**CHALLENGE**

**OVERCOME ACADEMIC WRITING CHALLENGES**
A combination of dyslexia and executive function disorder made writing school papers a real challenge for seventh grader Paul Cleary. He struggled with getting those first few sentences on the page and transferring his ideas in text using a keyboard and mouse. Spelling issues further impeded progress. As a result, Paul found writing to be a slow, tedious, and frustrating process.

**SOLUTION**

**DRAGON NATURLALLYSPEAKING**
Paul was one of many students at the Charles Armstrong School that were introduced to Dragon NaturallySpeaking speech recognition software. Dragon helps students of all abilities capture their thoughts in writing without worrying about the mechanics of spelling or typing.

**RESULTS**

**HELPING ALL STUDENTS REACH THEIR FULL POTENTIAL**
Dragon levels the playing field for students like Paul who are struggling with school work due to dyslexia or other learning challenges. Dragon made it easier for Paul to transfer ideas into written words at the speed of thought. Dragon took the focus off the mechanics of composition, such as spelling and sentence structure, so it was easier for Paul to transform his ideas into longer, more sophisticated written work that incorporated a richer vocabulary.

**DRAGON® NATURLALLYSPEAKING® HELPS STUDENTS WITH LANGUAGE-BASED LEARNING DIFFERENCES OVERCOME WRITING CHALLENGES**

Paul Cleary, a 16 year old from Burlingame, CA, is a bright, articulate teenager who has faced some challenges over the course of his academic career. At an early age, he was diagnosed with dyslexia, a learning disorder characterized by difficulties with accurate and/or fluent word recognition as well as poor spelling and decoding abilities. As he grew older, Cleary also demonstrated issues with executive function — those mental processes that connect past experience with present action and help people plan, organize, strategize, and remember details.

**Leveling the Playing Field**
When he entered seventh grad at the Charles Armstrong School (CAS), a San Francisco Bay Area independent elementary and middle school for students with language-based learning differences, Cleary encountered some challenges with written assignments.

“I was having a lot of trouble writing papers and getting my thoughts down onto a page,” explained Cleary. “So my teacher, Mr. Luke, said, ‘Hey, I’ve got a spot open in an assistive technology elective that might help.’”

For one academic quarter, Bob Luke, who is now director of the CAS middle school, taught Paul and three other students how to use Dragon NaturallySpeaking, the industry’s leading speech recognition software for the PC. Dragon enables users to turn talk into text three times faster than typing — with up to 99% recognition accuracy — and to command and control their PC and applications by voice. Luke installed Dragon on the classroom computers and encouraged the parents to purchase the software for students’ home PCs.

“Technology and communication are embedded throughout the curriculum at CAS,” explained Luke. “Proficiency with technology helps level the playing field for students with learning differences, so when we identify kids that might benefit from an assistive technology like Dragon, we introduce it as a way to work around their learning challenges.”

Luke kicked off the course by having the students create their voice profiles, reading training text aloud so the software could adapt its acoustic model to the unique characteristics of each individual’s speech. Luke chose training texts for each student based on his or her decoding levels. Within about two weeks Dragon recognized the students’ voices with a high rate of accuracy.

“I slurried a bit at that age, so I read three training texts so Dragon could get used to the way I talked,” commented Cleary. “But after that it started to recognize my voice fine and I got the hang of using all the features without any problem. In fact, it got to the point where I could sit back with my headset on and just talk to the computer.”
Over the course of the academic quarter, Luke focused about 75 percent of class time on dictation to build students' proficiency with speech-driven input and help them achieve strong recognition results. The other 25 percent of the time was spent teaching the students to command and control their PCs and applications by voice. To this end, one day Luke had the students open up Solitaire and play the game entirely by voice.

“The Solitaire exercise was actually very challenging, but it was useful for learning how to control the mouse grid just by speaking,” Cleary recalled. Students learned that in addition to basic dictation, Dragon can be used to control mouse movements and mouse clicks.

“We work with average and above-average intelligence kids who have learning disabilities that create roadblocks to academic success. Dragon can help some brilliant kids like Paul Cleary demonstrate just how smart they really are. Dragon helps unlock intelligence.”

Turning Ideas Into Written Words
When it came to reports and homework assignments, Cleary wasn’t at a loss for things to say. However, due to his executive function issues, he often had difficulty getting from an initial idea to a finished writing assignment. Dragon made it easier to getting the first couple of sentences down on the page to build his confidence and jumpstart the writing process.

“It was difficult for me to get started on a paper,” said Cleary. “I was thinking faster than my fingers were typing, so I had a tough time capturing my thoughts in text. But Dragon helped me get words on the page so it looked like I was making progress and that would encourage me to keep going.”

Dragon also helped Cleary address his writing challenges by taking the focus off the mechanics of composition — spelling, sentence structure, etc. — so it was easier for him to transfer ideas into written words. As Cleary dictated his thoughts, Dragon automatically turned his speech into correctly spelled text.

When using Dragon, Cleary also found that he was writing longer compositions with more sophisticated ideas, greater detail, and a more extensive vocabulary.

“Before using Dragon I might write, ‘I walked down the street and observed nature,’” explained Cleary. “But with Dragon, I’d go into more detail, writing something like, ‘I strolled down the street and observed the color and variety of nature, gazing at the blue sky and purple flowers.’”


“If students are typing, they are more apt to choose a ‘five-cent word’ — a short, simple one that they have a high certainty of spelling correctly. But if the students are using Dragon, they are going to use those big ‘50-cent,’ four-syllable words that come into their minds, but they can’t necessarily spell correctly.”

Going Beyond the Basics
Beyond achieving excellent recognition accuracy with Dragon in Luke’s elective class at CAS, Cleary started taking advantage of Dragon’s other productivity-boosting features, like voice shortcuts, vocabulary customization, and custom voice commands. These features helped speed the writing process and deliver accurately transcribed text that required fewer corrections.
“I found that I was very good at using all the tools and navigating through the features,” said Cleary. “I even created shortcuts so I could speak one word and Dragon would transcribe a whole phrase.” These custom voice commands allow students to quickly enter frequently used text, such as their name and home room, with a single command.

**A Valuable Assistive Technology Tool**

Cleary is now a junior at Mid-Peninsula High School, an independent day school for students in grades 9-12. The school recognizes that “intelligence is manifested in a variety of ways and that student learning modalities reflect this in a diversity of learning styles.” The school’s mission and programs are designed to foster unique learning styles and flexible academic programs so the students are empowered to reach their academic and social potential.

To help more students experience the benefits of Dragon, CAS purchased a full school license of the software. According to Luke, Dragon is a particularly helpful tool for students with learning challenges that manifest themselves in poor handwriting, spelling difficulties, and problems transforming ideas into text. He also considers it an ideal alternative input method for students who are slow or poor typists.

Since speech recognition accuracy gets better with each new version of Dragon, teachers at CAS have started using the software with students in the elementary grades — including a fourth grader who has use of only one hand. The teachers have noticed that Dragon is recognizing young voices with greater accuracy than ever before.

Monica David, the CAS’s current Dragon instructor, has been amazed at how quickly Dragon is recognizing students’ voices. “I was teaching some sixth-grade students how to use the latest version of Dragon and skipped initial training,” she said. “It worked really well, delivering high recognition accuracy even without training.”

Research studies and practical experience continue to reinforce the value of speech recognition for helping students with learning differences that interfere with their ability write and spell. Speech recognition tools like Dragon can generate a new excitement for writing and learning among students who were previously unable to write or produce written work due to learning challenges.

“We work with average and above-average intelligence kids who have learning disabilities that create roadblocks to academic success,” concluded Luke. “Dragon can help some brilliant kids like Paul Cleary demonstrate just how smart they really are. Dragon helps unlock intelligence.”

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