Government funding in schools has increased substantially since it began in April 1998. In 2002-03 it totalled £510 million compared with £657m over the years from April 1998. In addition £230m was made available for staff training through National Opportunities Fund.

Since then there has been a sustained and increasing investment in ICT in all sectors of education including the Test Bed projects, Computers for Pupils, Building schools for the future, primary capital programme, LSC capital programme and several high profile projects, such as the Home Access to Technology, announced as well as a revised Harnessing Technology Strategy from Becta the Governments ICT in Education agency.

The Office For Standards in Education (OfSTED) report, “ICT in Schools – The Impact of Government Initiatives Five Years On” was a timely reminder of the constant pressure on educators to demonstrate that the investment in technology was having the required impact on the learning process and outcomes.

The report highlighted the main positive aspects of the work of The National Grid for Learning including:

- Laptops for teachers
- Strategic Leadership in ICT
- Curriculum Online
- Enhancing subject teaching using ICT
- Continued funding of Regional Broadband Consortium
- The Test bed Project

The main findings suggested that the continued impact of government initiatives for ICT in schools has been significant. The outcomes of the initiatives are more evident in improvements in pupils’ achievements in ICT capability than in their application of this learning in other subjects. The incidence of effective application of ICT in lessons across subjects is increasing slowly but surely.

“Communities consist of a group of individuals interacting around a clear, shared purpose. Each participant brings value to the community, and the community brings value to each participant.”

Bob Harrison  
Support For Education and Training  
bobharrisonSET@aol.com
However the gap between the best and worst in ICT provision is unacceptably wide and increasing. As yet, the Government’s aim for ICT to become embedded in the work of schools is a reality in only a small minority of schools. More typical is a picture in which pupils ICT experiences across the curriculum are sporadic and dependent on teachers; in many schools, opportunities to exploit technology are not on a daily basis.

“Another issue is the widening gap between the best and worst provision. The quality of the use of ICT in any one subject varies enormously from school to school. However, in some schools that are furthest forward, ICT is starting to have beneficial effects in teaching and learning in ALL subjects.”

More recently Becta have reviewed the Harnessing Technology Strategy and published a progress report on the impact of technology in education in which Becta Chief executive Stephen Crowne claims

“There are many encouraging signs of progress and a growing evidence base demonstrating positive impact of technology and educational “e-maturity” on a range of outcomes”

However there is much more work to do as Stephen Crowne acknowledges:

“Clearly, however, the challenge of delivering even greater value from technology and realising significant benefits for learners is a continued one.”

One great conundrum Becta and the Government are currently struggling with is the discrepancy in the position of the UK in the European comparisons of embedding of ICT table where the UK, with a score of 250, tops the OECD league table and the rather lower placing in the OECD PISA study of pupil performance.

A comprehensive overview of the impact of ICT in schools is the landscape review produced by the Quality in Education Centre, University of Strathclyde Professors Rae Condie and Bob Munro and published by Becta in 2007.

Whilst they conclude;

“The overwhelming message is that most pupils and teachers have found the introduction of ICT into the classroom a positive development, motivating teachers and pupils alike and changing radically the learning experiences of both.”

They also note;

“A key concern is the extent to which teachers fail to appreciate that learning and teaching through technology requires a new approach to pedagogy, planning and preparation and how the curriculum is perceived.”

And in conclusion they pose a challenge for the Government flagship BSF programme;

“While this study has looked closely at the impact of ICT on how pupils learn in schools and how this might be enhanced, it has not addressed the impact that it might make on what they learn. This in turn raises the question of where learning takes place and whether the schools of the future will be the physical entities they are today.”

A recent contribution to the evidence of the impact of ICT in Education has come from BECTA in the form of a series of case studies in a DVD entitled “ICT in Education-Evidence Highlights 2008.” Which exemplify some of the key findings from BECTA’s 2007/8 research programme.

This helpful selection is under the headings of;

- Using ICT to improve schools
- Technology and Personalised Learning
- Models of innovation in learning online
- Web 2.0 in education
- The potential of ICT to engage NEETS
Formed in 2001 the Toshiba Ambassadors (UK) are part of a European network of leaders and managers in schools and colleges. The focus of the network is the implementation of wireless networks, use of portable and mobile technology and the impact on teaching, learning and management.

The original Toshiba Ambassadors case studies included the following schools, colleges, Local Education Authorities (LEA’s), Education action Zones (EAZ’s) and Excellence in Cities (EIC’s).

- Djanogly City Academy, Nottingham
- Ninestiles School, Birmingham
- Leigh CTC, Kent
- Homewood School, Hertfordshire
- King Edward VII, Leicestershire
- The Hermitage School, Newcastle
- Wildern School, Hampshire
- Bishop Stortford College, Hertfordshire
- Bristol LEA, Bristol
- Castle Vale College, Birmingham
- Arnewood School, Hampshire
- Claremont School, Surrey
- East Manchester EiC, Manchester
- Bristol LEA, Bristol
- Ealing and West Hammersmith College, London

Each had their own unique experience of implementation of wireless technology in teaching and learning.

Toshiba provided the support for the network to communicate with each other and the group received regular visits from Toshiba technical and business development staff.

The most beneficial aspect, for the educators, is the seminar programme, which holds workshops 4 times per year and is hosted by Toshiba in partnership with one of the Ambassador organisations.

The format for the workshops varies but usually has the following components:

- An overview of recent developments in ICT in Education including BSF/PCP/BCF
- A research update from BECTA
- Presentations on impact evidence from each of the Ambassadors on recent developments
- Technical update from Toshiba
- Presentation from host organisation on current issues in schools/colleges
- Feedback from Ambassadors on technical and pedagogical issues in wireless/portability/mobile learning
- New product testing. And focus group feedback

An International dimension has included a study visit to the Benelux countries to exchange ideas with other European Ambassadors and a visit to the Toshiba manufacturing plant in Germany. A study tour of China was made in conjunction with the Specialist Schools and Academies Trust.

Several Ambassadors have cooperated on joint project applications and a successful Networked Learning Communities project includes 3 Ambassadors and a school in South Australia where a Toshiba Ambassador used to teach.

Some Ambassador schools were featured in a Teachers TV feature “Future Visions” programme and ambassadors regularly feature in the SSAT future visions tour and the BECTA ICT Excellence Awards.

The Ambassadors attend BETT and provide advice and support not only to each other but also for other schools and colleges who are beginning their wireless/portable/mobile journey.

The Ambassadors play an active role in a variety of other communities including NAACE, ALT, BECTA ICT Research Network, BELMAS, Specialist Schools and Academies Trust, e Learning Foundation and several others.
Toshiba recommends Windows Vista® Business

Wireless And Portability

Wireless networking in schools and the use of portable devices featured in the OfSTED report,

“The purchasing of wireless laptops can greatly increase flexibility...the use of laptops on trolleys that can be wirelessly linked to the school network in different parts of the school has had a profound impact where this has been part of a co-ordinated and sustained drive to improve the uptake of ICT across subjects.”

Indeed Perry (2001) suggested that a wireless network can help teachers to:
• Work more efficiently
• Better support their pupils learning through their own use of ICT
• Use ICT to extract greater value from their teaching
• Work wherever and whenever suits them best

He claimed that, “The flexibility of wireless networks and portable computers means that lessons using ICT in depth can take place in ordinary classrooms, allowing it to serve children’s learning needs and not dominate them, and to improve teachers confidence in innovating. Schools have found that the flexibility of wireless networks supports both teachers’ teaching and administrative responsibilities highly effectively.”

He used three exemplars from the City of York Education Authority, Dorrington Primary School and Sawtry Community Technology College.

“What the research says about portable ICT devices in teaching and learning” is a BECTA (2004) report based on an analysis of available research about the use of portable information and communication technology devices in teaching and learning. The summary states that key benefits of the use of portable devices include:

General Benefits
• Portable ICT devices do not dominate in the same way desktop computers can, and may be more readily integrated into classroom use and across the curriculum with the minimum of disruption to existing practices
• The use of notebook computers, together with wireless networking technology, allows ICT work to be done in the classroom, saving both space and the time needed to move to specially equipped ICT suites
• Portability enables students to take work home to continue working, and this can foster greater feelings of ownership over work

Benefits For Students
• Gains in understanding and analytical skills, including improvements in reading comprehension
• Development of writing skills (including spelling, grammar, punctuation, editing and redrafting), also fluency, originality and elaboration
• Increased motivation, organisation skills and responsibility amongst pupils
• Encouragement of independent and active learning, and self responsibility for learning

Benefits For Teachers
• Gains in ICT literacy skills, confidence and enthusiasm
• Easier planning and preparation of lessons and designing materials
• Greater ability and confidence to support students’ learning with ICT
• Access to up to date pupil and school data, any time and anywhere
• Increased efficiency and accuracy of day to day registration of pupils
• Enhancement of professional image projected to colleagues

Benefits For Parents
• Increased involvement in education for parents and, in some cases, improved self esteem
• Increased knowledge of children’s learning and capabilities, owing to increase in learning activity being situated in the home
Two reports from Becta on the use of Tablet PCs in Schools (2005) have added further evidence of the value wireless and mobile technologies can add to learning and teaching including:

- Increased amount of ICT use, and the degree of integration across the curriculum.
- Increased motivation and positive impact on learning outcomes.
- More independent and collaborative study.
- More versatility
- Tablet and wireless projector combination provided a better solution than hard wired interactive white board.
- More effective use of space (No ICT suite)

Futurelab Report 11-Literature Review in Mobile Technologies in Learning has been a benchmark publication.

Produced by the University of Birmingham in 2004 it has been a vital contribution to the momentum in the mobile education movement;

“mobile technologies are becoming more embedded, ubiquitous and networked, with enhance capabilities for rich social interactions, context awareness and internet connectivity.”

Futurelab followed this with,” HANDHELDs – learning with handheld devices a series of case studies predicated on the assumption that handheld technologies, in principle, could enable schools to address concerns about access, personalisation and context.

Key questions raised by the publication include;

- Which models of ownership support learning?
- Which students benefit and in which contexts?
- Are short-term benefits sustainable?
- Can handheld technologies support assessments?

A very recent contribution to this field has come from Elizabeth Hartnell-Young whose study of the use of mobile phones in schools has stimulated an interesting reaction from education professionals.

This study was commissioned by Becta through a research grant related to the UK Government’s e-strategy “Harnessing Technology”.

In spite of school policies banning mobile phones in class, teachers in three schools explored ways of using students’ own phones and borrowed smart phones for learning. As a result, students had permission to use the mobiles for activities such as: timing experiments with the stopwatch; photographing apparatus, models, and experiments for reports; bluetothing project material between group members; receiving SMS & email reminders from teachers; synchronising timetables and setting reminders; connecting remotely to the school learning platform; accessing revision sites on the Internet; creating short narrative movies; downloading foreign language podcasts; using GPS to identify locations, and transferring files between school and home.

School heads and parents were supportive of the project, and in fact some parents asked why their students were not involved!

In the Learning and Skills sector a £10m project, Mobile Learning in Further Education, (Molenet) has produced some interesting early outcomes which suggest the use of mobile and portable devices and wireless networks can have positive effects on a range of performance indicators. Over 100 schools and colleges, 10,000 learners have participated in the project.

Any consideration of mobile learning would be incomplete without mention of the Wolverhampton Learning 2 Go project. The early indications from the evaluation of this project suggest that “mobile devices can make a very positive contribution to teaching and learning.”
Etienne Wenger (1998) poses the question; "What if the key to complex knowledge challenges faced by most organisations today lies in the age old, utterly familiar, and largely informal social structures known today and communities of practice?"

Communities of practice may well represent the national social structure for the ownership of knowledge, but they have been around for a long time.

Wenger (2001) further developed the concept and related it to the role of technology in supporting communities in practice and whilst the main thrust of this work was the exploration of appropriate technological platforms some of the key principles resonate with the Toshiba Ambassadors.

According to Wenger not every community is a community of practice. The fans that join in the City Of Manchester Stadium to support Manchester City can be described as a community but not a community of practice. He asserts that three characteristics are essential:

THE DOMAIN
Since a community of practice is focussed on a domain of shared interest, it is not merely a club of friends or a network of connections between people. Membership therefore implies a minimum level of knowledge of that domain – a shared competence that distinguishes members from other people.

THE COMMUNITY
In pursuing their interest in their domain, members engage in joint activities and discussions, help each other, and share information. That is how they form a community around their domain and build relationships. Having the same job or the same title does not make a community of practice unless the members interact and learn together.

THE PRACTICE
A community of practice is not merely a community of interest or people who like certain kinds of movies for example. Members of a community of practice develop a shared repertoire of resources, experiences, stories, tools, ways of addressing recurring problems- in short a shared practice.

Wenger goes on to say Communities of Practice are not a novelty. They are not a new solution to existing problems; in fact they are just as likely to have been involved in the development of these problems. In particular they are not a design fad, a new kind of organisational unit or a pedagogical device to be implemented.

They are about content, learning and a living experience of negotiating meaning, they are not about form. They cannot be legislated into existence or defined by decree. They can be recognised, supported, encouraged and nurtured, but they are not reified designable units, practice itself is not amenable to design.
Jane Seale (2004) has used Wenger’s work to explore communities of practice in relation to the Special Educational Needs and Disability Act and the link with learning technology. She concludes that “The application of Wenger’s (1998) theory to the development of accountable e learning has facilitated an exploration of current practice which suggests that the learning technology community might be attempting to develop a practice to deal with what they understand to their “enterprise” and to own that practice despite the imposition of such laws as SENDA”

She goes on then to make recommendations for the further development of the community such as making links with other communities of practice and changing focus from products to process.

Wenger also suggests that communities typically conduct four types of activity;
- Helping communities
- Best Practice communities
- Knowledge stewarding
- Innovation communities

The Social perspective on learning presented by Wenger (1998) may be summarised by the following principles:
- Learning is inherent in human nature
- Learning is the ability to negotiate new meanings
- Learning creates emergent structures
- Learning is fundamentally experiential and fundamentally social
- Learning transforms our identities
- Learning constitutes trajectories of participation
- Learning means dealing with boundaries
- Learning is a matter of social energy and power
- Learning is a matter of engagement
- Learning is a matter of imagination
- Learning is a matter of alignment
- Learning involves an interplay between the local and global
- Learning cannot be designed… it can only be designed for

CRITICAL SUCCESS FACTORS FOR COMMUNITIES OF PRACTICE

Communities of practice are different from teams and have different factors that lead to their success. These include;
- Committed facilitation and sponsorship
- Clear and well defined purpose
- Lively and committed leadership
- High level of pre-existing expertise
- High degree of credibility
- Regular meetings and high levels of engagement
- Rhythm and celebration within the community
- Visible outcomes
- Refreshing knowledge by encouraging new membership
CONCLUSIONS AND FUTURE WORK

There are 15 members of the Toshiba Ambassadors (UK). There is strong evidence that they have the potential to mature into a true community of practice, as Wenger defines them. Nevertheless they have formed a symbiotic relationship that has resulted in organisational and individual development. Most importantly they have had a significant impact on teaching and learning within their own schools and colleges and shared best practice at local, national and international level.

Further work will focus on the maturation of the community the addition and assimilation of new members as well as an evaluation of the impact of the Ambassador programme on educational outcomes within the ambassador schools and colleges.

REFERENCES

Twining, P; Evans, D; Cook, D; Ralston, J; Selwood, I; Jones, A; Underwood, J; Dillon, Gand Scanlon, E Tablet PCs in schools; Case Study report A Report for BECTA by the Open University. 2005.
Sheehy, K; Kukulska-Hulme, A; Twining, P; Evans, D; Cook, D; and Jelfs, A- Tablet Pcs in schools-A review of literature and selected projects A report for Becta by the Open University 2005.
Condie,Rae and Munro,Bob The Impact of ICT in Schools-a landscape review Becta 2007
Becta-Harnessing Technology Review 2007
Animist, Lonsdale, Vavoula,Sharples- Literature review in Mobile Technologies and Learning-Nesta futurelab 2004
Hartnell-Young E, How mobile phones help pupils learn in secondary schools, University of Nottingham 2008
Mobile Learning in Practice (Molenet) LSC/LSN 2008
McFarlane, Triggs, Yee Researching mobile learning-Becta/University of Bristol 2008

Bob Harrison
Education Adviser, Toshiba Information Systems(UK) Ltd.
2008