NCi TECHNOLOGIES

Sir James Smith's Community School

Our Success Story
NAO robots motivate students and help to raise achievement levels

> **"** I was fascinated by the cute, humanoid robot when I witnessed it talking, dancing and quizzing the audience at NCI's School Technology Show. The benefits for teaching and learning were immediately apparent and we have purchased several NAO robots with specialist funding from 'Awards for All' to support our students. The results so far have been excellent and NAO has attracted students to programming who would normally not be interested in the subject. **"**
>
> **Michele Bacchus, Director of Finance and Business**

▶ Profile

Sir James Smith's School is a small, comprehensive school for 11-16 year olds serving the historic market town of Camelford and the surrounding area. Proud to be Cornwall's first Co-operative Trust School, Sir Jim's is a founding member of The Moor and Coastal Partnership Trust.

▶ Summary

The school selected NCI, award winners in transformational and innovative technologies that support teaching and learning, to provide five mini-humanoid robots for use throughout the school. The robots also included the ASK NAO package for children with autism and other special educational needs.

Sir Jim's have seen significant results in the progression of learning when using the NAO robots to support students with little interest in science or computing and for those with special educational needs. NAO is not only developing student engagement and skills in programming but also creating opportunities to merge science with creative arts for a rich learning experience that empowers students of all levels and abilities.

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▶ The Problem

Sir Jim's were looking for ways to support the adoption of computer programming and also to engage students who wouldn't normally be interested in computing or science. In addition, the school were keen to develop teaching and learning for students with special educational needs.

▶ The Solution

NCI visited the school to better understand their requirements and demonstrate the capabilities of the fantastic NAO humanoid robot that's bringing programming to life and empowering students of all ages.
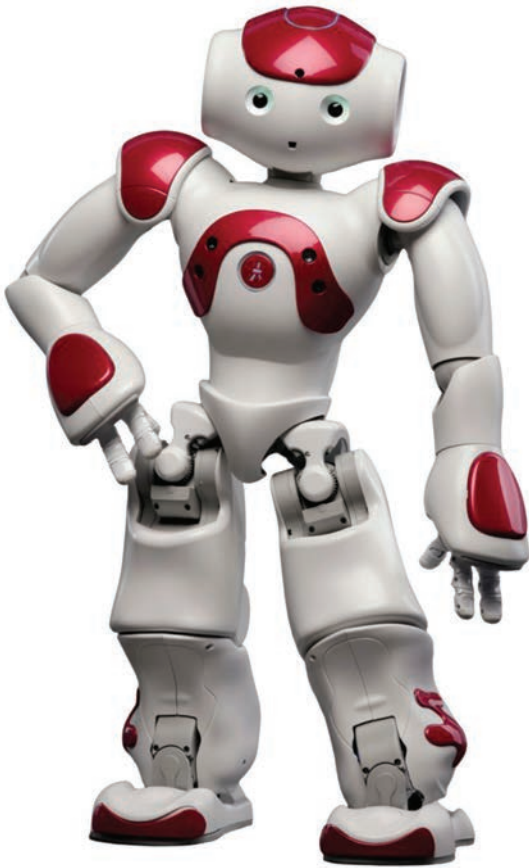
The friendly, autonomous NAO robot, standing at only 58cm tall, displayed human behaviours to the staff and students amazement and laughter. Andy Trish, Education Director at NCI, simply and quickly programmed NAO via laptop and Wi-Fi connection, using a 'drag and drop' selection of actions linked to typed messages in a sequence, instantly demonstrated through the robot. NAO was brought to life; he could impressively talk, walk, sing, dance, quiz students, pick up a pen and even play football. The school immediately saw the advantages and opportunities that this robot could bring to their students.

The intuitive programming interface that Andy Trish demonstrated, called 'Choreographie', makes it very easy for staff and students alike to program NAO whether at a basic primary level or using more advanced workflows. Introducing and exploring coding this way helps to empower students as their animation projects, problem solving and social interactions are tested through the robot. Progression to advanced computer programming languages such as C++ or Python can also be facilitated.

NCI explained that the little robot character has proven to be a transformational influence on teaching and learning because it quickly engages students of all ages and abilities with endearing and non-judgmental behaviours that help to motivate and inspire. The robot can thus deliver lessons and involve students in activities in a totally unique way. In particular, many schools using NAO robots were reporting greater interest and progress in science and computing from female students and other groups who were not typically adopting these subjects.

NAO's capabilities are vast, and Sir Jim's were also particularly impressed with the robots ability to detect faces and voices and respond with a pre-programmed behaviour, such as addressing a student by name when they walk into the classroom. Furthermore, they could see it was not a passive 'toy' as the robot could deliver far beyond the initial novelty attraction. NAO is powerful in its capacity to remember and learn from interactions and adapts it's behaviours accordingly, a truly intelligent robot!
This personalised adaptation in the robots behaviour can be especially effective with special educational needs (SEN) groups.

To support teaching and learning for SEN, the NCI team advised the school to include the ASK NAO package, a tailored 'Autism Solution for Kids' programme which has been hugely effective. Targetted interactions between student and robot can be controlled remotely by a member of staff and behaviours adapted as the interaction progresses.

> " He's so Cool
>
> **Student** "

Sir Jim's were keen to adopt NAO to support teaching and learning and could immediately see the opportunities for student advancement at all ages and abilities and across the curriculum. Having successfully received funding from 'Awards for All', Sir Jim's were able to part-fund the purchase of five robots for use throughout the school including the ASK NAO package.

The robots, with their stylish electric blue and red colours were delivered in robust cases. The end-user manual included a quick-start, step-by-step guide to setting up and using the NAO robot plus, lesson objectives and guidelines for easy integration and adaptation to suit any curriculum.

NCI, as experts in ICT solutions for schools, were selected to also provide further training and support to staff to ensure effective, ongoing application of the NAO robots.

▶ The Outcome

The staff and students found programming the NAO robot simple and thus were able to quickly utilise the robots for various activities throughout the school. NAO became a member of staff, a friend to the students and a facilitator for student teams.

The students were given a demonstration of NAO's powers during assemblies at the start of the term and have continued to be amazed by the robot. It is being used throughout the school and for 'after school clubs' with fantastic results, helping to motivate students and raise aspirations and achievements. NAO was also a success in one of the school's year7 history lessons, adding input to a lesson on the Battle of Hastings. The history teacher selected the best piece of work submitted by members of the class on the battle and NAO was programmed to read it aloud.

To support students with special educational needs the robots enabled non-judgemental, social interactions in a controlled manner that created effective communications and learning. In addition, from a distance and via the robots camera, staff can observe, record and adapt lessons accordingly to empower both the students' learning experience and enrich the teaching.

Furthermore, Sir Jim's benefits as part of an international online community of NAO robot users for education who embrace robotics as the next technological revolution after the internet and who experience NAO's expansive capabilities to empower teaching and learning. The online community can benefit from shared ideas for curriculum applications and lesson plans and upload creative projects.

NCI's education team supported the initial project and provide on-going support with programming, software updates and curriculum application.

The Technologies

NAO mini-humanoid robot with:

Vision and audio:
Text to speech, speech recognition, face detection and recognition, object recognition, sound detection and localisation.

Sensors:
sonars, accelerometers, gyroscopes, motors, cameras.

Natural motion reflexes:
antiself-collision, resource manager, fall manager, smart stiffness.

An Introduction to NAO robotics manual:
includes objectives and lesson plans.

Visual Programming software

NAO was created by Aldebaran, a SoftBank company.

▶ About NCI Technologies

NCI was founded in February 2004, by Directors Andy Trish, Chris Penrose and John Andrew, with a vision to provide great IT support to the local community. Over the last decade, the company has grown considerably and is now a 30 strong team of passionate and dedicated professionals delivering IT solutions to businesses and schools across the UK.

NCI continually strive to improve their services and increase customer satisfaction. Years of experience working closely with small and medium sized businesses and schools have led NCI to develop products and services that empower their customers to progress and lead the way.

A dedicated team of ICT specialists can support with the integration of NAO robots in schools. Please get in touch if you would like to book a demonstration at your school or visit our website for more details.
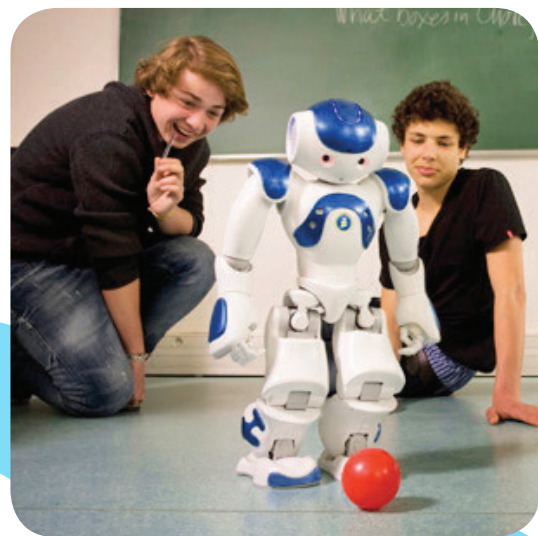
NCI Technologies providing IT Support and Solutions for Schools

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