Fulfilling the Potential

**Transforming
teaching and learning
through ICT in schools**

department for

education and skills

creating opportunity, releasing potential, achieving excellence

Transforming
teaching and learning
through ICT in schools

Foreword

Foreword by the Secretary of State for Education and Skills

Since being appointed Secretary of State I have made clear my commitment to shaping our policies so that they will unlock the value that information and communications technologies (ICT) can undoubtedly bring to education.

In support of our commitment to higher standards for all children and young people I want every school to make excellent use of these opportunities, particularly to develop and deliver e-learning where there are considerable benefits to be gained. This is not only true for individual learners, teachers and other professionals working in schools, but also for schools themselves, the communities they serve and the future prosperity of the nation.

I welcome the enthusiasm with which the education service and industry have responded at local, regional and national levels to the challenges set by the Prime Minister in 1998, and to the record levels of investment we are providing. Together we have moved from a low base to achieve real progress, tackling many of the issues around ICT provision in schools and elements of training.

However, the potential for real transformation still remains largely untapped.

Looking ahead to 2006 and beyond, this paper invites schools to develop the use of ICT in the context of our broader strategies for primary and secondary education and for school workforce reform. It is also a challenge to Government and its partners to provide the support and encouragement needed to embed this in everyday practice. We recognise that transformation in this area is not achieved easily, quickly or cheaply.

To conclude, my vision is one where schools are confidently, successfully and routinely exploiting ICT alongside other transformational measures. By doing so they will be delivering an education that equips learners for life in the Information Age of the 21st century.

Charles Clarke

1. The School Reform Agenda

Introduction

1. Since 1997 the Government has worked with its partners and schools to drive up standards of achievement. We start from the belief that all children are capable of attaining high standards and should leave school with the knowledge, qualifications and life skills that will help them thrive in the 21st century. Significant gains have been made, notably in the proportion of 11 year olds reaching the expected standard in literacy and numeracy and of 16 year olds gaining 5 good GCSEs. Ofsted says that we have the best generation of head teachers and teachers ever. There have also been significant improvements in the quality of teaching and learning in both primary and secondary schools.

2. While these achievements give a strong foundation for progress, huge challenges remain. 25% of 11 year olds do not achieve the expected level in literacy and numeracy; almost half of 16 year olds do not leave school with 5 good GCSEs; some schools are far more effective than others in helping their pupils progress; and some groups of children are consistently under-achieving in the current system – boys, children from some ethnic minority groups and children in care.

3. We are committed to continuing to work with schools to transform educational achievement. We want to see year-on-year increases in overall attainment and above-average improvement for under-achieving groups. We want all children to have the opportunity to benefit from high quality teaching and learning within a broad rich and enjoyable curriculum at both the primary and secondary stages. Our vision is a dynamic and diverse school system, in which each school is committed to the pursuit of excellence for every child, and with the main drive for improvement coming from within the school itself.

4. We are supporting schools to build capacity for improvement through action to develop strong leadership teams; to encourage schools to work together to spread best practice and raise standards; to help build partnerships beyond the classroom to enhance the quality of learning within the classroom (for example by engaging with parents to tackle behaviour issues); and to reform the way the school team works to allow teachers more time to teach.

5. Running through the whole agenda is a strong emphasis on encouraging schools to innovate in the way they teach and in their internal organisation, and to build on their distinctive strengths and ethos. At the heart of all this is the central drive for higher standards, supported by our national programmes of policy development and curriculum support delivered through the primary and secondary strategies.

The Contribution of ICT and e-learning

6. Information and communications technology (ICT) and e-learning[1] have a massive contribution to make to all aspects of this reform agenda. For example:

- ICT can make a significant contribution to teaching and learning across all
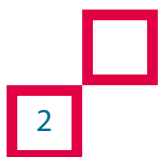
subjects and ages, inside and outside the curriculum;

- ICT can provide opportunities to engage and motivate children and young people and meet their individual learning needs;

- ICT can help link school and home by providing access to teaching and learning materials, and to assessment and attendance data, from home;

- ICT can enable schools to share information and good practice in networked learning communities;

- intelligent information management systems within schools can support school leadership;

- integrated curriculum and management information systems can help schools monitor individual pupils' progress for assessment for learning as well as for administrative purposes; and

- use of shared drives in schools to bank lesson plans and other resources can produce vast savings in time and effort for teachers.

7. ICT therefore needs to be seen as a key, integral element of the school reform agenda: freeing up time and energy to help remodel the school team; enabling efficient knowledge management within schools; supporting knowledge transfer between schools and outreach to parents and the community; as well as being a hugely powerful medium for transforming teaching and learning. The empowered school system we want to see, committed to continuous improvement and innovation

in support of excellence and inclusion, will increasingly need to be an e-confident system (see Annex A).

Advancing Use of ICT and e-learning: The Way Forward

8. Since 1998 there has been a very significant investment in ICT in schools through the National Grid for Learning Programme. As this paper describes, nearly all schools are now connected to the Internet and the average number of computers in schools for teaching and learning has virtually doubled. But the vast majority of schools are only beginning to tap the potential of ICT to enhance teaching and learning and to modernise the way in which schools are run and organised. This paper signals the directions in which schools should be moving to advance the development of e-learning and the use of ICT. It is relevant to everyone concerned with primary and secondary education. Focusing on the period to 2006, it describes:

- **our goal that every school should be making excellent use of ICT resources and electronic services for teaching and learning and for whole-school improvement;**

- **our expectation of what this might mean in terms of outcomes at institutional and personal levels; and**

- **the extent of progress since 1997 and the challenges that remain if we are to secure a further step-change, including the need for a sharper focus on the science of teaching around ICT.**

9. What this paper does not do is to present a self-contained strategy. ICT and e-learning are not ends in themselves, but important enablers of the broader changes we want to bring about in schools through our main reform agenda. Use of ICT and e-learning need to be promoted – not as something separate – but as an integral element of our primary and secondary education strategies and our programme of radical reform for school workforce. This paper sets out for schools and all those who work in support of schools our view of the steps that need to be taken to help schools make the most of what ICT and e-learning can offer. To support this, funding for ICT in schools in England will rise to over £700m[2] in 2005-06.

The National Grid for Learning Programme

10. In 1998 the Prime Minister challenged the education and culture sectors to work in partnership with industry to help learners in schools, colleges, libraries, at home, at work and elsewhere to benefit from the Information Age[3]. This would improve standards, increase opportunity, and make the UK a world leader in the development, deployment, use and export of digital learning services.

11. The resulting NGfL Programme was accompanied by unprecedented levels of investment. For schools this meant action to improve: levels of ICT infrastructure and Internet connectivity; access to worthwhile educational resources and content; and teachers' ability to use these resources effectively in their everyday teaching.

2   This figure includes matched funding from local authorities
3   *'Open for Learning, Open for Business'* (DfEE, 1988)

Box 1. A great deal has been achieved since 1998[4]

In just over four years:

- over 99% of schools have been connected to the Internet, of which over a quarter have a fast 'broadband' connection:

- the NGfL has been developed into the world's largest portal of indexed educational content while customised portals are being created for key groups such as young people, teachers, parents and school governors;

- the average number of computers in schools for teaching and learning has virtually doubled while the proportion over three years old has decreased by a third;

- continuous professional development (CPD) and leadership programmes for ICT have been put in place with over 99% of schools having signed up for or completed training;

- teacher confidence in the use of ICT in the curriculum has improved and over 100,000 teachers have received a computer through centrally-funded initiatives;

- Curriculum Online has been launched, providing teachers with a showcase of high quality digital resources from public and private sector suppliers;

- over 6,000 UK online centres have been established to provide access to ICT in the community; and

- over 2,000 learndirect centres are now in operation, some of which are based in schools and in the community.

12. Advances in the evidence base underpinning the use of ICT in schools, at home and elsewhere have been equally impressive.

Box 2. ICT makes a difference[5]

In just over four years we have:

- moved from a leap of faith to real evidence of successful practice;

- created a growing body of research to answer the question of the extent to which ICT impacts on standards – and moved the debate to 'how?';

- shown that ICT can have a direct positive relationship to pupil performance – equivalent in some subjects to half a GCSE grade;

- shown that (at KS2) schools with good ICT resources have better achievement than schools with poor ICT resources:

    (i)   even when compared with schools of a similar type…
    (ii)   irrespective of socio-economic circumstances…
    iii)   irrespective of quality of management;

- identified that leadership, resources and vision are key to the successful adoption of ICT in schools;

- illustrated the trend for households with young people to have a growing range of ICT, with over 80% having at least one computer and almost 70% with Internet access; and

- shown that learners are increasingly using ICT at home for educational purposes with over half of parents indicating that they feel such access makes their child more creative.

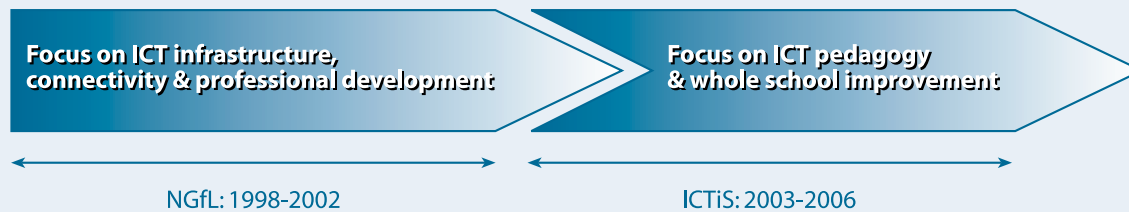4   NGfL was a national programme; this information relates to England only
5   This information relates to England only

2. Towards e-confident schools

13. The NGfL programme has achieved a great deal, but with the evidence now available to us, it is time to take the next step. We need to ensure that using and applying ICT as an integral part of the learning process - already being achieved by some schools - becomes a natural process for all schools.

14. The massive improvements we have seen in the basic ICT-enabled infrastructure for learning now need to be paralleled by a transformation in the use of ICT as a powerful tool for learning, teaching and institutional management – enabling the learning process to be enhanced, extended and enriched. This will require every school to become 'e-confident' (see Annex A).

15. While some schools are already pioneering applications of ICT for both curricular and non-curricular purposes and others are designed and built with this in mind from the start, these efforts need to be replicated elsewhere to eliminate the wide variations in the quality and diversity of practice that still exist, both within and between schools.

16. Working through the Government's primary and secondary education strategies, and the workforce remodelling agenda, our aims for the next stage of development will therefore be to ensure that for all schools:

• **ICT makes a significant contribution to teaching and learning across all subjects and ages, inside and outside the curriculum;**

• **ICT is used to improve access to learning for pupils with a diverse range of individual needs, including those with SEN and disabilities;**

• **ICT is used as a tool for whole-school improvement;**

• **ICT is used as a means of enabling learning to take place more easily beyond the bounds of the formal school organisation and outside the school day – and of enhancing the quality of such experiences; and**

• **ICT capabilities are developed as key skills essential for participation in today's society and economy.**

17. To achieve rapid and sustained progress towards these goals by 2006 will require both a shift in the emphasis of our policies and new and more effective approaches to delivery. This will involve focusing more on:

• **the science of teaching using ICT;**

• **the development of the school as the lead ICT-rich institution at the hub of community learning; and**

• **development of the means to deliver effective support for all schools.**

18. The progression from the NGfL Programme to its successor for English schools, the ICT in Schools Programme, reflects this and is illustrated in figure 1. To complement this change, the role of the British Educational Communications and Technology Agency (Becta) will also evolve: it will become a strategic partner to the Government in delivering these objectives.

Figure 1. The changing policy context[6]

Focus on ICT infrastructure, connectivity & professional development	Focus on ICT pedagogy & whole school improvement
NGfL: 1998-2002	ICTiS: 2003-2006

ICT pedagogy

19. Taking forward ICT in schools is a responsibility shared by Government and its Agencies, local education authorities and schools themselves. The Government, working through the new primary strategy and the KS3 strategy, and with its partners, needs to:

- develop a comprehensive range of advice, guidance and support for teachers of all subjects at all levels on how ICT can be used effectively in classroom practice, thereby helping to underpin subject specialism;

- look at how hardware and software assessment systems can support this agenda, and how effective assessment contributes to teaching and learning;

- help teachers develop the professional judgement, confidence and competence in ICT to explore its potential for different forms of teaching and learning through a combination of initial teacher training and continuous professional development opportunities sufficiently flexible to suit the needs of individual teachers;

- help teachers and support staff to get the best out of their non-contact time to enable them to integrate ICT in their planning and delivery of lessons; enable teachers and support staff to make informed choices, including through research into the materials they choose, supported by practical classroom-focused exemplars of best practice; and

- help teachers to develop and manage learning beyond the classroom and outside the school day, reinforcing synergies between home, community and the school.

20. To achieve this we will ensure that teachers and support staff have opportunities to use ICT in the most effective ways to support teaching and learning through access to appropriate training, support and resources by:

- developing an 'offer' of support at all Key Stages, starting with Key Stage 3, which will provide access to a comprehensive range of professional advice, guidance and professional development to embed ICT in subject teaching;

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6   In practice activities related to ICT infrastructure, connectivity and professional development will continue beyond 2002; complementing these will be support for effective practice in the Foundation Stage of education.

Box 3. An offer of support

The package of support for each subject area will be developed in conjunction with subject specialists, the subject associations and all the agencies involved in supporting subject teachers. It will include a free, national source of advice on, and support for, using ICT in teaching and learning as well as exemplification of how ICT capability can be applied and developed in a subject context, and will build on the work currently being done by Becta, the QCA and the national strategies.

- the provision of a local network of support using lead teachers and Advanced Skills teachers;

- identifying and disseminating effective practice in the use of ICT in teaching and learning (including assessment for learning, and learning beyond the classroom and outside the school day); and

- mobilising the national strategies' field force to promote and progress ICT for teaching and learning.

Institutional development

21. Schools are significantly behind most other organisations in their use of ICT to support leadership and management. The freeing up of teachers' time and the whole-school approach to improvement which are essential to create capacity for reform, depend on making better use of ICT at the institutional level. Working in particular through the workforce reform programme and the

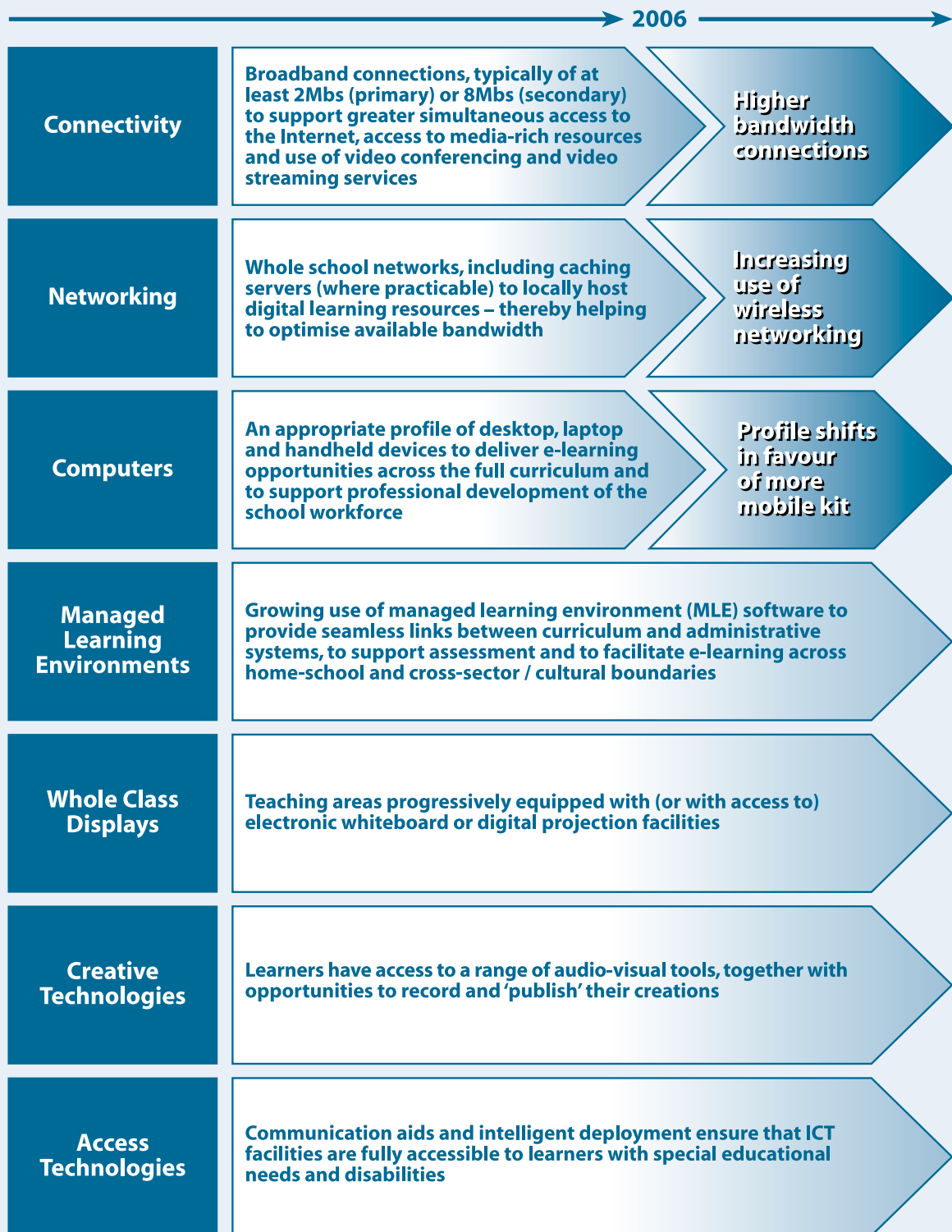National College for School Leadership, we shall:

- ensure that headteachers and leadership teams develop the vision, knowledge and skills to use ICT for whole school improvement, with governors, subject leaders and other professionals able to provide the support needed to drive it through;

- encourage more effective and sustainable investment in ICT by schools through systematic approaches to review and planning to ensure that it is deployed to support teaching, learning and personal development effectively; and

- increase the availability of both expert and routine technical support in schools to alleviate the burden of coping with day-to-day technical unreliability which can frustrate fuller use of ICT, and provide more advice to schools on curricular materials and content.
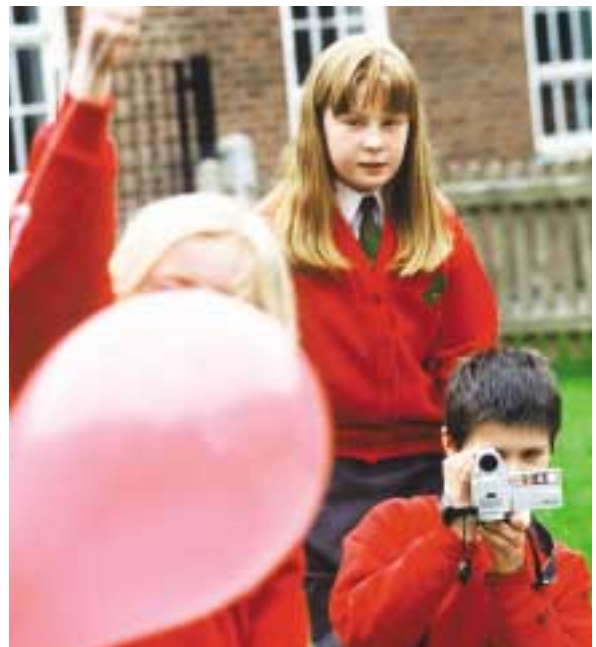
22. To achieve this we will help school leaders to develop a strategic vision for ICT, recognise its potential and integrate it effectively into their strategies for school improvement by:

• providing opportunities for school leaders at all stages of their professional development to gain the knowledge and insights they need to realise the benefits of ICT and to influence and develop staff to ensure that ICT becomes structurally and fundamentally embedded in learning, teaching, organisational and management processes;

• making investment in ICT an integral part of the design and building of new schools and the renewal of existing facilities, and of school planning and budgeting processes (with account taken of sustainability, total cost of ownership, and the environmentally friendly disposal of obsolete kit);

• delivering quality procurement guidance and advice that enables schools to purchase equipment and services of an assured quality and fit for educational use, including safe Internet services;

• encouraging development of integrated (curriculum and management) networks in all schools in order to build coherent managed learning environments (MLEs) which maximise pupils' opportunities to learn and schools' capacity to manage this; and

• making effective use of electronic communications to enable schools to receive important information in a timely manner and use their own professional judgement to select the information they wish to receive.

23. An indication of the directions we anticipate ICT infrastructure in schools evolving to support pedagogical and institutional development up to 2006 and (subject to future spending decisions) beyond is provided in *figure 2*. Information about educational technologies, together with practical help, resources and inspirational ideas to help school managers and teachers to get the best out of ICT in the classroom, can be found on Becta's ICT Advice website (http://www.ictadvice.org.uk/).

Figure 2. The 'e-confident' school: likely trends in ICT provision

2006 →

Category	Description	Trend
Connectivity	Broadband connections, typically of at least 2Mbs (primary) or 8Mbs (secondary) to support greater simultaneous access to the Internet, access to media-rich resources and use of video conferencing and video streaming services	**Higher bandwidth connections**
Networking	Whole school networks, including caching servers (where practicable) to locally host digital learning resources – thereby helping to optimise available bandwidth	**Increasing use of wireless networking**
Computers	An appropriate profile of desktop, laptop and handheld devices to deliver e-learning opportunities across the full curriculum and to support professional development of the school workforce	**Profile shifts in favour of more mobile kit**
Managed Learning Environments	Growing use of managed learning environment (MLE) software to provide seamless links between curriculum and administrative systems, to support assessment and to facilitate e-learning across home-school and cross-sector / cultural boundaries	
Whole Class Displays	Teaching areas progressively equipped with (or with access to) electronic whiteboard or digital projection facilities	
Creative Technologies	Learners have access to a range of audio-visual tools, together with opportunities to record and 'publish' their creations	
Access Technologies	Communication aids and intelligent deployment ensure that ICT facilities are fully accessible to learners with special educational needs and disabilities	

Delivering effective support

24. We will not succeed in transforming the use schools make of ICT unless we develop an effective delivery model for support that integrates ICT into national and local strategies and programmes and involves all major educational agencies and bodies. We need to:

- clarify the roles of local education authorities and the support that they should be providing to schools in their area; and

- work with industry and other professionals to ensure that the digital learning resources available to schools take full advantage of the teaching and learning possibilities offered by ICT, including understanding of, and recognition for, outcomes peculiar to e-learning, and that as far as possible, they are consistent and coherent with those used in other learning environments (such as further education or work based learning);

25. To achieve this we will:

- enhance collaboration between schools and other community organisations through the development of interoperable management information systems;

- improve co-ordination between the Department and agencies such as Becta, the National College for School Leadership (NCSL), Ofsted, the Qualifications and Curriculum Authority (QCA) and the Teacher Training Agency (TTA);

- build on evidence from a dynamic programme of research and evaluation designed to inform policy and practice at all levels; and

- develop and promote credible performance measures based on outcomes.

3. What will this mean in practice?

26. Because schools are at different stages of embedding ICT, and since their approaches are influenced as much by local circumstances as by wider developments, it would be impractical to attempt a 'one size fits all' description for life in an e-confident school. However, it is possible to put forward a number of common characteristics which the use of ICT either enables or enhances.

- **For learners** it should mean improved educational outcomes, with higher standards of attainment and the acquisition of important skills such as digital and visual literacy[7]. It should also help to make learning more differentiated and customised to individual needs, and deliver a more engaging, exciting and enjoyable learning process that encourages better learning outcomes, including greater autonomy and emotional resilience, as well as:

- broadened horizons with more opportunities for creative expression;

- flexibility to study where, when and in ways best suited to individual needs and preferences, with smoother transitions between different phases of education;

- increased motivation through learning that stimulates, stretches and takes into account prior and concurrent experiences in and out of school;

- personalised feedback on progress based on the use of assessment tools, and the ability to record and share achievements with others;

- wider access to learning and participation, particularly for learners with special educational needs and disabilities, and those unable to attend school due to illness or disaffection with traditional learning methods;

- better informed choices through greater access to information, guidance and support services; and

- the ability to make sensible choices about when, when not, and how to use new technologies to enhance, extend and enrich their learning, reflecting the increasingly ICT-rich environment in which they live and learn.

- **For parents** it should provide opportunities to:

- become better informed, active participants in their children's education through improved access to information and guidance relating to the education system in general, their school and its performance, and safe use of the Internet for learning;

- become vital members of the school community, with easier communications with school staff, governors and other parents; and

- take advantage of improved community access to schools' ICT facilities to gain greater awareness of, and better local access to, lifelong learning opportunities and e-Government services.

- **For teachers and support staff** it should contribute to improved professional status, help to increase capacity and provide opportunities for career development and progression that build on the recognition and reward of effective e-learning practice. It should also mean:

- access to a comprehensive range of advice, guidance and support for teachers of all subjects at all levels on how ICT can be used effectively in classroom practice to embed ICT in teaching and learning across the curriculum;

- opportunities to access a wide range of resources that simplify the preparation and enrich the delivery of lessons;

- more sophisticated use of pupil data, including the matching of teaching and learning styles and the setting and tracking of individual learning goals;

- revitalised professional networks supporting communication and collaboration, including the sharing of resources and best practice, within and between schools;

- support for workforce remodelling through the automation of routine administrative tasks and the availability of technical support;

- increased opportunities to develop innovative and creative ways of supporting pupils' learning, enabling seamless links with experiences beyond the conventional classroom and timetable; and

- taking a more rounded approach to the development of digital learning resources so that these can link more effectively with, and aid progression into, post-16 learning.

- ***For school leaders and governors*** greater awareness of the educational potential of ICT and freedom to innovate under the principles of earned autonomy should be complemented by:

- extended reach to excellent teaching (particularly in shortage subjects) and the availability of an improved curriculum when qualified teachers are absent;

- networking that supports specialisation and enhanced professional collaboration, both with school leaders across the country and across cultures and sectors;

- more opportunities to reflect on their practice and continually develop their vision for e-confident schools in order to exploit new technologies for teaching and learning as they emerge;

- better informed decision-making and more efficient information flow within and between schools, and with other organisations such as local education authorities and the Department;

- more effective tracking of pupils' performance, attendance and behaviour, and of children at risk;

- simpler co-ordination of support for children through improved links to other organisations and agencies in the local community; and

- an enhanced community learning presence and more dynamic communications with parents.

27. Schools may wish to assess their own level of e-confidence by considering:

a. how many of these features – and those described in the fictitious case studies of current good practice presented in Annex B – they have in place now; and

b. their readiness to move forward in the other areas highlighted.

Further advice and guidance to support schools through this process will be provided by Becta.

4. Next steps

28. While this paper focuses on the period up to 2006 and beyond, an indication of some of the support schools can expect to receive over the next twelve months is provided below:

Autumn 2003

- Pilot of lead ICT teacher scheme – providing local support for teachers in the use of ICT across all subjects and Key Stages using nationally developed materials

- Start of master classes for teachers on subject specific teaching using ICT

- Roll-out development programmes for KS1, KS2 & KS3 consultants to equip them to support ICT in teaching and learning

- Initial outcomes from a rolling programme of action research into ICT pedagogy

- Resources to help support staff use ICT effectively in support of workforce remodelling

- Launch of Parents Online week 2003

- Guidance to inform schools' investment in ICT and the accreditation of ICT service suppliers

- Launch of regional mechanisms for the purchase of broadband Internet services

Spring 2004

- Roll-out of subject-based offers of support to embed ICT in Key Stage 3 teaching

- Exemplar lessons available nationally through a variety of delivery channels

- Release of a further £100 million e-Learning Credits for Curriculum Online

- Release of new funding for training for teachers to enhance subject teaching using ICT

Summer 2004

- Guidance and exemplar practice available for parents

Annex A: Defining e-confidence

In summary, we want every school leader and governor, every teacher and member of the support staff and every pupil to become "e-confident".

The National College for School Leadership has developed an initial framework for this that has identified ten key features of the e-confident school.

These are:

1. High levels of staff confidence, competence and leadership

2. Re-engineered teaching, learning and assessment, integrating effective use

3. Leading and managing distributed and concurrent learning

4. Effective application within organisational and management processes

5. Coherent personal learning development, support and access – for all leaders, teaching and non-teaching staff

6. Secure, informed professional judgement

7. Appropriate resource allocation to ensure sustainable development

8. Availability, access and technical support

9. Pupils/students with high ICT capability

10. School as the lead community learning and information hub

Further details of this framework, including examples of the characteristics that underpin these features, can be found on NCSL's website (http://www.ncsl.org.uk/slict).

Guidance and support can also be found on the following Becta websites:

- for school leaders
  http://www.becta.org.uk/leaders/schools

- for local education authorities and support providers
  http://www.becta.org.uk/leas

Annex B: A day in the life of...

Kirsty (Key Stage 2)

Kirsty is hurrying her breakfast because she wants to email her account of 'Barnaby Bear's Visit to the Cinema' to her teacher before she leaves for school.

'Barnaby Bear' is the class mascot; he accompanies the children in Year 5 on lots of exciting trips. He also has his own palm top computer and this is what Kirsty took home with her at the weekend to write her story.

Kirsty's teacher has also been busily working at home. She has been preparing activities for the daily mathematics lesson using software that she can project using the whiteboard and projector in the shared study bay.

It's literacy first lesson and Kirsty's teacher invites her to share her account of Barnaby Bear's cinema trip with the rest of the class. She opens her saved file and the writing is projected for all the class to see. The teacher invites the children to read the text with Kirsty. They then use the highlighting facility of the software to prompt and focus discussion of the language and style she has used. Kirsty has written the story in the present tense and so the teacher copies the story to another document and she and the other children help her re-write it in the past tense.

The new copy is saved and stored in Kirsty's work area on the class computer so that she can continue to develop it, in collaboration with a response partner, during her independent working time. Later she will be able to email the file to her own home and share the finished work with her parents. In guided reading time, she and her group work with the teacher on reading an interactive ICT text, using laptops.

Next lesson is mathematics. The teacher is working on fractions and decimal equivalents with the class. She has prepared a number of different exercises for the children in advance and she loads up the first screen which displays shapes with different fractional parts coloured and projects it onto the electronic whiteboard. She then reveals some written fractions and asks children in turn to come out and match the written fraction to the correct shape. Kirsty is asked to match 3/5 and she correctly matches it to the rectangle with three sections out of five coloured.

Next, the teacher uses her overhead calculator and asks the children to remind her how she can calculate the decimal equivalent of 3/5 using the calculator. She then displays her second prepared screen with other fractional parts shown. The children are challenged to find and match their decimal equivalents, using their calculators where necessary.

After lunch, Kirsty's group are working on their ICT project. They are putting together a proposal for improvements to the junior playground and have decided they need to gather opinions of children from each year group before they develop their proposal further. They have already designed a questionnaire and posted it on the school intranet for each class to complete, but they have also asked for two children from each class to be interviewed about their views. They carefully plan their questions and word process them so that they will not forget what they want to ask. With the help of the school's ICT technician they set up a digital video camera in a quiet part of the library and interview the children. On reflection, they think some of the ideas the children put forward are really interesting and they think their playground proposal will be better as a multi-media presentation rather than a printed document. They upload the video interviews onto the computer and begin to edit them.

Last lesson of the day is science. The children have been studying the earth, sun and moon and have spent some time talking about gravity and the effect it has on earth. As an extension activity, the teacher asks Kirsty's group to investigate the effect of gravity on the other planets in the solar system.

They discuss each planet in turn and try to predict whether they would weigh more or less on each of the planets. They make a note of their predictions before logging on to the 'NASA Kids' Internet site where they are able to enter their weight on earth and have the on-line calculator work out how much they will weigh on each of the other planets. At the end of the lesson, the teacher asks Kirsty to demonstrate to the rest of the class what her group has been doing. Kirsty talks about her work and she demonstrates how the calculator works using the weight of one of the other children to make the calculation.

For homework, Kirsty decides to use the 'NASA Kids' site to research what conditions would

be like if she were an astronaut visiting each of the planets in the solar system. She word-processes her 'Captain's Log' and emails it to her folder on the school intranet so she can continue working on it at school the next day.

Meanwhile, Kirsty's teacher is preparing an electronic text that the class will use in tomorrow's literacy lesson. She bases this on an idea gained from an online discussion she had last week with other primary teachers in the area. This had been mediated by the local education authority.

Kirsty returns home. Her dad helps with her project on the earth, sun and moon. He locates suitable websites and gives Kirsty advice on manipulating images and sequencing them to music to make her presentation more creative. Kirsty's dad likes working with her as he finds this

motivating for both him and his daughter; they transfer computer skills, (usually Kirsty to her dad!), and this activity encourages Kirsty's dad to email her school and go on the school's website to track his daughter's progress.

Jermaine (Key Stage 3)

Jermaine arrives at school on the bus at about 08.30; his first task will be to register using his smart card. Although he has a tutor group room this is used for PSHE time and the class do not have to spend time registering as this is done automatically.

His first lesson today is English so he goes to Ms Wilson's classroom. The class are studying poetry (not Jermaine's favourite topic!) and had read through the poem they are studying in the previous lesson. Ms Wilson starts the lesson using an interactive whiteboard with a presentation, 'word challenge', focusing on the vocabulary in the poem they are studying. Jermaine has met most of the words before and so he is able to write down their meanings. Although he does not know the meaning of two of the words, he is able to select one of the meanings presented in the word challenge. Ms Wilson goes through the challenge and asks the class for their answers while running through the presentation again.

Using the whiteboard Ms Wilson displays the text of the poem again, this time line-by-line. Clicking on underlined words reveals short questions on the meaning of the text in the poem. Jermaine and his classmates are asked to discuss these.

The class discuss the last line of the poem and are then taken to the computer suite.

Here they download a document Ms Wilson has prepared for the lesson. The document contains the text of the poem with questions added at key points in the text using the reviewing facility of the word processing package. Additional comments give Jermaine help with the words the class had reviewed in the word challenge activity.

By the end of the lesson Jermaine has his own version of the poem's text, saved in his English folder on the school server, complete with answers to questions and teacher comments.

First break and Jermaine goes to the admin area to top up the credit on his smart card. As well as being used for registration the smart card acts as a debit card for school lunches. He inserts money into the cash point and the credit to this value is added to his card. He will now be able to "swipe" his card to pay for his lunch.

Design and Technology is next and Jermaine is working on a Textiles project designing and making a novelty notebook cover. Jermaine has researched his design ideas and made rough sketches of a logo by hand. He then produced his final version using a CAD package. He is now ready to embroider his designs using a computerised sewing machine. He had cut out the material to be used in a previous lesson.

Before he can start the machine he has to load it with the correct colour thread. His teacher had shown the class how to do this in the last lesson. Using a video camera, linked to a projector trained on to a machine, she demonstrated how to thread the sewing machine. The large screen display gave all the class a good view of what she was doing, including those at the back of the room. Jermaine is able to view the video on one of the PCs in the room to refresh his memory and has the additional aid of a step by step guide of laminated digital photos.

Having correctly threaded the sewing machine he takes the floppy disc containing his design and inserts it into the sewing machine. The software enables the design to be produced automatically. Jermaine repeats the process for the second colour in his design but will have to wait until after lunch to see the final product when he completes the third and final colour.

It is now time for lunch. Jermaine phones his Mum to check that they are still meeting each other at their local City Learning Centre (CLC). His Mother uses the centre to brush up on her ICT skills following a recent Parents Online presentation she attended at Jermaine's school. She is a school Governor and wants to be able to keep in touch with the other school Governors, the headteacher and teachers via email and be able to log onto the Governors site of the schools website. Jermaine uses the centre's modern foreign languages facilities. He is learning Italian

which his school does not offer on the current curriculum.

After lunch Jermaine returns to his lesson to complete the making of his textiles project. He is really pleased with the final product but now he has to carry out a critical evaluation of how the project has gone.

Using one of the PCs in the classroom he downloads a template his teacher has produced which provides help on how to evaluate what he has done. Jermaine is able to cut and paste his CAD designs into the evaluation document as well as writing about what he has done, the changes he has made to his design and the reasons for doing so.

The last lesson of Jermaine's day is Science and so he makes his way to the Science block. He is currently studying a unit of work on heating and cooling. Jermaine's science teacher Mr Watts introduces the lesson on changing state by showing the class how

to change water to ice. He stands a small beaker of ether in a film of water and then evaporates the ether by blowing a stream of air into the beaker. The beaker becomes frosty and the film of water under the beaker turns to ice. Mr Watts explains the class are to study how water changes state.

Jermaine and his friend collect crushed ice, a beaker, a data logger, temperature sensor and laptop. They record the temperature of the ice as it is gently warmed and the results are displayed as a graph on the laptop.

Jermaine continues with the experiment until all the ice has melted and the water reaches 200c. They save their results and graph. Mr Watts, using a laptop and projector now displays some results collected by one of the groups and leads the class in a discussion on what is happening during the experiment. To illustrate his explanation he uses a simulation of the particles in a block of ice and showing the class how these behave as the ice changes to water. Seeing this animation helps Jermaine to relate the physical changes he has observed to what is happening to the particles.

Mr Watts sets the class a worksheet to complete for homework. Those pupils who have Internet access can download it in electronic format and send it back by email to have it marked by Mr Watts.

Simon (a modern foreign languages teacher)

Simon is second in the MFL department at a large suburban comprehensive. He teaches French and some German and has some knowledge of Latin. He starts his day by logging on to his school intranet to check for today's notices and to check if his non-contact time is still free. He scans his email – he's expecting replies about next year's school trip. An assistant who helps out in the department two days a week will be dealing with the administration for the trip.

Pupils in this school register through an electronic system so today Simon's time with his tutor group is spent preparing for next week's form assembly. They are producing a short video clip to show to the year group that will raise awareness of the issue of homelessness in the area and show the work of a local charity.

Simon's first lesson is sixth form German. Four of the students are enrolled in the sixth form here; two of the class participate in the course via video conferencing, email tutoring and occasional face-to-face lessons. He had sent comments on their last essay by email, and today's session focuses on a discussion of how the language could be improved. The students have placed their work on a shared drive. They comment on the strengths and weaknesses of each piece and then spend part of the lesson working with a partner to redraft. Final versions are shared with the group.

The school ICT technician has connected Simon's laptop to the data projector ready for the Year 7 French lesson. Simon's introducing some new vocabulary and uses a slide show of images taken from a pool of ready-made resources. The technician has also placed the images on the network so that pupils can add the new words and images to their electronic vocabulary book at some point during the lesson.

In his non-contact period, Simon updates the school's information management system with the latest marks for his year 10 groups. The system automatically generates profiles of strengths and weaknesses. He uses this information to identify where pupils are having specific difficulties with oral work and builds this into the plans for working with the foreign language assistant. The information will also be useful when he's submitting predicted grades to the head of department.

Simon has booked the computer suite for the Year 9 French lesson on 'at the restaurant'. He uses a short video clip of people at a restaurant taken from the Internet and the pupils watch this as a whole class. Simon demonstrates some of the new language, using the software to pause; listen again to difficult phrase and to remove the sound track so pupils can play the part of one of the customers.

The French Club meets at the end of the day. They are preparing a presentation for pupils in a partner school in France which they intend to deliver during their next video conferencing session. Simon has set up a class email link and the pupils log on to read the responses from the partner schools to the pupils' latest version.

Finding out more

'Fulfilling the Potential'

If you want to find out more about the future direction of ICT in schools policy this document is on the following website: www.dfes.gov.uk/ictinschools

Examples of the evidence underpinning the ICT in Schools Programme (including reports in the ICTiS Research & Evaluation Series) may be found on Becta's ICT research website: http://www.becta.org.uk/research/index.cfm

Links to related websites, portals and gateways

Department for Education and Skills: http://www.dfes.gov.uk/index.htm

- DfES e-learning strategy: http://www.dfes.gov.uk/elearningstrategy/index.cfm

- DfES e-business strategy: http://www.dfes.gov.uk/e-business/

- The Standard Site: http://www.standards.dfes.gov.uk

British Educational Communications and Technology Agency: http://www.becta.org.uk/

National College of School Leadership: http://www.ncsl.org.uk/

Ofsted: http://www.ofsted.gov.uk/

Qualifications and Curriculum Authority: http://www.qca.org.uk/

Teacher Training Agency: http://www.canteach.gov.uk/

National Grid for Learning: http://www.ngfl.gov.uk/

Curriculum Online: http://www.curriculumonline.gov.uk/

Culture Online: http://www.cultureonline.gov.uk/

Parents Online: http://www.parentsonline.gov.uk

Connexions: http://www.connexions.gov.uk/

National Curriculum: http://www.nc.uk.net/home.html

National Curriculum in Action: http://www.ncaction.org.uk

Selected Internet portals within the e-citizen framework

- UK Online: http://www.ukonline.gov.uk/

- Teachers' portal: http://www.teachernet.gov.uk/

- Parents' portal: http://www.dfes.gov.uk/parents/

- School governors' portal: http://www.governornet.co.uk

(NB. A portal for young people is currently under development)