

Role-bot

New studies show artificial intelligence can bring autistic children out of their shell



Tara Loader Wilkinson
Editor in Chief, Billionaire

EVERYONE remembers their favourite schoolteacher. For the children of Prior's Court school in Newbury, UK, their teacher is particularly memorable. Nicknamed Steve, he can sing, dance and canter along to *Gangnam Style* with the best of them. Steve also happens to be a robot.

All of the 80 students at Prior's Court suffer from profound autism, a developmental disorder. Most cannot speak; they have no sense of danger; very little understanding of the world around them; and they may bite or hit themselves or others when they get anxious.

"Usually they join Prior's Court when their current school is unable to provide the specialist expertise and environment they need, says Stephanie Shirley, a British entrepreneur-turned-philanthropist who spent £37 million (\$\$63.9 million) developing the innovative school after the tragic death of her own autistic son. "Usually when they come to us, they, and their family, are in crisis."

But when they meet knee-high Steve, she says, something seems to click.

"Pupils who, due to their autism, have difficulty relating to others, are comfortable interacting with the robot, making prolonged eye contact and responding to its demonstrations and instructions," says Ms Shirley – known as "Steve", a pseudonym she gave herself to clinch boardroom meetings during the glass-ceilinged 1980s.

The majority of pupils at Prior's Court can-

not talk, but Steve can recognise flash cards, as well as words, and has voice and facial recognition. This means that Steve recognises who he is talking to and can respond specifically to the pupil he is engaging with; he can even tell if a pupil is looking at him or not. He helps with communication techniques (such as telling a story – but only as long as the child maintains eye contact) through to more advanced games that help teach turn-taking and collaborative working. And he never gets tired of repetition. "One pupil even kisses Steve goodbye," says Ms Shirley.

Early intervention

Recent studies put the number of autistic children as high as one in 40 among boys in developing countries. It's a condition that defies generalisation, but one thing is for sure: The potential of autistic children has historically been squandered due to lack of early intervention. Most autism sufferers never make it to high school; fewer still make it into the workforce. This is exacerbated without the right sort of early treatment, according to research published this year by the University of Manchester, King's College London and Newcastle University. The study found that children who received early intervention therapy showed less severe symptoms of autism six years later, with improvements in social communication and a reduction in repetitive behaviour. Artificial intelligence in schools represents a chance to give autistic children a boost.

The positive link between autism and robots was established by pure chance a few years ago. At a science trade show, a mother noticed that her severely autistic child was interacting with a robot with sociability she had never seen before. The idea that autistic children may learn better from robots than human teachers was taken up by Karen Guldberg, director of the Autism Centre for Education and Research at the School of Education, University of Birmingham.

Learning from interactive robots is easier for autistic children because it filters out some of the complexity of communicating with humans, such as facial expressions and tone, Dr Guldberg discovered. In line with her research, in 2012, French manufacturers Aldebaran donated

two robo-teachers to Topcliffe Primary, a school with 30 per cent autistic children in Birmingham, UK.

It was an instant hit. In the four years since then, around 450 robo-teachers have been installed in schools and universities in the UK, according to Carl Clement, founding director of Emotion Robotics, part of the original team that developed the apps for the robot.

Mr Clement is working with researchers and teachers to develop new software for NAO robots (Steve is a NAO robot). Robots in schools are installed with a suite of around 40 activities, but future versions will be more diverse.

"They've come up with a number of ideas for apps we don't have. For example, in each of their classrooms, they have large touchscreen displays. They want to bring up graphics on the screen that represent actions, such as kicking a ball or touching the floor, so that when the child touches the action on the screen, the robot performs it," says Mr Clement.

The take-up of robots in special schools is on the rise, especially as the price tag of assistive technology drops. It is now 6,000 euros (\$\$9,200) for a NAO robot installed with software, compared to around double that price for the first ones developed six years ago.

The trend is positive, especially in the UK where the government has plans to turn Britain into a leader in robotics. After the recession, former chancellor George Osborne outlined a vision for robotics being one of eight "future technologies" that will revolutionise the British economy over the next 20 years, with various subsidies going to universities and schools specialising in robotics.

The success of Prior's Court school and Steve the robo-teacher is the life-changing impact it has on the children and their families, adds Ms Shirley. "For parents, knowing that their child is safe, healthy and happy is a huge relief. Then come milestones such as being able to go out for a family meal – that is an enormous step forward."

For one child, a major achievement may be learning to ask for a drink; for another, saying their brother's name for the first time or being able to enter a classroom after a year of gradual acclimatisation.

"Both parents and teachers live vicariously through their young people. My dream was for Prior's Court to be the school to which I would happily entrust my Giles's physical, mental and spiritual development – that dream is being funded by others in the future," adds Ms Shirley. ▣



PHOTO:STEPHANESHIRLEY

MS SHIRLEY
British entrepreneur-turned-philanthropist



JAMIE AND ROBOT STEVE

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