

Promoting Participation for Development and Learning with Assistive Technology Supports

Fundamental to our knowledge of child development is the understanding that all children learn best through active participation in everyday activities and routines where they strengthen existing capabilities and promote new competencies. However, disabilities and developmental delays prevent full participation in typical childhood activities for over one million of our nation's youngest children, ages birth to five.

Assistive technology (AT) devices and services can provide these children a means of engaging with physical/social environments, making possible learning opportunities that would otherwise be denied to them. The Let's Participate! Project provided the necessary knowledge and skills for families and service providers to successfully implement AT supports into the lives of children yielding positive outcomes.

Assessing Child's Development & Establishing Family Priorities and Concerns

A child is assessed with a variety of measurement tools to identify progress and delays in developmental areas as defined in IDEA Part C:

- Cognitive
- Physical (includes vision + hearing)
- Communication
- Social or emotional
- Adaptive (Self Help)

Assessments for developmental domains are used to identify the area of a child's delay or need. Development is known to be uneven and overlapping across domains. As children grow, each area of development and learning affects another. Understanding the overlapping effect of developmental areas in young children may lead to differing conclusions. For example, if a child can't follow a 2-step direction is it because a) he can't hold in his memory sequential activity steps (cognitive), b) he doesn't understand the directions (receptive language), or c) he's in a power struggle with you and chooses not to follow the directions (social/emotional)?

Because each child develops in unique ways, domains include a series of predictable but not rigid milestones that children typically follow. The milestones are the "what" of development. These assessments are often observation-based in authentic family settings and help to identify a child's abilities and needs as they interact in everyday activities. Assessment results provide detailed information and help to guide areas of intervention. A child's development in each domain is assessed. This provides criteria for Parts C and B eligibility. Family concerns focus on areas of delay and the services and strategies that can be offered to reduce or diminish the delays. With these supports the



child can make progress towards developmental milestones. Among those supports are assistive technology devices and services.

AT devices alter the accessibility of the environment, putting control back into the hands of the user, thus enhancing the child's ability to explore, learn, and play, leading to ongoing development. In fact, AT may be the only means by which some children with disabilities can be engaged with a physically and socially responsive environment. AT services ensure that appropriate assessment, training and evaluation takes place.

Identifying a Child's Level of Participation in Everyday Routines + Activities

Children attain ongoing developmental milestones by their active participation in daily routines and activities where learning opportunities occur. During development a child participates in more and more complex ways, building on past experiences and eventually becoming independent by naturally developing skills overtime. These skills are reflected as the milestones described above. A single activity can provide opportunities for developing skills in several areas.

For example, a 2-year-old child who is involved in imitative play while pretending to take his "baby" for a walk to get milk at the store would be developing competence in any/all of the domain areas. A disability in any of the areas could result in an inability to fully participate:

- Put the baby in the stroller and walk it across the room (motor)
- Respond to his mother that he is "going to the store" or "getting milk" (language)
- Imitate/remember the sequence of getting ready to go somewhere (cognitive)
- Regulate his behavior to carry out the actions (social/emotional)

Daily routines and activities are the "how" of development. Every child is unique in terms of his or her activities. Every family has its own habits, rituals, and traditions. On the other hand, some events, such as eating, sleeping, and waking up, are common to all infants and toddlers. It is important to know the daily routines and activities in a child's day and their priority and impact on family life in order to identify the supports a child needs. There are hundreds of activities throughout the day that can provide learning opportunities for children. Typical routines and activities in a home setting include:

- Waking up
- Getting dressed
- Meal time
- Nap time
- Playtime: inside and outside
- Story time
- Going out
- Watching TV
- Bedtime

As children get older the number of settings and activities they participate in increase. When a child attends a childcare setting, the number of activities he participates in expands, as do the related learning opportunities for growth and independence. Typical routines and activities in a childcare setting naturally include interactions with more adults and peers as well as a growing variety of available materials and tools to use. All of these experiences add to a child's attainment of skills. The more the child successfully interacts the more he grows and learns; building on past experiences. Routines and activities in a childcare setting include:

- Arrival
- Circle time (group meeting)
- Choice time in learning centers (blocks, dramatic play, toys and games, art, library, discovery, sand and water, music and movement, cooking, computers and tablets)
- Focused activities in small groups
- Snack time
- Transitions/cleanup
- Outside choice time
- Story time
- Rest time
- Closing and departure

These routine events within the child's day are the arenas for AT devices and services. Finding out where and how families play, work and live, specific activities they enjoy, and how each member participates, is valuable information for determining if and how AT can benefit a particular child and his or her family. The family in partnership with EI professionals works to identify strategies that address the barriers to participation in specific daily activities where the child could be more actively involved. As children become more competent and independent in their participation in daily activities, their level of skill development increases. They are frequently formally and informally re-assessed to identify emerging strengths, supports that work, and new areas of needed support. Issues associated with "AT fit" change as the child participates in different natural environments. Among those issues are portability, training across settings, and preference for AT with universal design features.

Identifying Supports to Increase a Child's Level of Participation in Specific Activities

Disabilities can present barriers to full participation for young children so that there are fewer natural opportunities for development embedded in everyday activities. By understanding the learning opportunities inherent in everyday activities and the developmental progress of a child, we can better identify the supports that may be most useful to circumvent the barriers. Supports provide flexible ways to engage, assess and support development and learning. They can take many forms: the strategies a teacher or parent may use, personal and peer supports, changing an activity or how it is presented, reducing the number of choices are some examples. Supports vary by child, setting and activity. All consider a child's abilities-what he can and wants to do; then address the barriers that prevent him from

doing more. When a child needs a physical support or tool to help him participate more fully, that item is considered assistive technology. All supports are not AT, but all AT devices and services are supports.

Assistive Technology as a Support Strategy

AT is a strategy that can be combined with other strategies to provide an adequate level of support in order for the child to “do” in order to participate in everyday activities. AT use with young children goes beyond matching the devices and services to the child’s abilities and disabilities, and reflect the family’s goals: helping the child to grow and develop independence while reducing stress and empowering the family.

In the development of the young child, developmental domains often overlap and may be unable to be differentiated or prioritized in importance, as it is their functional integration that results in the acquisition of developmental milestones. For example, movement is closely aligned with a child's visual abilities –she reaches and moves towards something interesting that she sees and begins to interact with it. This self-directed mobility expands a child's opportunities to interact with their world, thereby promoting social, emotional, physical and cognitive development.

There are four functional ways in which young children participate (“do”) in their daily activities: (1) through movement, (2) through communication, (3) through use of activity materials, and (4) through appropriate interactions. AT supports for each area are described in each arena below:

- **Movement** refers to body positioning, balance and mobility. For infants and toddlers with disabilities, barriers to participation may be uncontrolled body movement, or alternatively, the inability to initiate or sustain stable positioning, balance or movement. An infant who cannot sit up independently will require support in order to be comfortably and safely maintained in that position in order to engage in an activity. AT movement devices support a child to experience more opportunities for self-directed movements. As a result, the child’s intrinsic motivation is encouraged and promoted. As children adapt to these experiences they are perceived and responded to by others as more mature and independent.
- **Communication** between infants and caregivers begins at birth and includes a repertoire of sounds and gestures including facial expressions, smiling, cooing, grasping hands and crying. All of these interactions lead eventually to the development of communication and language which provides the foundation for social relationships and learning in the early years. Infants and toddlers with disabilities may need assistance to recognize and/or respond appropriately to communication cues. Communication influences the development of functional language and social domains and is a critical indicator of overall development. When a child's acquisition of a language system is delayed, a communication-based approach where all IFSP team members apply the same communication strategies throughout the program is encouraged. When verbal speech is limited due to disability, AT systems are available to support their communication abilities and to acquire language skills.

- **Use of Activity Materials** involves seeing, hearing, touching, holding, tasting, smelling and moving things in everyday activities. These actions directly influence the development of all domain skill areas. Most routines and activities include materials such as utensils, tools or toys that children use in order to participate. For an infant, the active materials list may be relatively short, including clothes, blankets, and toys. As a child ages, the settings and activities expand and the child's materials list grows quickly. By the time a child can move around independently, s/he may have access to everything in the environment. These materials are as numerous and varied as the learning opportunities throughout the day and are at the heart of "participation". A variety of AT supports are available that can make it possible for a child to interact successfully.
- **Engagement Behavior:** Disabilities can make it difficult to attend, read social cues, follow rules, and interact appropriately in daily activities with peers and adults. This lack of full engagement impacts the development of social, emotional, cognitive and communication skills. The right assistive technology can make a big difference for young children by supporting active play, learning, interactions with other children, and adults. Supports are available that can help reduce frustration, increase emotional awareness, expand understanding, and guide appropriate behaviors.

Continuum of Assistive Technology Devices

According to the federal definition, a range of AT supports should be considered for any child. They include a hierarchy of off-the-shelf devices that are designed for all children, modifications to those items, and equipment that is customized for disability. All are used to support a child with a disability to do something s/he couldn't do without it.

- **Off-the-shelf** devices are designed for all children, with and without disabilities, at a particular age (e.g., booster seat, suction bowl, puzzles with knobs). These items often include specific features that may be uniquely responsive to a child's disability. Service providers can help families select and procure such devices when needed. Research shows that families often prefer to use off-the-shelf supports.
 - **Common hand-held technology** (e.g., smartphones and tablets) have been found to be effective for young children in providing successful unique learning opportunities. Service providers can help families select and use appropriate apps with their children.
- **Modifications** to existing products become assistive technology when they enable children to do something they cannot currently do and may not be able to do for a while (e.g., non-slip material under puzzle pieces, picture communication systems board, rolled towels or wedges to enhance positioning)
- **Customized/Specialized** devices designed for children with disabilities can be simple (e.g. battery-operated or single-feature electronic devices or adaptations (e.g., switch-activated toys, cordless remote control to activate appliance/light, or single message recording devices) or complex (specialized AAC apps, adaptive seating or walking aid, multi-level communication device). The

use of these devices may require additional skills and knowledge of the family and service providers.

Types of Assistive Technology Devices

Assistive technology devices range from the creative use of existing resources in the child's environment (e.g., household items and common technology) to adaptations for their use to technology specifically designed for children with disabilities. Many types of AT are available to address needs in all functional areas of development, learning and participation: movement, communication, use of materials and engagement supports.

- **Sensory Integration supports** (weighted lap blankets, timers, visual supports and social stories apps)
- **Supports for hearing and vision** (e.g., toys with sound or vibrating feature, large picture books, headphones or other forms of noise reduction or amplification)
- **Communication** (e.g., picture communication boards, single or multiple message devices with switches or multi-level augmentative and alternative communication devices).
- **Mobility** (e.g., balance balls, adapted walkers, trampolines with standing aids).
- **Positioning** (e.g., pillows, wedges, floor sitters, inflatable discs).
- **Early Learning** (e.g., switch-adapted toys, adapted books, page separators for ease of turning, slant boards, magnifiers, digital recorders, touch-screen tablets, apps).
- **Play** (e.g., Velcro mitt to catch a tennis ball, a ball designed with openings/strings for ease of holding, knobbed crayons, weighted blocks, switch adapted game spinners, apps).
- **Self-care** (e.g., Velcro shirt closures, suction bowl, bath mitt).

AT can be useful not only in supporting participation but by enhancing learning opportunities. A device that may be useful in one arena is likely to be useful in others as well. For example, using visual supports to depict all steps of the "shopping" activity could support a child's memory of the event, promote the use of new vocabulary, and provide a framework of what comes next to reduce frustration. It could also extend the activity described above by enhancing the sequence, introducing new concepts, and vocabulary. Cumulative research efforts concur that AT supports promote ongoing child development. In fact, evidence confirms that AT supports do not hinder development. Instead, by decreasing frustration and strengthening a child's abilities, it makes it possible for a child to actively participate in everyday learning opportunities. In this way AT helps to increase the further development of skills in every domain: motor, language, cognition, social/emotional and adaptive behavior.

Evaluating Effectiveness of AT Supports

Identifying appropriate effective supports are based on the family's priorities for their child and will directly relate to the participatory behaviors and abilities of the child. Identifying measurable observable child behaviors will help to determine if the intervention is successful. For example, if a family is

concerned that they would like to see their child begin to engage in pretend play, they would identify specifically what they would like to see the child “do”.

Outcome: to engage in pretend play with her brother

We will know he can do this when we observe the following actions:

- initiates an imitative or fantasy activity
- uses available props to imitate family activities
- repeats a sequence of 2-3 actions
- uses activity-appropriate language
- repeats activity at home and at grandma’s house

The overarching goal of early intervention and early childhood special education programs is to support families and teachers to help their children to participate in all of the natural environments that are characteristic of the child and his or her family. To contribute to this goal, the Let’s Participate! Project works to enhance the role of AT within the services that support the continuous growth and development of infants and toddlers with disabilities. As a result of AT supports that encourage a child to actively participate in more of life’s experiences, children with disabilities are meeting positive child outcomes including:

- Building relationships through positive social and emotional skills
- Learning through the acquisition of knowledge and skills, and
- Becoming independent through the use of appropriate behaviors



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