

Interventions and Adaptations for Children with Autism Spectrum Disorder in Inclusive Early Childhood Settings

Katharine L. Brodzeller¹ · Jennifer R. Ottley² · Jeusun Jung³ · Christan G. Coogle⁴

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Abstract The inclusive education of children with disabilities is considered best practice, yet many early childhood educators feel unprepared to deliver appropriate instruction for children with disabilities and often require supports to successfully meet the children's unique needs. Young children experiencing autism spectrum disorder are being diagnosed at a young age and they are commonly receiving their education within inclusive early childhood settings. This article presents two methods to meet the needs of children with autism spectrum disorder. First, early childhood educators can provide interventions tailored to the children's learning needs. Second, educators can adapt the environment, materials, activity, instruction, and assistance they provide so that each child is appropriately supported, while still being encouraged to succeed as independently as possible. This article summarizes research-based

interventions and adaptations that early childhood educators can implement within inclusive settings to meet the diverse needs of young children with autism spectrum disorder and presents a case study to describe how these practices can support young children with autism spectrum disorder within inclusive settings.

Keywords Autism spectrum disorder · Inclusion · Early childhood · Adaptation · Intervention

Allen is a bright and energetic Chinese-American kindergarten student. He comes from a supportive family who values education and actively pursues any support that can benefit Allen's growth. Allen is twice exceptional, meaning he is gifted and talented as well as having another disability, namely, autism spectrum disorder. He excels in math, reading, and handwriting. However, there are areas that prove to be challenging for Allen such as cooperating during learning center activities. Allen's parents have indicated the following areas as their priorities and concerns for his current and future learning: communicating effectively with adults and peers, seeking assistance or support in an appropriate manner, and being able to function successfully in inclusive classroom environments while staying engaged and on task.

Early childhood (EC) educators involved in Allen's schooling (e.g., kindergarten teacher, music teacher) have faced challenges that align with the family's concerns. The most notable challenge for his educators has been the impact of Allen's delayed communication on his social interactions with peers. For example, he often physically hits his peers when they do not understand his wants or needs. In an inclusive classroom setting with 19 other students and no in-class support from a special educator

✉ Jennifer R. Ottley
ottley@ohio.edu

Katharine L. Brodzeller
kb167012@ohio.edu

Jeesun Jung
jungj@ohio.edu

Christan G. Coogle
cooglec@duq.edu

¹ Department of Teacher Education, Ohio University, Athens, USA

² Department of Teacher Education, Ohio University, 100 East Union Street, 309D McCracken Hall, Athens, USA

³ Department of Teacher Education, Ohio University, 100 East Union Street, 309FF McCracken Hall, Athens, USA

⁴ Department of Counseling, School Psychology, and Special Education, Duquesne University, 600 Forbes Avenue, Canevin 412-D, Pittsburgh, PA 15282, USA

or aide, Allen's educators have become frustrated. Allen's educators have attempted to maintain positive interactions with him while providing support and guidance, but, due to his communication difficulties and their limited inclusive education training, they have not been able to communicate with Allen in an effective manner. In addition, Allen's educators have struggled creating an environment that is conducive to his unique need for structure. For example, the kindergarten classroom environment includes a variety of centers and transitions and at times is very chaotic. Allen often becomes distracted, anxious, and confused due to the constant noise and movement of the other students in the classroom. This situation often results in Allen shouting or pacing back and forth in a repetitive manner. Allen's kindergarten teacher restores order to the classroom and comforts Allen in order to calm him down, but this takes instructional time away from the class. Consequently, these challenges have led to much anxiety, stress, and frustration for both Allen and his EC educators.

Introduction

Current statistics from the Center for Disease Control (CDC 2014) indicate that 1 in every 68 children are diagnosed with autism spectrum disorder (ASD) in the United States (U.S.). An increasing number of children are also being diagnosed with ASD in other countries, although the rates vary greatly. For instance, 1 in 38 children are diagnosed with ASD in Korea, 1 in 63 children in the United Kingdom, 1 in 588 in Venezuela, and 1 in 10,000 in Oman (as reported in Elsabbagh et al. 2012). Individuals from all racial, ethnic, and socioeconomic backgrounds experience ASD. There are distinct differences in the prevalence of ASD based on gender. For example, some data report that boys are 4.5 times more likely to be diagnosed with ASD than girls (CDC 2014).

Increased attention has been dedicated to the development of early screening and evaluation tools for children with red flags for ASD (Guthrie et al. 2013). These efforts have resulted in researchers validating multiple assessment tools (e.g., autism diagnostic observation schedule; Lord et al. 2012). Consequently, children with ASD are reliably being identified at a younger age (Guthrie et al. 2013; Woods and Wetherby 2003). With ASD becoming more prevalent and children being diagnosed in their toddler and preschool years, it is not surprising that many EC educators provide services to children with ASD in their classrooms. The U.S. Department of Health and Human Services and the U.S. Department of Education (2015) issued a joint policy statement aimed at advancing the inclusive education of young children with disabilities in EC programs across the U.S. Around the world, similar policies have been created,

such as the Education for Persons with Special Educational Needs Act in Ireland (Department of Education and Skills 2004) and the Success for All: Every School, Every Child in New Zealand (Ministry of Education 2010). However, as these initiatives have only recently been enacted and many other countries are still without these policies and system-level supports, EC programs and/or educators regularly seek out instructional and behavioral methods to address the unique needs of children with ASD.

In addition to inclusion representing a legal requirement and a civil right of young children with disabilities, multiple researchers have documented the benefits of inclusion for children with disabilities such as enhanced cognitive and communication development and meaningful peer relationships (Holahan and Costenbader 2000; Nahmias et al. 2014) as well as benefits for children without disabilities, such as increased empathy, compassion, and understanding of diversity (Diamond and Huang 2005; Odom et al. 2011). Yet, for these benefits to transpire, EC educators should receive the necessary supports to provide individualized interventions and adaptations to meet children's needs and maintain a high-quality environment. Currently, many educators around the world still lack supportive systems and structures such as inclusive education and qualified EC special educators. Consequently, when EC educators desire to effectively adapt instruction for children with special needs, they are often left alone without personnel support or helpful resources. In hopes of supporting all EC educators who may or may not have the supportive systems in place, the purpose of this article is to describe adaptations that educators can make within inclusive settings to enhance the learning of children with ASD.

Teaching Children with ASD in Inclusive Settings

ASD affects children's communication and social-emotional development as well as their perceptions of their surroundings (American Psychiatric Association 2013). It is common for children with ASD to initiate and respond to peers and adults less frequently than their peers who do not have disabilities. For example, without prompting during free play, children with ASD may engage in repetitive behaviors (e.g., rocking side-to-side, moving their fingers in front of their eyes, repeating quotes from movies) or may play by themselves without socializing with their peers for the entire activity. Children with ASD also tend to need more structure and routine than children without ASD and a large majority are visual learners; for these reasons, children with ASD thrive in settings that include visual supports and predictability.

Intervention is the intentional teaching of content for the purpose of improving knowledge and skills (e.g., social

narratives, peer-mediated interventions) and adaptations are supports provided to children to make the content taught more accessible (e.g., focusing on key concepts, using visual supports). Interventions and adaptations should be implemented within inclusive environments so that all children can successfully participate as valued members of the academic environment and community of learners with their peers who do not have disabilities. Importantly, both interventions and adaptations promote the meaningful participation and learning of children with ASD in inclusive EC environments. Table 1 presents examples of interventions and accommodations for children with ASD that are grouped according to the following types of support: organizational, behavioral, social-communication, sensory, and structural supports for staff. Each support includes a brief explanation and then implementation examples of how the support might appear in a classroom setting. The final column contains references/resources where more information on the resource can be located.

Embedding Evidence-Based Practices into Typical Routines and Activities

Children with ASD need multiple opportunities to practice a skill prior to acquiring it (Johnson et al. 2015). They also need support in learning how to generalize acquired skills to new activities, settings, materials, and people. For example, if an educator was using repeated opportunities for a child with ASD to practice using his alternative communication system (e.g., picture exchange communication system; see Table 1) in a one-on-one context, the child may achieve mastery in using his communication system in that setting; however, the child may need additional prompting and reinforcement when attempting to use the communication system during mealtime routines that include a group of children and different adults.

There are various strategies that educators can use to enhance desired outcomes for children with ASD. By considering the strengths and needs of each child, specific learning opportunities can be embedded into the typical routines and activities of the classroom. Embedded interventions are an evidence-based practice that align with the Division for Early Childhood's (2014) recommended practices within the instruction topic (i.e., INS5. Practitioners embed instruction within and across routines, activities, and environments to provide contextually relevant learning opportunities). One strategy to support educators in embedding individualized goals into the daily activities and routines is to utilize an *activity matrix* that gives educators specific strategies to use across routines to give children an opportunity to practice their target goals. The activity matrix, as shown in Table 2, can be posted in various areas

of the classroom to remind educators to provide the specific learning opportunities for children with ASD throughout the day and during meaningful times when children are engaged in the activity.

Another helpful resource for understanding how to provide adaptations in the manner that is least intrusive to meet children's needs is the *Creating Adaptations for Routines and Activities* toolkit (i.e., *CARA's kit*; Milbourne and Campbell 2007), which can be used across areas of developmental need (e.g., social-emotional, sensory). *CARA's kit* defines five types of adaptations (i.e., environment, materials, activity, instruction, and assistance) and provides guidance regarding how to utilize these adaptations across a variety of classroom activities. These different categories of adaptations are helpful to support educators in identifying strategies that can enhance the participation and learning of children with ASD and other disabilities during typically occurring activities and routines. For example, in classrooms where learning centers occur frequently, stress and anxiety can rise in children with ASD due to the multiple transitions and risk for over stimulation. In order to provide support for a child with ASD experiencing stress and anxiety, educators can use organizational supports such as arrows on the floor to dictate how to move through the centers (environmental adaptation), handheld schedules to ease the transition (materials adaptation), and peer partners to transition through centers together (assistance). Table 3 contains a detailed adaptation chart where the first column poses a potential challenge in the classroom and the following five columns list adaptations presented from least intrusive (left side) to most intrusive (right side) that can be used to create a solution for the issue.

Organizational, Sensory, and Structural Supports

In order to support Allen in his needs for structure and clear expectations and to meet his family's priority for successful functioning within inclusive environments, his teacher has tried a few adaptations. To manage sensory stimuli in the constant transitions between centers, she taped arrows onto the floor to show the direction in which children should move from center to center. This environmental adaptation, the least intrusive type of adaptation, was effective in guiding him from one center to the next. However, what was still challenging was ensuring that Allen completed his work in the center before transitioning to the next center, as the environment was distracting to him. To minimize the sensory stimuli, the teacher made available noise-dulling headphones to block some of the background noise. Additionally, she worked with Allen's speech and language pathologist (SLP) to create a visual schedule template and pictures that she could customize for each center that

Table 1 Interventions and adaptations to support children with ASD in inclusive environments

Support	Explanation	Examples	References and resources
Organizational supports: Strategies that provide structure and predictability to the environment			
Daily class schedule	A classroom schedule is posted in a location visible to the student to keep track of the day and assist in priming for what is forthcoming	Personal desk schedule or moveable schedule in front of room	Banda et al. (2009) http://afirm.fpg.unc.edu/visual-supports http://challengingbehavior.fmhi.usf.edu/do/resources/teaching_tools/toc/folder5/5c_class_vis_sched.ppt
Task analysis	A process for teaching students a skill in a step-by-step fashion to support skill acquisition	Checklist of what sequential steps to be completed	Machalicek et al. (2009) http://afirm.fpg.unc.edu/task-analysis
Location chart	A chart is posted indicating where a specific person is at any time during the day; Can be used to prepare students for any upcoming absences	Student can move educator to “home” when they know they will be absent	Savner and Myles (2000) http://afirm.fpg.unc.edu/visual-supports http://card.ufl.edu/resources/visual-supports/people/
Classroom personal space	A designated space is provided for the student to retreat to if overstimulation occurs or a need arises for a break	Sectioned off space away from main events of classroom	Brown (2014) https://www.autismspeaks.org/sites/default/files/afyo_environment.pdf
Timer	A timer is set for the student to see that provides visual information about the amount of time left for a specific activity	Personal hand held timer placed on or near student's desk	Dettmer et al. (2000) https://www.autismspeaks.org/docs/sciencedocs/atm/visual_supports.pdf
Circle time mat	A mat can be used to designate a specific spot for students to sit during circle time activities	Movable carpet square with initial or symbol for child	Simonsen et al. (2008) https://www.autismspeaks.org/sites/default/files/afyo_environment.pdf http://iris.peabody.vanderbilt.edu/module/acc/
Organized/structured classroom	Highly organized or color coordinated materials are utilized to make the classroom environment easy to understand and follow through with expectations	Color coordinated boxes, paper, utensils	
Visual support	A picture or other visual is provided to assist in understanding or communicating	Picture of washing hands by the sink	Murdock and Hobbs (2011) http://afirm.fpg.unc.edu/visual-supports
Behavioral preventative: Strategies that enhance understanding of expectations and appropriate responses to stated rules			
Clear and concise instructions	Explicit expectations are provided that eliminates unnecessary information from the guidance given	Provide concise directions or give instructions in chunks or steps	https://www.autismspeaks.org/sites/default/files/setk_supporting_learning.pdf http://iris.peabody.vanderbilt.edu/module/acc/
Visual cues for desired behaviors	Utilize hand signals, cue cards, or picture cues to support children's understanding of expectations and provide a reminder of class rules. This can replace/reduce the need for verbal reminders	Picture of individual with finger over mouth when student needs to listen	West (2008) http://afirm.fpg.unc.edu/visual-supports
Stay in your space tape	Use tape to outline a student's work space where the student is taught to “stay in their space.” This can cut down on students going into their peers' personal space	Designated boundaries for the child's chair	Simonsen et al. (2008) https://www.autismspeaks.org/sites/default/files/afyo_environment.pdf

Table 1 (continued)

Support	Explanation	Examples	References and resources
Preferential seating	Place the student in a location where distractions or irritants are reduced	Seat near the educator or a positive peer model	http://iris.peabody.vanderbilt.edu/module/acc/https://www.autismspeaks.org/sites/default/files/afyo_environment.pdf
Offering choices	Providing student with acceptable responses to a given scenario	Choice chart that student can use when deciding on actions	Dunlap and Liso (2004) http://teach.com/about-autism/autism-and-the-importance-of-choice
Redirection	Interrupt an inappropriate behavior and redirect to a more appropriate alternative behavior	Handing the student a more desirable utensil	Neitzel (2009) http://www.murrieta.k12.ca.us/cms/lib5/CA01000508/Centricity/Domain/64/EBP_overview_24_2.pdf
Antecedent-based intervention	Modifying the environment to remove/lessen a behavior that interferes with the student's learning	Providing activities based on the student's interests	Conroy et al. (2005) http://www.murrieta.k12.ca.us/cms/lib5/CA01000508/Centricity/Domain/64/EBP_overview_24_2.pdf
Differential reinforcement	Utilize function-based reinforcement to support desired behaviors only	Provide praise when a desired behavior is used for students who desire attention	Simonsen et al. (2008)
Social-communication supports: Strategies that assist children with understanding the social environment and communicating in a socially-appropriate manner for the situation			
Model social situations	Show students how to perform a social task to support accuracy and reduce anxiety while completing the activity	Involve peers to model how to carry out an action	Landa et al. (2011) https://www.autismspeaks.org/sites/default/files/sctk_supporting_learning.pdf
Extra time for information processing	Provide extra time for the student to process information and requests before requiring a response	Waiting an additional 10 s before moving on	http://iris.peabody.vanderbilt.edu/module/acc/https://www.autismspeaks.org/sites/default/files/sctk_supporting_learning.pdf
Picture exchange communication system	Provide visuals for the child to use to communicate wants, needs, and challenging words	Feelings chart with images to complement each feeling	Dogoe et al. (2010) http://www.tacanow.org/family-resources/pecs/
Social narratives	Provide narrative stories that describe the social situation to assist in understanding the procedures and expectations for an activity	Social story about sharing with friends	Schneider and Goldstein (2010) http://afirm.fpg.unc.edu/social-narratives http://depts.washington.edu/hscenter/social_stories
Video modeling	Record a video of the student or another individual performing the target skill. Show the video to the student and provide time to practice the skill	Video self-modeling, video prompting, point-of-view video modeling	Green et al. 2013; Franzone and Collet-Klingenberg 2008 http://www.watchmelearn.com/video-modeling/video-modeling-in-practice
Sensory supports: Strategies to assist children in managing the multiple stimuli of a given environment			
Lessen sensory experiences	Lessen the environmental and activity sensory experiences to support active participation in the activity	Lessen light, avoid strong deodorizers	Thompson and Raisor, 2013 https://www.autismspeaks.org/sites/default/files/afyo_environment.pdf

Table 1 (continued)

Support	Explanation	Examples	References and resources
Noise-dulling headphones	Provide headphones that block out some noise in the environment to lessen sensory stimulation	Earmuffs, noise reduction headphones	http://at.mo.gov/information-resources-publications/documents/Autism.pdf http://www.kitonline.org/pdfs/Autism%20participant%20guide%20with%20scenarios.pdf Grandin (2015) https://www.autismspeaks.org/family-services/resource-library/sensory-tools-products
Tactile fidget materials	Provide a tactile item for the student to fidget to aid in focusing and relieving anxiety	Stress ball, chair bouncy band	
Structural supports: Classroom- or staff-level changes to the environment that aim to enhance children's outcomes			
Peer-mediated instruction	Provide a peer buddy to model and assist with academic and non-academic activities throughout the day	An appropriate peer to help with going to the bus, lunch, recess, etc.	Harris et al. (2009) http://afirm.fpg.unc.edu/peer-mediated-instruction-and-intervention
Prompting	Physical or verbal assistance to keep student on track or moving towards desired behavior	Putting an object closer to the student to increase choice of object	Ingvarsson and Hollobaugh (2011) http://afirm.fpg.unc.edu/prompting
Classroom aide	Utilize classroom aides to assist with one-on-one support for tasks that are novel, more challenging, or stress provoking	Classroom helper, parent, additional trained staff member	Giangreco et al. (2010) https://www.carautismroadmap.org/aidesparaprofessionals-for-school-age-students/
Computer-aided instruction	Utilizing technology to supplement educator instruction and practice skills	Computer provided to student to assist in vocabulary practice	Simonsen et al. (2008) https://www.sciencedaily.com/releases/2014/07/140717151505.htm
Staff training on ASD	Attend a training on ASD to acquire knowledge about the disability, effective instructional strategies, and developmentally appropriate supports	Speakers visiting school during monthly staff meeting	Robinson (2011) http://www.autismtoolbox.co.uk/whole-school-planning/staff-training/

Note This is not complete/comprehensive list. Rather it provides research-based recommendations across a variety of areas of need to support children with ASD in inclusive environments

Table 2 Embedded learning opportunity activity matrix paired with accommodations

Activities	Goal 1: complete a task when provided with reminders of expectations	Goal 2: engage in activities with peers in an appropriate manner	Goal 3: use fine-motor skills to accomplish tasks throughout the day	Goal 4: communicate with peers or adults in an appropriate manner for at least 4 turn-taking exchanges
Morning meeting	Provide directions with a visual cue that identifies steps within the routine (e.g., Shhh card with quiet face, sit on rug, listen for directions)	Provide a verbal prompt with mat for the child to sit upon with ample personal space and at an appropriate distance to other students	Provide materials such as pencil grips or for the child to write their name down on the check in sheet	Have a peer student provide a verbal model how to greet and then ask the child repeat those actions
Morning centers	Provide verbal prompts behavioral or task support/ reminders	Implement “stay in your space tape”, where the student’s chair should not leave the area marked off	Provide a variety of materials to practice fine-motor skills in centers (e.g., scissors, glue stick)	Provide visuals for the student to reference for speech options at each center
Recess	Provide appropriate choices to the child regarding behavior prior to the activity	Provide a prompt such as a cue cards for initiating play with peers	Have a peer model how to zip up a coat prior to the child attempting the skill/ action	Provide conversational starters or modeling how to ask another student to play, or ask what they are playing
Lunch	Provide directions with a timer that indicates the time they should spend eating before talking	Provide directions and adjust the location of the student to a location where they can interact with peers	Model using an adapted fork	Provide lunch conversation cards to assist in communicating or asking for help with their lunch
Dismissal Transition	Provide materials such as a handheld visual schedule of the tasks that need to be completed	Provide directives that will maintain a calmer classroom atmosphere and provide physical assistance in transitioning to dismissal	Provide a physical model. Then allow the child to use a rope or large ribbon on the zipper of the child’s book bag to assist them in zipping their bag	Provide a prompt such as a cue cards for how to say goodbye to peers as they leave for the day. (e.g., waving, “bye”)

Table 3 Cara's kit adaptation continuum for center activities

Environment	Activity	Materials	Instruction	Assistance
Students are having trouble following the order of tables	Place arrows on the floor showing which direction to follow for table to table movement	Provide a class-wide visual schedule on the wall showing the table order	Provide a portable hand-held schedule for students with the order of tables they visit	As a whole class or in groups, practice moving from table to table prior to starting
Students are placing work in the wrong location upon completion	Move the work turn in locations in different locations so they are not as easily confused	Have a sign in sheet for each location, students will sign their name once they turned in their work	At the top of the students' paper, write down where they turn in the paper (e.g., green tray, mailbox)	Give a verbal reminder prior to centers of where each individual paper/ work piece will be turned in upon completion
Students are not completing the centers or are spending too much time at one center	Place clear and direct instructions at each table to clarify any misconceptions and provide step-by-step instructions	If students are experiencing challenges with writing, have them write less and draw to save time	Provide the materials for each center at the center so students can immediately begin working upon arrival	Provide reminders or additional redirection to ensure that student is completing work on time

outlined the tasks to be completed. Having never created a visual schedule before, collaborating with the SLP was a source of professional support for her.

The interventions and adaptations implemented within the classroom resulted in large success for Allen's engagement in activities and interactions with peers. Due to the individual tools and resources provided to him such as hand-held schedules and visual timers, Allen learned to follow the general flow of the classroom schedule without interruptions or anxiety. Allen's success was strengthened by the adaptations to the environment, which made the classroom a relaxing and safe space for him to learn and succeed academically and emotionally.

Behavioral Preventatives and Social-Communication Supports

In addition to assisting Allen during activities that were more challenging for him, Allen's teacher incorporated two types of interventions (i.e., peer buddy, video modeling) and visual supports to promote his socially-appropriate engagement with peers. First, she selected Joelle to be Allen's buddy throughout the day. Joelle was selected because of the positive connection between her and Allen and her caring and helpful nature toward adults and other students. Then, Allen's teacher purposefully created opportunities for Joelle and Allen to work together, such as placing them in the same center group and having them be walking buddies when traveling to other areas of the school (e.g., library, cafeteria). Third, based on Allen's social-emotional goals to engage in activities with peers, she used Joelle's positive examples of socialization with other students to create video models that she then displayed, discussed, and practiced with Allen as another type of social intervention that demonstrated desired social skills and behaviors. She also created a number of visual supports to assist with Allen's skill development such as providing Allen with cue cards of phrases that could be used to initiate play with peers and a portable visual schedule for pair-share activities during circle time that reminded Allen to (a) look at a peer nearby, (b) respond to the teacher's prompt with his peer, and (c) listen while his peer talked.

The interventions utilized to assist in communication also resulted in meaningful social success for Allen. Instead of hitting his peers when communication was a challenge, Allen began to use words—single words in the beginning and slowly evolving into phrases to communicate wants and needs. Allen's teacher implemented one strategy at a time in a manner that was manageable for her and based on the family's priorities. Specifically for Allen, the tools that laid a foundation for communication development were peer buddies, video-modeling of social situations, and

incorporating visual supports. All of the effort that Allen's teacher put forth towards supporting Allen proved to be beneficial for his success in kindergarten and also made the environment more inclusive to all students and their individualized needs.

Conclusion

All of the interventions and adaptations described in this article can assist children with ASD. Each of the adaptations are focused on making an inclusive environment more receptive to the needs of children within the ASD population as well as providing a pathway for their future success. It is, however, important to remember that in order for an intervention to be effective it must be implemented with fidelity or how it was intended to be delivered (Cook and Odom 2013). Therefore, when identifying target skills and evidenced-based practices, it is important to also consider the components of implementation, individuals responsible, and feasibility of the intervention. The various interventions and adaptations described in Tables 1, 2 and 3 outline how educators can help children with these specific needs be successful. Furthermore, educators in countries that do not implement inclusive education or educational support systems can use these resources to strengthen their instruction for children with ASD. It is imperative that these adaptations are included in the educational environment for children with ASD so that children's environments are conducive to their developmental and academic needs. The inclusion of these supports can also help build a positive educational experience that promotes desired outcomes for young children with ASD. When educators provide these supports, children with ASD receive the benefits of an individualized education that is tailored to their abilities and strengths and serves to assist them in achieving success within inclusive early childhood settings.

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