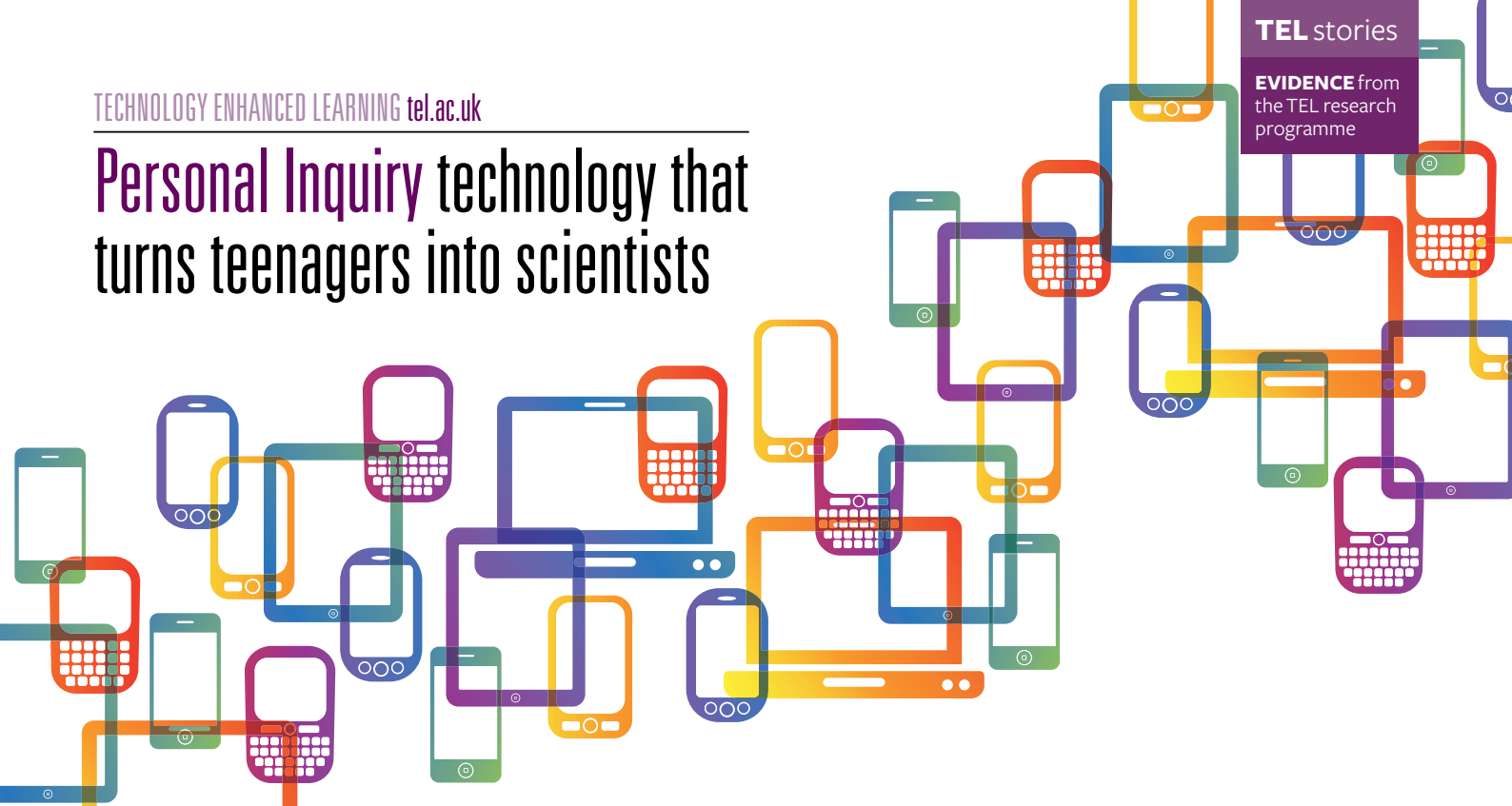


TECHNOLOGY ENHANCED LEARNING tel.ac.uk

Personal Inquiry technology that turns teenagers into scientists

TEL stories

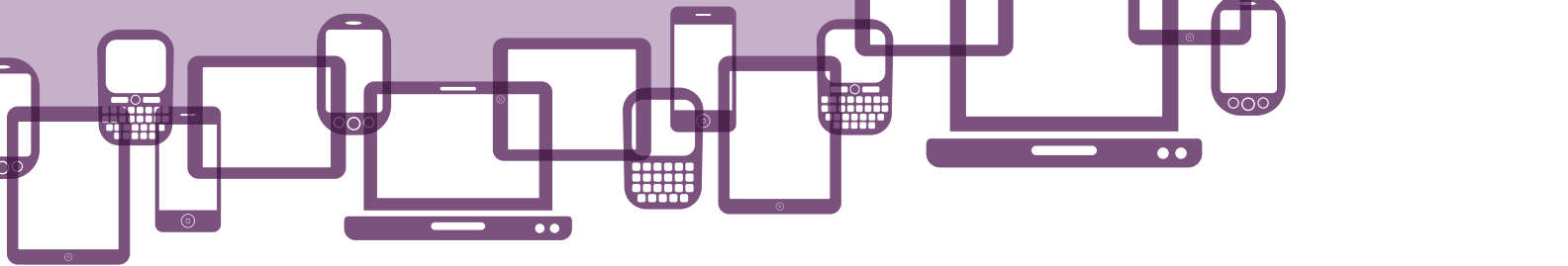
EVIDENCE from the TEL research programme





The Personal Inquiry project has given pupils the power to carry out real scientific inquiries outside the classroom, helping them to think and act like scientists. Now we have the opportunity to extend this approach to adult learners by developing smartphones and tablet computers as scientific instruments.

Professor Mike Sharples, principal investigator, Personal Inquiry project.



Personal Inquiry... the challenge

Many teenagers are struggling to engage with science. 'An informal hands-on approach seems fine in primary school, but at secondary level some young people start to see science as difficult,' says Professor Mike Sharples of the Open University's Institute of Educational Technology. 'They follow the curriculum, they learn the principles, but there's a big divide. They don't connect school science with real life.'

Teenagers can spend hours investigating how to reach the next level in a computer game, says Professor Sharples, but they don't take that experimental, inquiry-based approach to science. Why? 'Because that's something other people do.'

That's not the only problem with secondary-school science. The pressure is on teachers to do experiments that work – and work within the time-span of one lesson. This need for reliable, predictable outcomes doesn't encourage pupils to question and think in the way that scientists should.

Motivated by a desire 'to do science differently,' Professor Sharples and his colleague Professor Eileen Scanlon launched the Personal Inquiry (PI) project.

Their aim was to find ways of turning 11 to 14-year-olds into inquisitive scientists. They believed the answers lay in:

- letting pupils decide what to investigate and how to do it.
- liberating them from the classroom by equipping them with the latest in mobile technology.

'We wanted to understand how changes in technology might support inquiry learning,' says Professor Scanlon. 'Teachers, like us, were seeing the potential of mobile technology for engaging young people as well as the possible advantages of connecting school, home and other places.'

So in 2007 the Personal Inquiry project began, supported by a £1.2m grant from the ESRC and the EPSRC research councils.

Personal Inquiry... The team wanted young people to understand themselves and the world in which they live.

Personal Inquiry... the technology

The PI team wanted young people to understand themselves and the world in which they live, through the scientific process of gathering and assessing evidence, conducting experiments and engaging in informed debate.

So they built a computer toolkit from scratch. Called nQuire, it runs on handheld machines, enabling young people to design and conduct experiments at school, at home, outdoors – or anywhere in between.

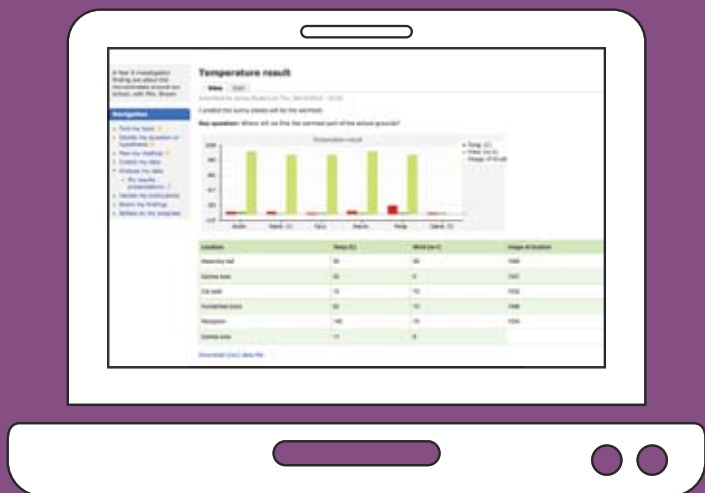


nQuire's software is a form of 'scripted inquiry learning,' says Professor Sharples. 'It provides a dynamic and high-tech twist on the traditional lesson plan. Pupils are guided through devising and planning scientific experiments, collecting and analysing data and discussing the results.'

Teachers can choose from a set of ready-made inquiries which they can adapt to suit their pupils' interests and abilities. Or they can create new inquiries using nQuire's authoring tools. They can monitor progress, giving pupils access to new parts of the inquiry as they complete each stage.

nQuire was developed with the help of teachers and pupils. An open source kit, it runs on Windows, Linux and Apple Mac computers. It can also run on mobile devices such as iPads or be downloaded on to a USB data stick.

nQuire is accessible to schools and universities in the UK and worldwide, to try, use, design, author, and share scripted personal inquiries. Download it free of charge at www.nquire.org.uk/



...the technology

Personal Inquiry... Thanks to nQuire, teenagers can devise and conduct their own scientific research.

Personal Inquiry... in action



Thanks to nQuire, teenagers can devise and conduct their own scientific research. So far they've tracked the decomposition of blue cheese and studied the eating habits of pigeons. Healthy diets and urban heat islands have been investigated while much was learnt about microclimates through working out the best site for a new school bench.

All this research was carried out by pupils in Nottingham and Milton Keynes. They put nQuire through its paces in six trials in various settings, including at school, at home, at an after-school club and outside on field trips.

The trials revealed that pupils enjoyed this investigative, relevant science. It had a positive effect on learning outcomes and improved their understanding of the scientific process.

nQuire gives young people a real and dynamic insight into how the pieces of a scientific inquiry jigsaw can fit together or, occasionally, fall apart. And, as one Nottingham pupil said: 'It's great fun.'

The PI team's belief in the pedagogic, technological and scientific principles behind nQuire has been amply justified. The toolkit was a prize winner in the 2011 International e-Learning awards and its approach inspired the Girl Guides to introduce a Neighbourhood Researcher badge. Not only that, but the team will be integrating the nQuire toolkit into the University's new Wolfson OpenScience Laboratory. For example, students will be able to form questions and hypotheses about the moon's geology and then find answers by examining high resolution images of moon rock samples with an online virtual microscope.

Personal Inquiry... find out more

More information about Personal Inquiry is available at www.tel.ac.uk. The project is part of the Technology Enhanced Learning (TEL) research programme. This is...

- a £12m programme funded by the UK ESRC and EPSRC from 2007-2012;
- designing and evaluating systems to advance our understanding of learning and teaching in a technological context;
- supporting eight large interdisciplinary projects;
- working to achieve impact for emerging research results;
- mapping progress on key themes.





tel.ac.uk

Technology Enhanced Learning Research Programme
London Knowledge Lab, Institute of Education,
University of London, 23-29 Emerald Street,
London, WC1N 3QS

youtube: [youtube.com/tlrptel](https://www.youtube.com/tlrptel)

twitter: @TLRPTEL

email: tlrptel@gmail.com

phone: +44 (0)20 7911 5577

E · S · R · C
ECONOMIC
& SOCIAL
RESEARCH
COUNCIL

EPSRC

Pioneering research
and skills