

What's Inside

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Fellow classmates help fasten pictures to Sabrina's eye-gaze board.



Photo: Jeff Dunn

NCIP is the National Center to Improve Practice in special education through technology, media, and materials.

Technology Supports Inclusion in Preschool

Providing All Preschoolers With Opportunities to Learn

Increasingly, students with disabilities are being educated in preschool settings together with typically-developing children. As the youngest students with disabilities strive toward the same developmental milestones as their non-disabled peers, the challenge is to provide all students with opportunities to:

- develop autonomy by expressing their own preferences and interests
- learn the social nuances of engaging in group learning experiences
- deepen their language skills and become effective communicators

Teachers and specialists throughout the country are exploring ways technology can help preschoolers with disabilities reach these goals. Take, for example, Barbara Smith at the Diagnostic Center in Brockton, Massachusetts. With the help of Helen Virga, Brockton's computer specialist, Barbara has discovered a range of technologies that enable her students with disabilities to participate in all aspects of her typical preschool curriculum. Barbara's classroom moved from a self-contained model to an integrated model two years ago. About the change she says, "Integration is easily twice the work in terms of preparation, but when we consider the progress these kids have made, we could never go back."

All Students Make Choices, Interact with Peers

Integrating students with disabilities into a classroom with non-disabled children presents many challenges. How will children who cannot speak make themselves heard? How will students who have limited movement participate in activities with their peers? And how can students achieve some degree of independence so that they can interact without adult help?

These are just some of the issues that Barbara Smith has tackled in her classroom of 14 children, 8 of them typically developing and 6 with severe speech and physical impairment (SSPI).

All of Barbara's students with disabilities share a strong need for augmentative communication strategies to help them interact. Barbara has always relied on relatively simple approaches such as communication boards and picture charts, and has only in the past two years turned to more sophisticated computer-based tools to supplement these approaches.

Free Choice Time

Sabrina, an engaging 5-year-old girl with cerebral palsy, cannot speak or point. To help her communicate her preferences, she sometimes uses an eye-gaze board, a simple apparatus

consisting of a Plexiglas frame with Velcro tabs. During free choice time, Jan, a classroom aid, places the eye-gaze board perpendicular to Sabrina's wheelchair tray and fastens six pictures of her preferred activities – such as read a book or listen to music – around its edges. Jan stands behind the board to gauge where Sabrina's eyes are pointing. By looking directly at one of the pictures, Sabrina chooses "Bobby, Bobby, What Can You Do?" her favorite book on computer.

Often, young children with SSPI are given one choice at a time and asked to indicate "yes" or "no," while typically-developing children pick from a field of choices. By featuring a range of options, the eye-gaze board allows Sabrina to make authentic choices alongside her non-disabled peers. Once the choice is made, Jan connects a switch on the left side of Sabrina's wheelchair tray to a simple "switch box," which plugs directly into the computer. The software for "Bobby, Bobby" is loaded and Sabrina is on her own.

Using its internal speech capability, the computer reads the story aloud while highlighting the words. By hitting a switch when she is ready, Sabrina turns the pages at appropriate



Page from "Bobby, Bobby, What Can You Do?" which a computer "reads" by its internal speech capability.

times. Sabrina clearly delights in the story, laughing to herself when the main character, Bobby, gets dirty playing in the mud.

When she is done, Sabrina hits another switch on the right side of her tray that activates an electronic speech aid called SpeakEasy™. The message "Come here please" is clearly emitted. This 12- by 8-inch device has 12 squares or "message locations" that hold discrete prerecorded messages. Jan has recorded the various messages that Sabrina will need for the day and Sabrina's switch can be plugged into any of these locations, depending on the activity she is engaged in.

Jan responds to Sabrina's call for assistance and enlists the eye-gaze board once again. Like most kids, Sabrina likes to read her favorite stories more than once and chooses "Bobby, Bobby" again. Jan reloads the software and Sabrina is off and "reading" again.

Circle Time

In addition to helping Sabrina and the others develop their autonomy by making choices, Barbara ensures that all students participate during circle time. Many preschool classrooms offer daily group activities that promote listening to peers, turn-taking, and collaborative problem-solving. Circle time in Barbara's classroom incorporates many activities that focus on these social-cognitive goals.

Barbara begins by asking students to take turns describing the day's weather. Non-disabled students walk up to the front, pick from a variety



Barbara Smith holds the Communiclock™ for Sabrina, who uses the device to participate in circle time alongside her peers.

Photo: Jeff Dunn

of weather pictures (such as sunny, cloudy, rainy) and place them on the calendar.

Sabrina's turn is next. She uses a clock-like rotary scanning device with weather pictures mounted on the face to make her choice. Jan activates the clock and Sabrina closely watches the hands move around the dial, hitting her switch (which is now plugged into the device) to "stop the clock" at the picture she feels is most accurate. Jan confirms the choice with Sabrina and places it on the calendar. Sabrina's peers enjoy watching this process and "sing out" the names of the pictures as the clock hand sweeps over them. Occasionally, typically-developing students ask to take their turn on the clock.

Next, students sing a song together. Today's song is "The Fish in the Sea Go Splash, Splash, Splash." Again, non-disabled students indicate the "fish" they want to sing about (such as crab, shark, porpoise) by choosing pictures and placing them on a chart. Sabrina uses her eye-gaze

board to choose a crab and the whole class sings the song together incorporating the crab.

Sabrina also participates in the singing. She uses the same speech aid that she previously used to get Jan's attention, only now it is plugged into a message location with the song's prerecorded refrain, "splash, splash, splash." As the group sings "The crab in the sea goes..." Sabrina positions herself to hit her switch and delights in bellowing "splash, splash, splash" with her peers.

The eye-gaze board also allows Sabrina to interact independently with her peers. After the students break for snack, they have free choice time. Without adult prompting, two students ask Sabrina if she wants to sing the song again. She excitedly indicates "yes" and they wheel her over to the song chart. They use the eye-gaze board to provide her with choices and then together sing the song incorporating the "fish" she has chosen.

Expanded Keyboard Helps Students with Autism Write



Paula Brassil, left, demonstrates a membrane keyboard to a student.

At the Warren Prescott School in Boston, Paula Brassil has developed an integrated program for her five students with autism (ages 5 through 7). These students spend half of each school day with a small group of typically-developing kindergarteners. While all of Paula's students benefit from developmental writing, she feels that these skills are especially critical for her students with autism. For them, writing is another means of expanding their limited communication repertoire.

Keeping her students with autism focused is always a challenge, particularly during group activities. Paula often uses the computers as an attentional anchor but finds that her students are often overwhelmed by the standard keyboard. The mix of letter and abstract function keys, as well as the random placement and small size of letters, can be confusing.

Paula has been able to minimize her students' frustration by introducing them to IntelliKeys™, a 15 inch by 10 inch membrane keyboard with enlarged boldface letters displayed in alphabetical order. Students can readily see the letters, learn their locations, and confirm their selections by listening to the speech feedback as they write. Since using Intellikeys, her students are more attuned to letters and their corresponding sounds and this foundation is having a positive impact on their emerging literacy skills.



Sabrina chooses her preferred free choice time activity by staring at picture symbols on her eye-gaze board.

Photo: Jeff Dunn

Technologies for Preschool Classrooms

A Sampling of Supports for Preschoolers

Descriptions of the kinds of hardware and software discussed in this profile are included below. These represent a small sampling of technologies available to meet the individual needs of students with disabilities in pre-school settings. NCIP is not endorsing any product or manufacturer and strongly encourages readers to explore a range of products with qualified personnel in their area. A more comprehensive product listing, complete with addresses and phone numbers, is available in the NCIP Profiles Library on NCIPnet.

Eye-gaze Communication Boards

Eye-gaze communication boards are sometimes used when pointing is not feasible. Basically, these are clear plastic boards (about 15 inches by 19 inches) on which symbols – such as words, pictures, and objects – can be fastened. The student conveys messages by gazing at the appropriate symbols while someone on the other side of the board follows his gaze. Eye-gaze boards can be easily homemade; however, a variety of commercial products already exist, including the Eye-Com Board™ by Imaginart Communications Products and the Eye Transfer Communication System™ by Zygo Industries.

Switch-accessible Books

A software selection of switch-accessible books is available to build literacy skills and meet the physical and cognitive needs of students with motor impairments. These typically enable students to independently choose their story, turn pages, highlight, and have text “read” or reread by hitting a switch at a particular time. Many include animated graphics that can be manipulated. These include Storytime Tales™ by Don Johnston and

Wiggleworks™, a more comprehensive literacy program by Scholastic.

Electronic Speech Aids

Simple and relatively inexpensive communication devices allow the user to “speak” short phrases or messages that are prerecorded for them. The devices have a set number of “targets” which can be pressed to “speak” the phrases. The targets can be labeled with symbols or words. Messages also can be accessed through one or more switches. Examples of simple “speech boxes” include Cheap Talk 4™ by Toys for Special Children and SpeakEasy™ by AbleNet.

Clock-like Rotary Scanning Devices

There are a variety of clock-like rotary scanning devices which enable students with limited motor ability to choose from a field of pictures or words. The student controls the circular movement of a pointer by activating a switch, stopping the pointer at the desired message. The speed and direction of scanning is customizable. These devices are lightweight, portable, and battery operated. Two examples include the Communiclock™ by the Crestwood Company and the Dial Scan™ by Don Johnston.

Alternate Membrane Keyboards

There are a variety of alternate keyboards that simplify access to software for preschoolers and/or students with disabilities. Membrane keyboards typically come with a variety of vinyl sheets or “overlays” with letters, numbers and special “keys” in large print. Users can also design their own overlays for individual students or specific tasks. The touch sensitivity required to activate the “keys” can be adjusted to meet the users’ needs. Speech can be added to make these keyboards “talk.”

Additional Resources

More about Using Technology in Preschool Settings on NCIPnet

- Student and classroom vignettes that depict innovative uses of technology in preschool settings
- Descriptions of a range of technology tools to support children with disabilities in preschool settings
- An annotated listing of projects and organizations that provide information and technical assistance
- An updated list of selected hardware and software products and a list of vendors who carry these products
- Summaries of important research findings about young students with disabilities and technology
- On-line discussion events featuring experts in the development or implementation of technology in preschool classrooms

Be an active member of the NCIPnet Community!

Log on to NCIPnet and:

- Discuss your experiences with integrated preschool settings
- Share tips on ways to use technology to include children with disabilities in classroom activities
- Let others know what technology tools work best for you



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