NGfL

Research and Evaluation Series

NGfL Pathfinders

Preliminary Report on the roll-out of the NGfL Programme
in ten Pathfinder LEAs

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NGfL Pathfinders

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1 Introduction

1.1 Evaluating the NGfL Programme

The NGfL Programme is the Government's key initiative for improving ICT provision in schools, developing a wide range of digital resources for teaching and learning and equipping teachers to be effective users of ICT. It seeks to involve learners, the education and lifelong learning services, industry and local government in a vision focused on three key areas:

- Stimulating the development of high-quality on-line and off-line digital content relevant to the UK education system, and developing an accompanying Internet portal – the NGfL web site[1]

- Ensuring that schools and other educational institutions have the means to access and use these resources effectively

- Providing teachers with appropriate training opportunities so that they are able to incorporate the use of these technologies and resources into their everyday teaching.

Since it was launched in 1998, the NGfL web site has grown to over 362, 000 unique indexed documents. Resources for teachers include the VTC (Virtual Teacher Centre) and the Teacher Resource Exchange to which teachers are invited to contribute lesson ideas. The needs of pupils are also addressed in the Grid Club, which provides a safe but stimulating range of activities and information for 7-11-year-olds.

Between 1998 and 2002, £657 million of grant funding is being made available to schools in England through the Standards Fund to help them to develop their ICT provision; a further £710 million of expenditure will be supported between 2002 and 2004. A programme of professional development for teachers is also in train to help develop their competence and confidence in using ICT. This is being funded by the New Opportunities Fund (NOF).

The NGfL Programme has links with several initiatives to raise standards in teaching, learning and administration, including Excellence in Cities, Education Action Zones, Technology Colleges and the Information Management Strategy.

Along with ImpaCT2[2], **NGfL Pathfinders** is an important strand of the NGfL evaluation strategy. It focuses on the roll-out of the NGfL Programme in schools in ten Local Education Authorities (LEAs). LEAs play an important role in supporting schools and, ultimately, teachers and pupils. In respect of the NGfL Programme, LEAs are committed to ensuring that their schools achieve the following baseline in 2002:

- Access to ICT for teaching and learning purposes equivalent to a computer to pupil ratio of at least 1:11 in each primary school and 1:7 in each secondary school.

- A secure connection to the Internet in each school, with at least 20% of schools connected at broadband level.

- At least one networked computer with Internet access in each school for management and administrative purposes.

1.2 NGfL Pathfinder LEAs

This is the first interim report on the NGfL Pathfinders evaluation. The evaluation began in November 1999 and is planned to finish in March 2003. It comprises three separate but inter-related studies:

- The evaluation of the implementation and management of on-line technologies in the ten LEAs (University of Lancaster)

- The evaluation of the impact of digital technologies on standards and effectiveness in schools (University of Bristol)

- The technical evaluation (University of Nottingham).

The work of these three teams is drawn together by a Synopter at Manchester Metropolitan University.

The Department for Education and Employment (now DfES) designated six LEAs (Birmingham, Bradford, Cumbria, Dudley, Kent and Staffordshire) as NGfL Pathfinders in April 1998. A further four LEAs (Greenwich, Somerset, Stoke-on-Trent and Telford and Wrekin) were designated as such in the spring of 1999.

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1. http://www.ngfl.gov.uk/index.html
2. The ImpaCT2 study is evaluating the impact of Information and Communications Technologies on pupil attainment in 60 schools in England. Emerging findings may be found at http://www.becta.org.uk/impact2

These LEAs were chosen as Pathfinders because they had put forward interesting approaches to the implementation of the NGfL Programme and were representative of different approaches rather than necessarily the 'best' proposals.

The evaluation is designed to enable policy makers and managers, nationally and locally, to learn from the successes and problems encountered in each approach.

1.3 Background to the report

The implementation of such a major innovation – one involving procurement and installation of high-cost infrastructure and hardware, and significant changes in management and teaching practices – takes time. It is too soon, after only 18 months, for the evaluators to identify any significant outcomes. Instead, this report provides interim findings and raises key questions to guide future developments in the implementation of ICT in schools in Pathfinder and other LEAs.

This publication is based on interim reports presented to the DfEE in April 2001 by the three evaluation teams. Information from these reports is presented separately to ensure that their different perspectives remain clear.

This report and copies of associated research instruments can be found at http://www.becta.org.uk/research

2 Findings from the evaluation of the implementation and management of on-line technologies in the ten LEAs (University of Lancaster)

In 1999-2000 the research team built up an extensive database of confidential information from the Pathfinder LEAs through the collection of a large number of documents (including guidance documents to schools and samples of school ICT development plans) and interviews with key personnel in all ten Pathfinder LEAs. The data provided the evidence for the preliminary report presented to the DfEE in April 2001. This report also draws on additional data collected between July 2000 and February 2001, which included interviews with key LEA personnel and data from selected visits to schools in four of the Pathfinder authorities.

2.1 LEA-wide issues

- Approaches to the implementation of the NGfL Programme and associated 'outcome costs'

  Although every Pathfinder LEA has adopted its own approach to managing the implementation of the NGfL Programme in its schools, four scenarios typify the range of approaches.

LEA Type A	The LEA takes a very decentralised approach. Schools take responsibility for making choices about connectivity, networking, hardware and software. The LEA maintains a range of choice and low-cost options through framework agreements. The schools need to make decisions about maintenance and upgrading without any long-term involvement or commitment from a provider, which could lead to some compatibility problems or to lack of access to spare parts in the longer term.
LEA Type B	Networking provision (but not connectivity, hardware or software provision), is contracted to a single company by agreement with all schools. This offers greater potential for coherence, but can lead to wide ranging difficulties if problems do arise. The advantages and disadvantages of individual schools making decisions on hardware and software purchase are maintained in this model.

LEA Type C	A partnership has been managed between the LEA and a single company, to provide for all networking, hardware, software and content. The partnership has the advantage of enabling the cost benefits of bulk purchase, while schools may still opt out of being involved. The partnership is time limited - so alternatives of using other providers are regularly reviewed.
LEA Type D	A public-private financial initiative places a greater emphasis on the company involved to provide technological support, but links schools into a much longer agreement with a single company. Schools have committed their funding to the initiative over a long time period, and if there are any inflexibilities in terms of what the company provides, or how it provides it, these may be imposed on schools. The problems of long-term commitment versus not being tied to particular technologies need to be considered carefully, and built into contractual arrangements.

Many lessons can be learned from tracking the purchasing and implementation of the NGfL Programme within these different management strategies. Some of these are explored below.

- Outcome costs

  One aspect that has not yet been considered in any depth by LEAs is that the 'outcome costs'[3] are quite different for each of these models. For example, if an LEA has entered into a long-term contract with a provider, it may not be possible to change direction to capitalise on new opportunities. Longer-term contracts give longer apparent stability, but could potentially lead to higher outcome costs, if things do not work as expected. At this stage in the evaluation, some costs of this kind are beginning to emerge in all LEAs with managed service contracts. The evaluation offers the opportunity to monitor the differences in these costs within different models for purchasing, installing and supporting ICT infrastructure and resources in schools. In undertaking any outcome analysis, therefore, this must be taken into consideration.

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3. The concept of 'outcome costs' (sometimes called 'failure costs') is a common method of analysis amongst specialists in management and procurement. It provides a mechanism for learning from experience by looking at the hidden costs, over time, resulting from decisions made at the initial stage. It is considered to be an important device for maximising learning and is not concerned with apportioning blame.

- **Expertise of personnel**

  The Pathfinder LEAs, having had no experience of implementing similar large-scale technology initiatives, did not have personnel in leadership roles at the outset with the prior experience needed to lead the NGfL initiative. LEAs adopting 'Type A' and 'B' approaches appeared to find this issue more problematic than those adopting 'Type C' and 'D' approaches. Often the scale of Type C and D approaches involved a wide range of external and internal expertise as a 'natural' part of the initial development; Type A and B approaches were more often handled by one individual or a small group who explored avenues without wider corporate support.

  Great care was taken to seek advice and take decisions on the basis of the best possible information; some LEAs purchased external consultant support when handling contractual arrangements. Nevertheless, lack of prior experience was an initial handicap, and the need to develop key personnel and use them effectively has remained problematic.

  One issue has been that personnel involved in strategic planning are not necessarily those with the necessary skills to take forward implementation. One approach adopted in a number of LEAs has been to appoint a project manager to this link role with specific responsibility for liaising between schools and LEA strategy groups. Other LEAs have set up working parties with school representation. However, in general across the Pathfinder LEAs, the potential mismatch of skills and responsibilities has not been sufficiently recognised.

- **Sustainability of procurement**

  Sustainability strategies were built into the procurement policies of all the LEAs. However, the emphasis was on putting in place mechanisms that would deal with sustainability over the life of the initiative and these have not been systematically renewed. Those LEAs adopting 'Type D' approaches were undertaking developments that they thought would address long-term sustainability issues. Whilst in one respect this has been shown to be true so far, in another respect shifts in technology need to be fully accounted for in ways that allow the greatest flexibility for longer-term choice by those in schools.

  At this stage in the implementation of the NGfL Programme in schools there needs to be a clear focus on (a) evaluation of procurement strategies and (b) planning for long-term sustainability beyond the life of the NGfL Programme. This evaluation has not found evidence of Pathfinder LEAs planning for long-term replacement of hardware or the recurring costs of consumables. Senior managers in schools are worried about the consequences of this lack of forward planning by the LEA. However, it is not clear whether responsibility for long-term sustainability rests with LEAs, central Government or indeed, individual schools. There is a need to identify within the LEAs those responsible for long-term planning for sustainability and for liaising with central Government and other potential sponsors.

- **Key Performance Indicators (KPIs)**

  LEAs should now be beginning to review how well suppliers are meeting the key performance indicators included in their contract. These KPIs, as part of a managed service contract, should enable Pathfinder LEAs to transfer an element of 'risk' to the supplier. The evaluators found that LEAs that had adopted 'Type B', 'C' and 'D' approaches have been more concerned with KPIs. In Type A approaches framework agreements have not tended to involve KPIs, especially as they have often been renewed after only one year.

  LEAs that specified KPIs that are measurable and appropriate to their needs are now in a stronger position to ensure delivery of the intended outcomes. However, there may be problems if the KPIs are concerned with elements of the NGfL initiative over which the supplier has little control (pupil performance, for example), or if key measures such as technological performance of connectivity have not been included. In other cases it is clear that schools are in a position to know whether KPIs have been met, yet are not always aware of the details relating to these since they had been set up by the LEA.

- **The management of web-based content**

  Management of the NGfL has been sequential across LEAs, starting with equipment and connectivity and moving on to the provision of curriculum content. However, many schools are now concerned about the range of curriculum support and advice available to them to support the effective use of on-line contents to influence pupils' learning outcomes.

LEAs involved in Type A and B approaches are addressing web-based content issues more easily than LEAs involved in Type C and D approaches. It appears that longer-term hardware and connectivity contracts mean that relationships with content and its provision involve more liaison and negotiation in attempts to ensure that functionality is maintained.

No Pathfinder LEAs are as yet offering schools guidance on key issues related to the storage of content.

2.2 School-based issues

- School ICT co-ordination
  Many school ICT co-ordinators are engaged in co-ordinating a number of different things, including the development of ICT infrastructure in the school, the use of ICT to support teaching and learning, pupils' acquisition of ICT skills and the training of colleagues. The schools in the Pathfinder LEAs do not appear to have established clear roles for ICT co-ordinators, so that in practice most have taken on a combination of two or three of these responsibilities. The co-ordination of ICT to support teaching and learning tends to be the one that they have least time for when technical support needs are at high levels. Some schools have adopted a strategy of sharing the co-ordination responsibilities across a number of staff, including the head teacher, deputy head teacher with responsibility for the curriculum, and subject co-ordinators or leaders.

- The experience of schools working with a managed service provider
  Schools do not appear to be making the best use of managed service providers. Such a service should free senior staff and ICT co-ordinators to focus more attention on the curriculum uses of ICT. However, there is evidence that in many schools senior staff have not 'saved' time on technical issues but are now dealing with them indirectly through negotiations with the Managed Service Provider (MSP). In some cases, inflexible contracts (those, for example, with no adequate provision for home–school ICT links) are leading to schools working outside the MSP and incurring additional costs.

- Buildings and the deployment of equipment
  National policies for school buildings need to be revised to take account of the changing needs

resulting from networked technologies. Teachers tend to accept traditional buildings and try to work round them, but as technologies change, buildings need to change to enable new approaches to teaching. Key issues are connectivity (wired or wireless), network points and sockets, specialist furniture (complying with health and safety regulations), and flexible spaces. Some schools have adopted wireless technologies coupled with laptop use to address the need for flexibility, while others have developed areas with sufficient space for pupils to work on documents alongside computers and on tables in the same areas.

- School ICT development plans
  The use of templates in the construction of schools' ICT development plans is proving to have been an effective mechanism. School ICT development plans were used by LEAs to judge the 'readiness' of schools for the NGfL initiative and should now be available to evaluate progress towards targets. However, in LEAs that did not provide a template, schools' ICT development plans are sometimes proving inadequate for this purpose. For example, some schools have not included sections on curriculum use, so it is not possible to use these to monitor curriculum progress.

- Monitoring and evaluation practices
  LEAs need to develop procedures for the evaluation of their NGfL initiative. This study has found no evidence that fully adequate evaluation procedures are being put into place in the Pathfinder LEAs, although, in at least one LEA, subject or phase advisors evaluate each school's practice as a normal part of visiting and providing guidance. LEAs are aware of the fact that the focus of attention on implementation is shifting, but do not, for example, implement regular evaluation of the effectiveness of installed technologies to check when replacement or upgrading might benefit schools.

3 Findings from the evaluation of the impact of digital technologies on standards and effectiveness in schools (University of Bristol)

During the first phase of the evaluation (prior to March 2000) the evaluators sent out a questionnaire to all schools in the Pathfinder LEAs. This provided baseline data from which two schools from each LEA (one primary and one secondary) were chosen as case studies. All had a basic level of connectivity (in practice, at least one Internet connection and one e-mail address in the school) and had received NGfL funding in 1998-99 and/or 1999-2000.

The information contained in this report is based on questionnaires completed by teachers and pupils in the case study schools in June 2000, and classroom observations carried out in the same schools between November 2000 and February 2001.

Questionnaires were administered in May and June of 2000 in the case study schools (10 primary and 10 secondary). Some 1,953 secondary students in Years 9 and 11 completed questionnaires and 179 secondary teachers returned questionnaires. At primary level, 327 Year 6 children and 71 teachers completed questionnaires.

3.1 Infrastructure

The implementation of the NGfL Programme in schools is progressing. All the case study schools have increased their hardware and software provision and connectivity since March 2000, although progress has generally been slower than anticipated. Access to the Internet is still slow in most schools, either because the bandwidth of the connection is low or because a very large number of users are using the system at the same time. As well as networked PCs, many schools have now purchased additional hardware, such as digital cameras, projectors to link to computers, and interactive whiteboards. Variation in provision means that teachers and pupils in different schools/LEAs are working under very different conditions.

Networked computer suites are in place in all but one of the case study schools, which has opted for networked 'clusters' located between classrooms. Suites have been generally welcomed by primary teachers although, as

teachers' confidence grows, they are beginning to express concerns about the inflexibility arising from restricted timetabled access to suites. Networked computer rooms in secondary schools are often mainly used by ICT specialists and many secondary teachers would prefer 'clusters' of computers linked to subject areas. Some teachers find computer networks inflexible with respect to available software, and where schools or LEAs have instituted an 'approval' process before software is added to the network, the resulting delay discourages use. As space is also a problem in many schools, there is increasing interest in portable/hand-held computers and wireless networks, which many believe would also enable more flexible use.

Support structures for digital (including on-line) technologies in schools are not yet fully in place in the Pathfinder LEAs. Relationships between schools and the LEA can, in some ways, be compared with the relationships between parents and children. There is a sense of affection and mutual responsibility but irritation and disputes can also arise over control. Relationships vary depending upon the LEA's strategy for leading the NGfL Programme centrally or devolving decision-making to schools. Some schools prefer one approach and some the other.

One contentious issue between LEAs and schools is technical support since schools typically expect more support than the LEA is able to provide. This is frequently related to individual teachers' lack of awareness of the small scale of LEA budgets for central services under NGfL.

Another contentious issue relates to decisions about infrastructure and the allocation of NGfL funds. There is a recognisable human tendency to presume that decisions have been made in someone else's best interests rather than one's own.

Where the LEA has contracted with a Managed Service Provider, schools generally prefer to retain the option to purchase additional software/hardware beyond the 'package' but this, of course, leads to additional costs. In some LEAs teachers are frustrated by the length of time it takes to gain 'approval' to install their own choice of software on the network.

Pathfinder LEAs have begun to move towards establishing intranets[4] with 'content' for use in schools, but as yet schools are making very little use of these.

4. Addresses for these are provided at the end of this report in the 'References' section.

With regard to LEA support structures for curriculum and pedagogy, schools generally welcome what is available although it is often seen as insufficient. Relationships are generally closer between primary schools and LEA teaching and learning support teams. Some departments in secondary schools have long-standing relationships of mutual trust with LEAs, going back to the time when there were advisory teams providing subject support. This varies between the Pathfinder LEAs and between subjects within the LEAs.

3.2 Pupils' use of computers

The vast majority of pupils in the case study schools report having access to computers out of school (88% of secondary pupils and 83% of primary pupils). Some 60% of secondary pupils use a word processor daily or weekly and 44% use the Internet with this frequency as a source of information. Home use of ICT is lower for primary pupils than secondary pupils (23% and 26% respectively). Pupils also report using computers for a range of other activities, including playing games.

Table 1: Reported use of different computing activities in and out of school by secondary school pupils (expressed as a percentage)

N=1953	Out-of-school use			In-school use		
	Daily to Weekly	Monthly or less	Never	Daily to Weekly	Monthly or less	Never
Writing/word processing	60	26	4	45	40	12
Drawing/designing	30	45	14	19	46	30
Working with spreadsheets	12	39	38	24	47	23
Looking up information on a CD-ROM	41	38	10	13	41	40
Looking up information on the Internet	44	23	23	25	31	38
Making web pages	12	21	56	4	15	74
E-mail/chat rooms	30	22	35	16	20	57
Using software that is designed to teach me something	21	41	26	12	32	49
Playing computer games	61	23	6	11	16	67
Making music/recording music	Not asked			7	13	73

* All figures based on percentage of the total 1953 (percentages may not add to 100% due to missing data)

The vast majority of pupils are enthusiastic about using computers. However, many assume that they are using them at school to acquire ICT skills rather than as tools to help them learn about the curriculum. Secondary pupils generally feel that they don't get enough opportunity to use computers at school.

According to the June 2000 survey, levels of secondary pupils' use of computer applications in school are much lower than their use out of school. Word processing has the highest levels of use, in school, but only 45% of pupils use it on a daily to weekly basis, compared with 60% out of school. Sizeable numbers report never using computer applications (CD-ROMs and the Internet included) at school. Use of computers is not yet fully integrated with subject teaching in secondary schools. Computers are used most in IT/ICT specialist courses in line with Key Stage 3 and 4 curriculum specifications. Levels of use in all other subjects are comparatively low; for example, many secondary pupils report never using computers in a wide range of subjects: English (35%), maths (53%), modern foreign languages (45%), history (39%) and geography (33%). In this context, only about half of secondary pupils say that computers are helping them with literacy, and few find them helpful with any aspect of numeracy. There is also evidence   in secondary schools that use of computers in teaching varies across different age groups. Teachers report the highest use with Year 9 and the lowest with Years 12 and 13.

Table 2: Secondary school pupils' responses to the question: 'how often do you use a computer in school in the following subjects? You probably will not be taking all the subjects that are listed so only tick a box for those subjects you are taking at the moment'.

N=1953	Daily to Weekly	Every Month or less often	Never
Art	4	19	49
Business Studies	4	10	37
Design & Technology	21	43	20
English *(e.g. Language & Literature)*	13	43	35
Foreign Languages *(e.g. French, German, Spanish)*	6	37	45
Geography	8	35	33
History	10	26	39
IT/ICT	44	16	15*
Mathematics	7	30	53
Music	7	14	47
PE *(Physical Education)*	2	7	70
RE *(Religious Education)*	4	25	55
Sciences *(e.g. Biology, Chemistry, Physics)*	6	37	45

Note: Summed percentages will not equal 100% due to missing data.
* This result is higher than expected. The researchers are unable to account for this surprising result at this stage. This issue will be investigated more fully in the ongoing work.

Primary pupils report more use of a range of computer activities in school than out of school, and it seems   clear that the organisation of the curriculum with fewer specialist classes and teaching in longer blocks of time makes the logistics of computer use easier in primary schools. Primary pupils report finding computers helpful with all aspects of literacy and some aspects of numeracy.

In both primary and secondary schools, there is evidence that computers are being used much less effectively for teaching numeracy than for teaching literacy. For example, only 6% of secondary pupils state that they find computers 'help a lot' with decimals and fractions, and only 8% say they help a lot with algebra; in primary schools 10% or fewer pupils say that computers 'help a lot' with all areas of mathematics. However, it is interesting that 32% of secondary pupils and 28% of primary pupils report that computers have helped them a lot with diagrams, graphs and tables. These issues will be further investigated in ongoing work. In the area of literacy, 58% of secondary pupils reported that using computers helped a lot to present information and 33% that computers helped a lot with spelling. Some 58% of primary children reported that computers helped a lot to find information and 31% reported that computers helped a lot with spelling.

Table 3: Secondary school pupils' responses to the question: 'how much help do you think using a computer has been in the following areas?' (expressed as a percentage)

N=1953	Helped a lot	Helped a little	No help at all
Reading	7	43	42
Writing	27	38	27
Spelling	33	41	18
Using Different Words *(vocabulary)*	24	43	24
Finding Information	58	27	7
Presenting Information	57	27	7
Planning, writing and improving of work	41	38	13
Calculating *(adding, subtracting. multiplying, dividing)*	10	36	45
Working with decimals & fractions	6	28	57
Using symbols and letters to represent numbers *(algebra)*	8	28	55
Using diagrams, graphs & tables	32	41	18
Imaging 3-D images	26	34	31

Note: Summed percentages will not equal 100% due to missing data.

Table 4: Primary school pupils' responses to the question: 'please tick how much help you think using a computer has been in the following areas' (expressed as a percentage)

N=327	Helped a lot	Helped a little	No help at all
Reading	6	48	43
Writing	21	43	34
Spelling	31	46	21
Using Different Words *(vocabulary)*	21	50	26
Finding Information	55	33	9
Planning, writing and improving of work	28	49	17
Calculating *(adding, subtracting. multiplying, dividing)*	8	41	47
Working with decimals & fractions	7	30	59
Using symbols and letters to represent numbers *(algebra)*	10	35	51
Using diagrams, graphs & tables	28	44	24
Imaging 3-D images	14	29	52

Note: Summed percentages will not equal 100% due to missing data

There continues to be evidence of inequalities of access to, and use of, computers outside of school. Moreover, there is some evidence that schools are not succeeding in counteracting this. In both primary and secondary schools, pupils with regular access to computers out of school report higher levels of use of computers in school than those without out-of-school access. They also report higher levels of confidence than those without regular out-of-school access, and in secondary schools there are indications that they are also more autonomous users. This will be further investigated during the next phase of the research to see if social class factors are linked to differential home access to ICT.

A high proportion of the 23% of secondary pupils who do not have access to the Internet out of school report that they never use the Internet (41%) or e-mail (63%) or make web pages (73%) in school.

Table 5: Reported use of computers in secondary school subject areas by pupils' access to computers out of school (expressed as a percentage)

N=1953	Access			No Access		
	Daily to Weekly	Monthly or less	Never	Daily to Weekly	Monthly or less	Never
Art	4	19	49	5	14	53
Business Studies	5	11	37	2	6	37
Design & Technology	22	44	20	13	39	28
English	13	44	34	11	37	41
Foreign Languages	6	38	44	5	27	56
Geography	8	35	32	7	28	40
History	9	27	39	6	21	44
IT/ICT	44	17	14	45	7	18
Mathematics	6	30	53	6	26	56
Music	7	15	47	4	10	50
PE	2	8	69	3	4	77
RE	5	26	54	3	19	60
Sciences	14	19	38	9	32	47

Overall, over 96% of secondary pupils with access to computers outside of school report using computers for schoolwork. Around 15% of boys and 12% of girls report using computers for schoolwork on a daily basis. As Table 8 shows, 29% boys and 27% girls report doing schoolwork every 2-3 days using a computer. More girls (34%) than boys (31%) report using computers for schoolwork on a weekly basis and 15% girls and 11% boys report doing schoolwork on a monthly basis.

Table 6: Secondary school pupils' reported use of a computer out of school for fun, by gender

N=1745		Gender		
		Boys	Girls	Total
Never	Count	16	45	61
	% within gender	1.8	5.2	3.5
Less often	Count	69	132	201
	% within gender	7.8	15.4	11.5
Monthly	Count	67	106	173
	% within gender	7.6	12.3	173.0
Weekly	Count	150	218	368
	% within gender	16.9	25.4	21.1
Every 2-3 days	Count	223	208	431
	% within gender	25.2	24.2	24.7
Daily	Count	361	150	511
	% within gender	40.7	17.5	29.3
Total	Count	886	859	1745
	% within gender	100.0	100.0	100.0

Table 7: Secondary school pupils' reported use of different computing activities out of school, by gender (expressed as percentages)

N=1953	Boys			Girls		
	Daily to Weekly	Monthly or less	Never	Daily to Weekly	Monthly or less	Never
Writing/word processing	61	24	5	60	28	2
Drawing/designing	34	41	15	26	48	14
Working with spreadsheets	15	38	36	9	40	40
Looking up info on a CD ROM	44	36	10	39	39	10
Looking up info on the Interent	49	19	21	38	25	25
Making web pages	16	23	51	7	20	61
E-mail/chat rooms	32	23	33	28	22	37
Using software that is designed to teach me something	22	39	27	19	43	25
Playing computer games	72	15	3	49	31	9

Note: Summed percentages will not equal 100% due to missing data

There is little evidence of either primary or secondary schools carrying out any systematic audit of pupils' home ownership of computers or of Internet access. Rather, many schools appear to ignore home ownership of computers, perhaps from some notion of treating all pupils the same to ensure equality of opportunity. Closer home–school links using ICT are affected by the fact that the software on home computers is often not the same as that used in school. In addition, teachers and LEAs expressed concerns about transfer of viruses via floppy disks, and about ensuring security when pupils are given e-mail addresses.

In relation to gender, there are no significant differences between the levels of out-of-school access to computers or frequency of use for girls and boys. However, there are statistically significant differences between the kinds of uses reported:

• More boys than girls reported using the computer every day for schoolwork (15% as opposed to 12%)

• 5% of boys and 2% of girls said they never used a computer out of school for schoolwork.

Table 8: Secondary school pupils' use of computers out–of school for schoolwork, by gender.

N=1734		Gender		
		Boys	**Girls**	**Total**
Never	Count	43	19	62
	% within gender	4.9	2.2	3.6
Less often	Count	89	89	178
	% within gender	10.1	10.4	10.3
Monthly	Count	96	127	223
	% within gender	10.9	14.9	12.9
Weekly	Count	269	292	561
	% within gender	30.5	34.2	32.4
Every 2-3 days	Count	252	228	480
	% within gender	28.6	26.7	27.7
Daily	Count	132	98	230
	% within gender	15.0	11.5	13.3
Total	Count	881	853	1734
	% within gender	100.0	100.0	100.0

In primary schools more boys (30%) than girls (18%) report using the Internet a lot for looking up information out of school. In reporting their use of the computer for fun, boys were much more likely to do this on a daily basis (41% as opposed to 18% of the girls). However, a quarter of the girls reported using computers for fun on a weekly basis (as opposed to 17% of boys). Girls (5%) were more likely to say that they never used the computer for fun than boys (2%).

Table 9: Reported use of computers out of school by gender for primary school pupils (expressed as a percentage)

N=357	Boys			Girls		
	Lots	**Little**	**Never**	**Lots**	**Little**	**Never**
Writing/word processing	19	59	11	27	51	9
Drawing/designing	32	44	12	38	39	10
Maths/working with numbers	6	37	45	5	38	42
Looking up information on a CD ROM	34	42	13	26	39	21
Looking up information on the Internet	36	26	28	18	31	36
Making web pages	12	15	61	3	14	67
Talk to people (e-mail)	16	22	51	9	14	63
Using software that is designed to teach me something	17	47	25	17	39	27
Playing computer games	64	23	2	54	28	14

3.3 Teachers' professional development

By June 2000, 89% of secondary teachers and 76% of primary teachers reported having a computer at home (of unspecified age) that they use for work-related activities. 81% of secondary teachers and 62% of primary teachers report using computers for school-related activities on a daily to weekly basis; and all secondary teachers reported some use of their computer for school-related activities. The most frequent use they made of it was for word processing, but secondary teachers frequently used CD-ROMs and the Internet at home to get access to information. More primary teachers used CD-ROMs and the Internet to access information at school than at home (see Tables 10 and 11).

Table 10a: Secondary school teachers' responses to the question: 'how often do you use a computer at home for work related activities?' (expressed as a percentage)

N=179	**Daily to Weekly**	**Montly or less**	**Never**
School-related work	81	10	0
Other purposes	68	16	3

Note: Summed percentages will not equal 100% due to missing data

Table 10b: Secondary school teachers' responses to the question: 'how often do you do the following things on a computer?' (expressed as a percentage)

N=179	Use at home		
	Daily to weekly	**Monthly or less**	**Never**
Writing/word processing	80	10	6
Drawing/designing	17	44	28
Using a spreadsheet/databases	27	41	20
Looking up info in a CD-ROM	24	50	15
Looking up info on the Internet	50	16	21
Make web pages/CD-ROMs	6	12	67
Talking to people (E-mail, Chat rooms)	35	19	33
Trying out software to be used in school	10	44	33
Playing computer games	15	26	47

Note: Summed percentages will not equal 100% due to missing data

Table 11a: Primary school teachers' responses to the question: 'how often do you use a computer at home for work-related activities?' (expressed as a percentage)

N=71	**Daily to Weekly**	**Montly or less**	**Never**
School-related work	62	13	1
Other purposes	40	27	9

Note: Summed percentages will not equal 100% due to missing data

Table 11b: Primary school teachers' responses to the question: 'how often do you do the following things on a computer?' (expressed as a percentage)

N=71	Use at home		
	Daily to weekly	Monthly or less	Never
Writing/word processing	62	18	
Drawing/designing	13	41	18
Using a spreadsheet	5	36	31
Looking up info in a CD-ROM	10	43	21
Looking up info on the Internet	26	20	30
Make web pages/CD-ROMs	7	7	59
Talking to people (E-mail, Chat rooms)	22	18	35
Trying out software to be used in school	7	45	21
Playing computer games	15	27	35

Note: Summed percentages will not equal 100% due to missing data

A majority of both primary and secondary teachers reported that they were confident in using a range of ICT with their pupils. However, a sizeable minority still reported being 'not at all confident' about using ICT in lessons: 17% of both secondary and primary teachers said they were not confident about looking up information on the Internet with their pupils. Nevertheless, teachers in general are enthusiastic about the impact they believe that computers will have on young people's learning in the near future, although they are often unsure about how to realise this potential.

Table 12: Secondary school teachers' responses to the question: 'how confident are you now about using a computer with your students for the following purposes?' (expressed as a percentage)

N=179	Very confident	Fairly confident	Not sure	Not at all confident
Writing/word processing	54	33	5	6
Drawing/designing	24	21	28	35
Using spreadsheets/databases	20	28	21	29
Looking up info on a CD-ROM	35	39	12	12
Looking up info on the Internet	35	32	14	17
Reading/sending E-mails	34	27	16	20
Making Web Pages	6	7	9	75
Using Educational Programmes	11	32	35	17

Note: Summed percentages will not equal 100% due to missing data

Table 13: Primary school teachers' responses to the question: 'how confident are you now about using a computer with your students for the following purposes?' (expressed as a percentage)

N=71	Very confident	Fairly confident	Not sure	Not at all confident
Writing/word processing	54	39	6	1
Drawing/designing	24	49	20	6
Using spreadsheets/databases	10	28	37	24
Looking up info on a CD-ROM	30	47	17	7
Looking up info on the Internet	23	38	21	17
Reading/sending E-mails	32	25	20	21
Making Web Pages	3	3	23	69
Using Educational Programmes	28	54	13	6

There is still little use of ICT for administration in primary schools, but 37% of secondary teachers use computers for classroom administration and management on a daily to weekly basis.

Table 14: Secondary school teachers' responses to the question: 'how often do you do the following things on a computer at school?' (expressed as a percentage)

N=179	Daily to weekly	Monthly or less	Never
Preparing lessons/classroom materials using a word processor or desktop publisher	39	29	28
Classroom administration & management	37	28	34
Searching a CD-ROM for information and resources to use in the classroom	10	44	43
Searching the Internet for information and resources to use in the classroom	21	35	42
Sending/receiving e-mails	25	16	58
Working with software which you will use in your subject-based teaching	17	50	32

Note: Summed percentages will not equal 100% due to missing data

In June 2000 the number of secondary teachers who had received training in ICT during the previous year was small, but the training had been mainly well received. More than half of the primary teachers reported receiving general ICT training and more than a third had had training in how to integrate the use of ICT with their teaching. Only very few primary and secondary teachers had received NOF training by that date.

Evidence from the case studies suggests that by December 2000 many more teachers had begun to receive NOF training and many reported dissatisfaction on

the grounds that it was disorganised, lacking focus and too fragmented and text based. Criticisms were made of both distance courses and face-to face provision. Distance courses were criticised for providing extensive packs of paper-based materials (on one occasion a pile of thick manuals was seen by the evaluators unopened in the IT co-ordinator's office) and involving technical problems, without face-to-face support. However, face-to-face courses were also sometimes criticised as inappropriate, often with reference to a particular provider failing to meet the school's needs. Teachers who themselves undertook courses to become NOF trainers criticised the NOF approach as over-prescriptive and insensitive to the needs of their own school. This suggests that to optimise the effectiveness of NOF training, schools need to have the opportunity to select training that is customised to the needs of their particular staff.

There was also evidence that NOF training was not consistent across providers and that schools had differing expectations about its purpose. At the two extremes, some schools were looking for basic training and intended to provide post-NOF specialist support, whereas others were delaying NOF training until after the completion of an in-school, pre-NOF course. Although these are early findings, this negative response to NOF training is worrying in the light of teachers' general enthusiasm for ICT training in the preliminary questionnaire they completed, pre-NOF, in the autumn of 1999. In primary schools, teachers reported most favourably on whole-school training provided, within the NOF programme, by the ICT co-ordinator, but there was no evidence of a similar whole-department approach to training in secondary schools. Basic ICT courses are often delivered in a very step-by-step approach and classroom observations suggest that many teachers reproduce this in teaching pupils in a way that militates against productive learning.

In primary schools by December 2000 there was a noticeable change in attitude with teachers generally more positive and more confident in using ICT, particularly where NOF training had been provided in-house by the ICT co-ordinator. In secondary schools progress has been patchier, with some departments doing innovative work and others having made few changes. Although most secondary teachers report increasing confidence with ICT, a sizeable minority say they are not confident at all.

3.4 Teaching and learning with ICT

Schools and teachers hold a number of different beliefs about the purpose of using ICT in schools, and there is very little agreement or clarity about ICT pedagogy. For example, opinions vary on whether it is better for pupils to work in pairs with computers or singly, and on whether it is a good idea to group according to ICT skill levels. Decisions about where resources are located and the construction of the timetable have a major impact on the kind of use of ICT which is possible, but these are routinely made in relation to specific constraints such as available space, curriculum specifications and patterns of assessment. The emphasis therefore tends to be upon ICT skills acquisition rather than upon using ICT to support learning.

A few teachers are finding innovative and productive ways of integrating ICT with their teaching, but for many – particularly in secondary schools – use of ICT appears to push their teaching towards being directive, routine and lacking in imagination. In classroom observations subject teachers often only talked to pupils about technical issues relating to hardware and software, rather than the subject that was the supposed focus of the lesson. The reasons for this need further exploration but are likely to be linked to both the school's understanding of the requirements of the National Curriculum and the deployment of computers in specialist ICT rooms away from departmental bases as much as to teachers' lack of expertise or confidence with ICT.

The school ICT co-ordinator's beliefs about the role of computers in education are clearly very influential, and many appear to tend towards a techno-centric approach. Where the ICT co-ordinator's beliefs are in harmony with those of the headteacher and senior management, progress is discernible and teachers are more prepared to take risks. Where this is not the case, teachers show frustration and use ICT instrumentally to cover requirements only.

The variation in usage of ICT between year groups, reported in 4.2 above, appears to indicate that pupils working for Standard Attainment Tasks (SATs) and external examinations have less opportunity to use computers for learning. Many secondary subject teachers say that they cannot find time in the curriculum to use computers. Pupils, on the other hand, are becoming more aware, through out-of-school use, of the

value of ICT in helping their learning and unless they are able to use it for this purpose at school, as opposed to practising skills, there are indications that they may become bored and alienated. At Key Stage 4 by far the most innovative use of ICT for problem-solving activities, observed by the evaluators in the case study schools, was in specialist ICT and Technology courses. Use of ICT in other subjects was generally disappointing.

In secondary schools pupils reported very little cross-referencing by teachers of different subjects; a few were making connections for themselves, but for the majority ICT remained confined to a 'subject box' rather than being applied across the curriculum. However, there are some indications that the QCA frameworks for ICT are beginning to influence teachers to use ICT for cross-curricular planning and monitoring.

The present use of ICT in schools can be said to be in a temporary transition phase. With so much new equipment and the advent of the Internet, teachers are concentrating on the development of ICT skills, understanding and applications. A change of direction will be essential soon, especially in secondary schools when new pupils arrive with substantial skills developed at Key Stage 2.

4 Findings from the technical evaluation (University of Nottingham)

Between November 1999 and March 2000 the evaluation team analysed documentation from the Pathfinder LEAs and carried out interviews with key LEA personnel with responsibility for co-ordinating the roll-out of the NGfL Programme in schools. This data was used to facilitate comparisons and contrasts between the different approaches to the NGfL Programme.

The analysis presented in this report is based on a series of focus group meetings carried out with teacher representatives and LEA personnel in the period May 2000 to February 2001.The aim of the focus groups was to deepen understanding of technical issues emerging at both the school and LEA level.

Section 5.1 below presents the issues raised by participants in the focus groups and the LEAs' plans for the coming year. Section 5.2 provides interim conclusions and recommendations from the analysis of the focus group data.

4.1 Key technical issues

In many schools the network is still too slow. The popularity of the Internet means that in larger primary or secondary schools up to 150 pupils may be using it during the lunch hour. Slow access is therefore a problem, particularly when a large number of pupils have speedier access at home via a modem. Finding a solution to this problem should be a key priority in the coming year, given the enthusiasm with which pupils are beginning to use the Internet, and its potential to support teaching and learning.

Safety issues are a major concern to all of the Pathfinder LEAs and their schools and in some cases these have to be balanced against considerations of speed. Issues of child safety include the filtering of undesirable content or unwanted approaches to children from adults, and the use of firewalls against computer viruses and 'hackers'. Where administrative networks containing sensitive information are linked to networks used for pedagogic purposes, these issues become more complex. This is because additional care has to be taken to ensure that pupils do not gain access to administrative records that need to be kept confidential.

Provision of e-mail facilities linking staff and pupils in schools across an LEA can be difficult to achieve, especially where a range of Internet service providers and networking suppliers are involved. Firewall issues and competing commercial interests add to the complexity of setting up such e-mail links.

The focus in the Pathfinder LEAs is now on the provision of content. However, there is an increasing recognition that technical and curriculum issues need to be considered jointly. This links to the need to budget for software as well as hardware, and to give attention to issues of quality control and coherence. Providing on-line materials is only the first step; what is even more important is the development of pedagogic models to guide teachers. As one LEA ICT manager put it, succinctly, "Content is not about content; it's about delivery models."

Technical support for schools is a key issue. As schools become increasingly ICT active, the need for network support provided at industrial standards of reliability will grow and it will be important to maintain servers handling very large amounts of information. This may need to be on a 24-hour basis as staff, pupils and parents dial into the network from home. Some of the Pathfinder LEAs would like the Government to set standards for technical support for networking in schools.

Many schools would now like to move to wireless connectivity with, for example, sets of at least 16 wireless-networked laptops that can be used flexibly to provide access to ICT in any classroom with two pupils per machine. LEAs are not yet sure if this is the best way forward, because of security, health and bandwidth considerations.

The Pathfinder LEAs are aware that the digital divide applies to parents as well as pupils and many are now viewing the establishment of school web sites as an important channel for home–school communication. Technical difficulties related to sending e-mail over networks that are managed by a number of different service providers might be reduced through the use of web-based e-mail.

Professional development of teaching staff is crucial to supporting ICT, and particularly networked ICT in schools. NOF training is beginning to pay dividends, but in some Pathfinder LEAs, less than 10% of schools had completed NOF training by January 2001. This will continue to be a high priority in the coming year.

4.2 Interim conclusions and recommendations

There is no single optimal technical solution for networked ICT and for establishing and supporting school-based local area networks (LANs) and broader wide area networks (WANs). However, individual Pathfinder authorities have learned a great deal about implementing their chosen solutions and dealing with the problems that inevitably arise. In the coming year, the evaluators will continue to monitor any experimental solutions that are introduced, particularly in the area of wireless connectivity.

In implementing the NGfL Programme, LEAs need good two-way communications with their schools in order to make well-informed decisions about support for staff development and the creation of content. The role of the ICT co-ordinator or LEA advisor is crucial in maintaining such links.

Speed of connectivity is currently the key issue that needs to be addressed. Teachers and pupils are learning to expect fast access to the Internet as a result of their use of ICT at home, and the huge uptake of use in schools – especially during the lunch hour – is showing that current levels of connectivity are inadequate. It is not just the width of the 'pipe' (in a broadband connection) that affects speed, but the number of users accessing information at the same time, the type of resource being accessed, and the distance from which it is being accessed. The assumption that broadband connectivity is the whole or only solution may not be the right one. Another approach, which is in the course of development in some of the Pathfinder LEAs, is the provision of 'cacheing' facilities: these enable storage of downloaded web pages at one of several possible locations – for example, the computer currently in use, a server located in the school, or a server located in the LEA. Through nested networking of computers, downloaded web pages can be 'cached' for instant delivery, thereby avoiding the time lags involved in downloading every time from national or international web sites.

There is a need to understand that decisions on technical matters such as hardware and infrastructure have a direct impact on teaching and learning in schools. To address this, 'joined-up thinking' in relation to planning and policy might include the following:

- Broadening LEA goals for ICT beyond a focus on delivery of services and/or infrastructure to include performance targets in relation to staff or pupil learning with ICT.

- Involving Government and LEA architects in working with schools to provide more space and reconceptualise classroom design; for example, to find ways of installing and cabling mini-suites of up to four computers in a classroom where this is the preferred solution rather than a computer suite.

- Integrating the process of curriculum planning with planning for the development of web-based content and decisions about the provision of hardware and infrastructure; a national kite mark for web-based content might provide a valuable framework for quality control.

- Adopting an integrated model of sustainability planning, in which sustainability goes beyond the provision of computer hardware and software, to include adapting to changes in infrastructure technologies (increasing bandwidth, developments in microwave and infra-red wireless networking) and staff development.

Technical developments in ICT advance at a rapid pace. Since the baseline data was collected a year ago, streamed video has become available to schools that have the bandwidth to make use of it; wireless networking has become a key issue for many schools; e-boards, data projectors and the Internet are changing how teachers teach and how children learn.

But even in Pathfinder LEAs, the embedding of networked ICT into lessons, and into teachers' and pupils' lives, is progressing unevenly. The digital divide exists between pupils, between teachers, between schools and between LEAs, and the massive resources pumped into infrastructure and teacher development have yet to bring about a transformation of teaching and learning. But that transformation is beginning. What is crucial now is for those resources and that support to continue, to enable the processes of change to achieve a critical mass, and for networked ICT to begin to affect every teacher and every pupil in every school.

5   Summary of progress

The roll-out of the NGfL Programme has been the largest and most costly single initiative ever to be undertaken by local authorities in the UK. By early 2001 much had been achieved, as described below.

5.1 At the LEA level

- The network infrastructure, hardware and software are broadly in place.

- LEA personnel have increased their expertise in managing a large-scale ICT initiative of this kind, although as 'pathfinders' they are of necessity learning as they go along.

- The technology has continued to develop since the inception of the NGfL Programme and LEAs remain committed to exploring its potential and improving both ICT infrastructures and their use in schools.

- All of the case study schools in the Pathfinder LEAs have increased their hardware and software provision and connectivity. However, in a majority of cases progress has been slower than anticipated. In most of the LEAs, intranets and content provision were only just coming on-line. Connection to the Internet was limited and slow in many schools. This has led to a considerable frustration for all staff and missed opportunities for learning.

5.2 At the school level

- Real progress has been made in primary schools where teachers' competence and confidence have increased and ICT is being used for a much wider range of activities than a year ago.

- In secondary schools there is some excellent use of ICT in specialist ICT courses at Key Stage 4.

- Some schools are beginning to make innovative use of electronic whiteboards and other peripherals such as digital cameras and projectors linked to computers.

- Many pupils – particularly in primary schools – report that they find ICT is helping them with literacy.

- Many schools have purchased digital equipment and interactive whiteboards, although use of these in classrooms is very patchy.

- Teachers' acknowledgement of their need for training, the importance they attach to it as the route to increased confidence and improved practice are as strong a feature in Year 2 of the evaluation as they were in Year 1. Teachers are generally positive about the effects of training in general. Increasingly, teachers are looking to NOF training to take them further forward. However, evidence indicates that many teachers across the Pathfinder LEAs are dissatisfied with the NOF training they have received so far and this new negative attitude is a cause for concern.

- Analysis of the questionnaire returns shows that a majority of both primary and secondary teachers believe that ICT will have a positive effect on pupil attainment. However, in their interviews fewer said that they are sure that they knew how to realise this potential.

- Some teachers are finding innovative and productive ways of incorporating ICT into their teaching. However, for other teachers, particularly in secondary schools, using ICT seems to push their teaching in the direction of being directive, routine and lacking in imagination.

5.3 In the home

- There has been an enormous increase in the ownership of computers and access to the Internet. (Although not part of the NGfL Programme, this has major implications for the potential value of the NGfL in schools.)

- Pupils are enthusiastic about using ICT, particularly at home.

- Most teachers have access to a computer at home and use it for their work.

- Students report more potential benefit from ICT with literacy than with numeracy; this seems to link to actual usage both in and out–of–school.

ANNEX A

Questions to inform the roll-out of the NGfL Programme

One of the aims of the Pathfinder evaluation is to inform the ongoing roll-out of the NGfL Programme in other LEAs and schools. The following questions are grounded in the data collected by the evaluators and should be read in the light of this report as a whole. They are intended to be used as a checklist by those responsible for the NGfL Programme in LEAs and schools.

Questions for LEAs

Management and procurement of infrastructure

Q1: The procurement and management of the NGfL infrastructure in LEAs has necessarily been led by personnel without prior experience of an ICT initiative on this scale. What has been learnt?

Q2: Are there any skill-gaps that LEAs need to address before any further development of on-line technologies? In particular, are the necessary skills available in the areas of finance, procurement and project management?

Q3: Are appropriate personnel involved in strategic planning and in implementation? Is there a project manager who can liaise between these individuals or groups?

Q4: The evaluation has identified four broadly different approaches to the management of the NGfL. Within each approach, who has responsibility for each of the aspects of implementation?

Q5: What planning is in hand in the LEA for sustainability and replacement policy after the six years of current NGfL funding? What do schools think about this issue? Is hardware the main issue to be addressed in terms of sustainability, or should the focus be on access to resources?

Q6: LEAs have not, so far, put much emphasis on evaluation of the NGfL from the point of view of sustainability and procurement. Have LEA personnel recognised the potential 'hidden costs' of their own model of managing the NGfL and taken steps for damage limitation, where possible?

Q7: Are there any lessons to be learnt from the way that Key Performance Indicators were drawn up in the initial contracts with managed service providers? Is any re-negotiation of KPIs possible to make them more effective in measuring outcomes and performance?

Management and development of NGfL in schools

Q8: What are the available options to increase the speed of connectivity when large numbers of users in a school are accessing the Internet at the same time? What combination of solutions would give the users the best service? Would some form of 'nested cacheing' be cheaper and more efficient than broadband?

Q9: What strategies would give teachers more 'ownership' of content on LEA intranets? Could such strategies increase schools' use of LEA intranets?

Q10: Many Pathfinder LEAs are currently involved in 'content creation' rather than assisting schools in developing 'content use'. What mechanisms exist for formative evaluation of this content to reduce any potential wastage? Does the content develop pupils' learning skills? Does it develop their higher order thinking skills?

Q11: Do school ICT development plans cover all the aspects they should? Which aspects should be given more emphasis? How are ICT development plans used by schools and the LEA to monitor development and improve practice?

Q12: Is ICT co-ordination in schools being monitored and evaluated? Is the amount of technological demand increasing and, if so, how is this being addressed? How does ICT co-ordination integrate with school development?

Questions for schools
Primary schools

Q13: What is the impact on teaching and learning in primary schools of deploying computers in suites? If

there are any disadvantages, can these be overcome through innovative pedagogy? Would deployment in clusters or as stand-alone workstations have any advantages?

Secondary schools

Q14: What can be done to encourage the use of ICT to support learning of subjects in secondary schools? Is the current low usage for this purpose due to curriculum constraints, timetabling, the deployment of computers away from subject bases, or culture clashes between ICT and subjects?

Q15: Is the role of ICT co-ordinator in secondary schools clearly defined? Have ICT co-ordinators got the skills to lead innovative work in ICT pedagogy and support colleagues in using ICT for teaching and learning across all subjects? Is the role becoming too demanding for one person?

Q16: Is the increased use of ICT for 'discrete ICT' courses at Key Stage 4 decreasing the opportunities for pupils to use ICT as a tool for learning in other subjects?

Q17: Are secondary schools ready to receive pupils who have already acquired considerable ICT skills and expect to use computers regularly? In particular, what would make it possible for secondary teachers (other than teachers of ICT and technology), to use ICT regularly to support teaching and learning in their subjects?

Q18: Could departments in secondary schools develop a whole-department approach to organising NOF training? And could NOF trainers be identified who would be prepared to work with departments in this way?

For both primary and secondary schools

Q19: Do schools have evidence of the extent of pupils' home-ownership of computers and the level of skills many have developed through using computers outside school?

Q20: Why is it that computers are used less by year groups preparing for external examinations? Does this relate to their use in schools being mainly for skills acquisition rather than to support learning?

Q21: Are teachers aware that pupils without computers at home are likely to be using them less in school than pupils who do have access at home? What strategies are schools employing to ensure that this is not the case?

Q22: How could schools make more effective use of the new resource of computers in pupils' homes? Voluntary use appears to be widening the digital divide, so what would happen if computer use at home for school work was requested by teachers? Could any unfairness be overcome by identifying those without computers at home and giving them additional access to computers at school?

Q23: Why is it that pupils in both primary and secondary schools report using computers less for numeracy than for literacy? How could better use be made of computers for numeracy teaching?

Q24: How can schools support pupils in transferring work between computers at home and at school? Specifically, what solutions are possible to the problems that have emerged in relation to viruses and software incompatibilities?

Q25: Is the rich, creative experience that increasing numbers of young people are having with computers out of school affecting their attitude to prescribed computer use in school?

Q26: Could schools use 'total pupil connectivity' to change the way that ICT is used in teaching and learning? What solutions are available to allow all pupils in a school to have their own e-mail address without undue security risks?

For both primary and secondary schools and the LEA

Q27: How can the development of web-based content be made integral with curriculum planning? What range of content options is possible? Do the various current conceptions of 'content' include the pupil as author/provider as well as consumer?

Q28: What are the experiences of schools in meeting current costs of consumables, power and peripherals? How can these experiences be gathered to inform future

practice and need? Is there any other way of dealing with such costs on a long-term basis?

Q29: How can LEAs and schools develop the capacity to provide technical support for wide area networks and intranets that will ensure complete reliability in handling large amounts of traffic? Should this be provided on a 24-hour basis?

Q30: How could new school buildings be designed, or old ones adapted, to allow the flexibility for different kinds of computer installations, changing over time as the school's needs change – using, for example, networked suites, clusters, wireless-networked laptops in specific areas or across the whole building? What is the advice of architects on this?

Q31: What new developments is the wider community promoting and likely to introduce in the next five years?

Questions for those with responsibility for training

Q32: If ICT training was pedagogically focused, rather than skills focused, would this encourage teachers to experiment with using ICT for teaching and learning in innovative ways, rather than using it in routine and procedural ways?

ANNEX B

References

Pathfinders' Progress is available on-line at http://www.becta.org.uk/supportproviders/support/pathfinders.pdf

The web sites of Pathfinder LEAs can be found at:

Birmingham: http://www.bgfl.org
Bradford: http://www.ngfl.ac.uk
Cumbria: http://cleo.ucsm.ac.uk
Dudley: http://www.edu.dudley.gov.uk
Greenwich: http://www.g2fl.greenwich.gov.uk
Kent: http://www.kented.org.uk/ngfl
Somerset: http://www.somerset.gov.uk
Staffordshire: http://www.sln.org.uk
Stoke-on-Trent: http://ngfl.stoke.gov.uk
Telford & Wrekin: http://www.telford.gov.uk

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