

System Upgrade

Realising the vision for UK education



Almost every field of employment now depends on technology. From radio, to television, computers and the internet, each new technological advance has changed our world and changed us too.

But there is one notable exception. **Education has barely changed.**

Rt Hon Michael Gove, BETT conference January 2012

This document is an overview of the System Upgrade report, available in full from www.tel.ac.uk. The report offers recommendations for shaping the future of technology enhanced learning.

Connect	Red
Share	Orange
Analyse	Yellow
Assess	Light Green
Apply	Green
Personalise	Teal
Engage	Light Blue
Streamline	Blue
Include	Dark Blue
Know	Purple
Compute	Dark Purple
Construct	Pink

The Technology Enhanced Learning Research Programme

The EPSRC/ESRC funded (£12m) Technology Enhanced Learning Research Programme ends in December 2012 after some 5 years of research with eight large projects – plus seven development projects and ten thematic strands.

The System Upgrade report summarises the work of the Technology Enhanced Learning Research Programme and offers recommendations for shaping the future of technology enhanced learning. (Available in full from www.tel.ac.uk.)

Mapping the territory: 12 key themes and recommendations

Connect	Exploit the power of personal devices to enhance learning.
Share	Catch the wave of social networking to share ideas and learn together.
Analyse	Use technology to understand better how we learn, and so help us learn better.
Assess	Develop technologies to assess what matters, rather than what is easy to assess.
Apply	Allow technology to help learners apply their education to the real world.
Personalise	Utilise artificial intelligence to personalise teaching and learning.
Engage	Go beyond the keyboard and mouse to learn through movement and gesture.
Streamline	Enhance teachers' productivity with new tools for designing teaching and learning.
Include	Empower the digitally and socially excluded to learn with technology.
Know	Employ tools to help learners make sense of the information overload.
Compute	Understand how computers think, to help learners shape the world around them.
Construct	Unleash learners' creativity through building and tinkering.





The massive ambitions we share, as a nation, for education cannot be met without technology. Crucially, they cannot be met without technology designed to help people learn. For too long learning has been subsisting on the crumbs of technologies designed for other purposes. It is too important and too complex for that to continue.

The Technology Enhanced Learning research programme has spent more than four years developing systems and software that, for example, use artificial intelligence to teach teenagers algebra and help autistic children with their social skills. We have created virtual islands where young people acquire the confidence to tackle some of life's bigger challenges. We have exploited the potential of giant touch-screen tables to encourage young children to work together. We have taken sense-of-touch technology – the sort that makes that gaming controllers vibrate – and used it to train dentists cheaply and effectively.

The potential for learning is clear when we consider the technologies that are present in homes and in people's pockets. But there is little sign that this kind of technology is being adequately exploited for teaching and learning.

Of course some schools are pioneering the use of technology in learning. But too many are struggling with cumbersome networks and outdated computers and a fear of all that lurks on the internet. Meanwhile, their students are busy at home setting up servers to allow them to play online games, or making videos to upload on YouTube, or socialising with their friends on Facebook. They and their



Professor Richard Noss
Director, TEL Research Programme

parents may be perfecting their digital photos on their multi-touch tablet or doing the week's shopping online. Colleges and universities are making headway, but there is much more that can be done. And the possibilities for lifelong learning are endless, though yet to be thoroughly realised.

Driven by the desire to discover, create and communicate (and play and shop), people of all ages have developed impressive skills in order to pursue their own interests. Somehow, this has not yet transformed learning and teaching in the same way. Partly, this is due to a reluctance to change

what counts as learning. All forms of professional life have been transformed by technology, but we are wary of making radical changes to what is taught and what is learned. Yet this is where change is most needed – to learn the new things that matter in the 21st century, and find new ways to teach and assess them.

There are signs of change: new technologies like tablet computers are helping to turn the tide as is the long-overdue recognition of the importance of teaching children something about the art of programming. And of course almost everyone in the UK has a powerful computer in their pocket, even if they have to switch it off when they enter the school.

Education at all levels needs technology that is designed for learning and teaching, not the leftovers of systems designed for quite other purposes. Without it, our schools will languish, locked in an analogue mind-set while the rest of society goes digital. We must come to see technology as an investment, not a cost.

This report addresses 12 key themes, with recommendations that will be relevant to everyone involved in learning – including teachers, policymakers, lecturers and workplace trainers. Our ambition is to feed these into the debate, to provide focus and, where possible, evidence that can guide policy and practice. As such, our recommendations are not simply demands on government or a set of unrealistic calls on the public purse; they are an attempt to map out the territory of what we – academics, industry, policymakers and practitioners – should recognise as crucial for getting the best out of technology, and finding effective and productive ways to invest for the future.



The Technology Enhanced Learning Research Programme

The Programme

- 5 years
- £12m
- 150 researchers
- 30+ universities
- 400+ publications
- ESRC/EPSRC funded
- Eight large projects across UK
- Interdisciplinary teams designing hardware, software and pedagogy in partnership with teachers and learners.

The programme is based at London Knowledge Lab, Institute of Education, University of London and led by Professor Richard Noss

The Projects

Echoes: harnessing artificial intelligence to improve autistic spectrum disorder children's social skills

Ensemble: hi-tech tools to help learners make sense of information overload

hapTEL: improving efficiency and productivity of dental education with touch-feedback technology

Inter-Life: exploring online worlds as a means for helping young people through difficult life transitions

Learning Designer: intelligent software for teachers to improve productivity

MiGen: helping secondary school children 'get' algebra using AI techniques

nQuire: sparking interest in science through fieldwork, mobile devices and a toolkit of resources

SynergyNet: realising a vision of classroom collaboration with networked touch-screen tables.



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