

## The power of assistive technology

*What does research tell us about how different types of assistive technology affect the language and literacy development of young children with disabilities?*

Just how effective are speech-generating devices and computer applications—assistive technology—that are designed to improve the language and literacy behavior of young children with disabilities?

This question was addressed by researchers from the Center for Early Literacy Learning (CELL), who evaluated 19 assistive technology studies that included 687 child participants ranging from typically developing children to those with severe and profound disabilities and delays.

While the term “assistive technology” includes devices ranging from the simple to the very complex—from adapted spoons to sophisticated power wheelchairs—the CELL research synthesis focused on material and equipment specifically designed to affect literacy and language abilities. Speech-generating devices in the studies included but were not limited to Tech/Speak, DynaVox, Minispeak, VOCA, and MiniMo. A variety of computer software with interfaces for promoting language and/or literacy were also included in the studies.

The research findings showed that both speech-generating and computer technology were effective in improving young children’s communication and literacy-related outcomes. They were similarly effective for children with differing types and severities of disability. Unfortunately, parents and practitioners often fail to use assistive technology with young children, especially infants and toddlers, despite its proven effectiveness. In other studies, CELL researchers have found that this is due,



to some degree, on failure to use appropriate adult training methods to promote early use of assistive technology.

In a report of the CELL research synthesis on assistive technology, the authors recommend the Tots ’n Tech Research Institute ([www.tnt.asu.edu](http://www.tnt.asu.edu)) as one of the best resources for information and ideas on using assistive technology with young children with disabilities.

This *CELLnotes* summarizes findings reported in Dunst, C. J., Trivette, C. M., & Hamby, D. W. (2012). Assistive technology and the communication and literacy development of young children with disabilities. *CELLreviews* 5(7), 1-13.

# Acting on the Evidence

Download free, two-page *CELL* practices guides in versions for parents or practitioners at [www.earlyliteracylearning.org](http://www.earlyliteracylearning.org)

Staff of CELL have created a number of practice guides especially for parents and early childhood practitioners to encourage putting this research evidence to use in home, community, and classroom settings. All of the two-page practice guides listed below are available for free download on the CELL project web site: [www.earlyliteracylearning.org](http://www.earlyliteracylearning.org). At this web address you can also find interactive posters called *CELLpops* and multimedia practice guides such as videos that illustrate practices supported by this research.

## Infants:

*Making Noise Is a Lot of Fun*  
*Picture This*  
*Mark My Word*

## Toddlers:

*Look Who's Talking*  
*All . . . Write*  
*Speaking Without Words*

## Preschoolers:

*It's Story Time*  
*Sounds Good To Me*  
*Talk to Me*

**Especially for preschoolers with disabilities**

### Sounds Good to Me

Rhymes and Sound Awareness

Young children enjoy making sounds with their voices, whether they are saying words or just making sounds for fun. Sometimes, preschoolers with disabilities need help to make sounds and words. If your preschooler has a hard time making words loud enough to hear, this guide will show how to help him talk louder.

**What is the practice?**  
The practice is to help your preschool child make words that he and others can hear. Making and hearing words helps preschool children learn to say and repeat the words that they hear around them.



**What does the practice look like?**  
Some preschool children with disabilities cannot make words loud enough to be heard. Using simple things that make words louder can help a child hear himself and be heard by others. These machines are often made for young children and can be found in many stores. They include megaphones, speech amplifiers, computer games that increase sound, and home karaoke machines.

**How do you do the practice?**  
Here are some ways that you can help your child make words that she and others can hear:

- Choose a machine that you think your child will enjoy using. Some children like talking into tape recorders and playing their words back on high volume. Other children have fun talking into microphones on home-karaoke machines and hearing their words coming from the TV.
- Put a quiet place so your child will not be distracted while making words. Show her how to use the machine to make words that can be heard. Have her say words she already knows into the machine. Make a game of it, take turns saying a word and then have your preschooler say a word. Preschoolers enjoy rhymes also, so use songs with rhyming sounds and take turns saying each line with your child.
- Record words your child says and play the words back so she can hear herself. It may help her to hear if she wears headphones while listening to the words. By hearing her own words, your preschooler will likely be excited and want to say more words.
- Find recorded nursery rhymes or stories that your child likes and encourage her to "talk" along with the recording. If it has words she already says, she may try to say some new ones, too. Computer games or "sing along" DVDs that show favorite characters as they play may get your child to say words.
- Use players that play your child's favorite music or videos when she talks with a microphone. When your preschooler likes the music or video, she is likely to repeat the words. Songs like "Whoosh on the Day" encourage preschoolers to say words and make sound effects. Singing is a fun way to help children be confident in saying words out loud.
- Play with sounds using empty paper towel rolls or homemade or purchased megaphones to amplify your voices.

**How do you know the practice worked?**


- Does your preschooler try to say more words?
- Does your child enjoy playing sound games?
- Is your child making words that others can hear?



Look at more fun with rhymes and sounds

**ging!**

words loud enough to hear. She has become to others. Leena loves to listen to music and see. Her mother bought a children's karaoke machine and set it up. Leena happily less on the television as the music played up to say words into the microphone. Leena when she heard her voice come through the spent the rest of the afternoon saying different along with the pre-recorded in the video. She for the rest of the family when they come



**Crank It Up!**

It is a challenge for Sam to put enough energy into making his voice loud enough to hear. Sam is an active child with lots of imagination. His father bought him a voice recorder that's small enough for him to easily hold. Sam can record his voice and play it back with the volume on "high." Now others can hear what he says. Sam plays with his cars on the living room rug with his brother. He records noises for the cars. "Vroommm," "beep, beep," "Mmmmm." Sam plays the sounds and words on high volume so his brother can hear them as they roll the cars along. Sam adds new sound effects as he goes.



talk to his Dad through the inter. Mom notices his curiosity y lap in front of the computer, mation try," she tells David. "I'll ear me when I talk to him with r him talk to me, too. Why don't ld?" David shyly gets his mouth one. He says the word "Hi." "Well, ad. David is happily surprised to ough the computer speakers. He ore again. He is more confident. "Daddy!" His dad tells David how happy he is to get to hear him and talk with him.



happy he is to get to hear him and talk with him.

CELLnotes is a publication of the Center for Early Literacy Learning (CELL), funded by the U.S. Department of Education, Office of Special Education Programs (OSEP), the Center for Applied Research on the Use of Computers and Technology in the U.S. Department of Education, Copyright © 2013 by the Center for Early Literacy Learning, Storrs, Conn. (www.earlyliteracylearning.org)

**Especially for toddlers with disabilities**

### Speaking Without Words

Talking and Listening

Most toddlers use words to get adults to give them the things they want. Sometimes toddlers with disabilities are not able to use words to talk. This practice guide includes different ways toddlers can communicate with others without speaking.

**What is the practice?**  
This practice guide is about ways to help toddlers interact with others and ask for things without using spoken words. This is called alternative and augmentative communication.



**What does the practice look like?**  
Toddlers can communicate in different ways. A toddler can hold up her cup to say she wants more milk. A toddler can point down to ask his dad to help him down from his high chair. A toddler can show her dad a picture of a swing to "say" she wants to go outside to swing. These non-speaking toddlers are "asking" for what they want without using speech. The main idea is to encourage your toddler to "talk" in the way that works best for him.

**How do you do the practice?**  
Here are some ways young children speak without talking:

- Young toddlers who use few words often communicate by pointing to or showing the adult what they want. For example, a child might point to juice when wanting a drink or get a ball when wanting to play. Be sure to notice, say the word, and respond to these requests whenever possible.
- Young toddlers who are able to move their hands and fingers can use sign language to "talk" to others. A child can learn new signs that increase the number of things he can "talk" about. To get your toddler to use more "words," use signs for his favorite activities, people, and objects. Be sure to say the word when your child signs it.
- Pictures of favorite foods, toys, and people make it possible for a young toddler to "talk" without speaking. Place a few picture cards in various parts of your house. Let your child show or point to a picture to let you know what she wants. When your child points to a picture, name what's in the picture. Encourage, but don't force, her to say it too. Regularly add new pictures for her.
- Simple switch devices that "say" one or two words when touched can make it easy for a child to "talk." Words like "yes," "no," or names of favorite toys or people are a good way to start.

**How do you know the practice worked?**

- Is your child asking for things more often?
- Is your child learning new "words" to ask for what he wants?
- Is your child using this way of "talking" to interact with others?



Look at more communication fun

**Toys**

As a young toddler, he does He mom decided to paste pictures picture board. She started with one tractor. She kept showing him the y the tractor. She put the board in ever plays, so he would see it often. laying with his tractor, she showed invece, see the tractor again, and uddenly found the toy tractor, said y Prince. Since this happened, they e pictures of other favorite things.



**Favorite Manual Signs**

Lee is a 35-month-old toddler who uses only two or three words. But he knows 10 to 15 signs for his favorite things and people. Since he loves his family so much, Claire, he and his dad have a special "sign" for Claire: in the morning when they feed the cat, Lee helps his dad. Dad encourages Lee to combine two signs (words) by asking him questions that he can answer with signs he knows. Lee's signs include **Food**, **Charlie**, **mother**, **bow!**, **cat**, and **get**. Dad asks Lee, "What do we need first?" Lee signs back, "Food." His dad continues, "Where does Charlie's food get?" and Lee signs, "bow!" Dad responds with another question, "Your bowl or Charlie's bowl?" Lee laughs and signs, "Charlie."



odder who does not use any words to mple adjective communication device (pictures when a switch is touched). He d him stories. Pablo's device is set so he "turn the sign" "my turn," and "read" to read. Pablo's mother makes sure gets three or four of her son's favorite s he wants to read. Pablo points to e reading the story. She stops often to be answers by making labeled cards to nish the first book. Mom says, "I guess ablo quickly responds with "read more" to another book to read.

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