



FROM GUI TO NUI

Multi-touch technology is nearly thirty years old but it has never quite made the breakthrough. Only with the arrival of the iPhone in mid 2007 and Microsoft Surface in 2008 did it become a hit for the wider public. Touch technology enables an intuitive interface to be made for every device with a screen, from a PC to a TV, from smartphone to smartboard in the classroom. Twenty-five years ago the graphical user interface (GUI) with the mouse was a breakthrough. We now stand at the dawn of the natural user interface (NUI), where multi-touch is one of the components. TNO is investigating how new applications can provide solutions to the questions that challenge society.

Touchscreen stimulates autistic children

Children with the autistic disorder PDD-NOS are motivated to work and learn thanks to an application developed by TNO. A trial lasting four weeks revealed that these pupils were more capable of learning arithmetic, cooperating and more sociable behaviour. Their teachers are enthusiastic and significant interest is being shown by regular primary school education.

The application is an educative game based on multi-touch technology, particularly familiar from Apple's iPhone. In this case children stand around a large table that is comprised of an enormous touchscreen. They do sums together using their hands and, especially, fingers. Each subsequent level – there are six in all – intensifies the need to cooperate. Cooperation is the core of the application since it is this group of autistic children that have difficulty with social interaction and communication.

'Learning using a PC is ideal for these children but not in isolation,' explains TNO expert Arnoud de Vries. 'We want to break that trend and get them exercising together. We found that children who are introspective by nature think it's great. Their arithmetic marks improve and they begin to socialise.'

The practical study was a graduation project by

student Maarten van Veen from the University of Groningen for TNO together with the Professor W.J. Bladergroenschool for special primary education in Groningen and the Regional Expertise Centre Northern Netherlands (RENN4).

REPLACING THE SQUEAKY CHALK

Market manager for Education & Media, Mark Ruijsendaal elucidates. 'Within TNO we combine innovation in the fields of ICT, education and game design. This has generated pioneering results. We work closely with and carry out assignments for Kennisnet, the Education Council, the Ministry of Education, Culture and Science, and the European Commission, all of whom want to see innovations geared to the future being realised in education. We offer education the very latest technologies and show what this can produce, with a sound scientific

foundation. Innovation in education is somewhat slow. Many classrooms have a smartboard but there is much more potential to it than just replacing the squeaky chalk.'

IT'S JUST THE BEGINNING

Multi-touch can help education a great deal but, TNO believes, the touchscreen table can be used in many more applications. Arnoud de Jong, who writes the software for the multi-touch table, gives a short demonstration. Experts from the police, fire service, ambulance, local authority, dike board and *Rijkswaterstaat* (Department of Public Works) bend over the table on which a map of their geographical area is projected. They zoom in, plot routes, pass each other documents, open them, add new information that is calculated immediately, track vehicles in real-time, begin a telephone conversation by just touching and simulate a new scenario with a sweep of the finger over the table.

'This technology encourages and realises mutual cooperation: in education, among government services, in business. It's just the beginning,' say the TNO experts.

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