

CITES

Leadership Literature Review

2023



**Center on
Inclusive Technology
& Education Systems**
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Definition of Key Terms

For an expansion of the glossary and additional Key Terms, visit the [CITES Glossary](#).

Accessibility

Accessibility refers to the design of apps, devices, materials, and environments that support and enable access to content and educational activities for all learners. Educational materials and technologies are “accessible” to people with disabilities if they are able to “acquire the same information, engage in the same interactions, and enjoy the same services” as people who do not have disabilities. As a person with a disability, you must be able to achieve these three goals “in an equally integrated and equally effective manner, with substantially equivalent ease of use” ([Joint Letter US Department of Justice and US Department of Education, June 29, 2010](#)). Technology can support accessibility through embedded assistance—for example, text-to-speech, audio and digital text formats of instructional materials, programs that differentiate instruction, adaptive testing, built-in accommodations, and other assistive technology tools. [AEM Center](#)

Accessible Educational Materials (AEM)

Accessible educational materials, or AEM, are print and technology-based educational materials, including printed and electronic textbooks and related core materials that are designed or converted in a way that makes them usable across the widest range of individual variability regardless of format (print, digital, graphic, audio, video). [AEM Center](#)

Active Implementation Drivers (AID)

Active implementation drivers are components within the Active Implementation Framework (AIF) that are designed for the development of leadership engagement, organizational supports, and competencies to assist leaders in developing practices to build capacity for an inclusive technology system. The three primary drivers include Competency Drivers, Organization Drivers, and Leadership Drivers (Fixsen et al., 2021).

Active Implementation Framework (AIF)

A leadership-based framework that supports the development of innovation-related competencies, organization changes, and engaged leadership that integrates high-fidelity use of innovations in practice and student success (Fixsen et al., 2021; Fixsen et al., 2015; Bertram et al., 2015).

Assistive Technologies (AT)

Assistive technology is any item, equipment, software program, or product system used to increase, maintain, or improve the functional capabilities of persons with disabilities. Assistive technology helps people with difficulty speaking, typing, writing, remembering, pointing, seeing, hearing, learning, walking, and many other things. Different disabilities require different assistive technologies. Examples include low-tech: communication boards made of cardboard or fuzzy felt, special-purpose computers, hardware: prosthetics, mounting systems, and positioning devices, special switches, keyboards, pointing devices, screen readers, communication programs, electronic devices, wheelchairs, educational software, power lifts, pencil holders, eye-gaze, and head trackers. [Assistive Technology Industry Association](#)

Data-Informed Decision-Making

Data-driven decision-making (D3M) is the systematic collection, analysis, and application of many forms of data from various sources designed to enhance student performance while addressing student learning needs (Marsh et al., 2006; Schifter et al., 2014).

Educational Technology (EdTech)

Educational Technology involves analyzing, designing, producing, evaluating, implementing, and managing educational systems and other learning environments, leading to learning and developing mind, body, and spirit (Song & Kidd, 2010; as cited by [Ahmadigol](#), 2016). It also includes a dynamic system of study and moral action to provide an interactive environment for learners' activity for their fast, easy, durable education and learning in alignment with their individualized interests and characteristics ([Ahmadigol](#), 2016).

Engagement

The process of communicating to, learning from, and partnering with stakeholders that acknowledges the unique needs and strengths of the stakeholders involved is meaningful, inclusive, clear, effective, and ongoing to best support educational equity and excellence (CCSSO, 2017, p. 2).

Families

Families are essential adults in a K-12 student's community who care for and support the student's learning outside of the school setting. This may include parents, siblings, grandparents, or paraprofessionals caring for the student outside of school.

Information and Communication Technology (ICT)

Information and communications technology (ICT) is an umbrella term that includes any communication device or application encompassing technology such as mobile phones, computer and network hardware, software, the Internet, and satellite systems (Huth et al., 2017) used for gathering, storing, transmitting, retrieving, or processing information (NIST, 2023).

Information Technology (IT)

Any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency. For purposes of the preceding sentence, equipment is used by an executive agency if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency which (i) requires the use of such equipment or (ii) requires the use, to a significant extent, of such equipment in the performance of a service or the furnishing of a product. Information technology includes computers, ancillary equipment, software, firmware, similar procedures, services (including support services), and related resources. [FIPS 200 under INFORMATION TECHNOLOGY from 40 U.S.C., Sec. 1401](#)

Educational Leadership

Educational leadership is closely associated with transformational leadership, a leadership style that emphasizes positive change and growth and inspires all educators and students to reach their full potential for the collective benefit of all.

Educational Leadership applies to all levels of academia from early childhood to higher education and includes leading by example, uniting and elevating others, making meaningful connections with teachers, staff, students, and parents, embracing the diversity of thought by valuing the opinions, ideas, and viewpoints of others, being solutions-oriented and willing to make changes for the benefit of students and teachers, inspiring a positive work culture that is team-oriented, inclusive, and

operates with a clear vision of the future, and demonstrating thought leadership and the ability to overcome complex challenges (American University, 2023).

Stakeholders

Stakeholders, more commonly referred to internal and external school partners, are those involved and invested in districts, schools, programs, and student outcomes (CCSSO, 2017). Stakeholders may include students, community members, district or school staff, parents, guardians, family members, educators (e.g., teachers, administrators, related service providers), and community, school, district, local, regional, or state leaders.

[Meaningful Local Engagement Under ESSA: A Handbook for LEA and School Leaders](#) developed by the Partners for Each and Every Child and the Council of Chief State School Officers (CCSSO, 2017) is an exemplary resource for stakeholder or school partner engagement and offers a preface for defining school partners

Technology

Technology means any equipment or interconnected system or subsystem for which the principal function is the creation, conversion, duplication, movement, control, display, switching, interchange, transmission, reception, or broadcast of data or information. It includes but is not limited to, electronic content, telecommunication products, computers and ancillary equipment, software, information kiosks, transaction machines, videos, information technology services, and multifunctional office machines that copy, scan, and fax documents. Footnote 7 of [the RFP that established the National Center for Accessible Education Materials for Learning](#)

Professional Development

Professional development is mandatory one-time workshops, seminars, or lectures selected by school or district leaders and is typically a one-size-fits-all approach to training educators and staff (Scherff, 2018).

Professional Learning

An interactive, sustained, and customized learning opportunity or training specific to the individual educators' needs that the educator commonly selects or that is based on individual assessment data. Professional learning encourages teachers to take responsibility for their learning and practice what they learn in their teaching contexts (Scherff, 2018).

Introduction

Effective technology leadership in local education agencies (LEAs) or school districts promotes the development of a balanced and inclusive technology infrastructure that examines assistive technology (AT), educational technology (EdTech), and information technology (IT) as part of a technology ecosystem (CITES, 2023). To take full advantage of technology to transform learning for all students, including those with disabilities, requires strong leadership capable of creating a shared vision of which all members of the community feel a part (OET, 2017). According to the 2017 National Education Technology Plan (NETP), which is based on extensive research and practice, there are *four key focus areas of effective leadership*:

- 1) collaborative leadership,
- 2) personalized student learning,
- 3) robust infrastructure, and
- 4) personalized professional learning.

In alignment with research, the NETP, work with the CITES Framework Development Districts (FDD), and characteristics of effective leadership, CITES developed *five specific Leadership practices* that have been adapted to include:

- 1) Creating a community-wide vision and aligned goals;
- 2) Developing a strategic technology implementation plan;
- 3) Measuring progress for continuous improvement;
- 4) Developing clear outcomes for professional learning;
- 5) Engaging families in leadership.

Using the research and development of these practices, CITES aims to align with current research and literature to expand technical assistance and disseminate support to districts, schools, and educators looking to create or enhance inclusive technology systems through targeted leadership efforts. This includes building the capacity of school districts to develop, implement, and refine comprehensive, equitable technology ecosystems that include AT, EdTech, and IT - starting with the systematic structures developed within leadership.

Purpose

This literature review aims to collect relevant and timely research to inform and identify connections between the newly adapted practices developed in the CITES Leadership Framework and current research on the impact of leadership for inclusive technology systems. It also aims to inform and guide leaders in various roles across states, schools, districts, and organizations that influence technology integration and implementation. When implemented alongside evidence-based, research-based, and promising leadership practices, leaders and leadership teams can use this review and its embedded research and resources to analyze and redesign their systems for a more inclusive environment for students with disabilities.

Methods

The CITES leadership Literature Review was conducted in two phases between 2020 and 2023: the initial review phase and the final review phase. Phase 1 consisted of an initial review of the literature at the beginning of the CITES Framework development to inform Leadership practices and support for Framework Development Districts (FDDs). The second phase was conducted at the conclusion of the CITES work with the FDDs. At this time, additional literature was added in Phase 2 to connect research to observed practices and data collected throughout the CITES Framework development process. Throughout the CITES work with the FDDs, it was found that the Teaching, Learning, Infrastructure, and Assessment Frameworks were all impacted by Leadership practices in some way; therefore, expanding on the literature to find connections and improve systems overall was vital for inclusion in the final review.

Phase 1

The first initial review phase included a series of annotated bibliographies that were collected during the research phase in March 2020 by A. Crossland, K. Ruedel, and T. Gray at the American Institutes for Research (AIR). These were collected through automatic (e.g., Google Alerts, Zotero) and manual searches of keywords to include reports, articles, journals, and other resources published between January 2014 and April 2019. At this time, a strategic review of leadership practices

identified in previous publications (e.g., 2017 [The National Education Technology Plan](#) (OET, 2017), [PowerUp What Works Technology Implementation Practice Guide](#) (PowerUp What Works, 2014), and the [Center on Technology and Disability State and District Spotlight](#) (WestEd, 2021) generated a list of recommended practices and related terms for initiating the literature review. The alignment of leadership practices identified and related keywords can be seen in Table 1.

Table 1. Alignment of Leadership Practices and Keywords

Leadership Practice	Keywords
<i>Work as a team</i>	leadership, teamwork, collaboration, organizational change
<i>Enhance district vision and set concrete action goals</i>	district technology vision, agenda-setting
<i>Align funding and procurement policies</i>	district technology procurement, district education technology budget, assistive technology budget, resource allocation, sustainable infrastructure
<i>LEA policies/systems policies</i>	student data, student privacy, interoperability, infrastructure
<i>Plan ongoing professional learning opportunities</i>	effective professional learning, professional development strategies, personalized professional learning
<i>Provide access to technology and support</i>	district technology infrastructure, technology support, technology device maintenance, district networks, broadband access
<i>Engage all stakeholders (i.e., school partners)</i>	stakeholder engagement, engagement strategies, effective engagement, outreach
<i>Provide opportunities for continuous improvement/feedback loops</i>	teamwork, leadership, effective feedback, building human capital, continuous improvement, feedback loops
<i>Develop partnerships</i>	national technology partners, district collaboration
<i>Provide clear communication internally and externally</i>	effective communication, strategic outreach, outreach strategies

The literature scan using these keywords and leadership alignments in Table 1, produced an annotated bibliography summary report of 47 articles or leadership-based resources developed in

2020. The articles and resources were then aligned with Every Student Succeeds Act (ESSA) Tiers of Evidence (REL at AIR, 2019) based on the article study design, results of the study, findings from related studies, sample size and setting, and population alignment. The ESSA Tiers of Evidence include:

- Tier 1: Strong Evidence
- Tier 2: Moderate Evidence
- Tier 3: Promising Evidence
- Tier 4: Demonstrates a Rationale

The literature review results included findings from the articles across all tiers. The initial leadership practices developed within the Framework were also identified and developed through tiered literature classification to represent exemplars of the practices.

Phase 2

Over time, these practices were further refined and integrated into technical assistance and ongoing work with the Framework Development Districts (FDD) Cohort as they implemented the CITES Framework. Findings from the articles and resources in Phase 1 – on leadership team practices that best support the development of an integrated AT, EdTech, and InfoTech system – identified five broad categories of promising practices to inform the next stage of engaging local education agencies (LEAs) or school districts. These practice categories were used to identify and select school districts that demonstrate the use of evidence-based practices in these areas. Known as Knowledge Development Districts (KDDs), the CITES team engaged the selected districts in interviews related to:

1. Collaboration and stakeholder engagement
2. Continuous improvement
3. Funding and procurement
4. Professional development and coaching
5. Technology infrastructure

The second review phase was completed in September of 2023 after CITES' work with the KDDs and FDDs was completed. The initial annotated bibliographies were reviewed and coded manually, and their corresponding articles were then digitally coded in NVIVO – a qualitative coding software that identifies themes within large sets of text-based data. A multi-database search expanded the literature to include research and articles from 2020-2023. Various Boolean phrase

combinations with the keywords: “technology” AND “education” AND “schools” AND “administration” AND/OR “leadership” were used. New annotated bibliographies were developed for 20 additional peer-reviewed articles emphasizing leadership and impact on inclusive technology practices. These articles were reviewed, coded, and digitally coded in NVIVO alongside those in Phase 1. Within the 67 articles collected, 43 open codes were derived from the two phases to create a series of parent codes, with a collection of 1,949 references to lines of code across both phases. After analysis, 58 articles or resources (e.g., published handbooks and government documents) were included in this review, in addition to 41 additional resources that can be found in the extended reference section.

Thematic Findings

Five primary themes were identified within and between the articles, resources, and frameworks across both phases and align with the current Leadership practices within the CITES Framework in leading teams as part of a technology ecosystem. The five themes identified include:

- A. **transformational and implementation leadership** qualities to build inclusive technology systems,
- B. using various forms of **data to inform decision-making** to develop inclusive technology systems,
- C. **engaging families in leadership practices**,
- D. understanding and considering **educators' perspectives on leadership**, and
- E. creating meaningful **professional development and individualized professional learning opportunities** for all educators in inclusive technology practices.

One of the additional findings within the literature review is the identification of active implementation drivers (AIDs), which are subcomponents within the active implementation framework (AIF). These drivers are ingrained within all the thematic findings and align with implementation science, providing a unique and multidisciplinary approach to the research. Before delving into the themes described above, the three drivers (Competency, Organization, and Leadership) are discussed in more detail and aligned throughout the literature review.

Active Implementation Drivers (AID)

According to Fixsen et al. (2015) in coordination with the [State Implementation and Scaling-Up of Evidence-based Practices Center \(SISEP\)](#) and the [National Implementation Research Network](#) located at the University of North Carolina at Chapel Hill's [Frank Porter Graham Child Development Institute](#), there are three primary categories of **active implementation drivers (AID)**, which are subcomponents within the **active implementation framework (AIF)** that support the development of innovation-related competencies, organization changes, and engaged leadership that supports the high-fidelity use of innovations in practice and student success (Fixsen et al., 2021; Fixsen et al., 2015; Bertram et al., 2015). These three drivers include the:

1. Competency Drivers,
2. Organization Drivers, and
3. Leadership Drivers.

The AIDs act as a grounding framework in developing leadership engagement, organizational support, and educator competencies and can assist leaders in developing practices to build capacity for an inclusive technology system. Each section or theme within this review was found to align with one or more of the corresponding active implementation drivers. The AIF and subsequent AIDs were formed by practice-based (those doing the work of implementation) and research-based (those studying implementation) evidence (Fixsen et al., 2021; Fixsen et al., 2005; Fixsen et al., 2015). A description of each of the drivers and a breakdown of nine additional components developed through an analysis of the implementation frameworks can be seen in *Table 2*. This table was adapted to apply the implementation drivers to align with the identified Leadership practices in inclusive technology systems.

Table 2. Implementation Drivers in Alignment with Leadership in Inclusive Technology Systems

Driver	Inclusive Technology-based Descriptive Alignment
Competency Driver	Developing, enhancing, and sustaining one's ability to implement inclusive technology systems that benefit students.

Selection	Methods to recruit and hire new staff, or to select current staff members, to implement innovative practices in alignment with student needs that enhance inclusive practices.
Coaching	Resources on inclusive technology programs are provided to practitioners through continued learning, including retraining, reflection, emotional support, or steps to promote problem-solving.
Training	Formal and informal training approaches are taken to ensure proficiencies in the skills necessary to integrate inclusive technology systems. This includes enhancing practitioners' sense of self-efficacy or establishing common beliefs and expectations about inclusive technology systems.
Fidelity	Assessing a practitioner's use of various technologies as initially designed (e.g., adherence, compliance, integrity, dosage, faithful replication).
Organization Drivers	Mechanisms to create and sustain inclusive organizational and systematic environments for effective educational services.
Systems Intervention	Effective communication and collaboration across various technology system leaders (i.e., EdTech, InfoTech, AT, administrative) to align inclusive technology practices with school or district-based internal and external partnerships to support system-wide capacity building.
Facilitative Administration	Meaningful and proactive adaptations by leaders and managers to remove obstacles and encourage innovation within organizations that support inclusive practices. This may include changes in administrative practices (i.e., paperwork, policies, procedures) and assuring access to high-quality training, technical assistance, and feedback on innovation use.
Decision Support Data System	The process for measuring formal and informal data uses, contexts, processes, or outcomes related to inclusive technology practices. This includes regular data reports to staff, managers, and leaders to improve support for the use/implementation of technology and support for practitioners.
Leadership Driver	Providing leadership strategies for different leadership challenges that may arise to help make decisions, provide guidance, and support organizational performance.
Technical Leadership	Leadership that creates a supportive environment that encourages inclusive and innovative technology practices can benefit

practitioners and can be enhanced by clearly communicating the vision, mission, goals, and benchmarks for use.

Adaptive Leadership Leadership takes the initiative and facilitates team participation in moving towards a more inclusive technology system and ensuring psychological safety that establishes a culture and climate conducive to experimentation and risk-taking.

Note: Adapted from the *Implementation Frameworks: An Analysis* by Fixsen et al. (2021), and the *Implementation Drivers* from the State Implementation and Scaling-Up of Evidence-based Practices Center (SISEP) and the National Implementation Research Network (NIRN) located at the University of North Carolina at Chapel Hill's Frank Porter Graham Child Development Institute (2015).

Integrated and Compensatory Nature of the Drivers

Implementation drivers are one of the critical components of capacity-building that subsequently have a high impact on students and ensure the development of relevant competencies, necessary organization support, and engaged leadership. A key feature of implementation drivers is their *integrated* and *compensatory* nature. *Integration* refers to the philosophy, goals, knowledge, and skills related to the program or practice that are consistently and thoughtfully expressed across all three implementation drivers. *Compensatory* refers to skills and abilities not acquired or supported through one driver that can be compensated for using another. Integrating various implementation drivers has the potential to lead to systematic change or a change in structures and processes to create alignment and integration of roles and functions.

The remainder of this literature review reviews the five thematic findings with embedded discussions on how the drivers align within the themes. Supporting findings and implications within specific articles in the literature that can help build leadership practices connected to technology integration are also included.

Thematic Finding A. Transformational and Implementation Leadership

The term *transformational leadership* was initially coined by James MacGregor Burns (1978) in his book, "Leadership," to define a process where leaders and followers work together to advance motivation and morale. Transformational leadership aligns with the **AID for Leadership** in being able to adapt and change to provide guidance, support organizational performance, and make informative decisions. This includes creating a supportive environment that encourages inclusive and innovative practices. According to Burns, transformational leadership is defined as:

“a style of leadership that transforms follower attitudes, beliefs, and behaviors, to a higher realm of motivation where the leader inspires followers to be motivated to rise above and beyond current levels of achievement and performance to even higher levels of achievement and performance.”

Transformational leadership is the leadership style most researchers feel is appropriate for today’s schools and is also characterized by a leader who works with others to a) identify needed change, b) create a vision to guide the change through inspiration, and c) execute the change in unison with committed members of a group (Anderson, 2017). Leaders who take on a transformational approach have the ability to systematically establish new norms, change employee attitudes, create a new vision of reality, and make fundamental changes to the organization's culture (Anderson, 2017).

When adopted, transformational leadership is also a viable choice for educational leaders to meet internal and external school partner demands (e.g., the students, local community, state, and federal). One of the key recommendations for achieving transformational change in K-12 education systems, according to the report [Current to Future State: Issues and Action Steps for State Policy to Support Personalized, Competency-Based Learning](#) (2020; Sharp, 2018), is that learning models should be rooted in research about how students learn best (the learning sciences), with any redesign putting student success at the center (p. 3).

Implementation leadership has been identified as critical for establishing an organizational context that supports implementation (i.e., the implementation climate) and aligns with the **AID for Leadership** through establishing a culture and climate conducive to inclusive systems and practices.

Leaders at multiple levels are responsible for moving parts (Moullin et al., 2017) and facilitating team participation. Leaders' roles, responsibilities, personalities, beliefs, and values can profoundly influence the success or failure of collaborations. Leaders are also instrumental in applying the implementation drivers and developing strategies with the highest likelihood of new program sustainment. For example, influential and effective leaders were highly proactive and forward-thinking about setting the stage and implementing system structures and process changes for intervention uptake and implementation. This leads to better engagement, funding, and support for community-based organizations (Aarons et al., 2016; Mollin et al., 2017) and increased sustainment at the system level.

When reviewed holistically with its many complexities, the “implementation leadership” process can be challenging and dynamic, requiring ongoing adaptation and proactive problem-solving. *Implementation* is posited as a multiphasic process influenced by various factors within a multilevel context. *Leadership* is a critical factor influencing system and organizational implementation climate, collaborations, and institutionalization approaches such as procurement and contracting (Moullin et al., 2017). Being proactive and persevering in the implementation process can help address disagreements or issues that may arise. Leaders who demonstrate individualized consideration can understand, acknowledge, and act on the perspectives of multiple collaborators in any given initiative (Aarons et al., 2014; Moullin et al., 2017).

Addressing Systematic Barriers to Transformational and Implementation Leadership

Systematic barriers were also found throughout the literature that were directly tied to decisions made at the administrative or leadership level. School leaders also cite motivating teachers to use technology for personalizing instruction as a primary challenge (Project Tomorrow, 2018). Baker et al. (2019) found that some of the barriers experienced by various school partners (e.g., families, administrators, teachers, staff, and related service providers) included:

- a) **Ecosystems of siloed internal and external providers with little cross-collaboration.**
 - o Specialization of core materials, supplemental materials, assessment, technology, and/or implementation.

- Materials and technology across schools and districts are not consistently designed to work together.

b) Systems lack coherent vision and strategy.

- Purchasing products and supports in parts (i.e., piecemeal procurement),
- Being reactive vs. proactive in the procurement of resources and technology,
- Misalignment of technology procurement and instructional vision.

c) Educators experience with interoperability and compatibility of materials.

- Overloaded with materials that commonly do not work for the teacher and/or student.
- Lack of guidance or training on the materials or practical use.

Other barriers to transformational and implementation leadership found in the literature included identifying strategies that facilitate working relations between university researchers, school practitioners, and community members; lack of information specific to systematic performance accountability; and lack of ethnic and racial diversity in school district IT leadership remains a severe problem in most school systems with very little progress (CoSN, 2019).

Thematic Finding B. Data-Informed Decision Making

All leaders must create a strong culture of data inquiry and ensure that multiple school partners are involved with varying roles and perspectives who are "*motivated to pursue data-involved approaches to solving problems of practice*" (Biag, 2017; Lange et al., 2012). This includes creating a culture for data-driven decision-making and the conditions for effective implementation. Data-informed decision-making aligns with the **AID for Organization** and includes:

- a) measuring formal and informal data uses, contexts, processes, or outcomes related to inclusive systems and practices,
- b) being proactive through data, communicating data, and
- c) collaborating to develop meaningful administrative practices (Fixen et al., 2021).

When Every Student Succeeds Act (ESSA) was passed in 2015, it called for districts to be more intentional about data use, implementing evidence-based practices and data-based decision-making. With this, there has been a growing call for improvement of the research-to-practice pipeline and more closely linking educational researchers to schools and districts to work together to solve problems of practice.

Research-to-Practice in Data-Informed Decision-Making

Despite decades of school reform initiatives and educational research on school improvement, many school-change efforts struggle, and research is difficult to replicate in classroom settings (Meyer-Looze, 2015). Research-to-practice relationships are typically designed to address local problems of practice and policy in a specific context. Using research and data for systematic change is a complex social process that requires communication and collaboration across various internal and external systems and organizations. However, this interaction can build positive relationships over time, connecting institutional and state-based researchers to practitioners in the field.

To support research-to-practice, including data collection across agencies, Biag (2017) developed a set of recommendations to support leaders in creating successful partnerships between K-12 systems and educational researchers. These recommendations, with an emphasis on alignments with inclusive technology practices, include:

- **Integrating research with experiential knowledge** – Understanding local community context and knowledge and ensuring that research or suggested intervention makes sense based on what local leaders know and understand about their community. This includes:
 - culture, race, ethnicity, and socio-economic backgrounds,
 - access to and experiences with community resources, and
 - access to and experiences with technology (e.g., internet, devices, services)
- **Taking an iterative and collaborative approach** - Promoting a culture of trust and respect, including:
 - reviewing early findings with educators,
 - producing internal factsheets for discussion and feedback and
 - facilitating opportunities for partners to discuss and interpret the research.
- **Using linked data across multiple agencies** - Creating a deeper understanding of family/community through shared responsibility across agencies for addressing youth needs in and out of school, including technology. This may include:
 - **Internal agencies** – district or school-based resources for educators, families, and students, including those who work with or integrate technology (e.g., EdTech, IT, and AT).
 - **External agencies** – local businesses, organizations, state, or regional educational agencies designed to support educators, families, and students in technology, including

career and technology education (CTE); science, technology, engineering, and math (STEM) education; and transition programming for students with disabilities.

Data to Drive Instruction

According to Lange et al. (2012), leadership must ensure coherence among systems, data collection, and analysis to use data to have an optimal effect on instruction and student success. Lange et al. (2012) also identified three precursors to effective data use:

1. responsibilities of leadership,
2. professional development responsibilities, and
3. school culture responsibilities.

This includes recognizing the influential role of leadership in ensuring schools use data to drive instruction. Although data-driven decision-making has been the mantra of school reform for the last ten years, school leaders can benefit from frequent discussions on how to engage teachers (Lange et al., 2012).

Similarly, Biag (2017, p. 21) also states, "*Practitioners' knowledge and prior experiences, including their beliefs and expectations about the validity of the data, can influence how they use research information to guide reforms.*" Baker et al. (2019) also found that while teachers report regularly using data to inform instruction, they report multiple challenges, including the ability to digest and implement data, data volume, and data timeliness. While researchers and practitioners recognize that access to data is critical to inform planning and learning, significant barriers remain to the availability and usability of student data (Baker et al., 2019). According to Meyer-Looze (2015). Educators must also be considered active learners who must be empowered and supported to make data-based decisions or correlated as "*active researchers or scientists in trying to solve whatever problems might exist in their classroom or school.*" To support data-driven instruction, leaders in schools should:

- a) establish leadership teams that include educators within each school to guide the continuous improvement process,
- b) identify trained facilitators for each school and
- c) establish behavior norms for processes in collecting data to inform outcomes Meyer-Looze (2015).

Project Tomorrow – Voices of School Partners in Data-Informed Decision Making

[Project Tomorrow](#) (2018) is a global education nonprofit organization dedicated to empowering student voices in education with over 22 years of experience in education that has impacted transformational leadership practices and represents the most extensive collection of authentic, unfiltered school partner voices on digital learning. To collect data, Project Tomorrow annually polls K-12 students, parents, educators, and community members about the impact of digital tools, content, and resources on students' learning experiences in and out of school. Since 2003, "over 5.4 million K-12 students, parents, teachers, librarians, principals, technology leaders, district administrators, and community members have shared their views and ideas" (Project Tomorrow, 2018, p.26). Project Tomorrow also regularly provides consulting and research support around critical K-12 science, math, and technology education trends to school districts, government agencies, businesses, and higher education.

According to Project Tomorrow, district leaders are increasingly valuing the leadership skills of school-based leadership. In 2017, when the data was collected for the 2018 report, 40% of principals agreed that enhanced school leadership had the potential to change student outcomes versus 11% in 2010 (Project Tomorrow, 2018). The report also highlights that effective principal leadership is essential in closing achievement gaps and addressing equity gaps and that recognition of that critical role is increasing amongst district admins, especially in urban areas.

While district leadership is responsible for creating the vision and moving innovation forward, they must depend upon school-level leaders to implement, so it is increasingly important to have well-developed leaders at the individual school level. Transformational leaders, according to Project Tomorrow, also value the potential of technology to create more personalized learning while at the same time appreciating what it takes to bring their teachers along in the process.

Family Engagement in Data-Informed Decision Making

When administrators, families, and educators discuss meaningful data, they strengthen the partnership and collaboration between school and home (Garcia, 2016). Sharing student performance data and gathering information from families about students' interests, behaviors, and challenges has several benefits. It helps families support children's learning, advocate for school improvement, and reshape their thinking about family and community engagement (Weiss et al., 2011; Weiss & Lopez, 2015).

Families are interested in knowing how well their children are performing in school, and understanding the reasons for wanting data can help all educators, including administrators, determine which data to share (Garcia, 2016). This helps families understand what the school is doing to improve student learning and how they, as parents and caregivers, can help. In a recent study cited by Garcia (2016c) conducted by the Northwest Evaluation Association (NEA) in 2012, parents from various ethnic backgrounds and with children at all school levels were asked to indicate their reasons for wanting data about their children's education. In this study, five priorities directly related to student data were identified by 90 percent of the 1,009 parents who participated. These priorities included parent's interest in:

- Monitoring their child's general progress in education.
- Knowing when to be concerned about their child's progress.
- Monitoring their child's achievement of specific education standards.
- Communicating regularly and consistently with their child's teacher and school administrator.
- Identifying ways to help their child with homework.

Note: Additional resources on connections to family and educator engagement in data can be seen in the Extended References section.

Thematic Finding C. Engaging Families in Leadership Practices

According to more than 40 years of accumulating evidence, family engagement is one of the strongest predictors of children's school success (Weiss et al., 2009) and is dependent on strong,

trusting relationships (Gorinski & Fraser, 2006). Family and community engagement barriers, however, continue to pose challenges (Berg et al., 2006; Onikama et al., 2001) that arise if families have not been exposed to positive family engagement practices, experiences, and beliefs that are validated by leadership or the school culture (Weiss et al., 2009). In the literature, there has also been a shift from parental involvement to parental engagement (Stefanski et al., 2016). Parental or family involvement is simply parents or families participating in activities developed or implemented by staff and measured by the number of parents attending meetings or events. On the other hand, parental or family engagement is defined as a goal-directed relationship between staff and families that is ongoing and culturally responsive, where all parties share the responsibility and mutually support what is best for the student(s).

Parental engagement aligns with all three **AIDs – Leadership, Organization, and Competency**. Family engagement is connected to the **Leadership driver** in:

- a) being able to communicate the vision, mission, goals, and benchmarks to families,
- b) taking the initiative to make data-informed decisions on how to provide guidance in including families in leadership, and
- c) supporting a positive culture and climate conducive to family engagement.

Findings related to family engagement are also connected to the literature through the **Organization driver**, which emphasizes data-informed decision-making to create systematic processes and facilitation in assuring access to high-quality training, technical assistance, and feedback specific to families. Since IDEA requires family engagement in the Individualized Education Planning (IEP) process, in addition to 504 planning and within most ethical guidelines for educators across states, family engagement also aligned with the **Competency driver** in

- a) family engagement and collaboration in selecting inclusive technologies at both the student and systematic levels,
- b) coaching and training families to support proficiency, continued use, and generalization of technology across environments for student progress, and
- c) continuously assessing families to determine the fidelity of technology use in the home that links to positive learning outcomes.

District and school leaders that engage families at both the system and student levels will most likely see an increase in student engagement and student success. While family engagement is not explicit in the AIDs comparative to the application across practitioners, these connections

indicate that educators should ask, “How are we engaging families within each driver to maximize individual student and systematic success?”

Families as Partners in Education

The [Partners in Education: A Dual Capacity-Building Framework for Family-School Partnerships](#) (Mapp, 2013) is a publication of the Southwest Educational Development Laboratory (SEDL) in collaboration with the U.S. Department of Education that presents an ESSA Tier 1 framework for designing family engagement initiatives that build capacity among educators and families for student success. The framework is based on existing research and best practices and is designed to scaffold the development of family engagement strategies, policies, and programs. The process conditions – or series of actions, operations, and procedures – and organizational conditions for success outlined in the framework can be seen in Table 3.

Table 3. Process and Organizational Conditions for Family-School Partnerships

Process Conditions	
<i>Linked to Learning</i>	Aligning family engagement processes with school and district achievement goals and connecting families to the teaching and learning goals for the students.
<i>Relational</i>	Building respectful and trusting relationships between home and school to motivate continued participation.
<i>Developmental</i>	Building intellectual, social, and human capital of all school partners, including empowering and enabling families and educators to be confident, knowledgeable, and informed.
<i>Collective/Collaborative</i>	Building learning communities and networks in groups that foster peer learning, communication, and social networks amongst families and educators.

Interactive	Integrating coaching opportunities for educators and families to test out, apply new skills, and provide feedback on school-home engagement.
Organizational Conditions	
Systematic	Purposely designing initiatives with family-school partnerships in mind, including core components of educational goals such as school readiness, student achievement, and school turnaround.
Integrated	Embedding capacity-building efforts into structures and processes, including training, professional development, professional learning, teaching and learning, curriculum, and community collaboration.
Sustained	Ensuring a systematic vision of family engagement with access to multiple funding streams and programs that are able to operate with adequate resources and infrastructure support.

Note: Adapted from [Partners in Education: A Dual Capacity-Building Framework for Family-School Partnerships](#) (Mapp, 2013).

Resources for Engaging Families

The [Meaningful Local Engagement Under ESSA: A Handbook for LEA and School Leaders](#) developed by the Partners for Each and Every Child and the Council of Chief State School Officers (CCSSO, 2017) is an exemplary resource on how to engage families in addition to other school partners. The handbook defines **engagement** as:

“The process of communicating to, learning from, and partnering with stakeholders (i.e., families) that acknowledges the unique needs and strengths of the stakeholders involved...that is meaningful, inclusive, clear, effective and ongoing in order to best support educational equity and excellence” (CCSSO, 2017, p. 2).

In addition to engagement, the handbook also offers local education agency (LEA) school planning recommendations, exemplars for meaningful engagement across specific categorical

stakeholder groups, tools for building engagement strategies, and a checklist for designing a comprehensive engagement strategy.

Considering families' perspectives and creating inclusive family leadership practices can help close these gaps to support student success and improve outcomes. Garcia et al. (2016b) developed a [Toolkit of resources for Engaging Families and the Community as Partners](#) in Education toolkit that presents a step-by-step model for leadership to assess and understand the current family engagement practices, build relationships with families through a cultural lens, communicate with families effectively, and engage families in discussions on students and large-scale data for meaningful input. The four components of the toolkit include:

- Part 1: Building an understanding of family and community engagement;
- Part 2: Building a cultural bridge;
- Part 3: Building trusting relationships with families and the community through effective communication; and,
- Part 4: Engaging all in data conversations.

Transformational leaders should prioritize families and recognize they can be powerful partners in supporting their children's education (Garcia, 2016b). However, the key to this partnership is ensuring that all educators listen to families' voices (Tyson, 2014) as part of two-way communication between the families and the district, school, and teacher.

Strengths-Based Family Model

Engaging families can be supported by identifying family strengths and looking to them as partners in their education. Focusing on a strengths-based model versus a deficit-based model acknowledges that families want to help their students succeed (Moore & Bratton, 2011). Leaders and all educators should recognize families' strengths, adapt to these strengths, and reach out to families as leaders in the community and partners in education. If district and school leadership encourage and support educator engagement in alignment with best practices with families, there is most likely an increased chance that educators will lead families with a more strengths-based versus deficit model (Moore & Bratton, 2011). This top-down influence on engagement has the potential to have a ripple effect that can lead to positive outcomes for students.

Impact of Family Diversity on Engagement

Educators' beliefs about family and community engagement are also critical to their success in identifying strengths and working productively with families; however, many educators feel unprepared to engage in effective family engagement, and families experience barriers to engaging with school, leading to family engagement fails (Mapp, 2013). Families from cultural, ethnic, language, and socioeconomic backgrounds, for example, often wait for guidance from educators before interacting with the school (Christenson & Sheridan, 2001). Understanding the various cultural lenses and their influences on school-home interactions can encourage engagement. Garcia (2016) noted that *"families who get involved in schools are typically those whose home culture most closely matches the values reflected in schools."* Garcia also cited work from Brewster and Railsback (2003) that found that *"racial/ethnic minority families, lower-income families, and families speaking limited English are often underrepresented in school-level decision-making and family engagement activities."*

Leaders and educators should remember that it is most likely not a family's lack of interest or willingness to get involved but somewhat differing needs, values, and levels of trust (Antunez, 2000; Goddard et al., 2001; Onikama et al., 2001; as cited by Garcia, 2016). For example, a parent who asks multiple questions about a teacher's instructional approach during a conference might be considered engaged from the teacher's perspective, but in some cultures, questioning a teacher is a sign of disrespect (DeGaetano, 2007). Another example may be the assumption that parents can initiate conversations with the school and its staff, but due to language, work schedules, or other barriers, this may hinder parents from reaching out (Vera et al., 2012).

Thematic Finding D. Educator Perspectives of Leadership in Technology

Throughout organizational culture and climate literature, leadership has been identified as playing a pivotal role in establishing the experiences of employees (Schneider et al., 2014), which translates to the experiences of educators or practitioners in schools and districts. The perception of administrative leadership by educators working directly with the students in the classroom has influenced teacher commitment and job satisfaction, which has, in turn, indirectly influenced student achievement and performance (Anderson, 2017). Talking with practitioners and including them in

administrative processes increases transparency, allows for clarity of expectations, and creates more teaming opportunities to procure technology and develop infrastructure to support student growth.

One study by Karakose et al. (2021) investigated the perspectives and experiences of 89 teachers with master’s degrees regarding their school principal's digital leadership roles and technology capabilities during the COVID-19 pandemic. The perceptions and experiences of the teachers in this study were directly aligned or connected to leadership in procurement and infrastructure practices central around:

- a) Digital Technology Usage,
- b) Support for Digital Transformation,
- c) Support for Technology-based Professional Development,
- d) Support for Digital Learning Culture, and
- e) Digital Leadership Skills.

Sub-themes were also developed within the themes identified by Karakose et al. (2021). For example, the primary theme of Digital Literacy Skills included technology usage, managerial skills, and personal skills. A table of the themes and their subthemes can be seen in Table 4.

Table 4. Themes and Subthemes of Leadership Roles in Technology

Theme	Subthemes
Digital Technology Usage	<ul style="list-style-type: none"> • Technology usage level • Reasons for technology use • Aims for technology usage
Support for Digital Transformation	<ul style="list-style-type: none"> • Supporting digital transformation • Reasons for supporting digital transformation • Reasons for not supporting digital transformation
Support for Technology-based Professional Development	<ul style="list-style-type: none"> • Supporting professional development • Support provided for professional development • Reasons for not supporting professional development
Support for Digital Learning Culture	<ul style="list-style-type: none"> • Supports a learning culture • Support provided for a learning culture • Reasons for not supporting a learning culture • Requirements for creating a learning culture
Digital Leadership Skills	<ul style="list-style-type: none"> • Technology usage • Managerial skills

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- Personal skills
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Note: Adapted from Karakose et al. (2021) *Examining Teachers' Perspectives on School Principals' Digital Leadership Roles and Technology Capabilities during the COVID-19 Pandemic*

Based on the findings, teachers perceived the school principals' digital technology usage as adequate and that they support technology-based professional development that “encouraged the use of technology, information sharing, cooperation between teachers, and the promotion of technological tools” (Karakose et al., 2021, p. 15). The teachers, however, emphasized that it was “necessary and important for school principals to make use of the available digital technologies” (Karakose et al., 2021, p. 14). The study also found that principals used digital technologies during the pandemic for different purposes. Some of the examples provided included technology to a) communicate with employees, b) develop news and announcements, c) increase student–parent communication, d) create pathways for document sharing, e) promote the school and events via social media, f) provide information regarding management processes, and g) hold online meetings with various school partners in the absence of face-to-face meetings due to restrictions in place due to the pandemic.

Additionally, in Karakose et al. (2021), teachers in the current study revealed that school principals generally support a digital learning culture. While there were a few who disagreed, it was stated that:

“School principals who supported the creation of a digital learning environments did so through fostering the use of digital media tools, as well as encouraging technology-based classes, and the use of technological tools such as e-books and e-exams. In the digital transformation of schools, not only can the administrators' leadership help to facilitate this transformation, but also the establishment of a digital culture and environment in which their digital leadership can be developed” (Karakose et al., 2021, p.15).

Another study conducted by Anderson and Putman (2020) investigated the perspectives of eight elementary special education teachers with varied levels of teaching experience and confidence using technology regarding integrating technology into lessons. This study provided insight into the interrelationships among teachers' technological pedagogical content knowledge, teaching experience, confidence in using technology, beliefs about the role of technology in education, and perceptions of the benefits and challenges associated with using it. In the study, there were four

overall stances toward using technology according to the study. This included “technology as inextricable from teaching, technology as a balance with other materials, technology as a tool, and technology as a supplement” (Anderson & Putman, 2020, p. 43).

In this study, in alignment with the technological pedagogical content knowledge (TPACK) framework, the special education teachers indicated that some were very confident with using technology (n = 5), whereas others lacked confidence (n = 3). Those more fluent with technology tended to use it excessively, while others less confident were reserved in its use. The findings also indicated that teachers who use technology early in their teaching careers were more confident and expanded their use of technology to adapt it to their teaching regularly. Interestingly, according to the study, “teachers drew a parallel between their struggles with technology and their student’s struggles with academic content” (Anderson & Putman, 2020, p. 42).

Other findings included perceived benefits and challenges of technology. The benefits included using technology for differentiation, various means of representation, motivation and engagement, formative assessment, and integration of life skills. The challenges included technology not working correctly, low confidence in technology, the associated increase in stress levels when struggling to get technology to work correctly, knowing how to problem-solve or circumvent technology malfunctions, teaching students’ technology, and how to use technology to engage in professional development teaching and learning (Anderson & Putman, 2020).

Practitioner Connections to Implementation of the Competency Driver

Similarly, within the **AID – Competency**, practitioners are the driving force in administrative decision-making regarding selection, coaching, training, and fidelity of technology use in schools. To explicitly align the Competency Drivers with the impact or role of practitioners, Table 5 shows examples of how the driver develops inclusive technology practices across practitioners. This includes providing support and including practitioners in the selection, coaching, training, and fidelity process that supports an inclusive technology system.

Table 5. Practitioner Connections to the Active Implementation Competency Drivers

Competency Drivers	Practitioner (e.g., educator, teacher) Connections
Selection	<ul style="list-style-type: none"> • Hiring high-quality educators and staff who can or are willing to learn how to adapt or transform instruction to support inclusive technology practices. • Selecting teacher leaders within the district or school to trial or implement innovative practices and report back meaningful data.
Coaching	<ul style="list-style-type: none"> • Practitioners are provided resources and training to support inclusive technology practice. • Practitioner leaders coach their peers in inclusive technology practices. • Practitioners are provided opportunities to learn and implement problem-solving skills independently and collaboratively. • Practitioners are provided social-emotional support and resources to create a positive and safe school and classroom climate in person and digitally.
Training	<ul style="list-style-type: none"> • Leaders develop various forms of formal and informal training for practitioners and adapt frequently based on the needs of the practitioners. • Leaders provide quality professional development to all educators including special education, general education, related services providers, and staff on inclusive technology practices. • Leaders provide practitioners the opportunity to obtain individualized professional learning sessions through internal and/or external providers to meet the needs of the students in the classroom.
Fidelity	<ul style="list-style-type: none"> • Leaders assess practitioner’s use of various technologies in the classroom with individual students and as a whole-group instructional tool. • Leaders provide constructive and meaningful feedback to practitioners with support in place to meet expectations. • Practitioners are given the opportunity to give reflective feedback in a positive, welcoming environment.

Note: Adapted from the Competency Driver found within the *Implementation Frameworks: An Analysis* by Fixsen et al. (2021), and the *Implementation Drivers* from the State Implementation and

Scaling-Up of Evidence-based Practices Center (SISEP) and the National Implementation Research Network (NIRN) located at the University of North Carolina at Chapel Hill's Frank Porter Graham Child Development Institute (2015).

Thematic Finding E. Professional Development & Professional Learning

There is a distinction between traditional professional development and professional learning that adapts over time and throughout the literature. While both are intended to result in system-wide changes in student outcomes, **professional development** is often associated with mandatory one-time workshops or lectures selected by school or district leaders. It is typically a “one-size-fits-all approach” for training large numbers of educators and staff simultaneously (Scherff, 2018). In contrast, when designed well, **professional learning** is typically interactive, sustained, and customized to individual teachers' needs. According to Scherff (2018), “*professional learning encourages teachers to take responsibility for their own learning and to practice what they are learning in their own teaching contexts.*”

According to Borko (2004), the key elements in professional development include:

- a) The professional development program (curriculum and design);
- b) The educators (learners in the system);
- c) The facilitator(s) or leader(s) who guide teachers as they construct new knowledge and practices; and
- d) The context (setting) in which the professional development occurs.

Darling-Hammond et al. (2017) later defined effective professional development as “*structured professional learning that results in changes in teacher practices and improvements in student learning outcomes*” (p. v). This definition emerged from an extensive search of three decades of literature and extended effective professional development to include:

- a) **Content-focused teaching strategies** with specific curriculum content support in the educator's context;
- b) **Active learning** that allows educators to engage in authentic artifacts, interactive activities, and other strategies to provide deeply embedded, highly contextualized professional learning.

- c) **Collaborative learning** alongside peers in the same or similar context;
- d) **Modeling of effective practices** to provide educators with a clear vision of what best practices “look like;”
- e) **Coaching and expert support** focused directly on the educators’ needs;
- f) **Feedback and Reflection** that is built in for educators to think about their practices, receive input, and make changes;
- g) **Sustained duration** of guidance and support to learn, practice, implement, and reflect on new strategies to facilitate change in their practice (Darling-Hammond et al., 2017).

While there is a place for professional development, leaders should focus on professional learning models for more effective training and coaching practices. Effective professional learning has the potential to improve both teaching and student outcomes (Fischer et al., 2018) in addition to improving recruitment and retention of teachers (Scherff, 2018). According to the research – and in alignment with the structured professional learning professional development models – **high-quality professional learning** also includes:

- a) expectations tied to specific content and standards,
- b) active and interactive learning,
- c) job-embedded training,
- d) internal and external collaboration with multiple school partners,
- e) models of best practice with time allocated to implement new skills,
- f) individualized coaching,
- g) sustained and continuous learning, and
- h) alignment with school goals, standards and assessments, and other professional learning activities (Archibald et al., 2011; Darling-Hammond et al., 2017; Labone, & Long, 2016; as cited by Scheff, 2018).

Similarly, Holzberg et al. (2017) also identified similar features in professional development for educators that positively impacted instruction in transition programming for students with disabilities, including coaching and feedback, collective participation among teachers, consistent content and training, and active learning.

Teachers as Leaders in Professional Learning

Sandholtz (2002), as cited by Turner et al. (2017), also stated that professional development or professional learning should be designed as “teachers teaching teachers” (p.825). Teachers (i.e.,

educators) are more likely to value the contribution of their colleagues whom they share daily experiences with. Leaders should consider that teachers (i.e., educators) have insider knowledge of students, families, the curriculum, and the school-based systems, which could facilitate improved professional learning for colleagues and themselves.

Teacher leadership can be implemented or integrated into small or large-scale training, individualized coaching, professional learning communities, and any other professional learning opportunities that require a specific skill set that might be content- or student-based. For example, if multiple teachers are struggling with programming an augmentative and alternative communication (AAC) device for a student(s) with communication needs, the school or district could request the speech-language pathologist or assistive technology specialist that works with that school or district to do a personalized training with hands-on practices with the device.

Implications for Policy in Professional Development & Professional Learning

Policy can help support and incentivize a more proactive and professional learning approach if implemented by school leaders. Darling-Hammond et al. (2017) identified 7 implications for policy and practice in the [Effective Teacher Professional Development](#) handbook that state, district, and school leaders should consider and use as a guide to integrate more personalized professional development or individualized professional learning opportunities. According to their review of research and literature, these recommendations for policymakers and leaders include:

1. **Adopting standards for professional development** to guide the design, evaluation, and funding of professional learning provided to educators that reflect the features of effective professional learning and standards for implementation.
2. **Evaluation and redesign** of time and school schedules to increase professional learning and collaboration opportunities, participation in professional learning communities, peer coaching and observations across classrooms, and collaborative planning.
3. **Conducting Needs Assessment** using school, district, and/or state data from surveys to identify areas of professional learning most needed and desired by educators.
4. **Identifying and developing** expert educators as mentors and coaches to support learning in their area(s) of expertise for others.

5. **Integrating professional learning into Every Student Succeeds Act (ESSA) school improvement initiatives**, including implementing new learning standards, using student data to inform instruction, improving student literacy, increasing student access to advanced coursework, and creating a positive and inclusive learning environment.
6. **Providing technology-facilitated opportunities for professional learning and coaching**, using funding available under Titles II and IV of ESSA to address the needs of rural communities and provide opportunities for interdistrict and intraschool collaboration.
7. **Providing flexible funding and continuing education units** for learning opportunities that include sustained engagement in collaboration, mentoring, coaching, institutes, workshops, and seminars.

Role of Higher Education in Professional Development & Professional Learning

It is essential to note the impact of higher education institutions on the new and upcoming generations of educators, related service fields, and school administrators in connection to technology advancements in schools and classrooms. In higher education, the ever-changing realm of educational technology brings new challenges and opportunities to professional development and professional learning – similar to its K-12 counterparts. Leaders at the university or institutional level should take technology-related responsibilities for motivating and cooperating with instructors and faculty to achieve modeling of effective technology integration (Yiting, 2022). This is especially important for implementation in education-based programs where best practices in **educational technology (EdTech)**, **informational technology (IT)**, and **assistive technology (AT)** can support pre-service education personnel to use technology in local education agencies. Yiting et al. (2022) found a significant direct relationship between technology leadership and teacher **information and communication technology (ICT)** competency and ICT-integrated behaviors that significantly positively affected teachers.

Conclusion

Concerns over the leadership ability of education personnel have grown in importance within education research as the quality of leadership styles continues to impact and facilitate change, enhance employment commitment and performance, and improve overall organizational

performance and approaches (Anderson, 2017). Leadership at the state, district, school, or higher education level can create a positive or negative ripple effect across educators, staff, families, and students, with whom systematic change starts. The literature and supplemental resources that guide the development and implementation of the CITES Framework emphasized five primary themes in this review. These included a) the importance of transformational leadership qualities to improve inclusive technology systems, b) using various forms of data across school partners (e.g., leadership teams, families, educators, students) to inform decision-making, c) being proactive in identifying systematic barriers to implementing inclusive technology systems, d) understanding educators' perspectives on leadership and how to improve them, e) engaging families as leaders, and f) creating professional development and professional learning opportunities for all educators in inclusive practices.

Within these themes are some vital frameworks and resources that leaders can access to start to consider ways on how to improve their leadership abilities towards a more inclusive technology-enhanced system. Some of these include the [Toolkit of resources for Engaging Families and the Community as Partners](#) in Education toolkit that presents a step-by-step model for leadership to assess and understand the current family engagement practices, build relationships with families through a cultural lens, communicate with families effectively, and engage families in discussions on students and large-scale data for meaningful input; [Meaningful Local Engagement Under ESSA: A Handbook for LEA and School Leaders](#); the Active Implementation Drivers (AID) under the Active Implementation Framework (AIF); the [State Implementation and Scaling-Up of Evidence-based Practices Center \(SISEP\)](#) and the [National Implementation Research Network](#) located at the University of North Carolina at Chapel Hill's [Frank Porter Graham Child Development Institute](#); the report [Current to Future State: Issues and Action Steps for State Policy to Support Personalized, Competency-Based Learning, Project Tomorrow](#); and the [Partners in Education: A Dual Capacity-Building Framework for Family–School Partnerships](#) that is a publication of the Southwest Educational Development Laboratory (SEDL) in collaboration with the U.S. Department of Education that presents an ESSA Tier 1 framework for designing family engagement initiatives to build capacity among educators and families for student success.

Although general leadership practices found within this review can be applied in most leadership positions, this review aimed to align those practices with common influences that have been found to affect inclusive technology systems through the literature and through needs identified in working with the CITES Framework Development Districts. As identified in the Extended References, there are many resources and guides available to adapt this literature to various leadership positions.

Lastly, it is important to recognize that inclusive leadership may not come in the form of an administrator, principal, or superintendent and that teacher leaders, leaders in the community, parent leaders, student leaders, and leaders in specific technology departments (e.g., EdTech, IT, ICT, AT) – dependent upon the systematic structure.

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