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IESD CASE STUDY:
CHILDREN WITH ASD MAKE GAINS WITH ROBOTS4AUTISM IN A DALLAS, TEXAS CHARTER SCHOOL

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School Profile

KIPP Truth Elementary School, Dallas, TX
Free public charter school serving grades K-2
Enrollment: approximately 480 students
Student demographics:

- Approximately 70% African American, 30% Hispanic
- 99% eligible for Free/Reduced Lunch
- 28% English Language Learners
- 38 students with disabilities, including 19 on the autism spectrum

The Challenge

Located in a traditionally under-resourced neighborhood in Dallas, Texas, KIPP Truth Elementary School is one school in a network of free, open-enrollment, public charter elementary and middle schools in the Dallas-Fort Worth area. The Knowledge is Power Program (KIPP) is a national network of such schools designed to prepare students in under-resourced communities for success in college and in life.

As a college preparatory school, KIPP Truth Elementary has set independent learning as an important goal for students, and development of self-management skills as a key objective toward that end. At the same time, the school has established honoring and respecting others—including teachers and peers—as a core value. However, these goals and objectives have proved challenging for the school's 19 students with autism spectrum disorder (ASD). This group of students tends to have difficulty adapting to change. When given a negative consequence for bad behavior, the misbehavior would typically escalate. When faced with conflict with other students, they sometimes reacted with aggression. In short, they lacked the ability to self-regulate.

The Solution

To help teach emotional regulation and behavior skills to their students with ASD, administrators at KIPP Truth implemented Robots4Autism, an autism intervention program developed by RoboKind™ in collaboration with leading experts in the field.

Robots4Autism provides a systematic curriculum of evidence-based practices shown to improve social and self-regulation skills in students with ASD. The curriculum is delivered through Milo, a highly expressive, advanced social robot designed specifically to model and teach critical skills to students with ASD. The student and Milo engage through social narratives, with Milo connected to a student tablet where the robot can display multiple choice options and show supporting text, icons, and video modeling to enhance the lesson. Lessons can be delivered either one-on-one or in small groups and can be repeated as many times as needed to help the student develop a specific skill.

When KIPP Truth's School Leader, Katie Hill, first heard about Robots4Autism from a colleague, she was skeptical. However, during her initial demonstration of Milo, she started to think, "Wow, this could be really special!" The very first student to test the program showed impressive improvements in behavior. Prior to using Milo, this student would not pay attention to instruction, instead singing to himself, tapping his feet, and playing with things in his hands. As Ms. Hill recalled, as soon as the robot was turned on, the child "could not take his eyes off it" and immediately engaged with and followed all of Milo's instructions, all while enjoying himself immensely. Ms. Hill quickly understood that "this is something we need for our students with ASD." The combination of Milo and the Robots4Autism curriculum was a way of connecting with students who had been difficult—if not impossible—to reach up to now.

Implementation

When special education teacher Sarah Hoff received the initial training from RoboKind, she was excited about the potential for students to work with a robot that speaks and has a full range of facial expressions. In addition to the initial one-on-one training session, Ms. Hoff reviewed the resources within the Facilitator Manual as well as case studies and research summaries to help her prepare for the deployment. Throughout the year she had periodic phone calls with the RoboKind Client Experience Support Representative to help with the needed ongoing support and utilization of the program's features. Milo is now such a regular part of Ms. Hoff's classroom that she calls herself "Milo's mom."

Rhonda Hightower, a paraprofessional at KIPP Truth, also completed an Introduction to Robots4Autism webinar and received additional mentoring from the teacher, allowing expanded use of the program within the classroom and accelerating student success.

At first, Ms. Hoff would introduce Milo as a "new friend" to her students. She selected the "Dance Party" routine, during which Milo introduces himself, lifts his arms, and dances to music. Her students enjoyed this and immediately interacted with Milo by dancing when he directed them to do so. The "Dance Party" activity has since become a reward for good behavior. Ms. Hill notes that these children "seem to intrinsically appreciate the emotion and expressiveness of dancing, especially in respect to Milo."

Before they had worked with Milo, some students would have confrontations with their peers due to a poor sense of appropriate physical space and would get too close to other students. To address this problem, the educators used a social interaction lesson in which Milo directs students to "turn, look, and check your space." After Milo introduced this skill, students watched a video demonstrating the correct behavior, answered questions about appropriate physical space, and then practiced these skills. Two students who had had regular confrontations before completing this lesson, have had no further incidents.

For students who would get upset or angry, the staff used the Robots4Autism Calm Down tools, during which Milo demonstrates how to "Count to 10, Use your Words, and Take a Break," just to name a few. In fact, as part of his self-regulation strategy, one student taught himself how to turn Milo on and serve as the facilitator for this lesson.

Results

Of the 19 students with ASD, 8 worked with Milo consistently throughout the school year. All 8 started with severe challenges in self-regulation and lacked social skills such as the ability to play with others or work in groups. Because of these challenges, each of the students had difficulty progressing academically.

After engaging with Milo and the Robots4Autism curriculum on a regular basis, all 8 students showed progress in self-regulation and social skills. According to Ms. Hoff, Milo "gave them the tools to self-regulate." She also found that because of "the core values of KIPP and the social skills they developed from Milo, all 8 were able to function better in social situations."

With the development of self-regulation and social skills came academic gains. Ms. Hoff observed that these students were better able to focus on their classwork, and because of their experience with Milo, they came to see that "learning can be fun."

Based on her review of the data in her students' Individual Education Plans (IEP), Ms. Hoff provided examples of 3 seven-year-old students:

Student #1: This boy started Ms. Hoff's class as a nonverbal student. He was unable to express his needs and wants and couldn't walk down the school hall independently. He wouldn't read a leveled book aloud, not even in a whisper voice, making it impossible to assess his reading ability. He could write numbers to 100 but wouldn't count out loud. Upon introducing the student to Milo, the student became very excited about Milo's "Dance Party" routine, which stimulated him to become more vocal with his peers.

Since working with Milo and his teacher, he has met his IEP goal of expressing his needs and wants with the aid of visuals, prompts, and minimal assistance most of the time.[1] Due to his newfound ability to communicate, this boy is now meeting several academic goals he was unable to achieve previously, including reading a leveled book in a full voice; mastering 5 word families; writing 20 grade level sight words; counting aloud from 1 through 120; and counting aloud by 2s, 5s and 10s to 100. The student is also able to walk independently through the building from one destination to another more than half the time. Ms. Hoff observes, "His confidence was boosted working with Milo."

Student #2: Before working with Milo, this girl would usually have significant episodes of dysregulation and would run away when asked to do work or when she was angry. When given a negative consequence for misbehavior (using their established color-coding reward system), she would usually scream, cry, and try to escape. Because she wouldn't participate in any curricular activity, she could not meet her academic goals. One goal set forth in her IEP included writing the numerals 1 through 10, but often she would become frustrated and give up by number 3 or 4.

[1] Ms. Hoff reported that Student #1 was able to do this in "3 out of 4 trials," or 75% of the time

However, since working with Milo and the Robots4Autism curriculum, she has benefitted both socially and academically. Now when she gets angry or upset, she is usually able to count to 10 and take breaths to calm herself down with prompting.[2] When asked to accept a negative consequence because she was not following directions, she is able to do so, maintain a calm body, and continue to do schoolwork. Ms. Hoff considers this to be "dramatic improvement" and finds that it has enabled the girl to reach the academic goals set forth in her IEP, such as mastering the ability to write the numerals 1 through 10. She now sits with the rest of her group when engaged in classroom activities and actively participates. She has grown very fond of Milo, and her face lights up when she and her teacher work with him. She has even shared Milo's calm down techniques with family members and peers.

Student #3: This student would previously growl incessantly and become extremely aggressive toward the other students, teachers, and administrators. He would never play with the other students at recess.

Ms. Hoff describes a "complete turnaround" after this student was exposed to Milo and the Robots4Autism curriculum. He has learned to take breaths and use his words as a calm down technique. His aggressive outbursts have been reduced to no more than twice per week during most weeks, and he is able to play with his peers successfully most of the time.[3] According to Ms. Hoff, he is also able to focus better and "has soared academically" due to his newly developed ability to stay calm. For example, before Robots4Autism he couldn't write his name consistently but now writes his first and last name most of the time.[4] He also now recognizes the numbers 1 through 20, all letters in the alphabet, and all letter sounds. These are examples of the academic gains he made only after working with Milo. He talks about Milo as his friend and has said, "I am grateful that Milo taught me how to calm down."

In general, students with ASD at KIPP Truth Elementary School faced severe challenges with self-regulation and social skills—common issues that made it extremely difficult for them to focus on academic pursuits. For several of these students, working with Milo and the KIPP staff helped them learn how to calm down when upset or angry and how to get along with others. This, in turn, enabled them to focus on their academics, providing significantly more opportunities than previously thought possible.

Looking to the Future

As the school year progressed, Ms. Hoff and Ms. Hill continued to recognize the impact Milo and the Robots4Autism curriculum made with students. The school requested a demonstration by the RoboKind team to introduce Milo to other KIPP teachers and the school's speech and language pathologist (SLP) with the intention of expanding the use of Robots4Autism in the upcoming school year. Expanding the implementation will allow KIPP to reach more students and increase consistency in programming across grade levels. The program will also be expanded to a middle school in the Dallas-Fort Worth KIPP network.

Due to the high number of African American students in her school, Ms. Hoff would like to acquire the latest version of the robot—one with an African American likeness. She notes that her students perk up when the focus of a lesson "looks like me." She is looking forward to supporting her students with Robots4Autism again next year.

[2] Ms. Hoff reported that Student #2 was able to do this in "4 out of 5 trials," or 80% of the time.
[3] Ms. Hoff reported that Student #3 was able to do this in "4 out of 5 trials," or 80% of the time.
[4] Ms. Hoff reported that Student #3 was able to do this in "4 out of 5 trials," or 80% of the time.