

Early Childhood and Accessible Materials and Technologies: Synthesis of Knowledge Development Findings

By AEM Center at CAST

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Background on the Development of the AEM Quality Indicators for Early Childhood Programs

The National Center on Accessible Educational Materials for Learning (National AEM Center) at CAST is a technical assistance (TA) center funded by the U.S. Department of Education, Office of Special Education Programs (OSEP). The purpose of the Center is to improve educational and employment opportunities for individuals with disabilities through TA activities that increase both the availability and the use of accessible materials and technologies. The Center's stakeholders serve and advocate for individuals with disabilities and their families across the continuum of educational settings: early learning, K–12, and postsecondary academic and career training programs.

CAST has a rich history of providing AEM-related TA services, particularly to state leadership teams seeking to improve statewide systems for providing accessible materials and technologies to all students who need them. Since 2007, CAST TA specialists have provided intensive TA to leadership teams in twenty-seven States. Central to this TA has been the continuous improvement of the Center's Quality Indicators with Critical Components, which point to evidence-based practices for creating and sustaining coordinated systems for providing and using accessible materials and technologies.

In partnership with 15 states, between 2007 and 2014 CAST co-developed and supported the implementation of the Quality Indicators with Critical Components for the Provision of Accessible Instructional Materials (AIM). Based on evidence behind the Quality Indicators for Assistive Technology (QIAT), these indicators were designed specifically for K–12 systems and were limited to best practices for providing accessible formats of print materials. In 2016–2017, CAST revised the Critical Components for K–12 by adding considerations for the provision of accessible digital materials, which updated "AIM" to "AEM." In parallel with the K–12 revision, Critical Components for Higher Education and Critical Components for Workforce Development were co-developed with field experts and released in 2018 and 2019, respectively.

In early 2020, we turned our focus to the start of the education continuum: [Developing Critical Components of the Quality Indicators for the Provision of Accessible Educational Materials and Technologies for Early Childhood](#). This set completes the National AEM Center's Quality Indicators, giving States the guidance needed to ensure that all learners with disabilities are provided accessible materials and technologies as they experience transitions from PreK all the way to postsecondary settings.

Goals of the Center’s Early Childhood Knowledge Development

The goals of the National AEM Center’s knowledge development activities in early childhood programs are: 1) to understand the early childhood program landscape as it relates to the provision and use of materials and technologies for early learners and, on that basis, 2) to draft relevant Critical Components for the National AEM Center’s existing Quality Indicators for the Provision of AEM and Accessible Technologies (QIs).

Although the principles of evidence-based practice, inclusion, and use of AEM apply in early learning, the provision of AEM for children with disabilities in these settings is complicated by the nature of the early childhood educational system. Lead agencies differ across states, and consequently, there is wide variation in service delivery models in preschool settings (e.g., pull-out, push-in, collaborative consultation). Furthermore, the certification and training requirements for early childhood personnel is highly variable, leading to inconsistencies in staff awareness and implementation of AEM and assistive technology (AT). Therefore, it is essential to understand the early childhood landscape in order to develop appropriately contextualized QIs with Critical Components for the provision of AEM in these settings.

Knowledge Development Activities

In this section, we describe our early childhood knowledge development activities, particularly with respect to public preschool programs serving children with disabilities under Part B, Section 619 of IDEA. As described below, knowledge development activities included: a literature review; insights gained from the Inclusive Early Learning Care and Coordination Project, a partnership between CAST and the Santa Clara County (CA) Office of Education; interviews/focus groups with national and state TA providers; and the construction of a crosswalk between the National AEM Center’s existing QIs with Critical Components for K–12 and the Indicators of High-Quality Inclusion, which were co-developed by a coalition of partners co-led by the Early Childhood Technical Assistance (ECTA) Center and the National Center for Pyramid Model Innovations (NCPMI).

Throughout these activities, we stayed alert to facts, comments, practices, and recommendations that provide insights into how the seven AEM Quality Indicators (QIs) can apply in early childhood programs:

1. A coordinated system for providing accessible materials and technologies
2. Provision in a timely manner

3. Written guidelines
4. Learning opportunities and TA
5. Data collection
6. Data use
7. Allocation of resources

Literature review

We conducted a literature review to inform our understanding of the early childhood landscape, particularly with respect to service delivery models and the associated roles of staff typically responsible for the provision of AEM and AT. Resources included a comprehensive research review article and research synthesis brief ([Odom et al., 2004](#); [National Professional Development Center on Inclusion, 2009](#)), several practitioner-focused books ([Richardson-Gibbs & Klein, 2014](#); [Horn, Palmer, Butera, & Lieber, 2016](#)), and the 41st Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act ([41st-arc-IDEA; U.S. Department of Education, 2019](#)).

The literature review supported the following conclusions. First, and foremost, the provision of AEM should be used as a lever for inclusion; that is, we should prioritize AEM that promotes or enables the inclusion of all children with disabilities in early learning programs. The reasons for this are that inclusion is overwhelmingly regarded as beneficial for all young children, and older students, for that matter (Odom et al., 2004; National Professional Center on Inclusion, 2009; Richardson-Gibbs & Klein, 2014); and furthermore, Universal Design for Learning (UDL)—pioneered by CAST—is a way to satisfy the provision of inclusive AEM (Horn et al., 2016).

Second, initial efforts at supporting the provision of AEM in early learning may benefit from prioritizing our focus on specific educational environments. According to the *41st-arc-IDEA* (U.S. Department of Education, 2019), regular early childhood programs (i.e., those serving at least 50 percent of children without disabilities) account for two-thirds of all three through five year-olds served under IDEA, Part B. Regular early childhood programs include “Head Start, kindergarten, preschool classes offered to an eligible prekindergarten population by the public school system, private kindergartens or preschools, and group child development centers or child care” (p. 32, U.S. Department of Education, 2019).

Third, key findings from the *41st-arc-IDEA* indicate that “in 2017, the most prevalent disability category of children ages 3 through 5 served under IDEA, Part B, was *speech or language impairment* (specifically, 328,051 of 773,595 children, or 42.4 percent). The next most common disability category was *developmental delay* (37.2 percent), followed by *autism* (10.8 percent). The children ages three through five represented by the category “Other disabilities combined” accounted for the remaining 9.7 percent of

children served under IDEA, Part B (Exhibit 13).” These data on the highest incidence disabilities in early childhood programs provides an important context as the National AEM Center constructs customized Critical Components for providing AEM.

Fourth, not all service delivery models are equally effective in terms of inclusion or the provision of AEM (Richardson-Gibbs et al., 2014). Common models include itinerant-direct service (pull-out or push-in); itinerant-collaborative (collaborative consultation); team teaching (co-teaching); early childhood teacher only; Early Childhood Special Education (ECSE) teacher only (reverse mainstreaming); and integrative or inclusive activities (social mainstreaming). The least effective model is one that relies solely on the early childhood teacher to provide AEM. Furthermore, “the most common ‘model’ of inclusion support is the use of a one-to-one paraeducator assigned to a particular child in the inclusive classroom. Many paraeducators assume primary responsibilities for assisting children in inclusive environments and sometimes also for data collection used to make decisions regarding the instruction of a child” (Richardson-Gibbs et al., 2014, p. 31). Although the National AEM Center does not have control over the service-delivery models employed in specific educational environments, the Center’s ultimate goal is to develop Critical Components that are relevant and applicable across early learning settings where children with disabilities are being served.

Inclusive Early Learning Care and Coordination Project

The National AEM Center benefited from insights gained as a participant in the Inclusive Early Learning Care and Coordination Project (IELCCP), a partnership between CAST and the Santa Clara County Office of Education (SCCOE). This was a yearlong (2019-2020) project designed to advance the inclusion of children with disabilities in early learning settings in central California. Under the leadership of the [SCCOE Inclusion Collaborative](#), the project brought together a consortium of five neighboring counties: Monterey, San Benito, Santa Clara, Santa Cruz, and San Mateo. The overarching goal of the IELCCP was to enhance each county’s capacity to evaluate, design, share, and support inclusive practices in birth to age five settings. The IELCCP focused on three aspects of inclusive learning environments: facilities, equipment, and professional development. SCCOE identified UDL and AEM as core drivers of inclusive practices for the five-county consortium.

To kick off the project, teams from the five IELCCP counties attended a one-day workshop at the SCCOE office where CAST staff, including an AEM Center TA Specialist, introduced the UDL Guidelines and the K–12 version of the QIs for the Provision of AEM. County teams also completed a landscape review activity and a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. These activities

revealed gaps in the county teams' understanding of UDL and AEM. While the teams had some understanding of universal design in relation to the design of the built environment, they had less background knowledge of the UDL framework and its utility in designing curriculum.

To build the Collaborative's understanding of UDL and AEM, and then facilitate the transfer of this knowledge to create more inclusive early childhood settings across the five counties, administrative personnel from each team participated in monthly trainings over video conference with the CAST/SCCOE design team. Design work focused on using systems thinking, design thinking, and implementation science. For example, the county teams used systems-thinking protocols to examine each of the four domains of the [CAST UDL School Implementation and Certification Criteria](#). For each domain, they articulated their vision of what an inclusive birth–5 environment looks like and the practices that would be needed to achieve that vision.

Two key findings emerged from the IELCCP:

1. Family engagement is essential to inclusive early learning environments. Cultures that foster a sense of belonging promote families that see themselves represented in the curriculum. For example, including families in professional learning opportunities and sharing UDL practices with them leads to improved coaching support. And engaging families in collaborative problem-solving and strategic planning ensures that practices support equity and inclusion.
2. Communication must be uniform and seamless to prevent fragmentation among a variety of early learning service providers, including LEAs, non-LEAs, licensed, non-licensed, etc.

The outputs of the IELCCP are now being implemented by the county teams through a shared strategic plan.

Interviews with Early Childhood Experts

The goal of the knowledge development interviews was to gather information about the provision of disability-related TA and other services in the early childhood space. Two of the interview sessions were conducted with staff representing OSEP-funded centers that provide TA to ECSE providers: ECTA Center and the Center for IDEA Early Childhood Data Systems (DaSy Center). Two sessions, on separate occasions, were conducted with staff representing the Center on Enhancing Early Learning Outcomes (CEELO), a national center that provides TA to early learning offices within state education agencies. And one session was conducted with staff representing a state agency, within the Oregon Department of Education, providing TA to ECSE providers.

All interviews were conducted by the following National AEM Center staff: Director Cynthia Curry, TA Specialist Luis Pérez, and EC Specialist Jess Gropen.

Early Childhood Technical Assistance (ECTA) Center

ECTA Center representatives included Christina Kasprzak (Co-director), Megan Vhem (Co-director; also codirector of the STEM Innovation for Inclusion in Early Education Center (STEMIE)), and Katie McCullough (Associate Director).

The discussion centered on the need to be clear about the scope of AEM in early learning programs (e.g., including materials other than print, such as manipulatives, that support early learning activities) and the initial population focus of AEM (e.g., 3–5-year-olds in preschool classes within the public school system). ECTA staff described how they worked with partners (the National Center for Pyramid Model Innovations and others) to develop the Indicators of High-Quality Inclusion. They noted that a number of states are part of a cohort to receive TA on these indicators—including Oregon, a state selected in August of 2020 for the National AEM Center’s 2020-2024 intensive TA cohort (AEM Cohort). The discussion ended with some consideration of state agencies that are instrumental in coordinating early childhood services (State Advisory Panels and Interagency Coordinating Councils) and early childhood curricula in widespread use (Creative Curriculum, High Scope, and Teaching Strategies Gold).

Center for IDEA Early Childhood Data Systems (DaSy Center)

DaSy Center representatives included Kathleen Hebbeler (Senior Principal Education Researcher, SRI Education), Donna Spiker (Senior Early Childhood Researcher, SRI Education), and Cornelia Taylor (Early Childhood Researcher, SRI Education).

The discussion began with a brief summary of the history of the DaSy Center. The DaSy Center provides intensive and targeted TA to states on the development or enhancement of coordinated early childhood longitudinal data systems. A primary challenge is to build human capacity and a “data culture.” Much of the TA offered by the DaSy Center includes workshops on systems design (e.g., linking Part C data to Part B data), but they also provide support around data analysis, particularly involving child outcomes. They also support State Systemic Improvement Plans (SSIPs). Although DaSy does not support systematic data collection for the provision of AEM per se, the child-level data collected by DaSy corroborates the high incidence of children with speech or language impairments.

Center on Enhancing Early Learning Outcomes (CEELO)

The first CEELO representative interviewed was Jana Martella (former Co-director of CEELO). The discussion began with a brief summary of the history of CEELO. CEELO was funded by the U.S. DOE as a comprehensive center in the content area of early learning outcomes and charged with providing TA to offices of early learning in SEAs and LEAs. The main legacies of CEELO include a series of interviews with leaders in early childhood, a survey of offices of early learning, focus groups with state early learning specialists, and a report on highly effective offices of early learning. CEELO also assisted the ECTA Center in developing their framework and with the Indicators of High-Quality Inclusion. At a systems level, Dr. Martella noted that 45 states received 2018 preschool development grants and have completed needs assessments for children with disabilities. She emphasized the need to use trauma-informed practices, and to include consideration of behavioral barriers. Some of these issues were highlighted in the [2019 Roundtable](#), “Equity First: Strengthening an Equity Agenda for State Early Childhood Education Policy.”

The second CEELO interview was conducted with Diane Schilder, Senior Fellow at the Urban Institute and formerly with CEELO and with EDC as Principal Research Scientist. The discussion focused on Dr. Schilder’s extensive knowledge of early learning in different states, with particular attention to the states that applied to be part of the National AEM Center’s 2020–2024 AEM Cohort. As noted in early interviews, many states have received preschool development grants (PDG) and are engaged in developing strategic plans. Dr. Schilder provided valuable information on the readiness of states to undertake a systemic approach to the provision of AEM in early childhood programs. Relevant factors include whether a state has received a PDG, whether a separate agency oversees early childhood in a state, the quality of data systems, the size of the state, the agenda of the state early childhood leadership, and capacity issues (including the number and quality of staff and staff turnover).

Oregon Department of Education (ODE)

ODE representatives included Debra Fitzgibbons (Coordinator, Oregon Technology Access Program (OTAP); Meredith Villines (EI/ECSE Coherent Strategies Specialist); Mandy Stanley (EI/ECSE Education Specialist); and Gayl Bowser (Program Coordinator for ODE projects for 30 years, currently an independent consultant).

The discussion centered on the topic of what “inclusion” means in early childhood. Oregon is currently receiving intensive TA from the ECTA Center to improve high-quality inclusion in early care and education. The participants in this discussion were excited about the opportunity to receive intensive TA from the AEM Center, as well, and

wanted to talk about the relationship of AEM to inclusion. Following the [NAEYC/DEC statement on inclusion](#), the group agreed that efforts should be directed at ensuring the three defining features of *access*, *participation*, and *supports*. In their experience, need was greatest in the areas of motoric function, communication, and social/behavior. Furthermore, even though disabilities are often identified after the age of five, there are usually precursors to disabilities that are apparent during the preschool years; early childhood providers should be aware of these precursors, and proactive in identifying a child’s need for AEM.

Crosswalk: Indicators of High-Quality Inclusion and the Critical Components for the Provision of AEM in K-12

Given the close connection between the concept of inclusion in early childhood and AEM, as noted above, we developed a crosswalk to compare the current AEM QIs with Critical Components for K–12 and the [Indicators of High-Quality Inclusion](#), developed under the joint leadership of the ECTA Center and NCPMI. The purpose of this activity was to identify indicators of inclusion that necessitate the provision of AEM for children with disabilities. The process led to key considerations for the development of AEM QI Critical Components for early childhood programs:

- Relevant across all seven AEM QIs:
 - The role of families in the provision of AEM for children in early learning programs needs to be identified under each AEM QI
 - The purpose of print materials, digital materials, and technologies in early learning settings needs to be considered in unique and distinct ways from their purpose in K–12, higher ed, or workforce development—for example, to support early literacy skills (phonological awareness, letter and word recognition, print awareness, etc.) and social-emotional skills (e.g., understanding emotions, problem solving, entering play, taking turns).
- Relevant to AEM QI 1: A coordinated system for providing AEM
 - The need for state-level leadership in the form of a “State-Level Cross-Sector Leadership Team.” The cross-sector vision and mission should address the need for AEM by children with disabilities, and the team’s strategic plan should include the provision of AEM in local programs.
- Relevant to AEM QI 2: Provision of AEM in a timely manner
 - The provision of services should support children with disabilities in environments in which all children would naturally participate, hence the need for timely provision of those supports, including AEM and accessible technologies.
- Relevant to AEM QI 3: Use of guidelines

- Make an explicit reference to the use of State early learning guidelines/standards.
- Be explicit about the need to support the provision of AEM for children with disabilities “in environments in which all children would naturally participate.”
- Guidelines should address the coordination of resources across agencies.
- Relevant to AEM QI 4:
 - Be explicit about the training for early childhood special educators and paraeducators, as these roles have a disproportionate influence on AEM for young children.
- Relevant to AEM QIs 5 and 6: Collection and use of data
 - An expectation of the State-Level Cross-Sector Leadership Team is to use both qualitative and quantitative data on a routine basis; AEM-related data are essential to identifying and correcting barriers to learning for many children with disabilities.
 - AEM-related data should be used in the quality assurance process that addresses the provision of services and supports.
 - Assessment should be highlighted as critical to identifying children with disabilities, including some recognition of precursors to those disabilities. In keeping with ECTA State Indicator 4, data should be collected and used “to evaluate and improve how well children with disabilities are accessing and participating in inclusive early childhood programs.”
- Relevant to AEM QI 7: Allocation of resources
 - An expectation of the State-Level Cross-Sector Leadership Team is to secure resources for local programs to implement the state vision and mission; AEM is a necessary means for accomplishing a vision and mission for inclusivity in early childhood programs.
 - Resources should be coordinated across State early care and education agencies and the local level.

The above intersections between the AEM QIs and the Indicators for High-Quality Inclusion were immensely useful to the development of the Critical Components for early childhood.

Focus Group on Initial Draft of the Critical Components for the Provision of AEM in Early Childhood Programs

Staff from the AEM Center virtually convened a focus group of early childhood experts to provide feedback on a first draft of the Critical Components for the Provision of AEM in Early Childhood. Members of the focus group included some of the same experts

who served roles in the knowledge development activities (Diane Schilder, Gayl Bowser, and Christina Kasprzak), as well as Kelly Wylie (Coordinator, SCCOE and a leader of the IELCCP) and Donna McNear (education consultant with more than 40 years of experience as a teacher and O&M Specialist).

Three key themes emerged from the focus group:

1. Family engagement is essential and should be contextualized across each and every early childhood QI, including representation at the State, local, and program levels. The [Council of Chief State School Officers \(CCSSO\) State Consortium on Family Engagement](#) was specifically referenced as a model that has adopted by many States.
2. While a wide variety of materials from multiple sources are used in early childhood programs, the primary curriculum design is based on activities. To engage early childhood stakeholders, the related QIs should elevate the importance of designing activities that are inclusive of all children. From such context, the consideration of accessible materials to facilitate inclusive activities can be made.
3. The consideration of a child's need for AEM should be emphasized and routine in early childhood special education evaluation and eligibility.

The above themes were transferred to the Critical Components for early childhood programs.

Final Thoughts on the Process of Knowledge Development

The National AEM Center's use of knowledge development was clearly effective at meeting the purpose of informing the process of creating the Critical Components for providing and using AEM in early childhood programs. Beyond that, the Center established partnerships and an extended network of early childhood experts that will continue to support the evolution of the Critical Components over the course of the four years of the project.

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