, 2024). It is grounded in five practices that can support districts in ensuring effective implementation of inclusive technology across multiple domains. The five practices focus on leadership, infrastructure, teaching, learning, and assessment.

MTSS is a system for organizing layers of increasing levels of support for students to enhance their learning, based on their individual needs. It uses a three-tier structure in which Tier 1 provides universal supports for all students, Tier 2 provides additional supports, often to groups of students that need it, and Tier 3 delivers intensive, individualized interventions (American Institutes for Research, 2024; Averill & Rinaldi, 2011). MTSS is applied across many school systems to ensure that students receive the support they need to grow and learn. A hallmark of MTSS is the use of data to inform instructional decision making, including determinations as to which students need additional layers of support.

Both MTSS and CITES emphasize early identification of needs, at the systems level, and across contexts within a district. These needs might include procurement, continuous management of district-wide assessment data, designing criteria for intervention tiers, and individual progress monitoring. The integration of inclusive technology within MTSS, including assistive technology (AT) and tools, ensures students with disabilities can access and engage with learning in each of these tiers (CITES, 2024; State Leaders of Inclusive Technology in Education, 2024). This integration also promotes teacher effectiveness, streamlines data analysis, and fosters family engagement, creating a holistic support system for students.

Purpose

The purpose of this paper is to describe how critical components of education systems can work together in each area of a MTSS to better support outcomes for all students, particularly students with disabilities. Specifically, the intersection of the MTSS and CITES frameworks is explored through a review of relevant literature, with particular emphasis on how the two frameworks can mutually strengthen and enhance one another. While not a comprehensive review, the goal of this piece is to highlight the intersections of these frameworks, which, together, provide a robust and inclusive approach to education, ensuring that all students receive the support they need to thrive. By combining data-driven interventions with accessible technologies, schools can address diverse academic, social, and behavioral needs while promoting equity for students with disabilities (Choi et al., 2020; Sailor et al., 2021). CITES and MTSS emphasize the importance of crucial systems, including early intervention, continuous progress monitoring, and the strategic use of assistive tools to enhance learning across all tiers (McIntosh & Goodman, 2016; Zhang et al., 2023). At a more granular level, integrating CITES and MTSS not only strengthens instructional practices but also encourages collaboration among educators, families, districts, and policymakers, fostering a cohesive and supportive learning environment. As districts continue to embrace both MTSS and CITES, they can advance more inclusive educational systems that empower all learners to reach their full potential.

Methods

To locate articles relevant to the alignment of CITES and MTSS, researchers conducted an online search using the library system at the University of Arkansas, with combinations of the following search terms: MTSS k-12 schools; MTSS school; MTSS intervention; multi-tiered support systems K-12 education; multi-tiered support systems schools; and multi-tiered support interventions. Resulting articles were loaded into WordTune summarizer, an AI tool that assists users with long article summaries. The research team used these summaries to conduct an initial review of articles to determine alignment with our inclusion criteria. These criteria were: a) relates to k12 schools; b) references to student interventions (academic, behavioral, or social); and c) publications needed to be published after from 2015 to the present. Publications focused on non-school environments (e.g., health clinics), focused on professional development, counseling, occupational therapy, health, or social justice, without reference to education, were excluded, as were those published prior to 2015. WordTune summaries were provided for abstracts, purpose and objectives, research design, procedure, participants, outcomes, and findings. The researchers also hand-reviewed selected articles for purpose and research questions.

In addition to reviewing the literature, the CITES team conducted interviews with experts in the areas of information technology (IT), assistive technology (AT), special education, and inclusive technology. These interviews served two purposes: first, they allow the team to confirm themes emerging from a review of current relevant literature; second, the experts offered insights into the potential of integrating MTSS and CITES, in their own contexts and more generally. Additionally, the different roles and perspectives represented by the experts consulted reflect the necessity of collaboration across a system or district. Direct quotes from the experts are provided throughout the findings.

Findings

The findings from this review focus on the potential for the intersection and alignment of the CITES and MTSS frameworks. The findings are therefore organized according to

the components of CITES: Leadership, Infrastructure, Teaching, Learning, and Assessment.

The Role of Leadership, Technology, and Collaboration in MTSS and CITES Integration

Leadership is essential to the success of inclusive education, as it drives the development of school and district culture, resource allocation, and staff support. Leaders at every level—principals, district and building-level administrators, and teacher leaders—must establish a shared vision for inclusive education, emphasizing equitable access through the integration of technology (Bakken & Obiakor, 2016; Jacobson, 2011). This is facilitated by fostering collaboration, either formally, such as through the cultivation of Professional Learning Communities (PLCs), or informally, educators can work together to develop inclusive practices and design for the effective use of assistive technology (Dulaney et al., 2013). Leadership also promotes continuous professional development by providing teachers with the tools and knowledge to analyze data and deliver inclusive interventions aligned with MTSS principles (Choi et al., 2019).

School leaders play a vital role in ensuring that teachers receive training and that technology resources are distributed equitably. The use of mainstream tools such as Microsoft’s Immersive Reader and speech-to-text software exemplifies how technology supports inclusion by addressing specific learning barriers (Ray et al., 2023). Strong leaders also create opportunities for educators in various roles to work across departments (e.g., teachers, counselors, specialists) to promote transparent, data-driven decision making and ensure students receive appropriate interventions (Ray et al., 2023; Shepley & Grisham-Brown, 2019).

Effective leadership guides the development of equitable school environments through strategic resource allocation, professional development, and collaborative practices. By fostering a shared vision for inclusion and promoting the integration of technology, leaders ensure that both educators and students are equipped with the tools necessary for success. As Brian Wojcik, Education Program Supervisor and Assistive Technology Specialist for the Nebraska Department of Education, explained, “In an

ideal world, we are bringing multiple components of the system together to exist under that vision, and have input within that vision of creating these increasingly intensive layers of support... Starting with awareness, and then moving into that needs assessment, building and bringing the people together.”

Schools that empower educators through PLCs and continuous training create a culture of collaboration, innovation, and data-driven decision making. As leaders champion the use of inclusive and assistive technologies and equitable access to resources, they pave the way for meaningful interventions that support all learners. Through strong, inclusive leadership, schools can create sustainable systems that promote academic growth, engagement, and success for every student.

Creating Infrastructure that Supports Inclusive Technology and MTSS

Modern infrastructure is a critical component of both CITES and MTSS frameworks. Effective infrastructure ensures that schools have the physical and technological capacity to support diverse learning environments (Higgins & Rinaldi, n.d.). Schools must provide robust internet access, adaptive learning spaces, and devices for students and teachers to engage in digital learning (Higgins & Rinaldi, n.d.; Shepley & Grisham-Brown, 2019). Inclusive technology, including assistive tools such as text-to-speech software and communication devices, ensures that students with disabilities can engage meaningfully with the curriculum (Briesch et al., 2020).

School infrastructure also facilitates the seamless integration of data management systems to support MTSS implementation (Higgins & Rinaldi, n.d.). These systems allow educators to monitor student progress, identify learning gaps, and adjust interventions in real-time (Better-Bubon et al., 2023; Kearney et al., 2024; Linan-Thomson et al., 2002; Shepley & Grisham-Brown, 2019). Collaboration between technology coordinators, teachers, and administrators ensures that digital tools are updated regularly, aligned with instructional goals, and accessible to all students (Nitz et al., 2023). Schools must also develop policies and procedures to safeguard student privacy, ensuring data security in compliance with federal guidelines (West, 2017).

Modern infrastructure plays a pivotal role in the successful implementation of both CITES and MTSS frameworks by providing the necessary physical and technological support for diverse learning environments. Robust internet access, adaptive learning spaces, and assistive tools empower students with disabilities to fully engage with the curriculum, promoting equity and inclusion (Brenner et al., Choi, et al., 2019; 2013; Mohamed, 2018). Additionally, integrated data management systems enable educators to track student progress and make timely, informed decisions to improve outcomes (Bohanon et al., 2016; Choi, et al., 2019).

When it comes to infrastructure, Freddie Cox, Chief Technology Officer for Knox County Schools, TN recommends, “Involv[ing] IT early and often.” In his role, Cox has found that consistent communication and collaboration with IT can support students and teachers alike: “The more that, that we can be involved in the practice, we can try to hone and improve the experience... We're here to strategically help the district, the more information that we have, the more involved that we can be. It may be that we can improve the workflow for a lot of folks.”

Effective collaboration among technology coordinators, educators, and administrators ensures that resources remain current and aligned with instructional goals (Alper & Raharinirina, 2006). Additionally, by establishing and communicating clear policies for data security and privacy, schools create safe environments that ensure compliance with federal guidelines and foster trust within communities.

Fostering Inclusive Teaching Practices with MTSS and CITES

Teaching within the CITES framework emphasizes learner-centered approaches that are accessible and effective for all students. Research indicates that continuous professional learning is crucial for building educator capacity and maintaining effective implementation of inclusive technology (Robinson et al., 2023; Smith & Throne, 2007). In conceptualizing learner-centered approaches across MTSS tiers, educators can implement Universal Design for Learning (UDL) principles into teaching practices ensures the design of flexible learning environments to address learner variability across contexts, and consider the needs of every learner (CAST, 2024). To center

learners served by tiers 2 and 3, schools should provide professional development focused on incorporating assistive technology tools and interventions into classroom practices (Mohamed, 2018; Robinson et al., 2023; Thomas et al., 2023).

Collaborative approaches to teaching are equally essential for successful MTSS implementation. Joint planning sessions, peer mentoring, and participation in PLCs allow teachers to share best practices and develop interventions aligned with student needs (Kearney et al., 2024; Vescio et al., 2008). Sharon Smith, Director of Special Education in the Hampton Township School District, PA, emphasizes that this often starts with developing comfort with shared language: “One of the things I think that has to start to be your framework is training so that we're all speaking the same language, we all have a common goal, and so that we're setting up effective systems that we're not siloing anything or having it be all one person's responsibility. It has to be shared amongst the team.” Schools that foster and create opportunities for collaboration among educators, and between teachers and families enhance instructional effectiveness and support the integration of inclusive technologies (Alper & Raharinirina, 2006).

Teaching within the CITES framework, supported by UDL principles and MTSS interventions, ensures that all students receive accessible and effective instruction tailored to their individual needs. Additionally, it provides teachers the opportunity to reflect on their own practice and consider the “why” in their learning of inclusive technology. Focusing on the why of inclusive technology can deepen educators’ investment in their own learning and help keep them connected with the end goal of supporting students. As Brian Wojcik explained, “We're helping address the ‘why’ before the how, and getting people to buy into the shared vision. And the ‘why’ takes more time than the ‘how,’ in my opinion. And it takes more opportunities for people to get together, articulate, and discuss because it creates that buy in. So having those times to kind of process through the ‘why’ is really important.” Continuous professional development equips educators with the skills to integrate assistive technologies and evidence-based interventions, fostering inclusive classrooms that promote student success.

Promoting Learning Through Technology and MTSS Interventions

Learning within the CITES framework focuses on preparing students for postsecondary education, the workforce, and independent living by developing self-determined learners (CITES, 2024). Schools must provide students with opportunities to develop technology competencies that support accommodations and assistive tools.

Additionally, districts should offer resources for families to engage in transition programming that includes career planning, postsecondary education, and independent living skills.

MTSS frameworks provide the structure for delivering targeted learning supports. For example, Tier 1 interventions promote student engagement through accessible instructional technologies, while Tier 2 and Tier 3 interventions offer increasing layers of individualized support tailored to student needs (Reschly et al., 2020). Yet the learning supports within the tiers are not static. As Chris Bugaj, Assistive Technology Specialist in Loudoun County, VA, Public Schools, pointed out, interventions shift among tiers. What was once, many years ago, a tier 3 intervention is now universal: supports like one-to-one devices and text-to-speech are now widely available among all students, not only those with disabilities. Bugaj imagines that once educators realize this trend, they can use it to intentionally shift supports from tiers 2 and 3 to tier 1. “A big success story in MTSS is how assistive technology and AAC that was meant for just individual people...Now we're seeing that propagate out in the classrooms, other learning spaces, and entire schools. It's helping the [multilingual] population, it's not hurting anyone learning how to read. Educators are integrating AAC into their classrooms and building a culture around it.”

Supporting learning involves not only strategies, but also feeling a sense of belonging in the classroom. When students have the supports they need to be successful, they can more meaningfully engage with learning opportunities in the classroom. Sharon Smith provides an example from her district: “We have an early warning system that looks at students grades, office referrals and attendance...But once [students] are successful and engaged and feel like they belong and they don't feel like they're an other, they belong with the group. That sense of belonging helps them want to be in

school. Because if students have the right supports, the right strategies, they don't feel different using them.”

Integrating Assessment Practices with Inclusive Technology and MTSS

Assessments play a vital role in both MTSS and CITES frameworks by providing data to guide instructional decision making. Schools must implement accessible assessments that accommodate students with disabilities through tools such as adaptive testing formats and text-to-speech software (Smarter Balanced Assessment Consortium, 2021). MTSS frameworks rely on these assessments to identify learning needs, monitor progress, and adjust interventions as necessary.

Collaboration between educators, state testing officials, and families ensures that assessments remain inclusive and aligned with instructional goals. Public policies also support the development and procurement of accessible assessment tools, ensuring compliance with federal mandates such as the Individuals with Disabilities Education Act (Encarnação, 2013). Schools should establish data systems that allow for efficient collection and sharing of student performance data, fostering transparency and promoting family engagement in the assessment process.

Implications for Practice

To effectively integrate MTSS and CITES frameworks, schools must prioritize the following strategies:

1. Professional Development and Training:

- Offer hands-on training sessions focused on integrating technology into teaching and intervention practices.
- Provide continuous professional development to build educator capacity for using AT tools and analyzing data (Zumeta, 2015).

2. Data-Driven Decision Making:

- Implement data management systems that track student progress and monitor intervention effectiveness.
- Use data to make timely instructional adjustments and ensure interventions remain responsive (Smarter Balanced Assessment Consortium, 2021).

3. Collaborative Practices:

- Foster collaboration among educators, specialists, and families through PLCs and joint planning sessions.
- Engage families by providing online portals to monitor student progress and access resources (Garbacz et al., 2016).

4. Access to Inclusive Technology:

- Ensure that students have access to essential AT tools such as text-to-speech software and communication devices.
- Regularly update technology tools to maintain their effectiveness and alignment with instructional goals (Choi et al., 2022).

5. Infrastructure and Resource Allocation:

- Develop policies to safeguard student data and ensure compliance with federal guidelines.
- Allocate resources for technology acquisition, maintenance, and educator training (West, 2017).

Conclusion

The integration of MTSS and CITES frameworks provides a comprehensive approach to addressing the diverse needs of students. By combining inclusive technology with data-driven interventions, schools can create equitable learning environments that foster academic, social, and emotional growth for all students. Effective leadership, continuous professional development, and collaboration among educators, families,

and policymakers are essential for sustaining progress. As research demonstrates, the successful implementation of these frameworks leads to improved student outcomes, increased engagement, and enhanced access to education (Choi et al., 2020; Castillo et al., 2022). Schools must continue to invest in AT tools, infrastructure, and professional learning opportunities to ensure that every student has the support they need to succeed. Through thoughtful planning, resource allocation, and family involvement, schools can create inclusive environments where all learners thrive.

References

- Alper, S., & Raharinirina, S. (2006). Inclusive Technology for Individuals with Disabilities: A Review and Synthesis of the Literature. *Journal of Special Education Technology*, 21(2), 47–64.
<https://doi.org/10.1177/016264340602100204>
- American Institutes for Research. (2024). Center on Multi-Tiered System of Supports (MTSS Center). <https://www.air.org/centers/center-multi-tiered-system-supports-mtss-center>
- Averill, O. H., & Rinaldi, C. (2011). Multi-tier System of Supports. *District administration*, 47(8), 91–94.
- Bakken, J. P., & Obiakor, F. E. (2016). *General and Special Education Inclusion in an Age of Change: Roles of Professionals Involved* (1st ed., Vol. 32). Emerald Publishing Limited.
- Bettters-Bubon, J., Smith-Durkin, S., & Kortemeier, H. (2023). Culturally Affirming and Antiracist MTSS: Advocating for Equity for Every Student. In *The School Counselor's Guide to Multi-Tiered Systems of Support* (2nd ed., Vol. 1, pp. 61–93). Routledge. <https://doi.org/10.4324/9781003306412-3>
- Bohanon, H., Gilman, C., Parker, B., Amell, C., & Sortino, G. (2016). Using School Improvement and Implementation Science to Integrate Multi-Tiered Systems of Support in Secondary Schools. *Australasian Journal of Special and Inclusive Education*, 40(2), 99–116. <https://doi.org/10.1017/jse.2016.8>

- Briesch, A. M., Chafouleas, S. M., Nissen, K., & Long, S. (2020). A Review of State-Level Procedural Guidance for Implementing Multitiered Systems of Support for Behavior (MTSS-B). *Journal of Positive Behavior Interventions*, 22(3), 131–144. <https://doi.org/10.1177/1098300719884707>
- CAST. (2024). Universal Design for Learning Guidelines version 3.0. <https://udlguidelines.cast.org>
- CITES. (2024). CITES Framework Overview & Essential Questions. <https://cites.cast.org/binaries/content/assets/cites/cites-framework-overview--essential-questions.pdf>
- Choi, J. H., McCart, A. B., Hicks, T. A., & Sailor, W. (2019). An Analysis of Mediating Effects of School Leadership on MTSS Implementation. *The Journal of Special Education*, 53(1), 15–27. <https://doi.org/10.1177/0022466918804815>
- Choi, J. H., McCart, A. B., & Sailor, W. (2020). Achievement of Students With IEPs and Associated Relationships With an Inclusive MTSS Framework. *The Journal of Special Education*, 54(3), 157–168. <https://doi.org/10.1177/0022466919897408>
- Dulaney, S. K., Hallam, P. R., & Wall, G. (2013). Superintendent Perceptions of Multi-Tiered Systems of Support (MTSS): Obstacles and Opportunities for School System Reform. *AASA Journal of Scholarship & Practice*, 10(2), 30–45.
- Garbacz, S. A., McIntosh, K., Eagle, J. W., Dowd-Eagle, S. E., Hirano, K. A., & Ruppert, T. (2016). Family Engagement Within Schoolwide Positive Behavioral

- Interventions and Supports. *Preventing School Failure*, 60(1), 60–69.
<https://doi.org/10.1080/1045988X.2014.976809>
- International Society for Technology in Education. (2016). ISTE Standards for Educators. <https://iste.org/standards/educators>
- Jacobson, S. (2011). Leadership effects on student achievement and sustained school success. *International Journal of Educational Management*, 25(1), 33–44.
<https://doi.org/10.1108/095135411111100107>
- Ray, S., Brunelle, E., Naus, K., Lane, J., & Stapley, B. (2023). The development and implementation of an inclusive technology training for teachers in an underserved school district. *Journal of Occupational Therapy, Schools & Early Intervention*, 16(4), 496–515. <https://doi.org/10.1080/19411243.2022.2112360>
- Reschly, A. L., Pohl, A. J., & Christenson, S. L. (Eds.). (2020). *Student Engagement Effective Academic, Behavioral, Cognitive, and Affective Interventions at School* (1st ed. 2020.). Springer International Publishing.
<https://doi.org/10.1007/978-3-030-37285-9>
- Sailor, W., Wolf, N., Choi, H., & Roger, B. (2006). Sustaining positive behavior support in a context of comprehensive school reform. *Psychology in the Schools*, 43(1), 8–21.
- Shepley, C., & Grisham-Brown, J. (2019). Multi-tiered systems of support for preschool-aged children: A review and meta-analysis. *Early Childhood Research Quarterly*, 47, 296–308. <https://doi.org/10.1016/j.ecresq.2019.01.004>

Smith, S. G., & Throne, S. (2007). *Differentiating Instruction with Technology in K–5 Classrooms*. International Society for Technology in Education.

State Leaders of Inclusive Technology in Education. (2024, May). *Concept paper-supportive technologies [Version 1.0]*. <https://oercommons.org/courses/slate-concept-paper-supportive-technologies-version-1-0-may-30-2024>

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education*, 24(1), 80–91.
<https://doi.org/10.1016/j.tate.2007.01.004>