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33 W 87 Street NY • NY 10024 212 • 769 • 1715 631 • 691 • 2513 FAX 212 • 769 • 0909

IESD CASE STUDY: CHILDREN ON THE AUTISM SPECTRUM SHOW IMPROVEMENT WITH ROBOTS4AUTISM IN SPARTANBURG, SOUTH CAROLINA

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School Profile

McCarthy Teszler School, Spartanburg, South Carolina

Serving special needs children ages 3-20

Enrollment: approximately 240, but changes from week to week

Draws students from 76 schools across 7 districts whose needs can't be met in the home school

The Challenge

Educators at McCarthy Teszler School in Spartanburg, South Carolina, have a lot of experience working with children on the autism spectrum. Drawing from 76 schools across 7 local districts, McCarthy Teszler provides services for special education students from preschool through early adult whose needs can't be met effectively in their home schools. At any given time, this may include 90 or more students with diagnosed problems on the autism spectrum—the most challenging cases in the county

Despite the best efforts of school staff, many of the most seriously challenged students weren't experiencing success with existing approaches. So school leaders started looking for a new curriculum that would address the key areas of social skills, communication skills, and emotion regulation. Ideally, the approach would also incorporate support from technology but would not be strictly computer-based or tablet-based, since as one local specialist explained, "Left to their own devices, children with autism tend to interact with technology only and avoid human interaction."

The answer that McCarthy Teszler educators found was Robots4Autism, an autism intervention program developed by Robokind™ in collaboration with top autism experts.

The Solution

Robots4Autism integrates a variety of evidence-based practices shown to improve important skills in students with autism, packaged together systematically and delivered using Milo—a highly expressive, advanced social robot designed specifically to teach critical skills to children with autism. The curriculum is delivered through verbal interactions and social narratives between the student and Milo, who is connected to a student iPad where the robot can display multiple choice options and show supporting text, images, and video modeling to enhance the lesson. Lessons can be repeated as many times as needed to help the student develop a specific skill.

An important reason why McCarthy Tetzler chose Robots4Autism was the content focus. According to Elena Ghionis, lead autism specialist for Spartanburg County, Robots4Autism “was the only curriculum we found that combined instruction in all three key areas of need: social skills, communication skills, and emotion regulation.”

Another key selling point was Milo itself. Ghionis explains that Milo “provides children with an almost human interaction experience”:

Milo is a bridge between a child interacting with technology and interacting with humans. Children who start out avoiding human interaction are attracted to Milo; they practice skills and appropriate behavior with him until they are ready to transition to engaging with the teacher and other children.

Implementation

Autism specialists who were chosen to work with the program as facilitators participated in a live distance training session, in which they watched a demonstration of how to use Milo, then worked with their local Milo robot while the trainers observed via webcam and provided feedback. After the initial training, other online sessions were held every one to two months to answer questions and have facilitators share their experiences.

17 students in preK through grade 12 were chosen to interact with the program—children for whom other approaches had not been successful. All had large deficits in social skills, communication skills, and emotion regulation. Most were enrolled at McCarthy Tetzler, although a few were from other local affiliated schools. Each week, the students would be pulled out for two to three 30-minute one-on-one sessions with an autism specialist who acted as the facilitator. This continued for three-fourths of the school year—about 27 weeks.

Each session began with students playing a game involving Milo—Red Light, Green Light was a favorite. Students then completed between one and three modules chosen by the facilitator.

During the sessions, students communicated with Milo using symbols on a student iPad, while the facilitator used a separate iPad to control various aspects of the lesson. For example, during lessons on communicating emotions, Milo would demonstrate facial expressions, the facilitator would assess the child’s facial behavior, and Milo would react appropriately. After the child had successfully demonstrated a skill, a short video would play showing a real-life situation for the child to interpret. In the final lesson for each emotion, Milo would ask the student to demonstrate his or her own facial expression into a camera on Milo’s chest, and the student performance was captured in the Robots4Autism data collection system.

Results

GARS-3 Data

Of the 17 students using Robots4Autism, 8 showed improvements on both the 4-score index and the 6-score index on the GARS-3 (Gilliam Autism Rating Scale, 3rd ed.), comparing scores prior to use of the program with scores afterward.

Another 4 students showed reductions specifically in the area of restrictive repetition. Lead autism specialist Elena Ghionis noted that this is a particular benefit of working with Milo:

Many children with autism tend to use repetitive behavior as a calming behavior. Milo teaches alternative, socially acceptable, age-appropriate, calming behavior—so children have less need for restrictive repetitive behavior.

Progress Toward IEP Goals

Review of the students' IEP data and information from teacher records by the school's lead autism specialist showed that during the first nine week quarter before students started using Robots4Autism, all 17 students showed minimal progress toward their IEP goals. However, over the next three quarters after they started using Robots4Autism, students showed significant progress or mastery related to their social, communication, behavioral, and academic goals.

General Impressions

Autism specialists who worked with Robots4Autism as facilitators thought the program had helped many of their students to

- Recognize and communicate about their emotions
- Express and regulate their emotions
- Apply calming down skills, thereby reducing behavioral issues
- Maintain eye contact with other people in social situations
- Engage in appropriate, two-sided conversation

Specialists commented in particular on the value of Milo as a model for student interactions. For example, one teenage student working as a cashier in the teacher's cafe was making change with her head down and no eye contact with customers when her teacher asked, "What would Milo say?" Immediately the student turned her head, made eye contact, and said "Here you go" as she was handing back change.

Classroom teachers confirmed that students were enthusiastic about working with Milo, and that they were able to see the results of students' work with Milo in their classrooms.

The autism specialists reported that they now consider Robots4Autism an important therapy tool for selected students.

Examples of Individual Progress

Example #1: An elementary student on a half-day schedule due to severe behavioral issues was able to go to a full-day schedule after working with Robots4Autism. Tantruming and aggression decreased to no more than twice a day, and he is now able to self-regulate his emotions by removing himself from a whole-group setting to sit alone in a calming area. He has improved from being resistant to using the toilet to following a toileting schedule with minimal prompts and very few accidents. Where before he was able to follow along with a story that was being read to him, he can now read some books independently—a change the autism specialist attributes in part to interaction with Milo.

Example #2: After working with Robots4Autism, another elementary student, whose only oral speech had involved repeating words and phrases without functional meaning (echolalia), was able to use verbal language for simple forms of communication. Communication using an assistive device also became

much more in-depth. The student's behavioral issues (e.g., screaming, hitting, and kicking) were greatly reduced, and he was able to identify and communicate how he was feeling, where before he had made no attempts to play, interact, or communicate with others.

Example #3: One elementary student who did not show a gain on the GARS-3 index nonetheless made an important transition while working with Robots4Autism. Prior to use of the program, he was able to use an iPad as an assistive communication device, but could not speak. After using the program, he was able to speak functionally.

Example #4: A high school student who before working with Robots4Autism used to make multiple verbal outbursts in the classroom, did not readily make eye contact, and had problems interacting appropriately with others, has now reduced the number of verbal outbursts she makes, is doing a better job with eye contact, and engages more appropriately with both peers and adults. Where before she was unable to functionally communicate her emotions without shutting down, now she can identify and demonstrate multiple emotions, including *happy, sad, angry, hurt, tired, and worried*. Her interaction with others has improved to include socially appropriate greetings and reciprocal conversations.

Lessons Learned

Learning how to implement Robots4Autism most effectively with students has been a learning process for the educators at the McCarthy Teszler School. In particular, they noted that Robokind was very open to making adjustments to the modules and program features on an ongoing basis in response to problems as they arose.

Specific lessons mentioned by the McCarthy Teszler educators include the following:

- In order to interact successfully with Milo, students need to be able not only to verbalize but also to listen and talk/communicate with understanding. For some low-functioning students, the facilitator had to rephrase a question asked by Milo. In other cases, the facilitator had to switch to simpler modules when students couldn't pick up on small details of the video interaction.
- For five of the lower-functioning students, the facilitator found it useful to preteach symbols used in Robots4Autism before having students use them with Milo.
- While some students loved Milo from the first, others needed more time. For example, one student was initially scared of Milo and wouldn't go anywhere near the robot. Over time, the facilitator moved the child's workstation progressively closer to Milo so he could see Milo interacting with another student. Then the facilitator had the student interact with Milo using the iPad from across the room. Now the student loves working with Milo.

The autism specialists and teachers at McCarthy Teszler School are looking forward to continuing their use of Robots4Autism for the benefit of their most needy students on the autism spectrum.