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in Education**

2004 Report: ICT in schools – the impact of government initiatives

Primary schools

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Introduction

This report is based on subject-specific evidence from visits to primary schools, made as part of the inspection of the impact of government ICT initiatives between April 2002 and December 2003, and supplemented by other inspection evidence where appropriate. This report draws upon and consolidates the evidence that contributed to the main report, *ICT in schools*, which is available from the Ofsted publications centre (07002 637833) or via the Ofsted website (www.ofsted.gov.uk).

Main findings

- National Grid for Learning (NGfL) funding for new hardware has acted as a catalyst for improved ICT provision in primary schools.
- The quality of New Opportunities Fund (NOF) training has been variable; overall, schools found it did not provide good value for money. Where it was effective, it supported the professional development of teachers well. Where it was poor, it needed considerable subsequent input either from the schools themselves or from other organisations to enable teachers to develop sufficient skills to use ICT for teaching and learning.
- There has been a steady improvement in the provision of ICT, and pupils' ICT achievements have continued to improve as a result. However, there is still insufficient use of ICT in other subjects across the curriculum.
- Teachers' skills, knowledge and understanding in ICT, and their confidence in using it, have improved compared with the previous report. The 'Laptops for Teachers' initiative has been beneficial in supporting staff development. This is reflected in the quality of teaching and learning.
- Where interactive whiteboards are used, they often enhance the quality of teaching and learning.
- Pupils' attitudes to learning in lessons involving ICT are very good. They respond to ICT in a very positive way; this also has a significant impact in maintaining good standards of behaviour.
- Leadership and management of ICT continue to improve. In two out of three schools, leadership provides clear educational direction.
- In general, pupils have good access to a wide range of ICT software, hardware and peripherals.

The impact of the initiatives

Teaching and learning

The combined initiatives have contributed towards an increase in teachers' competence in and confidence with ICT and this is reflected in the quality of teaching of ICT and, to a lesser extent, in its more widespread and effective use in other subjects. The momentum of improvement has been sustained and consolidated, with many teachers using ICT more regularly and imaginatively. Teachers' planning, skills, knowledge and understanding have improved since the previous report. Many teachers are now making wider and more effective use of technology. In particular, where teachers have access to ICT for their own personal use, as well as to plan lessons, they are more competent and self-assured in their use of ICT. Where teachers are reluctant to use ICT it is generally because they have inadequate facilities or have received insufficient support.

Some computer applications enable teachers to do things which are difficult or impossible to do in other ways. For example, the ability to project a text which all pupils can see and then to be able to highlight, edit and retrieve previous drafts easily and quickly in a literacy lesson is a powerful tool for pupils at any level of attainment. In the example below, a Year 5 numeracy lesson, the teacher used the interactive whiteboard to provide additional challenge to the highest-attaining pupils:

While the rest of the class worked on lines of symmetry, using mirrors, the highest attaining pupils plotted the co-ordinates of shapes in the four quadrants. They rotated a variety of shapes by 90 and 180 degrees. They then tested the accuracy of their answers by using a programme on the interactive whiteboard which simulated the shapes being rotated.

In another example, involving pupils in Years 5 and 6, the teacher integrated the use of ICT into a good English lesson as a means of exchanging information. This was done in a way which would not have been possible as a paper exercise and without support from an additional adult:

The teacher used a multimedia presentation to introduce a scenario about a robbery. The use of the interactive whiteboard made it very easy for pupils to sequence the events. Pupils worked collaboratively, speaking and listening to each other while trying to establish the facts of what had taken place. They worked in pairs to compose and send questions to their teacher using email. They used the teacher's answers to help them to deduce who the robbers were, how they escaped and where they went. As the lesson progressed, pupils began to write emails which were more succinct. Their questions became increasingly more focused, intelligent and logical. The pupils remained completely absorbed for the duration of the lesson and the teacher monitored their progress through their emails. These exchanges also provided the teacher with good opportunities for assessing achievement and progress.

Many teachers are now using ICT well to match resources to the individual needs of pupils. They use ICT to produce differentiated examples, or to use programmes which

have an inbuilt degree of progression. For example, in a good Year 1 numeracy lesson, two boys worked collaboratively, using the interactive whiteboard to consolidate their number skills. The program allowed for the level of difficulty to be adjusted to match the competence of the pupils:

The boys used a program in which they were presented with a set of numbers to drag and drop to make a sum work. The level of difficulty increased and the time allowed for each sum was reduced as the pupils progressed. They shared ideas and strategies as they went. They concentrated very well and for a long period of time. The fact that they got steadily faster in providing the correct answer showed that their skills were developing rapidly.

Teachers are increasingly capitalising upon the motivating power of the computer, whether used as a teaching tool or when used by pupils themselves. Reluctant mathematicians will often concentrate even on repetitive work when competing against a computer program. Reluctant writers can become motivated when using electronically generated word lists or can see a more polished piece of writing when aided by a word-processing package. ICT lends itself well to shared writing, with pupils working together, listening to and supporting each other. In some schools, there is clear evidence of the effectiveness of planned opportunities to help pupils work collaboratively to develop these skills. For example, in a very good Year 2 literacy lesson, the teacher's laptop was connected to a 'live learning' website. She projected onto a screen a story from a big book about children lost in a cave. This followed a lesson in which pupils enjoyed a virtual tour of caves from the Lascaux website:

When scrolled down, the text revealed a picture of the prehistoric French cave paintings of Lascaux. This provoked cries of pleasure from the pupils, who wanted to see more of the cave paintings. This brought the text to life and added an extra dimension to the lesson and promoted very good discussion among the pupils, who eagerly talked about what they thought would happen next in the story. As a result, pupils worked well together producing shared writing which was interesting and made good use of adjectives to describe the caves.

This motivating power can be particularly effective for pupils with special educational needs (SEN). ICT can help them to overcome some of their barriers, for example their ability to write legibly, and hence can raise their achievement.

There has been a significant increase in the number of teachers using data projectors and interactive whiteboards as teaching tools. Although only a minority of schools have them, headteachers and teachers have reported that, when used by an effective teacher, their power and versatility have helped to produce excellent lessons. Inspection confirms this. For example, in a particularly good Year 4 geography lesson, the interactive whiteboard was used to enrich the quality of teaching and learning about topography:

The interactive whiteboard was used to display an aerial photograph of England. The teacher made effective use of technology to superimpose highlighted lines to identify features such as rivers and high ground. The teacher's good subject knowledge and use of a high-quality resource with attractive graphics ensured that the pupils engaged immediately and with enthusiasm. The lesson progressed at a brisk pace as

pupils acquired new knowledge quickly. This was demonstrated as they used technical vocabulary to identify significant topographical features with increased accuracy and confidence.

Interactive whiteboards provide teachers with the facility to use large and colourful text, shapes, data, illustrations and animation. As a result, the images help to bridge the gap between the concrete and the abstract and this has a positive impact on pupils' learning. Pupils can retrieve previous work almost instantly; simulate a broad range of resources, for example two- and three-dimensional shapes, clock faces or coins; and explore volume and capacity as well as angles that increase and decrease. Interactive whiteboards can be used for pupils to view digital video and other materials from the internet. Much of the software developed to support the teaching of literacy and numeracy using the interactive whiteboard includes high-quality graphics which help to catch pupils' interest. There is also evidence to suggest that the use of interactive whiteboards has led to an increase in the pace and quality of learning during lessons. For example, the work done in a previous lesson on maps in geography is instantly retrieved and linked with a lesson about co-ordinates in mathematics. The benefits of using interactive whiteboards also include: increased levels of participation and discussion by pupils, which helps them to develop ideas and acquire new knowledge quickly; and high-quality demonstrations by teachers, which provide pupils with visual examples.

Some pupils in Year 6 describe their reaction to teachers' use of the data projector:

'It makes the writing bigger and easier to read.'

'It makes the lessons really interesting.'

'It's not confusing and it's easy to follow. When the teacher writes on the class board it's not always easy to understand, especially when she rubs it out and then writes something else.'

'It's good that she can go back to earlier work instantly and it's still as clear and easy to read.'

'When we did our topic on Georgian transport, we could share our research and pictures on the screen.'

Overall, an increasing number of literacy and numeracy lessons are being supported by ICT and it is also being used more frequently in other subjects. However, although the use of these applications is becoming more widespread and more focused, it is still inconsistent and unsystematic.

Teachers' use of ICT to assist them with lesson planning and preparing resources has increased as they have developed the required ICT skills. Lesson plans and learning materials can easily be edited and updated without unnecessary paperwork. This is not without an initial investment of time, but many teachers now recognise that over time, ICT cuts down on preparation and planning and enables the resources saved to be available for future occasions. Generally, teachers are becoming more discerning about the suitability and use of software. In a small minority of cases there is an over-reliance on the technology to provide the teaching. For example, teachers may assume that the

programme will clarify new vocabulary, whereas in fact an introduction to the vocabulary by the teacher is still required.

There is also an increase in the use of learning materials from external sources, often drawn from internet sites and adapted by teachers to suit their own pupils. The power of email to send materials to others or to email from home to school is valued by an increasing number of teachers. However, the most successful practitioners ensure that the use of the technology enhances the quality of teaching and learning and, where it does not, they make use of more traditional methods. A newly qualified teacher with significant ICT expertise stated:

'I always plan using my laptop. When I plan I first think of how I would have taught the lesson without including ICT, then I think of how using ICT could improve the lesson. I do not begin my planning by thinking how I can incorporate ICT but what ICT can add to this lesson.'

Although there have been significant gains in the quality of teaching using ICT, a continuing issue is the lack of challenge presented to pupils in many lessons. Often this is because teachers have not gauged the ICT capability of pupils; for instance 'home users' are often more capable than the teacher realises. Furthermore, pupils sometimes learn a skill more quickly than anticipated, and then spend time practising something unnecessarily. Where the teachers are not sufficiently confident to jump part of a lesson or do not have extension material to move them on, pupils mark time. The use of one text for all pupils often fails to challenge them sufficiently, whereas it is not difficult to provide two or three texts to match the pupils' needs more closely.

Some teachers still need further professional development to enable them to use new pieces of hardware or software more effectively. For example, in one lesson pupils struggled to see a big book and the teacher did not make use of the digital projector and screen. In another lesson the teacher used an interactive whiteboard as a surface to write on to demonstrate handwriting practice. In these lessons the teachers missed a vital opportunity to use the board's interactive capability to engage their pupils.

Standards and achievement

There has been a steady increase in pupils' levels of achievement in ICT in primary schools. Pupils respond very positively to the use of ICT: they engage well with lessons, their behaviour is good and their attitudes to learning are very good. These bring clear benefits to their learning. Where pupils are encouraged to apply their ICT skills to their learning across the curriculum, they often make more rapid progress in these areas. There is clear evidence that where ICT is used effectively to reinforce learning in literacy and numeracy pupils make good progress, especially those who have previously displayed poor behaviour and negative attitudes to learning.

In the Foundation Stage and Key Stage 1, most pupils develop independence in saving, retrieving and printing their work for themselves. They learn to use word processing, for example to rearrange sentences into a correct sequence within a story or poem. Some use word and picture banks to produce illustrated pieces of writing. Pupils' keyboard

skills vary considerably and some schools work hard at keyboard familiarity. This can be helpful, providing it is kept in balance with the work it is seeking to enhance.

In a very good Year 1 literacy lesson, pupils used ICT to consolidate and apply their learning of consonant, vowel, consonant (CVC) words:

The lowest attaining pupils used a program which looked like a fruit machine. Three different letters were displayed every time the space bar was pressed. They were all brightly coloured, big and bold. The pupils tried to read the words displayed to see if they were real words. Words that could be read were handwritten into a list. At the same time the highest attaining pupils used word-processing to write sentences using CVC words.

Most pupils in Key stage 1 are familiar with art packages and use these to create a range of pictures, for example an Egyptian mural using ancient Egyptian symbols which pupils select from a menu. Pupils generally make good use of ICT in mathematics, for example to develop their understanding of place value. They manipulate shapes and construct tessellating patterns. They use ICT to draw pictograms to represent data and identify number patterns, for example, on a hundred square. In the following very good Year 2 numeracy lesson, the teaching assistant used a program about sorting and classifying shapes very effectively to support the needs of lower-attaining pupils:

Pupils worked in pairs at a computer. Using their fingers to move brightly coloured shapes on the screen, they took turns at sorting the shapes according to the number of vertices. If the pupils were correct the shape would remain in the allocated Venn diagram. If the pupils had made an error the shape would return to the top of the screen with the remaining shapes. Pupils did not feel discouraged when they made a mistake and the teaching assistant turned these occasions into learning opportunities. She would do this by encouraging pupils to count the number of vertices while reinforcing the different properties of shapes. Within a quarter of an hour, the lower-attaining group was able to sort and classify shapes confidently.

In Key Stage 2, most pupils gain confidence in using computers and are keen to develop their skills. Higher-attaining pupils demonstrate the ability to manipulate and develop text and check their spelling. Pupils are able to evaluate, select and develop information from sources such as the internet and incorporate this into their work. Pupils display high levels of interest and concentration and talk enthusiastically about ICT; this makes learning more enjoyable. Older pupils can access online resources which help to develop their research skills. This has proved of particular value in history and geography where, for example, pupils compare the climate of different countries.

Older pupils can make and use spreadsheets confidently, for example to produce graphs to illustrate weather patterns, record test results, calculate totals and work out averages. They can enter information into a simple database, ask questions of this to determine patterns and display the information in various ways. Pupils have developed good search skills when using the internet and other resources. They can make web searches efficiently by progressively narrowing down fields.

In another excellent mathematics lesson, pupils in Year 6 developed their own formulae using spreadsheets:

Pupils were learning to manage the income and expenditure of fictitious companies. They began by concentrating on the expenditure columns and had learnt how to add additional columns to include extra items of expenditure as they arose. Some pupils struggled with the idea of profit, measured as income minus expenditure. This was very challenging work and led to pupils creating formulae to 'do the mathematics'. The teacher provided pupils with sales circumstances that caused substantial changes to their spreadsheets. The pupils noted that the use of formulae helped them to perform recalculations with ease. The pace of the lesson was very fast but the pupils responded well to the challenge. There was a real sense of purpose and enterprise and the achievement of all the groups was very high.

Pupils can produce multimedia presentations, combining and adapting information from the internet with illustrations, texts and sound:

Pupils were learning how to use page transitions, hot links, sound buttons and animated graphics. They collaborated well in pairs and, being confident computer users, many were quickly able to extend the range of features they used by experimenting with the functions available. Pupils grasped new learning with ease and extended existing skills to develop new capabilities.

There are many good examples where pupils with special needs are enabled to participate and achieving well using ICT, in particular in presenting their work legibly and attractively. This improves their self-esteem and confidence as learners. The following example relates to the use of ICT by an autistic pupil in Year 6:

The pupil had mastered all of the technical skills required to use his laptop. The quality of his handwritten work was poor, but he could produce good work when it was word processed. He was able to see clearly what the teacher was writing on the interactive whiteboard as this also appeared on the screen of his laptop. Without the use of ICT this pupil becomes frustrated, which aggravates his potentially disruptive behaviour.

There has been a notable increase in the use of ICT for creative purposes, for example with pupils planning, shooting and editing their own digital video footage, exploring and simulating the works of well-known artists, composing simple melodies and designing fashionable clothing. Nevertheless, this area of ICT is still underdeveloped in many schools. In one school, pupils in Years 4, 5 and 6 made effective use of digital cameras and videos to produce animation and short films:

The pupils in Years 4 and 5 made figures out of plasticine and painted boxes to create backgrounds. They took photographs of single shots and moved their figures to suit a story board. These were then put into a sequence using ICT to create a cartoon.

Pupils in Year 6 used digital video and an editing suite to produce a short film highlighting the different activities at their school. The pupils downloaded recordings confidently into the computer. They edited their work, adding titles, fade ins and outs as well as commentary. They displayed high levels of ICT skills and capability and a very mature attitude.

In a few schools, pupils make safe and effective use of email. They exchange emails with pupils from other schools both in the United Kingdom and abroad. This has sometimes helped to raise the attainment of pupils who were previously identified as being reluctant readers and writers.

As well as developing their ICT capability, in some schools ICT contributes to pupils' achievement in other subjects, as in this Year 3 numeracy lesson on number problems:

Pupils were completely absorbed and eager to call out answers. As soon as a correct answer was called out, the teacher 'clicked' on the screen, which instantly displayed a new number problem. Pupils wrote the correct sequence from the numbers on the screen on their mini handheld whiteboards and then held them up for the teacher to see. Pupils also used the interactive whiteboard pen to drag the numbers into the number problem to make it work. They then moved on to use the interactive whiteboard to compare the time on standard and digital clock faces. They were motivated by the interactive use of the whiteboard and helped by the large, clear display.

Implementation in schools

Leadership and management

As the leadership and management of ICT in schools continues to improve, so do schools' forward planning and clarity of vision. The initiatives have helped to raise the profile of ICT in schools and have led to a better understanding of the potential of ICT to raise standards of achievement, especially in literacy and numeracy. As a result, ICT now has greater prominence in school improvement plans and two thirds of schools are now judged to have clear educational direction.

There is growing enthusiasm about ICT from headteachers as they become increasingly aware that ICT is a tool which can enhance the quality of teaching and learning across the curriculum. Where headteachers have worked in partnership with their ICT co-ordinators there has been an improvement in the understanding and rationale for the use and development of ICT. The best planning sees the co-ordinators of all subjects taking responsibility for ICT in their own subjects and working together with the ICT co-ordinator. Where planning is weak it is often because the ICT co-ordinator does not have sufficient influence outside the ICT subject area. The majority of ICT co-ordinators monitors teachers' planning, but there is insufficient monitoring of the quality of teaching and the application of ICT in other subjects.

At least half of all headteachers monitor teachers' use of ICT as part of their performance management. In the best practice, teachers' targets are linked to the raising of pupils' attainment. Where this takes place, there are effective strategies for monitoring and evaluating the quality of teaching and there is also a balance between different ICT activities and the use of ICT across the curriculum.

Co-ordinators influence practice by leading staff meetings, providing lesson demonstrations, and working closely with other co-ordinators to develop and implement

policy and practice. Provision is often made for ICT co-ordinators to have non-contact time which enables them to support teachers. On the whole, staff are very open about their strengths and weaknesses and ask for support and guidance when needed.

The Qualifications and Curriculum Agency (QCA) scheme of work is a basis for ICT planning in most schools. Where the use of ICT is firmly embedded, skills and capabilities have been thoroughly mapped for each year group, providing continuity and progression. These are integrated into tasks and activities both in the ICT scheme and in the literacy and numeracy schemes; increasingly, individual co-ordinators across the curriculum are beginning to take responsibility for the use of ICT in their subject. For example, there is more use of the internet to support history and geography projects.

The emphasis given to ICT in documentation across the curriculum is satisfactory. Support from LEAs is improving, with an increasing number providing schools with effective support and guidance on planning and documentation. Advisers often respond quickly to requests for help. Schools receive good feedback about policy. However, many schools feel that they need more help and advice than the advisers are able to give.

The majority of schools need a significant level of technical support as a result of the increase in the use of ICT and amount of hardware in schools. The level of technical support available is rarely sufficient. Headteachers need to identify an element of their ICT expenditure for technical support and those who do generally reap the benefit in terms not only of more reliable resources but also of the improved confidence of teachers. Schools have found different ways of meeting this need, some supplementing LEA service level agreements with the services of outside contractors and technicians, while others develop support through existing staff such as Learning Support Assistants or in partnership with other local schools.

Staff development

The expected outcomes of NOF training have still been met significantly in only about a third of all schools and in another third they have not been met at all. The expectations of the NOF-funded ICT training proved over-ambitious. The ICT needs of many primary teachers were more basic than the scheme anticipated, while others had already developed a high level of expertise, often through their own efforts. The majority of NOF training was insufficiently differentiated to meet such varied needs.

As the NOF programmes progressed, the original enthusiasm waned and teachers became resistant to training that was inappropriate to their needs. Much training made a limited contribution to their awareness of subject-specific ICT applications and did not encourage them to consider issues of teaching and learning with ICT. NOF figures show a high proportion of teachers completing the course, but this did not always mean that they had met the NOF expectations. Some teachers 'sailed through' with no challenge; others reported that they carried out the NOF tasks, but this had no impact on their teaching. In most schools, senior managers saw relatively little benefit from the training, and concluded that the funding could have been better spent.

The NOF-funded training undoubtedly provided considerable initial impetus, leading schools to recognise the need for all staff to become confident in the use of computers. Nevertheless, a combination of in-house training, LEA courses and independent providers, combined with improved resource provision, has generally had greater impact.

The main impact of NOF training was to raise the awareness of staff regarding ICT and the requirements of the National Curriculum. In many schools, high priority was given to ICT, allowing teachers the time to improve both their personal ICT skills and their confidence to apply these in teaching and learning in their classrooms. This also convinced some reluctant users that it was essential for them to come to terms with the role and use of ICT in education. On the basis of teachers' own audits of their training needs, and by increasing the provision for in-house training, the situation has been reached where most teachers are at least competent ICT users. The training acted as a catalyst for schools to provide the funding for new hardware and other professional development.

In the most effective practice, the developmental needs of all staff are clearly identified and budgeted for. For example, in one successful primary school:

The ICT co-ordinator undertook an audit of the ICT needs of all staff. He provided a range of support and training himself, which included one-to-one support and whole staff training. The school bought into the LEA training support for ICT and the co-ordinator made effective use of this support to supplement, reinforce and complement the training he provided to staff. The staff felt confident about asking for support and were delighted at the extent to which their skills had progressed in a matter of months. They appreciated receiving on-site training which catered for their individual needs and welcomed not having to travel after a full day at work in order to obtain this level of support.

Resources and accommodation

NGfL funding has contributed significantly to schools' increased provision for ICT. This has led to the use of a broader range of hardware and software for teaching and learning. The hardware is becoming increasingly reliable. The range and quality of software have improved significantly and there is a widening range of interesting and appropriate online resources. This has led to an increase in the use of ICT to support teaching and learning in both core and foundation subjects.

Overall, the accessibility of ICT resources in primary schools is much improved. NGfL has resulted in increased availability of hardware, allowing schools to update and rationalise their computers, or purchase a sufficient number to develop suites or clusters for classroom use. Staffrooms are better equipped, allowing teachers to use ICT for administrative purposes. However, many schools have invested substantial additional funds from their own delegated budget to improve resources further or to create suitable accommodation for a suite. Many have used funds from other sources, including Education Action Zones, Excellence in Cities, seed challenge, or industrial sponsorship. The 'Laptops for Teachers' initiative has helped teachers to develop and practise their own ICT skills. This has enabled them to explore a range of teaching and learning

materials at home and then make more effective use of the laptops in lessons. It has also enabled them to undertake a range of professional tasks, including planning, preparing resources and writing reports.

Schools are beginning to make better use of hardware which matches their needs. For example, more sets of laptops or palmtops are proving useful to supplement the class set of computers in a suite and allow for occasional use in the classroom. Most schools have established clusters of computers or suites where up to a whole class can be accommodated. On average, computer suites contain 16 computers; this often enables pupils to work in pairs and allows one computer for the teacher.

An increasing number of digital projectors and interactive whiteboards are being installed to enable teachers to demonstrate to a whole class. As teachers become more competent they are appreciating the potential of these. In the hands of good teachers they are proving to be very powerful motivators.

Many schools have upgraded their library facilities and use online facilities to supplement their books and reference materials. Network utilities are proving useful in a minority of schools, for example enabling the teacher to see what individual pupils are doing and to communicate directly with individual computers. The majority of schools allow pupils to use ICT in the library or in ICT suites outside of lessons, for example in after-school or lunchtime clubs. Some schools give priority to pupils who do not have access to a computer at home and others target pupils for additional support and enrichment activities. In one school the highest-attaining pupils make use of the ICT suite at lunch time to work on the school's newspaper and, in another, pupils use the ICT suite to access resources which enhance their problem-solving skills.

The network systems in schools are becoming more extensive. More schools have access through broadband connections to the internet, which decreases the frustration and increases the confidence of teachers using the computers. Digital cameras and videos are also increasingly available. When used effectively these are proving to have a significant impact, particularly in literacy and numeracy.

The majority of schools ensure that work surfaces and seating are at an appropriate height for pupils and that there is sufficient space for them to work. Although, on the whole, lighting in suites is good, not all schools are aware of the problems caused by glare from the brightness of projectors and strong daylight on interactive whiteboards, or the need for better ventilation. In some cases accommodation and resources in schools are limited by the lack of space. A minority of classrooms are too small to include more than one computer and schools do not have accommodation in which to house a suite. Nevertheless, where necessary, schools have often been very creative in providing for ICT.

The funding has helped to sustain the maintenance and improvement of ICT resources, but the issue of sustainability and the need to increase the amount of technical support in schools need to be addressed.

There has been an increase in the extent and quality of the network facilities in the schools themselves as more classrooms become linked to the school's central system. Some schools are linked to other schools in their area, often within a secondary school pyramid, and there is an increase in the communication between schools as a result.

Primary schools, especially the smaller ones or those without anyone on the staff with technical knowledge, have welcomed these advances, which have made the infrastructure more reliable, as well as easier and quicker to use with larger groups of pupils. However, though the picture is improving, there are still schools experiencing difficulties. This is mainly because broadband is not available where the local telephone systems are unable to support this facility.

Teachers have generally welcomed the Curriculum Online initiative. There is greater awareness of what is available and teachers have used it well to increase their range of good-quality software, often linked specifically to aspects of subjects like literacy and numeracy. Teachers readily share their knowledge through networks of co-ordinators, journals and internet links.

Accommodation and resource problems are sometimes the cause of unsatisfactory lessons using ICT; these include cramped working conditions and rooms where the teacher is unable to see pupils' screens sufficiently well to monitor their progress or a printer is situated elsewhere in the school. Other problems come from using procedures which are too complex for the pupils, such as logging on using their birthdates, which many younger pupils do not remember.

Where there is insufficient use of ICT overall, this is usually as a result of teachers' lack of confidence and expertise and is often compounded by unreliable hardware or budgetary constraints.