Harnessing Technology: Schools Survey 2008

Report 1: Analysis

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Executive summary

Introduction

This report summarises the main findings from the Harnessing Technology Schools Survey 2008, a national survey of ICT (information and communications technology) in primary, secondary and special schools. The National Foundation for Educational Research (NFER) carried out the survey on behalf of Becta in December 2007 and January 2008. The annual, representative survey is intended to assess the 'state of the nation' in terms of the uptake and impact of educational technologies in maintained schools across England. The survey has been running since 2002 under different names.

One of the key aims of the 2008 schools survey was to collect information that will help Becta assess progress towards the aims and outcomes of the original Harnessing Technology strategy, devised by the DfES in 2005, the revised strategy – Harnessing Technology: Next Generation Learning 2008–14 – and the Children's Plan, published in 2007, and to make strategic decisions based on the latest developments in ICT related to schools.

Key findings

Technological infrastructure

There have been some improvements in the quantity of hardware provision. For example, average numbers of interactive whiteboards have risen considerably in both primary and secondary schools since 2007. Pupil–computer ratios (which can be defined in a variety of ways) have been improving. In primary schools in 2008, there was an average of 13.9 pupils to every desktop computer and an average of 31.8 pupils for every laptop. In secondary schools, there were on average of 4.3 pupils for every desktop computer, but an average of 61.4 pupils for every laptop.

The vast majority of teachers reported that their computers were connected to a network: this was true for 94 per cent of secondary respondents, 69 per cent in primary schools and 66 per cent in special schools. Respondents were mostly positive about the speed, reliability and file-handling capabilities of their networks. In addition, most schools had their own websites, and around four-fifths of schools reported using this to provide information and resources for parents.

Management, leadership and administration

Most schools had a written strategy or improvement plan for ICT and/or e-learning, and generally these were reviewed on an annual basis.

Using learning platforms was a priority over the coming year for just over half of secondary schools, just over one-quarter of primary schools, and just under one-third of special schools. Improving communication with parents remained a high priority

for around one-third of primary schools and just under half of secondary schools. Using technology for personalising learning was a priority area for 40 per cent of secondary schools in 2008 compared with one-quarter of primary schools.

Across each of the three school sectors, local authorities and ICT consultants/advisers were key sources of information for schools in terms of influencing their ICT strategies or improvement plans.

Using computers for teaching and learning

Interactive whiteboards are the dominant technology in schools, and technology continues to be used primarily for presentational purposes. Display technologies are important, but there is scope for encouraging more engaged and interactive forms of teaching and learning using ICT. Linked with this, there is considerable opportunity for the further development of flexible learning based on increasing the use of mobile devices.

There is also much scope for the development of the use of social software for learning; at present, social software is reportedly used in only one in 20 schools.

Over 90 per cent of secondary schools reported offering their pupils a secure area for storing their work; this was similar to the percentage in 2007.

Teachers' use of digital learning resources, especially self-created resources, is increasing, with a quarter of teachers uploading such resources at least once a week. There have also been increases in the proportions of teachers sharing digital resources.

In terms of access to ICT facilities, school populations appear to have good access, and there is flexibility to accommodate pupils' use of facilities outside normal lesson times, but community access to ICT facilities remains somewhat limited.

In many respects, at a national level, the development of e-assessment is still in its early stages. Technology tends to be used for reporting pupils' progress rather than for interactive forms of assessment.

Practitioners' perceptions and continuing professional development

The majority of teachers across all sectors are confident and enthusiastic about using ICT. The substantial majority of ICT co-ordinator respondents (77 per cent) reported that teachers in their schools were either very confident or quite confident with ICT. Similarly, this sample reported that all or nearly all teachers were enthusiastic in 20 per cent of schools, and that most were enthusiastic in 51 per cent of schools. Having dedicated on-site technician support in a school appears to have a positive effect: a statistically significant association was found between reported teacher enthusiasm in using ICT to deliver the curriculum and the level of technical support available in a school.

Teachers were largely positive about the potential contribution of new technologies to learning. For example, around three-fifths of teacher respondents agreed with the statement that pupils enjoy lessons more if they use ICT than if they do not. Across all three sectors, there was agreement generally that ICT plays a positive role in engaging pupils in learning, having an impact on attainment and in terms of personalising learning.

With respect to training and support, informal, in-school ICT support from colleagues clearly emerged as the form of training rated most positively by teachers. Almost all teachers had accessed this form of support, and just fewer than nine out of 10 found it a good form of training.

Special themes: home access, learning platforms, personalising learning

According to school leaders' estimates, a digital divide still exists: the mean proportion of pupils across all three school sectors who did not have home access to a computer was 30 per cent. There were some differences between sectors: secondary schools had the highest levels of home access, with only 17 per cent of respondents reporting that their students did not have access; primary schools reported 27 per cent of pupils not having home access, and special schools reported 44 per cent of students not having home access.

The use of learning platforms by schools is increasing. In all sectors, the percentages of schools with learning platforms had increased from 2007: secondary schools experienced the biggest increase. The most common uses for a learning platform were, firstly, as a repository for documents for learning and teaching and, secondly, as a store for digital learning resources.

The use of technology to support the personalising of learning is important for school leaders, but it is not the most important consideration; ICT infrastructure and teacher skills appear to be more important priorities at present. Teachers have mixed views about the impact of ICT on personalising learning.

Overview: changing features

It seems that in many respects ICT across the school landscape has not changed dramatically since 2007. But where there have been changes, these have been important in that they reflect positive developments in the use of, and attitudes towards, technology for teaching and learning.

Several longer- and shorter-term trends have continued. One of the most noticeable of these is probably the continued improvement in the ICT infrastructure and in the numbers of devices available to schools. For example, average numbers of interactive whiteboards have increased considerably in both primary and secondary schools since 2007, pupil–computer ratios have continued to improve, and the

number of learning platforms in use has increased. In addition, more than nine out of 10 schools now have their own websites.

These technical developments have been accompanied by important ongoing changes in attitudes towards, and confidence in, the new technologies, particularly among teachers and school leaders. The survey findings revealed that the majority of teachers, across all school sectors, were confident and enthusiastic about using ICT. Perhaps one of the most significant survey findings was that teachers' use of digital learning resources is increasing, with one-quarter of teachers uploading such resources at least once a week.

Teachers are also positive about the benefits and the potential contribution of new technologies to learning. For example, a substantial majority of teacher respondents took the view that pupils enjoy lessons more if they use ICT than if they do not. Across all three sectors, there was agreement generally that ICT plays a positive role in engaging pupils in learning, having an impact on attainment and in terms of personalising learning.

Adoption or transformation?

The Harnessing Technology strategy has enabled schools and practitioners to make good progress through the adoption stage, but it seems that there are important barriers to overcome before the ambition of transformation can occur. Indeed, the research findings from these surveys of schools in England are consistent with the findings from a report into ICT use in schools in Wales, which concluded that there had been 'good progress… but not transformation' (Department for Children, Education, Lifelong Learning and Skills, 2008, pp.1–18). Other findings also suggested that schools' use of ICT is not yet at a transformational stage (and that the landscape, in some respects, is not changing). These findings were predominantly related to the special themes mentioned above, which are:

- **Home access**: The school leaders' survey revealed that the estimated mean proportion of pupils across all three school sectors who did not have home access to a computer was 30 per cent. There is a still a digital divide regarding home access to ICT, which is seriously hampering progress towards the goals of closing the gap between those from disadvantaged backgrounds and their peers, and bringing the full benefits of ICT to every child.
- **Learning platforms**: Although, as noted above, the use of learning platforms by schools is increasing, progress is limited. Substantial proportions of schools still do not have a learning platform. Furthermore, the most common uses for a learning platform are as a repository for documents for learning and teaching and, secondly, as a store for digital learning resources, both of which could be seen as 'passive' uses. There

is also evidence that the culture of classroom technology use is still geared primarily towards display and presentational functions.

- **Personalising learning**: Although most teachers were optimistic about the potential contribution of ICT to personalising learning, teachers have mixed views about this. Furthermore, although the use of technology to support the personalising of learning was important for school leaders, it was not their top priority.

Future priorities

These issues are not new to Becta or other stakeholders involved in this field of education. Indeed, it is important to acknowledge that, to some extent, these problems have already been recognised and measures have been initiated to address them. For example, the Computers for Pupils scheme was targeted at pupils from socio-economically deprived areas, and Becta has commissioned research on reducing social inequity with technology.

An overview of the Harnessing Technology Schools Survey findings for 2008 suggests some important areas that merit further attention. The two most prominent of these appear to be a need to:

- look further at how technology can be used for developing partnerships between parents and schools
- support and encourage teachers and schools to use technology in ways which are more engaging for learners.

Evidence from these surveys suggests that community access to schools' ICT facilities is still somewhat limited and that, even where technological and virtual forms of communications with parents exist, these tend to be one way and not interactive. The whole area of community–parent–child–teacher–school communication is important, especially in the current context of the Children's Plan and the Every Child Matters agenda.

Understandably, it takes time to embed new technologies, and the simpler technological functions will inevitably be used first, but there does seem to be evidence to suggest much potential for the more engaging use of learning platforms, school networks, and devices. Formal training sessions for school staff, greater use of mobile devices and of social software, and more active forms of assessment, for example, might help encourage better learner engagement.

There are some obvious barriers to developments in these areas: with regard to engaging learners, for example, teachers have frequently cited the need for more time to try out digital resources and the technologies used to deliver them. But these barriers are not insurmountable, and it is hoped that the findings presented here will

help Becta and others to take ICT in schools forward into the transformational stage of the Harnessing Technology strategy, for the benefit of both teachers and learners.

1. Introduction

Background

This report sets out the main findings from the Harnessing Technology Schools Survey 2008, a national survey of the use of ICT (information and communications technology) in primary, secondary and special schools in England. The National Foundation for Educational Research (NFER) carried out the survey on behalf of Becta in December 2007 and January 2008.

The Harnessing Technology Schools Survey is an annual, representative survey, commissioned by Becta, and intended to assess the 'state of the nation' in terms of the uptake and impact of educational technologies in maintained schools across England. Nationally representative data on ICT in schools has been collected annually since 1998 through the ICT in Schools Survey (1998–2004) and the evaluation of Curriculum Online (2002, 2003 and 2005). Comparisons with the findings from the 2007 survey (Kitchen *et al*, 2007), where relevant, are provided throughout this report.

This report is one of two volumes. This document, Report 1, presents the main findings and analyses from the 2008 Harnessing Technology Schools Survey and discusses some of the implications of these findings. A companion report, Report 2, presents the data in a more systematic fashion in an easy-to-use data reference document. In this second report, the findings from every question in each of the three surveys (for school leaders, ICT co-ordinators and teachers) are set out in tabular form. The findings for each question are also set out by school sector: by primary, secondary and special school sub-samples.

The Harnessing Technology strategy

In March 2005, the Government published the original Harnessing Technology strategy, designed by the (then) DfES to set out a five-year plan for a system-wide approach to the application of ICT in education, skills and children's services.

Since Harnessing Technology was first published, two new departments – the Department for Children, Schools and Families (DCSF) and the Department for Innovation, Universities and Skills (DIUS) – have been formed, leading to a number of major policy developments. In the light of such changes and in order to address new system challenges, the strategy has been revised (Harnessing Technology: Next Generation Learning 2008–14; Becta, 2008) with a focus on achieving greater value from technology for learners and supporting improvement and transformation. The revised strategy sets out a commitment to ensuring that every school, college, university and training provider is 'technology confident', and to achieve this through engagement with learners and parents and the professional development of teachers and trainers. The revised strategy identifies five system outcomes against which impact of the strategy will be measured. These are:

- improved personalised learning experiences
- confident system leadership and innovation
- technology–confident, effective providers
- engaged and empowered learners
- enabling infrastructure and processes.

The Children's Plan is another important driver of the e-strategy. In January 2008, the schools minister asked Becta 'to factor in the recommendations of the Children's Plan into the next stage of our e-strategy, building on what we have achieved already' (DCSF, 2008). It has been stressed that the unifying theme of the Children's Plan is a partnership between schools and parents, and in this respect certain elements of the Harnessing Technology strategy, such as home access to computers, and school–parent communications, have taken on increased importance in 2008.

In this context, one of the key aims of the 2008 schools survey was to collect information that will assist Becta with assessing progress towards the aims and outcomes of the revised Harnessing Technology strategy and the Children's Plan, and to make future strategic decisions based on the latest developments in ICT related to schools. All three survey questionnaires were informed by the strategy and included questions on specific elements of the strategy, such as the quantities and fitness for purpose of computer devices, home access, assessment, and uses of the technologies for teaching and learning. A broader goal was to assess progress towards the transformation stage of the strategy.

It was not within the remit of the 2008 survey to examine progress in all aspects of the Harnessing Technology strategy, and this project was only one of many that Becta commissioned for this purpose. The findings from these surveys therefore should be considered alongside other key research projects that took place at the same time as the survey work. These projects included the Harnessing Technology Local Authorities survey, a study on reducing social inequity with technology, and ongoing research on personalising learning.

There was also previous work on 'e-maturity', because assisting schools with developing their level of e-maturity will help them deliver the full benefits of ICT. Part of this process involves assisting schools in better mapping their progress and comparing their levels of development with those of similar schools. For this purpose, Becta has devised a self-assessment framework which enables schools to map out where they are in terms of technological developments and provides them with the option, when suitable progress has been made, of applying for nationally recognised ICT accreditation.

In considering the findings presented in this report, it is important to bear in mind the nature of the survey sample, made up of three sub-samples (school leaders, ICT co-ordinators and teachers). Report 2, accompanying this report, provides full details of

sample selection and respondents' characteristics. The next section summarises the characteristics of the respondents from each of the three different sample groups.

Survey respondents

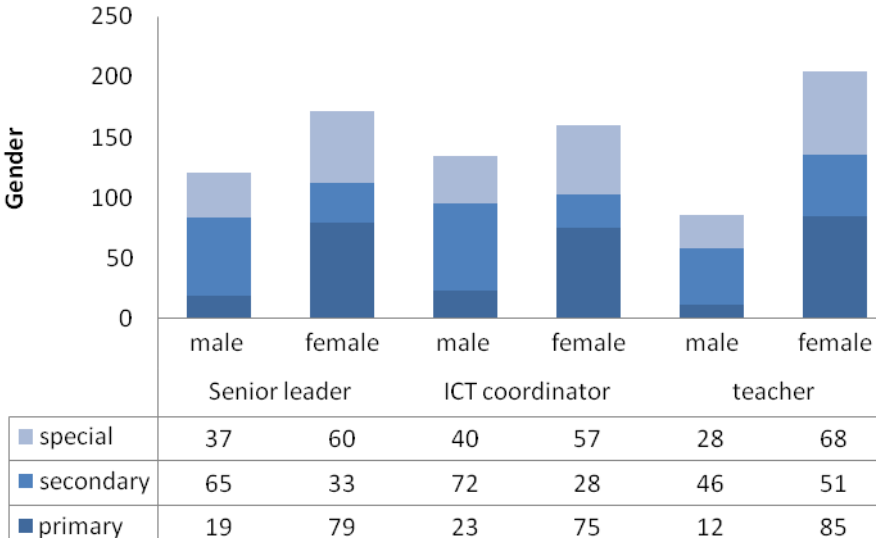
Characteristics recorded included gender, years of professional experience and current role. In the case of teachers, information was also provided on the primary subjects and the key stages that they teach.

Gender

The pattern of distribution of the gender of respondents within each of the sample groups may be interpreted as fairly typical (Figure 1).

Figure 1: Gender of respondents (%)

Secondary school teachers and special school ICT co-ordinators were the least disparate in terms of whether respondents were male or female, with a slightly more



	Senior leader male	Senior leader female	ICT coordinator male	ICT coordinator female	teacher male	teacher female
special	37	60	40	57	28	68
secondary	65	33	72	28	46	51
primary	19	79	23	75	12	85

even distribution between the two genders compared with other respondent types.

In primary schools, respondents were typically female, and this was especially the case among the teacher sample (which is reflective of primary schools). In secondary schools, there were higher distributions of male compared with female respondents at senior leader and ICT co-ordinator levels.

Professional experience in education

Respondents in each of the three samples were asked to provide information about their number of years of professional experience in education.

As Table 1 shows, the senior leaders who completed the questionnaire, across each of the school sectors, tended to have over 10 years' experience in education.

ICT co-ordinators in primary and secondary schools were fairly evenly mixed in terms of how many years of experience they had, with similar proportions in each of the different categories. The ICT co-ordinators in the special schools, by contrast, tended to be more experienced, with just over 40 per cent reporting 20+ years' experience in education.

Regarding the teachers who completed the questionnaires, in primary schools, again, the distribution was fairly even across the different categories.

In secondary and special schools, there was more of a tendency for the more experienced members of teaching staff to complete the questionnaires.

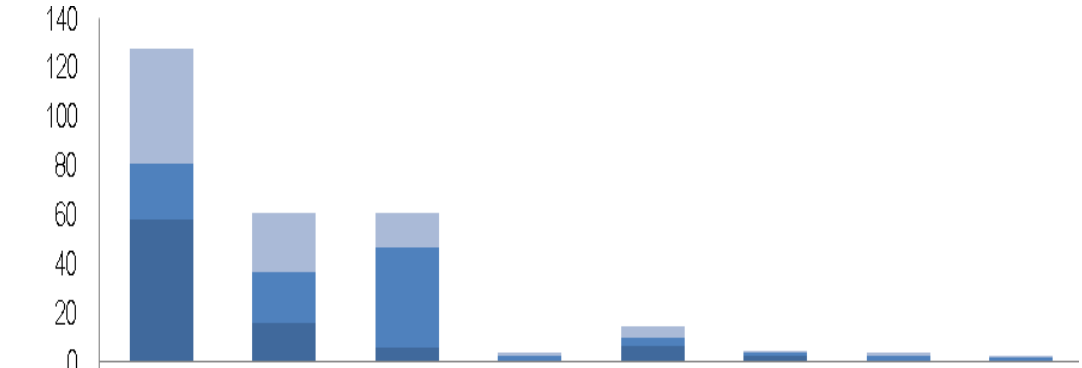
Table 1: Number of years of professional experience in education (%)

	Senior leader				ICT co-ordinator				Teacher			
	0–5 years	6–10 years	11–20 years	20+ years	0–5 years	6–10 years	11–20 years	20+ years	0–5 years	6–10 years	11–20 years	20+ years
Primary	3	13	30	53	21	27	27	26	22	28	22	25
Secondary	4	4	31	60	23	22	28	27	12	24	28	34
Special	1	7	21	70	15	17	24	42	12	20	25	40

Current role in school

As Figure 2 demonstrates, the senior leader questionnaire tended to be completed by headteachers, deputy headteachers, and assistant headteachers.

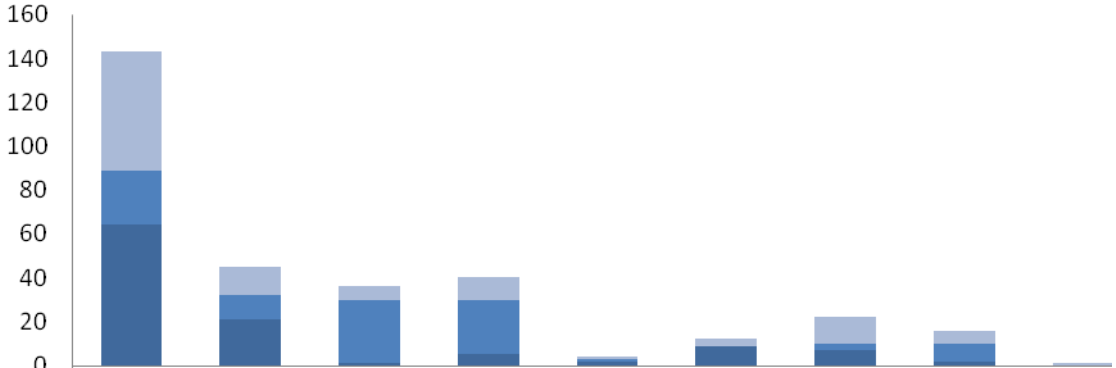
Figure 2: Senior leader: current role in school (%)



	Headteacher	Deputy headteacher	Assistant headteacher	Bursar	ICT coordinator	ICT subject leader	Head of ICT	IC T manager
special	47	24	14	1	5	1	1	1
secondary	23	21	41	2	3	1	3	1
primary	58	16	6	1	7	3	0	1

Figure 3 shows that individuals with the title 'ICT co-ordinator' tended to complete the questionnaire in the primary and special schools. In secondary schools, responsibility for completing questionnaires was fairly evenly spread among ICT co-ordinators, heads of ICT and ICT managers.

Figure 3: ICT co-ordinator: current role in school (%)



	ICT coordinator	ICT subject leader	Head of ICT	ICT manager	ICT adviser	headteacher	Deputy headteacher	Assistant headteacher	Bursar
special	54	13	6	10	1	3	12	6	1
secondary	25	11	29	25	1	0	3	8	0
primary	64	21	1	5	2	9	7	2	0

Just over three-quarters (76 per cent) of teachers who completed the questionnaire in secondary schools were heads of department. In primary and special schools,

respondents were fairly evenly mixed between subject co-ordinators and class teachers.

Subject and key stage

Teachers were also asked to say which subject they were primarily responsible for teaching and which key stage they taught. As can be seen in Figures 4 and 5, the distribution of teachers across each of the subjects reflects the context of individual school sectors, with a good balance of respondents from each subject area. The distribution in special schools was similar to that observed in primary schools.

Figure 4: Subject taught: primary

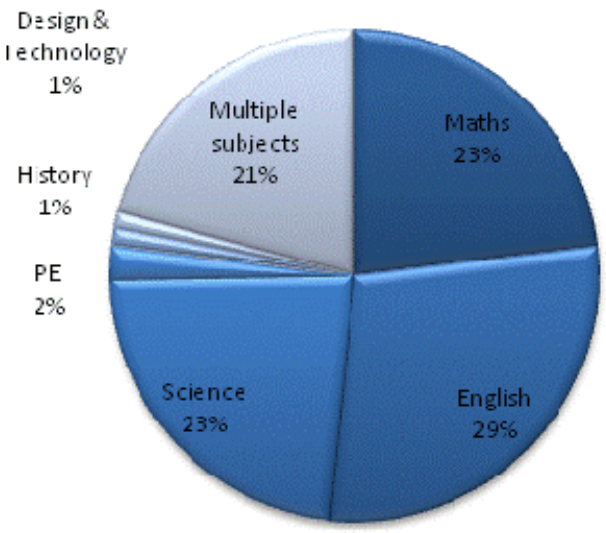
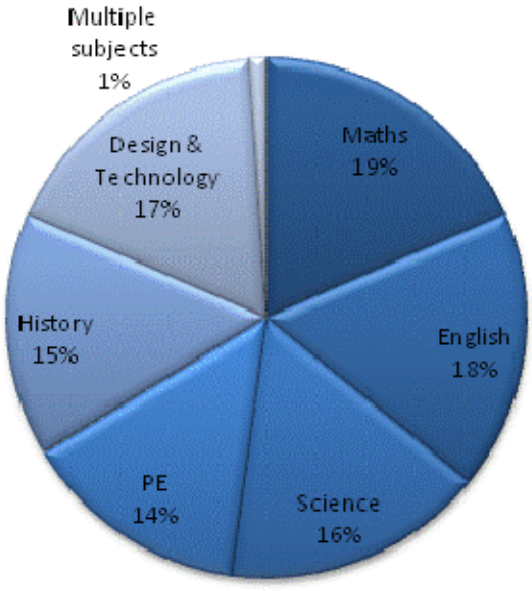


Figure 5: Subject taught: secondary

Teacher respondents in primary schools were fairly evenly distributed across Key



Stages 1 and 2, with slighter fewer respondents in the foundation stage. At secondary level, slightly more respondents reported teaching Key Stage 3 compared with Key Stage 4.

The structure of this report

This report uses a narrative approach to present the findings from the Harnessing Technology Schools Survey 2008, drawing upon findings from each of the questionnaires (senior leader, ICT co-ordinator and teacher) as and when appropriate. A more systematic and detailed presentation by sample, question and school sector is presented in the accompanying data report (Report 2). Subsequent chapters of this report examine the following key themes from the Harnessing Technology strategy:

- Chapter 2: Technological infrastructure
- Chapter 3: Management, leadership and administration
- Chapter 4: Using technology for teaching and learning
- Chapter 5: Practitioner perceptions and continuing professional development
- Chapter 6: Special themes: home access, learning platforms, personalising learning
- Chapter 7: Overview.

2. Technological infrastructure

Key points

- There have been some improvements in the quantity of hardware provision. For example, average numbers of interactive whiteboards have risen considerably in both primary and secondary schools since 2007.
- In primary schools in 2008 there was an average of 13.9 pupils to every desktop computer and an average of 31.8 pupils for every laptop. In secondary schools, there were, on average, 4.3 pupils for every desktop, but an average of 61.4 pupils for every laptop.
- In four-fifths of secondary schools, day-to-day responsibility for maintaining the school network was the job of a dedicated, school-based ICT technician (but this was a decrease since 2007). Primary schools using dedicated technicians decreased from 19 to 15 per cent.
- The vast majority of teachers reported that their computers were connected to a network: this was true for 94 per cent of secondary respondents, 69 per cent in primary schools and 66 per cent in special schools. Respondents were mostly positive about the speed, reliability and file-handling capabilities of their networks.
- There were good levels of satisfaction with internet access, speeds and reliability. In addition, most schools now have their own websites, and around four-fifths of schools reported using their websites to provide information and resources for parents. This information, however, was mostly one way, and individual, interactive communications with parents were rare.

Introduction

The new phase of the Harnessing Technology strategy aims to bring about a step-change in the way technology is used across the breadth of the education and skills system. Learners should be able to access resources at any time and from anywhere. This requires the technological infrastructure to be developed to create an e-confident system in which high-quality digital resources are available wherever and whenever learning takes place. This section summarises some of the main findings from the 2008 Harnessing Technology Schools Survey relevant to these goals, including findings relating to:

- ICT equipment
- ICT infrastructure
- connectivity.

ICT equipment

A range of questions in the ICT co-ordinator questionnaire gathered information about ICT equipment in schools, both in terms of availability and fitness for purpose.

Interactive whiteboards continue to be a dominant technology in schools. The average numbers of interactive whiteboards rose considerably in both primary schools (18 compared with just over six in 2005 and eight in the 2007 survey) and secondary schools (38, compared with 18 in 2005 and 22 in 2007). The fitness for purpose of interactive whiteboards is rated very positively in all sectors.

The average numbers of desktop computers available to pupils in primary schools have changed very little since 2007 (remaining at around 27 per school). In secondary schools, the average has decreased from 260 in 2007 to 246 in 2008.[1] The average pupil-to-computer ratio in 2007 was 6.6 pupils to every computer in primary schools, with slightly fewer pupils to computers in secondary schools – an average of 3.6 pupils to every computer. In 2008, this ratio had changed slightly in primary schools with an average of 6.25 pupils for every computer, but had remained the same in secondary schools. In special schools, there was an average of 2.6 pupils to every computer.

Separate ratios were calculated for numbers of desktops and laptops. In primary schools, there was an average of 13.9 pupils to every desktop computer, and an average of 31.8 pupils for every laptop. In secondary schools, there were far fewer pupils (on average) sharing desktop computers, with an average of 4.3 pupils for every desktop, but almost double the number of pupils sharing a laptop (in comparison with the number in primary schools), with an average of 61.4 pupils for every laptop. In special schools, the ratios were considerably lower, with an average of 3.2 pupils for every desktop computer and 16.5 for every laptop.[2]

The survey findings indicate that, on average, primary pupils have more access to laptops than do secondary pupils. Also, when asked to rate laptops for fitness for purpose, primary school respondents were more positive than those in secondary schools (46 per cent said ‘very good’ in primary schools compared with 29 per cent in secondary schools). These findings also confirm a trend already highlighted in the 2007 survey: while 92 per cent of secondary schools rated laptops as quite good or very good in 2002, this proportion has fallen slightly over the years and is now at 83 per cent.

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[1] There are different methods for calculating the average number of computers per school. To obtain these figures, schools where either the teachers or the pupils were reported as having no computers were excluded from the analysis.

[2] Computer-to-pupil ratios were produced by calculating the computer-to-pupil ratio for each school and then calculating the (mean) average. Only schools that provided data for both numbers of laptops and desktops have been included in the calculation; this equates to 128 primary schools, 154 secondary schools and 146 special schools.

The survey indicates that the availability of other types of devices for teaching and learning (such as graphics tablets and voting pads, for instance) varies considerably between schools, and that this is true of all sectors.

Not surprisingly, more special schools than primary or secondary schools have assistive technology devices for pupils with special needs, although almost of half of secondary school respondents had devices to support sensory access.

When asked to rate whether their schools had enough ICT equipment to deliver the curriculum adequately, secondary school respondents rated the amount of each type of equipment less positively than did primary and special school respondents. This was particularly the case with respect to interactive whiteboards and desktop computers, but less so with laptops.

ICT infrastructure

ICT co-ordinators were asked a range of questions about the ICT infrastructure. These questions were targeted at collecting information about the types of network, the network speed, who managed the network and whether schools thought their networks met their needs. ICT co-ordinators were also asked about which operating system their schools used. Furthermore, teachers were asked to provide information about the frequency with which technical problems prevented delivery of their lessons.

In secondary schools, day-to-day responsibility for network maintenance is usually the job of a dedicated school-based ICT technician, though was less the case than in previous surveys (down from 94 to 80 per cent since 2007). The proportion of primary schools with dedicated school-based ICT technicians, already much lower, had also fallen (from 19 per cent in 2007 to 15 per cent in 2008). This suggests a trend in both sectors towards the outsourcing of technical support to externally managed services.

Secondary schools were better resourced in terms of technical support staff than primary and special schools. They employ an average (mean) of 2.5 technical support staff, with a maximum reported number of six such staff in any one school. The average full-time equivalent (FTE)[3] number of technical support staff in secondary schools was 2.4. In special schools, there was an average (mean) of one member of technical support staff per special school and an average FTE of 0.5. In primary schools, the average (mean) number of technical staff was 0.6, with an average FTE of 0.1. Around a quarter of secondary schools provide technicians for other schools or colleges.

[3] The average full-time equivalent (FTE) has been calculated only for those schools that provided answers to two questions about staff numbers (Q37a and Q37b). Some cases have been re-coded to 'missing': this includes those schools whose FTE numbers were greater than the number of individual teachers, and where the number of teachers was given as greater than zero, but the number of FTE was zero.

Monitoring the network remains predominantly '*ad hoc* according to need' in all sectors, although there has been a slight trend this year towards monitoring to a pre-determined schedule. Secondary schools monitor more frequently than do the other two school sectors.

There is considerable uniformity in the type of operating system used in schools – this is almost always Windows, usually Windows XP. The vast majority of secondary school respondents (94 per cent) said that all their computers were connected to a network, compared with 69 per cent in primary schools and 66 per cent in special schools. The common type of computer network in schools continues to be a fat client network, in which data is stored on a server but computers can usually still work if the network is not available. It is unusual for schools in all sectors (but especially secondary schools) not to be on a client–server network.

Wireless technology is more established now in secondary schools than previously, particularly in networks accessed by teaching staff. Changes in the nature of the data collected, however, make it difficult to report specific trends in this area.

Network speed is also higher in secondary schools, with 29 per cent reporting backbone speed at over 1Gbps compared with only 8 per cent of primary schools and 11 per cent of special schools. Almost all schools in all three sectors said that their network performance was sufficient to handle large multimedia files.

Technical problems preventing delivery of lessons do not occur very often. This is particularly true of problems with interactive whiteboards (over a third of respondents said that problems occurred less than once a term). Printers cause the most problems: around half of respondents experienced printer problems at least once a month. Secondary schools generally reported a lower incidence of problems with ICT equipment (corresponding to higher levels of dedicated technical support).

Connectivity

One of the priorities within the Harnessing Technology strategy is to improve online information-sharing by creating more open and more accessible systems. To assess progress towards this priority, the 2008 School Survey asked ICT co-ordinators a range of questions about connectivity in their schools. These included questions about their schools' internet connections, whether their schools had websites, and information about school intranets. Further information about connectivity was also collected via the teacher survey: teachers were asked about storing digital learning resources on their schools' networks and access to their schools' networks.

Around three-quarters of primary and special school respondents said that all their computers were connected to the internet; 88 per cent of secondary schools said this was the case.

Staff and pupils generally have internet access in secondary schools (73 per cent), while in primary schools, pupils generally have access under supervision (64 per cent). These proportions are almost identical to those reported in 2007.

Similarly, classroom access to the internet remains broadly similar (97 per cent in primary schools and 82 per cent in secondary schools) to that in 2007, although access by means of a dedicated ICT room had fallen in both primary and secondary schools between 2007 and 2008 (from 74 to 67 per cent and 96 to 76 per cent respectively).

There is a high level of satisfaction with the speed of internet access across school sectors, with only around 8 per cent of respondents saying that the connection was not fast enough for their requirements. This compares with 30 per cent of primary school respondents and 13 per cent of secondary school respondents in 2002, although satisfaction rates have levelled out over 2007. Internet connections are also widely reported to be reliable at least most of the time.

Most schools have their own websites, which usually serve to provide school news and parent resources such as a calendar of events and school policy documents. Around 80 per cent of primary and secondary schools were using their school websites for providing resources to parents. This percentage had almost doubled for both primary and secondary schools in comparison with the 2007 survey findings, which clearly represents an important step towards bridging the gap between home and school. The percentage was slightly lower in special schools, but was still well over half.

Very few schools, however, used their websites to communicate directly with individual parents: only 4 per cent of primary schools, 3 per cent of secondary schools and none of the special schools were using their school websites to do this; these reflected similar findings in 2007.

There has also been little movement towards other types of website use, such as providing access to management information systems and learner performance information, and enabling homework upload or download.

Learner access to technology at any time and in any place, a key part of the Harnessing Technology strategy, has not yet been achieved across all school sectors, as the following analysis of secure login areas and access to school intranets and learning networks shows.

Secure login areas are not yet offered as a matter of course to all members of the school community. For instance, of the 44 primary schools that provided a response to this question, almost all said that teachers were offered secure login areas through the school website, but the proportions of other school staff, parents, governors and pupils with access were much smaller. In secondary schools (of which 102 provided a response to this question), the picture was fairly similar,

although a slightly higher proportion of pupils were reported as having a secure login area compared with pupils in primary schools.

School intranets are currently much more embedded in secondary schools than in primary or special schools. Access to intranets is almost always offered to teachers and other school staff, but less commonly to pupils and very infrequently to parents. This suggests that intranet access may be a potential way of improving school–parent communication.

Remote access to learning networks is again a feature mostly of secondary schools, and learning networks are available to teachers and senior staff rather than to pupils. Of the 49 primary schools that provided a response to this question, just under half said that senior teaching or administrative staff could access the school's network for learning externally, and 20 said that other teachers had similar access. Only 12 out of 49 primary schools reported that pupils were also able to access the school's network externally. In secondary schools, of the 101 schools that answered this question, 81 said that senior teaching or administrative staff could access the school's network for learning externally. In addition, 78 said that other teachers could do this, and 70 said that pupils had this level of access. Progress since the 2007 survey is strongest among secondary pupils and teachers, although some progress is also evident in primary schools.

3. Management, leadership and administration

Key points

- Most schools had a written strategy or improvement plan for ICT and/or e-learning, and generally these were reviewed on an annual basis. Local authorities and ICT consultants or advisers were key sources of information for many schools, influencing their ICT strategies or improvement plans.
- Using learning platforms was a priority over the coming year (2008) for just over half of secondary schools, just over one-quarter of primary schools, and just under one-third of special schools.
- Improving communication with parents remained a high priority for around one-third of primary schools between 2007 and 2008, compared with just under half (48 per cent) of secondary schools – up 3 per cent from 2007.
- Using technology for personalising learning was a priority for 40 per cent of secondary schools this year (2008), compared with one-quarter or primary schools.
- Across each of the three school sectors, local authorities and ICT consultants or advisers were undoubtedly key sources of information for schools, influencing their ICT strategies or improvement plans.
- Over 90 per cent of secondary schools reported offering their pupils a secure area for storing their work; this was similar to the percentage in 2007. Forty-nine per cent of primary schools offered this facility to all pupils, and 40 per cent offered it to some.

One of the priorities in the Government's Harnessing Technology strategy is to provide school managers and senior leaders with the support, skills and infrastructure to enable them to transform learning and teaching in their schools. The 2008 Harnessing Technology School Survey included a range of questions on ICT management, leadership and administration in schools, which were designed to measure progress in this area. This chapter presents findings from these questions. It includes:

- ICT strategy and leadership
- use of ICT in school management
- communication and collaboration
- ICT finance
- purchasing
- safety and security.

ICT strategy and leadership

A range of questions included in the senior leader questionnaire gathered information about ICT development strategies in schools. The aim was to understand whether schools had written ICT strategies and what areas they were prioritising over the next few years.

Most schools had a written strategy or improvement plan for ICT and/or e-learning, and generally these were reviewed on an annual basis. For the majority of schools, the strategy or plan was embedded within the whole-school improvement plan. This was the case across 70 per cent of primary schools, 65 per cent of secondary schools and 71 per cent of special schools. Just under a quarter of schools in each sector reported a separate ICT strategy or plan. These percentages reflect similar findings from the 2007 survey.

Encouragingly, the existence of an ICT plan or strategy appeared to be commonplace in schools across all sectors. However, clearly there is a difference in approach between schools that choose to embed their ICT strategies at a whole-school level and those that decide to keep them separate. This disparity in approach is comparable across all school sectors. This raises issues about the rationale behind the decision to embed ICT plans or produce a separate plan, and what the main influences are on this decision. For example, is the decision affected by the size of school, or the type of staff involved in deciding the ICT strategy? These questions perhaps warrant further investigation in the 2009 school survey.

While, proportionally, primary, secondary and specials schools were similar in terms of whether their ICT strategies were embedded or separate, the profiles of the staff involved in developing the strategies were quite different.

Secondary schools tended to have more dispersed involvement across a range of school staff in developing the ICT strategy, compared with their primary school colleagues. In secondary schools, the school leadership team (90 per cent of schools) and ICT co-ordinator (90 per cent) were heavily involved, as were other members of staff, such as ICT technical staff (72 per cent) and headteachers (81 per cent). Overall responsibility for the ICT strategy in secondary schools was split between the school leadership team and ICT co-ordinator: around a third of secondary schools in each case.

A similar picture appeared in primary schools, certainly in terms of the members of staff involved with the strategy. However, just over half of primary schools said that the strategy was the responsibility of the ICT co-ordinator. There were also fewer primary than secondary schools that involved their senior leadership teams in the development of the ICT strategy, and this percentage seems to have decreased during 2007. The 2007 survey reported that 77 per cent of primary schools involved

their school leadership teams, but in 2008 the figure was 66 per cent. The picture in special schools was similar to that in primary schools.

Priorities within schools' ICT strategies

For schools across each of the sectors, replacing equipment was commonly reported as one of the elements of their current ICT strategies: it was reported by around 80 per cent of schools in each of the sectors. Around three-quarters of secondary schools also highlighted, as part of their ICT strategies for 2008, investing in their schools' ICT infrastructures and using learning platforms; using learning platforms was highlighted as a priority area for just over half of secondary schools. Using technology for personalising learning was also one of the more commonly reported priority areas for secondary schools during 2008; just over 40 per cent of secondary senior leaders reported this.

As previously stated, primary schools also tended to prioritise the replacement of ICT equipment; just over 40 per cent of primary schools reported this. For just over a third of primary schools, teachers' professional development was also a priority, and investments in ICT infrastructure and using a learning platform were priorities in 28 per cent and 26 per cent of primary schools respectively. (Learning platforms are discussed further in Chapter 6.) Many primary schools are perhaps still in the early stages of 'e-confidence', with a focus on replacing equipment, investing in their ICT infrastructures and training and supporting staff to use technology.

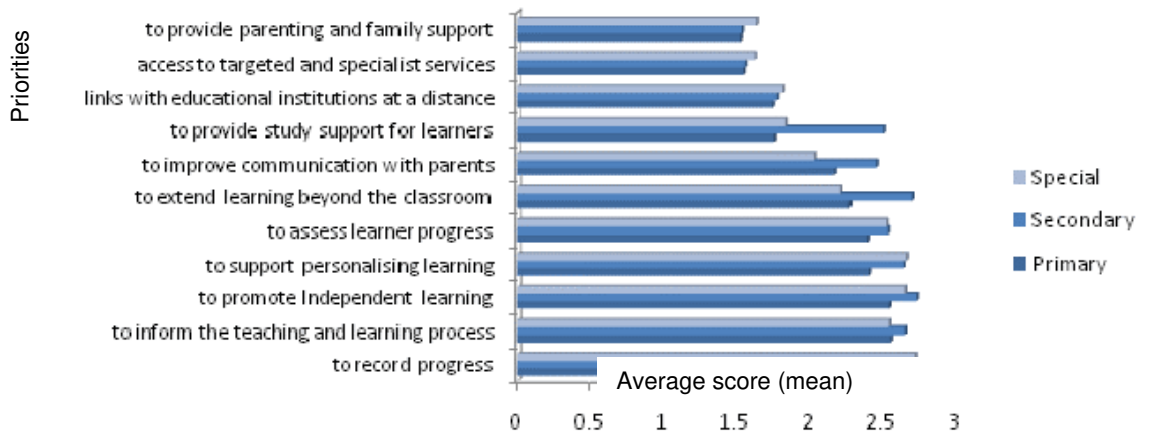
This 2008 survey coincides with a substantial capital investment programme (the Primary Capital Programme) in primary schools over the next few years; it is understandable that primary and secondary schools may be at different stages in ICT development. In secondary schools, the capital improvement programme started in 2005, and Building Schools for the Future is now underway; developments have perhaps moved on a stage.

While special schools were most commonly prioritising the replacement of equipment during 2008, over one-third were prioritising teachers' continuing professional development, and just under one-third were prioritising using a learning platform. Furthermore, one-quarter reported prioritising the use of technology for personalising learning.

While there was not a question in the 2007 survey about the elements and priorities that schools had within their ICT strategies, there were questions in both the 2007 and 2008 surveys which enable comparisons of the priority that schools gave to different ways of using technology to support learning over the next three years (eg using technology to assess learners' progress, or using technology to improve communication with parents). To enable examination of these priorities in more depth, the data from schools that provided a response to this question was ranked in

order of priority.[4] (The ranked scores are available in the accompanying data report – Report 2).

Figure 6: Priorities in using technology to support learning over the next three years (mean priority score)



The survey findings in 2008 revealed that the use of ICT in management and administration and teaching and learning were high priorities across schools in each of the three sectors over the next few years.

Certainly, across primary schools, greater priority was given to ways of using ICT that were linked to management and administration and teaching and learning rather than to communication and collaboration. For instance, over two-thirds of primary schools (68 per cent) reported that using technology to record learners' progress was a priority over the next few years; this was a slight increase on the percentage in 2007 of 55 per cent. Using technology to inform the learning and teaching process (a priority in 58 per cent of schools) and to promote independent learning (57 per cent) were also high priorities for over half of primary schools.

Improving communication with parents remained a high priority for around one-third of primary schools between 2007 and 2008. The percentage of primary schools reporting that extending learning beyond the classroom was a high priority in the next three years decreased from 43 per cent in 2007 to 38 per cent in 2008.

In secondary schools, the emphasis was similarly on prioritising the use of technology in management and administration and teaching and learning. However, unlike in primary schools, senior leaders in secondary schools also said that they

[4] Responses from schools were weighted as low priority = 1, medium priority = 2, high priority = 3. The scores were then added together and a mean average score was calculated. Schools that provided a 'don't know' response were excluded from the analysis.

were giving high priority to communication and collaboration and study support. Just under half (48 per cent) of secondary schools were giving high priority to using technology to communicate with parents (a slight increase from 45 per cent in 2007), and over half (55 per cent) said that using technology to provide study support for learners was a high priority. There was also a slight decrease in the percentage of secondary schools that reported that using technology to support personalising of learning was a high priority. This decreased from 73 per cent in 2007 to 63 per cent in 2008.

Across each of the three school sectors, local authorities and ICT consultants or advisers were undoubtedly key sources of information for schools in terms of influencing their ICT strategies or improvement plans. Well over half of primary, secondary and special schools identified each of these options.

However, there was a reduction in the proportion of schools using their local authorities for information and advice compared with a year ago. The 2007 Harnessing Technology School Survey found that 94 per cent of primary schools and 83 per cent of secondary schools used their local authorities for accessing information and advice, compared with 69 per cent of primary schools and 60 per cent of secondary schools in 2008.

This decrease in accessing information and advice was also evident in relation to accessing information from government bodies, particularly among primary schools. For example, in 2007, 60 per cent of primary schools reported accessing information from the DfES, 45 per cent from the National College for School Leadership (NCSL), 45 per cent from Becta and 41 per cent from the Qualifications and Curriculum Authority (QCA). In 2008, 32 per cent said they accessed information from the DCSF (DfES), 36 per cent from NCSL, 30 per cent from Becta and 18 per cent from the QCA.

A similar decrease in accessing information from local authorities was also evident in secondary schools, as was a similar decrease in accessing information from government bodies, but the decreases were perhaps not as striking as those observed in primary schools. In addition, the use of ‘other ICT consultants’ had increased in both primary and secondary schools. This may reflect increased intervention in ICT through the Secondary National Strategies’ school-improvement programmes: schools may be making more use of external advisers, as encouraged by the ICT dimension of the National Strategies Programme.

Despite this downward trend in obtaining certain information and guidance in comparison with last year, many schools still reported that they had gained information or advice that had influenced their ICT strategies. Besides using local authorities and ICT consultants, schools also used headteachers and teachers from other schools and colleges, the Specialist Schools and Academies Trust (SSAT) and Becta. Each of these was identified as an influential source of information and advice

by around half of secondary schools; the DCFS was also used by just under half of secondary schools. More secondary schools were also using their ICT suppliers as a source of information and guidance in comparison with last year: 48 per cent in 2008 compared with 35 per cent in 2007.

Use of ICT for managing and monitoring

It is now almost universally recognised that high-quality school leadership, broadly defined, makes an important contribution, both directly and indirectly, to school standards. Alongside new developments in school leadership (deliberately defined at a variety of different levels), governments have been anxious to promote the use of new technologies to improve learners' experiences and outcomes. The e-strategy, as set out in the *Harnessing Technology* document, indicates that leaders in education are 'crucial' to the effective adoption of ICT within their institutions: 'Through better training and development, improved professional and business partnerships, and peer networks, we can enable them and their organisations to make more effective use of ICT' (DfES, 2005, p.4). This is partly why organisations such as the National College for School Leadership have been examining and revising their school leadership and ICT training courses. As part of this year's Harnessing Technology survey, senior leaders were asked a range of questions about the systems in their schools, to access the extent to which schools are moving towards digitised management and monitoring processes.

Almost all secondary school leaders (95 per cent) reported that their schools used a management information system (MIS), and around 80 per cent of primary and special schools used an MIS. This reflects the findings from 2007, in which nearly all schools reported using some form of electronic system for financial management.

Most schools operated restricted access to the MIS. In 44 per cent of secondary schools, access was restricted to specific workstations. In primary and special schools, over half of ICT co-ordinators reported that access was restricted to workstations in a separate administration network. Few schools reported that their MIS could be accessed via a learning platform.

Regarding the question of whether schools were using electronic systems for recording learners' attendance and attainment, and behaviour issues, higher proportions of secondary schools than primary and special schools responded affirmatively to this. An electronic system for recording learners' attainment was evident in most secondary schools (95 per cent) and in the majority of primary and special schools (87 per cent and 75 per cent respectively). Electronic systems for recording learners' attendance were also in evidence, especially in secondary and primary schools – just over 80 per cent in each – with just over 60 per cent of special schools reporting having such a system in place.

Schools were also asked about the extent to which their effectiveness in identifying repeat non-attendance had been affected as a result of recording attendance electronically. Just under three-quarters of secondary schools and over half of primary schools said that electronic systems had made the identification of repeat non-attendance more effective.

Over three-quarters of secondary schools reported having a system to record behaviour issues electronically, compared with under a quarter of primary schools and just over a third of special schools. This finding may be partly due to the expectation at the time of the survey that involvement in behaviour partnerships would be compulsory for secondary schools from 2008.

Over a third of special schools (37 per cent), around a quarter of primary schools (26 per cent) and just under one-fifth of secondary schools (18 per cent) were using paper-based methods to report to parents. This is not to say, however, that these schools were not using electronic methods in tandem with a paper-based approach.

Communication and collaboration

Increased and more effective communication within schools, with parents and with other organisations, and improved collaborative working are important elements of current government policy. The 2008 Harnessing Technology School Survey was, therefore, used to assess the extent to which schools engaged in partnerships and collaborative networks regarding ICT, and how they organised their communication with staff, parents and pupils.

As already discussed, using technology in communication and collaboration was more of a priority over the next few years in secondary schools compared with primary schools, and this was reflected in the numbers of senior leaders across each of the phases who said that their schools were currently not engaged in any ICT partnerships or collaborative networks. For example, just under half (47 per cent) of primary schools, 37 per cent of special schools and 23 per cent of secondary schools were not engaged in any ICT collaborative networks.

Furthermore, over the next few years, using technology to establish links with educational institutions at a distance was a low priority for around a third of schools across each of the sectors. Of the 78 primary schools that reported currently taking part in partnership working in terms of ICT, the highest proportion (33 out of 78) were collaborating to purchase a learning platform. Similar proportions of secondary schools (47 out of 106) and, to a slightly lesser extent, special schools (38 out of 112) were collaborating to purchase a learning platform.

ICT finance

The senior leaders' questionnaire also collected information about spending on ICT, how this was being prioritised and plans for ICT investment.

Of the three school sectors, primary schools reported the highest average (mean) percentage (8 per cent) of their school budgets being spent on ICT (equipment, software, connectivity and ICT support). Secondary schools reported an average of 6 per cent and special schools reported an average of 5 per cent.

Comparing the various sub-categories of ICT spending (equipment, software, connectivity and ICT support), ICT equipment tended to have the highest reported average spend across each of the school sectors, compared with each of the other sub-categories of ICT spending. This reflects the earlier finding that many schools across each of the sectors had included the replacement of ICT equipment as a priority in their current ICT strategies.

To examine these priorities in more depth, responses from schools that provided an answer to this question were ranked in order.[5] The ranked scores are available in the data report (Report 2).

Regarding priority areas for ICT spending over the next three years, it appeared that spending on ICT equipment would be a high priority for over half of the schools in each of the three sectors. In secondary schools, the priority given to spending on ICT equipment was on a par with that given to spending on learning platforms. As already noted, spending on learning platforms was a priority area in ICT strategies for over half of secondary schools, and had remained the same since the 2007 survey. Although spending on learning platforms over the next three years was deemed a high priority for only one-third of primary schools, this was an increase since the 2007 survey findings, in which 26 per cent of primary schools reported this to be a high priority.

Responses to the school leadership survey revealed that spending on ICT software over the next few years was probably the area fewest primary and secondary school leaders thought would be a high priority; this area had decreased slightly in priority for both the sectors when compared with the 2007 survey.

Around a third of schools across each of the sectors reported that connectivity and internet access would be a high priority for them, in terms of spending, over the next three years, and around a quarter in each sector said it would be a low priority.

Comparison with the 2007 survey revealed that technical support was another area of decreasing priority, in terms of ICT spending, for both primary and secondary schools over the next few years. In the 2007 survey, 55 per cent of primary schools reported spending on technical support to be a high priority over the next few years; this had decreased to 36 per cent in 2008. Secondary schools had experienced a

[5] Responses from schools were weighted as low priority = 1, medium priority = 2, high priority = 3. The scores were then added together and a mean average score was calculated. Schools that provided a 'don't know' response were excluded from the analysis.

similar decline, with 61 per cent reporting technical support as a high priority in 2007 compared with 37 per cent in 2008.

For special schools, spending on ICT equipment was also a priority for over half of schools, and software was also identified as a high priority, with almost twice as many special schools awarding this a high priority when compared with primary and secondary schools. This confirms that the availability of appropriate software is particularly important for special schools.

Purchasing

One of the aims of the Harnessing Technology Strategy is to provide best-value ICT procurement frameworks that are available to all organisations, and to move towards more collective modes of working and achieving economies of scale. The Harnessing Technology School Survey 2008 therefore asked ICT co-ordinators a range of questions about the processes by which schools purchased ICT equipment and internet services.

Purchasing ICT hardware and networking

Schools' most common approach to purchasing ICT hardware (eg workstations, servers and peripherals) and networking equipment and cabling was directly from their ICT suppliers. In fact, the use of this approach had increased in primary and secondary schools since 2007. In 2007, 30 per cent of primary schools and 41 per cent of secondary schools reported purchasing their ICT hardware through their ICT suppliers, and 29 per cent of primary schools and 37 per cent of secondary schools purchased ICT networking equipment and cabling through their ICT suppliers. In 2008, the proportion of primary schools purchasing ICT hardware through their ICT suppliers had increased to 48 per cent, and the proportion of secondary schools to 63 per cent; 36 per cent of primary schools and 53 per cent of secondary schools purchased ICT networking equipment in this way. This also reflects the findings that more secondary schools, in particular, use their ICT suppliers for both information and purchasing, compared with the number last year.

Local authorities were also used by around a quarter of primary and special schools for purchasing both ICT hardware and networking equipment; this had remained fairly stable when compared with 2007 survey data. The use of local authorities to purchase this equipment was much less common in secondary schools – secondary schools had more of a preference towards purchasing hardware and equipment through other independent sources. In special schools, hardware and networking equipment was predominantly purchased via the schools' ICT suppliers, but local authorities and other independent sources were also used by around a quarter of special schools.

Purchasing technical support and advice

ICT co-ordinators were asked about how their schools obtained ICT technical support and maintenance services, and advice about designing their schools' ICT infrastructure. Schools that did not obtain either of these services were excluded from the analysis – the following percentages are based only on data from ICT co-ordinators who provided a valid response to this question[6] – which prevents direct comparison with the 2007 data. In secondary schools, 40 per cent of ICT co-ordinators said that their schools purchased ICT technical support directly from their ICT suppliers, just under one-third did so via their local authorities, and one-quarter did so directly from other independent sources. In primary schools, there was a greater tendency to purchase this kind of support from local authorities, with half of primary schools reporting this to be the case. Regarding obtaining advice about designing the school's ICT infrastructure, secondary schools' responses were fairly even spread, with around one-third using their local authorities and slightly fewer choosing to use their ICT suppliers or other independent sources. Again, primary schools continued to use their local authorities for obtaining advice about their ICT infrastructure, with just over 60 per cent choosing this option.

For primary schools, local authorities were the key providers of internet connectivity and advice, with around three-quarters of primary schools reporting this to be the case. In secondary schools, local authorities were also key providers of this type of support. Fifty-eight per cent of secondary schools reported obtaining internet connectivity from their local authorities, and 69 per cent obtained advice about internet connectivity from their local authorities.

Purchasing technical support services

The 2008 survey also asked ICT co-ordinators to identify how they purchased technical support services in their schools in each of four areas: data management, networking, personal computing and internal support. Across each of the school sectors, a small proportion of schools said that they did not offer this type of support in their schools. These schools were therefore excluded from the analysis – the following percentages are based solely on those schools that offered technical support services – however, this prevents direct comparison with the data from 2007.

Primary schools tended to outsource their data management technical support services either wholly (59 per cent) or partially (31 per cent). This was also the case for network support. However, for personal computing and internal support, more primary schools used in-house support than outsourced support. Nevertheless, 40 per cent of primary schools partially outsourced personal computing support.

[6] Note that the number of schools for each response is different. Refer to the data report (Report 2) for numbers of schools.

In secondary schools, the picture was slightly different: secondary schools appeared to have a greater capacity for resourcing their technical support services in house. Even so, just over half of secondary schools partially outsourced their data management support services, and one-third outsourced their network support. Special schools seemed to sit somewhere between the models of technical support operated by the primary and secondary schools.

Making decisions about purchasing

ICT co-ordinators were asked to identify who was responsible for making purchasing decisions about ICT hardware, networking equipment, and technical support and maintenance services. In primary schools, the headteacher tended to be the member of staff with this responsibility across each of the three purchasing areas. In secondary schools, this responsibility tended to be delegated to the ICT manager. In special schools, responsibility for each of the three purchasing areas was slightly more evenly balanced across the headteacher, the ICT co-ordinator and the ICT manager, with ICT co-ordinators taking more of a lead in terms of purchasing hardware, which was also the case in primary and secondary schools.

Most schools, particularly primary and special schools, described their system for purchasing curriculum-related software as one in which teachers submitted requests for software, and the ICT co-ordinator, headteacher or other senior member of staff made the decision. This approach was similarly observed in the 2007 survey.

Safety and security

The 2008 Harnessing Technology School survey explored various aspects of ICT safety and security, including theft of ICT equipment and the use of anti-virus software, as well as aspects of learner safety enshrined not only in Every Child Matters and the Children's Plan, but also highlighted in the more recent Byron report, *Safer children in a digital world* (DCSF and DCMS, 2008).

ICT theft in schools

The theft of ICT equipment – internally (no break-in and/or pupil theft), externally (break-ins and/or stranger thefts) and from pupils on their way to and from school – was relatively uncommon in primary and special schools, with the majority of senior leaders reporting no such thefts having taken place over the last 12 months.

In secondary schools, internal thefts and external thefts were slightly more common. Just over 40 per cent of secondary schools reported experiencing between one and five internal and/or external thefts over the past year. And, while the numbers of thefts from secondary pupils on their way to and from school were relatively small, their numbers were higher than in primary or special schools: 8 per cent of secondary schools reported between one and five thefts over the past year, compared with 1 per cent of primary schools and 3 per cent of special schools.

Just over 80 per cent of secondary schools reported having a CCTV system in place, compared with 36 per cent of primary schools and 43 per cent of special schools.

The use of anti-virus software

Regarding system security, most schools reported operating centrally controlled anti-virus software which delivered updates to all client services across the network. This was the case across all three sectors, but it was slightly more common in secondary schools. In addition, just over a 10th of primary and special schools reported that their anti-virus software was installed and maintained on individual client devices with no central control. Furthermore, in the majority of schools across each of the sectors, anti-virus software could be updated over the internet.

Regarding firewalls, just over 60 per cent of schools across each of the sectors used local-authority-managed firewalls. In addition, over 30 per cent of secondary schools reported using a school-managed software firewall and/or a regional broadband consortium managed firewall; however, these were less common in primary and special schools. Considering the data from the 2007 survey, the number of primary schools operating a school-managed software firewall had increased from 9 per cent in 2007 to 14 per cent in 2008. In secondary schools, a similar increase could be observed, with 16 per cent of secondary schools reporting a school-managed software firewall in 2007, compared with 39 per cent in 2008. The number of secondary schools using a local-authority-managed firewall had also increased, from 46 per cent in 2007 to 65 per cent in 2008.

Provision of personal secure areas for pupils

ICT co-ordinators were asked to consider whether their schools offered pupils a personal secure area for storing their digital work, and if they did, to identify who hosted this secure area. Over 90 per cent of secondary schools reported offering their pupils a secure area for storing their work, and in most cases the school hosted this; this was similar to the percentage in 2007. In primary schools, the picture was slightly more mixed, with 49 per cent of primary schools reporting offering all pupils a secure area for their digital work, and 40 per cent offering this facility to some pupils. As with secondary schools, the school tended to host the secure area, although the local authority was the host in just over a 10th of cases.

It is interesting to note that the number of primary schools that reported offering a secure area to some pupils had increased from 11 per cent in 2007 to 40 per cent in 2008. This increase is in line with the aim of the Harnessing Technology strategy to encourage institutions to offer a personal online learning space. In special schools, the picture was similar to that in primary schools, in that half said that all pupils had a personal secure area, and just over a third reported that some pupils had access to such an area for storing their digital work. Special schools, however, had the highest proportion of ICT co-ordinators who said that none of their pupils had a personal

secure area for storing their work: 11 per cent in special schools compared with 2 per cent in secondary schools and 6 per cent in primary schools.

Clearly, creating safe online environments for children and young people to explore, take risks in, and learn in is paramount. While the Byron report focuses primarily on keeping children and young people safe within an increasing culture of internet and video game use, it also talks of creating 'a shared culture of responsibility' in which everyone recognises the part they have to play. It is therefore important to consider the responsibility of schools in recognising some of the broader issues of e-safety, as explored in the current school survey, and the new set of challenges in keeping children and young people safe, which have arisen from increased use of technology. Such challenges include supporting children and young people to be safe on their journeys to and from school if they are carrying a laptop, making sure that pupils have a secure electronic area for storing their work, and, most importantly, raising the profile of e-safety among staff and pupils.

4. Using technology for teaching and learning

Key points

- Interactive whiteboards are the dominant technology in schools, and technology continues to be used primarily for presentational purposes. Display technologies are important, but there is scope for encouraging more engaged and interactive forms of teaching and learning using ICT.
- Linked with this, there is considerable scope for the further development of learning flexibility based on increasing the use of mobile devices. There is also much scope for the development of the use of social software for learning, which at present is reportedly used only in one in 20 schools.
- Teachers' use of digital learning resources, especially self-created resources, is increasing, with a quarter of teachers uploading such resources at least once a week. There have also been increases in the proportions of teachers sharing digital resources.
- In terms of access to ICT facilities, school populations appear to have good access, and there is flexibility to accommodate pupils' use out of normal lesson times, but community access to ICT facilities remains somewhat limited.
- In many respects, at a national level, the development of e-assessment is still in its early stages. Technology tends to be used for reporting pupils' progress rather than for interactive forms of assessment.

Introduction

The Next Generation Learning campaign seeks to enable learners to take greater control of their learning through access to learning resources at any time and from anywhere. The new phase of Harnessing Technology aims to develop a system that

exploits the benefits of technology for learning and delivers tangible and measurable improvements and outcomes. Schools that are 'e-mature' have integrated technology-based applications and processes into all aspects of their organisational practice and operation.

Bearing this strategic context in mind, this section looks at the extent to which schools reported using technology across the broad spectrum of teaching and learning. This includes consideration of the use of ICT:

- to provide resources for teaching and learning
- for lesson activities and across the curriculum
- for assessment and reporting.

ICT resources for teaching and learning

The availability and access to high-quality ICT resources is a priority within the Harnessing Technology strategy. This issue was explored in the current surveys by asking ICT co-ordinators and teachers a range of questions about the availability of ICT resources (including both hardware and software) in their schools and their levels of satisfaction with them.

Findings relating to schools' ICT infrastructure were presented in Section 2 of this report. These were primarily about school-level resources, based on ICT co-ordinators' responses. This section presents teachers' views about ICT resources.

The survey found that schools used technology primarily for presentational and display purposes. A detailed study of forms of e-learning in the further education sector also found that presentational use was much more common than the use of ICT for engaged learning (Golden *et al*, 2006). When schools were asked to rate the quantity of different types of ICT equipment, quantities of interactive whiteboards and digital projectors were reported as adequate or more than was needed to deliver the curriculum.

Primary schools generally reported higher levels of satisfaction with the quantity of ICT equipment at their disposal than did other schools. In secondary schools, for example, more than half of respondents said that they did not have enough networked desktop computers to deliver the curriculum adequately.

Portable devices such as laptops, PDAs, handheld games consoles and mobile phones were sometimes allowed on school premises, but not usually allowed into classrooms and almost never used on the school network. (It should be noted that this question generated a very high non-response rate.) The implication is that these devices are generally not used within schools to support educational activities, and therefore that the role of mobile technologies in giving pupils greater flexibility in where and how they learn has considerable scope for further development. This is

particularly important given that 'the scope of ICT resources now span beyond desktop computers and fixed internet connectivity' (Selwyn, 2007, p.19).

The amount of mobile technology used for teaching and learning is in some respects still low. Although there are slightly more laptops in schools in 2008 than in 2007 (only between a fifth and a quarter of respondents said that these were not available in schools at all in 2008), other mobile devices such as handheld computers and mobile phones were reported as not being available in their schools by over half of teachers. In primary schools, over 80 per cent of teachers reported that other mobile devices were not available. In secondary schools, 74 per cent of teachers said handheld computers were not available in their schools, and 65 per cent reported that mobile phones were not available. The picture in special schools was similar to that of secondary schools.

The quantities of specialist subject equipment (eg data loggers, synthesisers) are also not rated very highly – around a quarter of respondents across sectors said that they did not have enough of this equipment to deliver the curriculum adequately, and up to 45 per cent of respondents in primary schools said that this equipment was not available at all in their schools.

The teacher survey revealed a good level of satisfaction with software for school curriculum use, with primary schools, in particular, reporting that relevant software is easy to find and that fitness for purpose is either very good or quite good.

When asked to rate curriculum-related software, almost all teachers said that it was quite good or very good, although there has been a small drop since the 2007 survey. (A smaller proportion of teachers said that fitness for purpose was very good, and a slightly higher proportion said it was not very good.) Mathematics and history teachers were most likely to rate curriculum-related software highly.

Access to ICT resources

Another important priority of the Harnessing Technology strategy is making technology more accessible not only to teachers and learners but also within the wider community. The senior leader questionnaire collected data on how school ICT facilities were being used in the community, to explore whether technology is becoming more accessible.

The surveys revealed that computer access in schools is good. Pupils can use computers in a number of settings in the schools, including classrooms, dedicated ICT suites and libraries or study areas. In addition, schools are providing a large degree of flexibility to accommodate pupils' uses of ICT facilities outside normal lesson times. Most secondary schools, in particular, offer lunchtime (76 per cent) and after-school (81 per cent) clubs, while around the same proportion offer informal access at lunchtime, and slightly less (73 per cent) after school. This is important, bearing in mind the continuing high proportions of pupils who do not have home

access to a computer, estimated to be around 30 per cent (see Section 6 on home access).

In contrast, community access to ICT facilities remains low, with almost two-thirds of primary schools and 82 per cent of special schools saying that they offer no access at all. Just under half of secondary schools offer adult learning or evening classes. Community access to ICT facilities during the school day remains very limited. This may change as the move towards extended schools (by 2010) accelerates, but this seems to be another area that merits strategic attention.

ICT for use in lessons and across the curriculum

The Harnessing Technology School Survey 2008 also gathered information about how teachers were using ICT in their lessons and across the curriculum.

The average (mean) number of teachers of ICT as a discrete subject in primary and secondary schools was 2.9, with an average (mean) of 2.3 in special schools. In terms of full-time equivalents (FTE),[7] the average (mean) was 2.4 in primary schools and 2.6 in secondary schools. In special schools, the average (mean) FTE was 1.6.

In terms of curriculum time, ICT as a discrete subject occupies an average of 1.8 hours per week for Key Stage 1 pupils, and three hours per week at Key Stage 4. Key Stage 2 pupils have slightly more ICT subject time per week than Key Stage 3 pupils, at 2.5 and 2.1 hours respectively.

In around half of schools (slightly more in primary schools and slightly less in secondary schools), the whole-school policy governs decisions about how digital learning resources are used by teachers and department heads. In secondary schools in particular, it is unusual for decisions about the use of digital learning resources to be left to the individual teacher.

The frequency of use of digital learning resources by teachers is increasing. About a quarter of teachers in each of the three sample groups upload and store digital learning resources at least once a week on the school's network. Comparison with 2007 survey responses revealed that the proportion of teachers who do this at least once a month is rising. Interestingly, the surveys revealed that lesson planning is almost always at least partly based on digital sources. Teachers generally said that they planned their lessons mostly with paper-based resources, but with some digital resources, and secondary school teachers had the lowest proportion of responses indicating that they used primarily digital resources.

With respect to the types of digital resources used, teachers reported that they mainly used their own digital resources: almost half of secondary school teachers

[7] The average full-time equivalent (FTE) includes only those schools that provided answers to both of the relevant questions in the survey.

and a third of primary and special school teachers used self-created resources to plan all or more than half of their lessons. Teachers used digital resources created by colleagues much less frequently. Primary school teachers adapted learning resources created by other people more frequently than did other teachers.

Nearly all teachers create their own digital learning resources at least sometimes, and almost two-thirds of secondary school teachers said that they did so often. The proportion of teachers who create their own digital learning resources has increased since the last survey in 2007. Analysis of why teachers create their own digital resources shows that many teachers feel that existing resources are insufficient for their needs. Reasons cited by teachers included that they could better tailor resources to specific teaching and learning needs. Teachers also enjoy making their own resources, indicating a positive and confident approach to technology-based lesson planning. English teachers were most likely, and mathematics teachers least likely, to create their own digital resources. Also, teachers with up to 10 years' experience were more likely to say that they often created their own digital resources.

Almost a quarter of secondary school teachers said that they shared the resources they created with teaching staff in other schools. More respondents in the primary and special school sector than in the secondary school sector said that they did not share the digital resources they had created. There has also been an increase in the proportion of teachers reporting that they shared digital learning resources with other teachers and teaching staff both within their own schools and with other schools compared with findings from the 2007 survey. There are implications here, perhaps, for commercial digital learning resource providers, for school personnel responsible for school procurement, and for subject associations.

Websites for teachers tend to be used more often by primary school teachers to prepare lessons, while online subscription services are not often used for lesson planning (over half of respondents in all schools said they rarely or never used these).

Of the various ICT resources that may be used in lessons, the well-established role of display technologies is again confirmed by teacher responses: half of primary school teachers and about a third of secondary and special school teachers said that they used these technologies in all or most of their lessons.

In contrast, learning platforms are reportedly still used very infrequently, if at all. Around two-thirds of teachers (slightly fewer in special schools) said that they rarely used these in lessons.

Schools need time to embed new technologies; the relatively low use of learning platforms could mean that schools are in the process of adopting learning platforms, and any increase in use may take some time to emerge. However, there are still

important learning points for policy-makers and strategists. Firstly, the acquisition and use of learning platforms by schools does seem to have been slower than expected, and has not met the original target of having learning spaces for all pupils by spring 2008. Secondly, it may be that even where learning platforms are in place, at least some teachers are not aware of their existence or what they can be used for – so there seems to be a need for better communication about the advantages and uses of learning platforms.

Comparison with the 2007 survey findings show that secondary school teachers have increased their use of technologies such as computer packages, subject-specific software and internet resources. For instance, while only a third of secondary teachers said that they used internet resources in at least half of their lessons in 2007, almost half of them (46 per cent) reported doing so in 2008. Nonetheless, the gap between the primary and secondary schools remains in place, with primary school teachers continuing to use technology more often in their lessons. This may reflect a more widespread availability of software (and more software providers) for primary schools than for secondary schools.

Teachers predominantly use ICT for whole-class activities, in line with their preferred use of ICT for display and presentational purposes. There has, however, been a development in the use of ICT for other activities in secondary schools. Almost a third of secondary school teachers (32 per cent) now say that they use ICT with pupils working on their own in half or more of their lessons (this is up from 22 per cent in 2007, while the comparable figure in primary schools has not changed at 31 per cent). This change in practice in secondary schools is notable and perhaps indicative of a broader embedding of technology in teaching and learning.

The purpose for which ICT is used in lessons has also undergone some change since 2007. In primary schools, teachers now use ICT more frequently to help pupils be creative, while in secondary schools the biggest increase is with respect to information gathering.

There has been a decrease in the proportion of teachers who set homework requiring the use of a computer very or quite often, both in primary schools (from 13 per cent to 8 per cent) and secondary schools (from 11 per cent to 7 per cent). In some respects, this is a disappointing finding in that it runs counter to the goals of the Harnessing Technology strategy that emphasise flexible, anywhere, any time learning. However, the trend may be reversed by schemes to provide greater home access to computers for learners.

Encouraging the use of social software such as blogs, instant messaging, wikis and online discussion groups to support learning is still extremely uncommon, although there has been a slight increase since 2007 in the number of teachers saying that they do this. A sizeable minority of teachers (especially in primary schools) are completely unfamiliar with these types of software; even in secondary schools, a

quarter of teachers had never heard of wikis. This contrasts with the very high use of these types of software among young people for informal purposes.

These findings will be disappointing to those who emphasise the importance of the learning potential of social software and social media, especially for the personalisation of learning. Bryant (2007), for example, takes the view that: 'The adoption of social software tools, techniques and ideas will be the most important and visible example of the use of emerging technology in education over the next few years.' The findings point to a need to develop better awareness of the educational potential of social software among the teaching community. This point was also made in an early report from a Becta-commissioned project on the use of Web 2.0 technologies in and out of school, which suggested that: 'that there is a role for teachers in supporting effective learning using Web 2.0' (Luckin *et al*, 2008, p.11). It is also apparent that 'Better practical guidance on the use of social software in schools would also be useful' (Walker *et al*, 2008). Above all, perhaps, there appears to be a gap between the use of new technologies in formal and informal contexts, and this needs to be addressed by educators, researchers and policy makers.

When asked what prevented them from using ICT in lessons, more primary and special school teachers than secondary teachers gave answers that implied they were not comfortable with ICT: around a quarter said that they didn't know where to find or how to use ICT resources, or that they did not feel confident a lot of the time or some of the time in using ICT in lessons.

Secondary teachers had slightly different reasons for not using ICT in lessons – their answers were more about organisational issues. A high proportion (41 per cent) said that they found ICT difficult to access in their schools, and 29 per cent said that they did not think ICT was time-effective a lot or some of the time.

E-assessment and reporting

The reform and development of assessment processes and frameworks has received much attention in recent years. Furthermore, sharing information in order to engage with parents and learners is a key part of both the Harnessing Technology strategy and the Children's Plan (DCSF, 2007). The 2008 Harnessing Technology School Survey was therefore used to capture data on how teachers used technology for assessing and reporting on pupils' progress, including whether these were carried out electronically or using more traditional methods.

The survey showed that teachers do not use technology for pupil assessment very frequently. Around two-thirds of primary school teachers never used technology to assess work and offer feedback to pupils or to enable pupil-to-pupil reflection. In secondary schools, around half of teachers did not use technology to enable pupil-to-pupil or pupil-to-teacher reflection. This indicates that actual uses of e-assessment techniques in classrooms are still in the early stages of development.

The attention that commercial providers and examination bodies have been giving to e-assessment, however, suggests that developments in this area will be rapid in the near future. Ripley (2007, p.10) commented that e-assessment is 'developing rapidly'; however, 'it is not clear that it is playing its full role in acting as a catalyst for change'. He suggests that Becta should determine 'whether strategic interventions are needed' to encourage such change.

When technology is used for assessment purposes, this tends to be infrequent and mainly for reporting rather than for more interactive forms of assessment. Ten per cent of secondary school teachers used technology for analysing or reporting assessment data once a week, but this figure rises to 76 per cent doing so at least once a term. Findings also show that nearly all respondents used some form of electronic approach to producing pupils' reports, with the majority saying they re-used or modified prepared templates. There has been a slight decrease since 2007 in the reported use of technology for pupils to demonstrate learning, and for assessing work and offering feedback among primary school teachers.

Secondary school teachers used electronically held pupil assessment information more frequently for a greater variety of purposes than did primary or special school teachers. For instance, they were roughly three times more likely to use the information to enable pupil self-assessment and to make information available to parents at least once a term. Given the key role that technology can play in securing parental engagement through online reporting, and the plan by the minister for schools for all secondary schools 'to offer parents real-time access to information covering achievement, progress, attendance, behaviour and special needs' (Knight, 2008) by September 2010, this is an area that will undoubtedly receive further consideration.

5. Practitioner perceptions and continuing professional development

Key points

- The majority of teachers, across all sectors, are confident and enthusiastic about using ICT. The substantial majority of ICT co-ordinator respondents (77 per cent) reported that teachers in their schools were either very confident or quite confident with ICT. Similarly, this sample reported that all or nearly all teachers were enthusiastic in 20 per cent of schools, and most were enthusiastic in 51 per cent of schools.
- Having dedicated on-site technician support in a school does appear to have a positive effect: a statistically significant association was found between teachers' reported enthusiasm in using ICT to deliver the curriculum and the level of technical support available in a school.
- Teachers were largely positive about the potential contribution of new technologies to learning. For example, around three-fifths of teacher respondents agreed with the statement that pupils enjoy lessons more if they use ICT than if they do not.
- Across all three sectors, there was agreement generally that ICT plays a positive role in engaging pupils in learning, having an impact on attainment, and in personalising learning.
- With respect to training and support, informal, in-school ICT support from colleagues clearly emerged as the form of training rated most positively by teachers. Almost all teachers had accessed this form of support, and just fewer than nine out of 10 had found it to be a good form of training.

Introduction

This chapter examines the confidence levels of practitioners in relation to their uses of ICT for teaching and learning and the extent to which new technologies are perceived to be bringing benefits for teachers and learners. It also provides an overview of what practitioners think about their ICT-related professional development experiences and their perceptions of present and future needs in this area.

Teachers' attitudes towards ICT

Before looking at training needs in particular, it is useful to consider teachers' general attitudes towards ICT, as identified in a number of questions in both the teacher and the ICT co-ordinator questionnaires.

The ICT co-ordinator survey asked respondents to rate teachers at their schools in terms of their confidence in using ICT to deliver the school curriculum. The substantial majority of respondents (77 per cent), across all sectors, reported that teachers in their schools were either very confident or quite confident. There were

some differences by sector: primary school teachers, for example, were rated as being more confident compared with teachers in other sectors. The proportion of ICT co-ordinators in the primary school sector who said they thought teachers were very confident was 17 per cent. By comparison, respondents in the secondary school sector said that 5 per cent of teachers were very confident, and in the special school sector this proportion was 9 per cent. A higher proportion of ICT co-ordinators in secondary and special schools (14 and 16 per cent respectively) said that teachers were not very confident.

ICT co-ordinators were also asked to rate teachers' enthusiasm for using ICT to help deliver the curriculum. Responses revealed a high level of enthusiasm for using ICT in delivering the school curriculum. It was reported that all or nearly all teachers were enthusiastic in 20 per cent of schools, most were enthusiastic in 51 per cent of schools, some were enthusiastic in 23 per cent, and few in 3 per cent of schools. This would seem to suggest a broadly positive outlook with respect to using ICT to deliver the curriculum, which implies a degree of openness to considering and adopting new technologies for this purpose. This finding about the ICT-related enthusiasm of teachers was particularly applicable to the primary school sector, where more than three-quarters of ICT co-ordinators said that most teachers were enthusiastic.

A number of cross-tabulations were carried out in order to establish whether there were any relationships between the proportions of teachers who were identified by ICT co-ordinators as being enthusiastic about using ICT to deliver the school curriculum and a range of other variables. A number of these cross-tabulations were found to be significant.

The most interesting finding was that there was a significant statistical association between teachers' reported enthusiasm in using ICT to deliver the curriculum and the level of technical support in schools. (For analysis purposes, strong technical support was classified as a school having either a dedicated, school-based ICT technician or an ICT supplier who had responsibility for day-to-day maintenance and support of school networks. Not-strong technical support was classified as a school sharing an ICT technician with another school, loaning an ICT technician from another school or having a local authority support service.) For example, where all or nearly all of the teachers in a school were identified as being enthusiastic about ICT, 64 per cent were in schools that had strong technical support, compared with 36 per cent in schools that did not have strong technical support. It seems that technical support in a school can help foster teachers' enthusiasm for the use of ICT.

A series of attitudinal questions in the teachers' survey asked mainly about the impact of ICT. The general finding was that teachers were largely positive about the potential contribution of new technologies to learning, but when pressed to identify specific, current advantages, they were rather more ambivalent and sometimes doubtful.

On the positive side, a majority of the sample agreed with various general statements about the contribution that ICT can make to teaching and learning. For example, around three-fifths of teacher respondents agreed with the statement that pupils enjoy lessons more if they use ICT than if they do not, although some variation was apparent across school sectors in the sample, with more primary school respondents agreeing with this than secondary or special school teachers.

In addition, a majority agreed that ICT makes learning more effective (fewer respondents in secondary schools agreed with this, however) and that ICT is particularly useful in helping to support the diverse learning needs of pupils (not surprisingly, a higher proportion of respondents in special schools agreed with this). More than two-thirds of respondents across the three school sectors agreed with these two statements.

Against this backcloth of positive views about what ICT can do for pupils, there were a number of neutral and even negative attitudes towards technology use. In a small number of cases, attitudes had become more negative than they had been in 2007. For example, in 2008, more respondents expressed a neutral opinion towards the statement that ICT resources can help give individualised feedback to pupils than agreed with the statement. This was especially the case for respondents in primary and in special schools, while secondary school respondents were more positive. Compared with the sector-based findings those of the 2007 survey, the proportion of teachers agreeing that ICT resources can help give individualised feedback to pupils had fallen (from 38 per cent in 2007 to 23 per cent in 2008 in primary schools, and from 56 per cent in 2007 to 52 per cent in 2008 in secondary schools).

Views on the impact of ICT

Teachers were also asked whether they agreed or disagreed that using ICT can have a positive impact on specific groups of pupils in terms of three dimensions of their learning. These were:

- engagement in learning
- attainment outcomes
- personalising learning.

In relation to each dimension of learning, respondents were asked whether they thought that ICT had a positive impact on different groups of pupils. These were: pupils in each of Key Stages 1–4, boys, girls, able or gifted and talented pupils, and pupils with special educational needs.

Two key findings emerged from the data from this series of questions. Firstly, overall, across all three sectors, there was agreement generally that ICT plays a positive role in engagement in learning, attainment outcomes and personalising learning. A greater proportion of respondents strongly agreed that ICT has a positive impact on

engagement in learning, and slightly lower proportions strongly agreed that it has a positive impact on attainment and personalising learning (the impact on personalising learning is discussed in the following chapter).

The second major finding was that, overall, in the view of this teacher sample, ICT could help all the pupil groups listed, although a somewhat higher proportion of respondents (35 per cent) strongly agreed that pupils with special educational needs acquired enhanced attainment outcomes through ICT.

Statistical analysis showed a significant association between the extent to which teachers agreed that ICT makes learning more effective and their level of professional experience. Teachers with five or fewer years of teaching experience were more likely to strongly agree with this statement (31 per cent) – the proportion of teachers who strongly agreed decreased with their experience (thus only 16 per cent of teachers with more than 20 years' experience strongly agreed).

Teachers were asked whether the use of particular technologies helped them to save time each week. The overall finding here, across all school sectors and in line with one of the key themes of this report, was that a small amount of time was saved through the use of some technologies (but, again, this was not a transformation of any sort; for the majority of respondents, ICT resources did not make any difference to the time spent on teaching and preparation).

Online resources represented the greatest time-saving resource according to respondents – one-fifth of teachers surveyed said these saved them up to an hour, and a further one-fifth said that these saved them from one hour up to more than two hours. This finding was backed up by responses to an attitudinal statement: there was a relatively high level of disagreement with the statement that it is easier to find relevant teaching materials in textbooks than on the internet.

Interactive whiteboards were also considered to be a time-saving resource by about a quarter of respondents. The technologies for which time-saving efficiencies were not identified by respondents were learning platforms and management information systems, although considerable proportions of teachers said that these were not applicable to them.

The survey went on to ask about the time teachers saved by using ICT for a number of teaching tasks. Lesson planning and report planning emerged as the two tasks for which respondents thought the use of ICT had saved them the most time. Three-fifths of respondents said they had saved time on report writing, and just over a half indicated that time had been saved on lesson planning. A higher proportion of teachers in the primary school sample said that they saved time through using ICT for report writing, compared with teachers in the secondary school sample and, to a lesser extent, the special school sample.

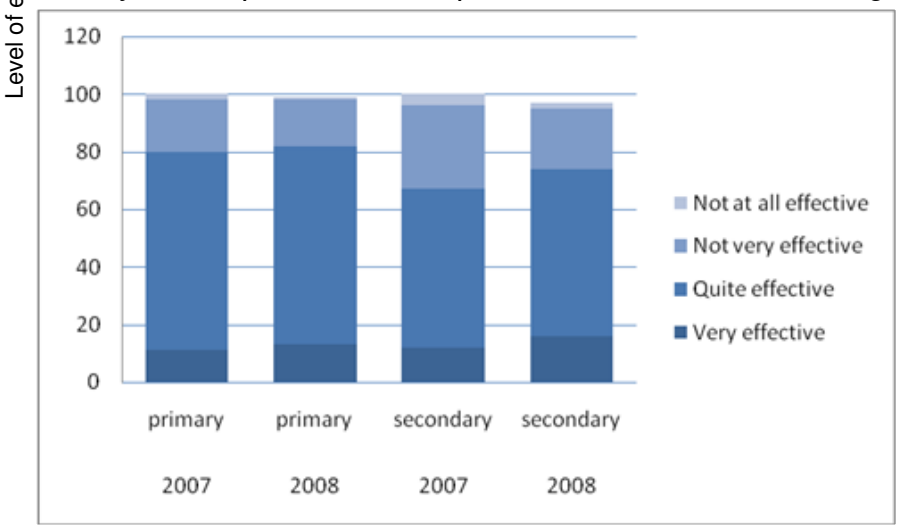
Teacher effectiveness

One question asked teachers to indicate how effective they thought they were in using ICT to support learning and teaching in the classroom. A high proportion of teachers responded positively across the three sample groups: over three-quarters of teachers (77 per cent) said that they were either quite effective or very effective in using ICT to support learning and teaching in the classroom. However, some differences emerged between teachers in the secondary sample and other respondents, with fewer secondary teachers indicating that they thought they were quite effective, and rather more indicating that they thought they were not very effective compared with primary and special school teachers in the survey.

As shown in Figure 7, when compared with findings in the 2007 survey, the proportion of teachers who thought they were very effective or quite effective in using ICT has risen. For example, in 2007, 12 per cent of secondary school teachers said that they thought they were very effective, compared with 16 per cent of secondary teachers in 2008.

Figure 7: Teacher effectiveness in using ICT to support learning and teaching in the classroom (%)

Cross-tabulations were carried out between a number of variables to explore their relationship with teachers' reported effectiveness in using ICT. A significant association was observed between, for instance, teachers' reported effectiveness and their number of years of professional experience in education. The highest



proportion of teachers who thought they were very effective using ICT were in the most experienced group (28 per cent), namely those who have taught for more than 20 years and the lowest proportion (20 per cent) was in the group of teachers with up to five years' experience.

A significant relationship was also apparent between ICT effectiveness and subject-specific software. Teachers who reported that they thought they were not very effective or not at all effective with ICT were much less likely to use subject-specific

software in most or at least half of their classes (25 per cent). A similar pattern was discernible in relation to the use of internet resources in lessons.

Continuing professional development

The survey then went on to ask teachers to rate the various forms of ICT training and support they had accessed. Across all three school sectors, informal ICT support clearly emerged as the form of training or support rated most positively. Almost all teachers had accessed this form of support, and just fewer than nine out of 10 found it to be a good form of training.

Reading books or manuals was rated positively by the lowest proportion of respondents: just over a quarter of teachers said they had not accessed this type of support, and of those that had, almost half indicated that it was not very good or not at all good.

Formal training courses had not been accessed by over two-thirds of respondents, and fewer respondents rated this type of support positively.

Although a quarter of respondents indicated that they had not accessed DVDs or CD-ROMS, of those that had, almost half rated this form of support positively.

These findings indicate that teachers prefer a mix of face-to-face and other training support, such as the use of websites or CD-ROMs/DVDs. They also seem to suggest that teachers would appreciate further formal training course options.

Responses to a question about access to forms of training in the ICT co-ordinators' questionnaire supported these findings. The majority of ICT co-ordinator respondents reported that informal support was the most frequently available form of training in the use of technology which was available to teachers in schools. Formal training courses, delivered in person, were also common. Over half of respondents also cited finding information online and reading books or manuals. The least frequently cited form of support was formal training courses delivered online.

These findings were strengthened by the responses to a further question which asked teachers to indicate the areas in which they thought they needed further development. The main finding was that teachers felt confident in using the internet, but for a range of other technology-related activities they needed more training. Well over half of teachers surveyed said that they need at least a little more development in each of the following areas:

- using particular software packages
- using classroom technology for teaching and learning
- using the school's learning platform
- creating electronic materials and activities
- supporting pupils' use of technology

- using digital video or camera equipment.

Some differences were apparent between the three school sectors surveyed. More secondary teachers than teachers in primary schools, for example, said that they needed a lot more development in using particular software packages.

The survey also provided an opportunity to ask teachers where (or who) they went to for advice about using ICT in teaching. Responses to this question indicated that, in the majority of cases, teachers turned to in-school advice from their ICT co-ordinators or equivalent (68 per cent), their departmental colleagues (51 per cent) or their colleagues more generally (85 per cent), rather than external sources of advice, though some did use websites (48 per cent), independent trainers and consultants (22 per cent), and staff in other schools (25 per cent). Respondents were proportionally less likely to turn to other sources of advice such as professional associations (13 per cent) and local authorities (14 per cent).

6. Special themes: Home access, learning platforms, personalising learning

Key points

- School leaders were asked to estimate the proportion of pupils in their schools who did not have home access. Not surprisingly, there were differences between the sectors: secondary schools had the highest level of home access, with respondents reporting that only 17 per cent of their students did not have access; primary schools reported 27 per cent of pupils not having home access, and special schools reported 44 per cent of students not having home access.
- The use of learning platforms by schools is increasing. The percentages of schools in all sectors possessing a learning platform had increased from 2007: secondary schools experienced the biggest increase. The most common uses for a learning platform are, firstly, as a repository for documents for learning and teaching and, secondly, as a store for digital learning resources.
- The use of technology to support personalising learning is important for school leaders, but it is not paramount. Having the ICT infrastructure in place and developing the necessary teacher skills appear to be more important priorities now. Teachers have mixed views about the impact of ICT on personalising learning.

Introduction

This chapter discusses the key findings from the Harnessing Technology Schools Survey 2008 under a number of specific headings. The headings represent special

themes which either have not been discussed elsewhere in the report or are deemed to be particularly important for this year's survey. The three linked special themes discussed here are:

- home access
- learning platforms
- personalising learning.

Home access

Some commentators have suggested that increasing home access to ICT (for both pupils and parents) is a way of further promoting ICT as a means of improving educational outcomes.

Findings from two of the surveys indicate that home access is by no means universal. According to school leaders' estimates, the mean proportion of pupils across the three school sectors who did not have home access to a computer was 30 per cent. There were some important differences between sectors: according to school leaders, secondary schools had the highest level of home access, with respondents reporting that only 17 per cent of their students did not have access; primary schools had a considerably lower level of access, with reportedly 27 per cent of pupils not having home access, and special schools had a lower level still, with 44 per cent of students not having home access.

Information on the proportions of pupils who had home access to a computer in each school was also requested from ICT co-ordinators. It was found that, on average, across all sectors, almost one-third of pupils (29 per cent) did not have home access to a computer. Of those pupils who did have home access, 13 per cent did so through a computer loaned or leased by the school, and almost three-quarters (71 per cent) had their own or a family-owned computer.

Again, the differences between sectors are worth noting. Secondary schools had the highest level of home access, with respondents reporting that only 18 per cent of their students did not have access; however, 30 per cent of primary school pupils were reported not to have home access, and special schools reported that 40 per cent of their students did not have home access. These two sets of findings are remarkably similar and provide robust evidence about the scale of the lack of provision that would need to be addressed by a universal home access scheme. They suggest that there continues to be a digital divide.

ICT co-ordinators were asked whether their schools had a home access scheme. Four per cent of ICT co-ordinators in primary schools reported having a home access scheme in their schools, compared with 17 per cent of respondents in secondary schools and 5 per cent in special schools.

School leaders (across all sectors) were asked what they thought would happen over the next 12 months regarding home access to computers. The majority of school leader respondents (58 per cent) took the view that the proportion of pupils with home access will increase slightly in the next 12 months, with around a quarter indicating that it will stay about the same. Secondary school leaders were slightly more optimistic about an expansion in home access, and special school leaders were slightly more pessimistic.

ICT co-ordinators were also asked what they thought would happen regarding home access to computers and, again, over half of all respondents thought that it would increase slightly over the next 12 months. Around a quarter thought that it would stay about the same. This pattern of responses broadly reflected the views of respondents across each of the different sectors.

School leaders and ICT co-ordinators (who reported having a home access scheme) were asked whether teachers were doing anything differently due to having a home access scheme in place in their schools. Of the 66 senior leaders who provided a response to this question, over half thought a home access scheme made a difference to the way teachers taught, although respondents had different views about the amount of difference (a big difference, some difference or a small difference) that the scheme made.

Of the 49 ICT co-ordinators who said that their schools had a home access scheme, most reported that teachers were setting more homework which required the use of ICT, because their schools had a home access scheme in place. This was particularly the case for primary and secondary schools. Primary and secondary schools also similarly reported that having a home access scheme in place had resulted in more electronic submission of homework and more use of ICT in lessons.

If home access schemes were to have an impact on schools, what form would this impact take? Half the school leader sample (49 per cent) felt unable to respond to this question, but where responses were given, these indicated that there was more likely to be an impact on pedagogy or teaching (43 per cent of respondents) than on policies regarding the devices that would be allowed into school (24 per cent) and school procurement policies (14 per cent). Again, secondary school respondents, who would be much more likely to have experienced home access schemes, were more likely to identify impacts than their primary or special school colleagues.

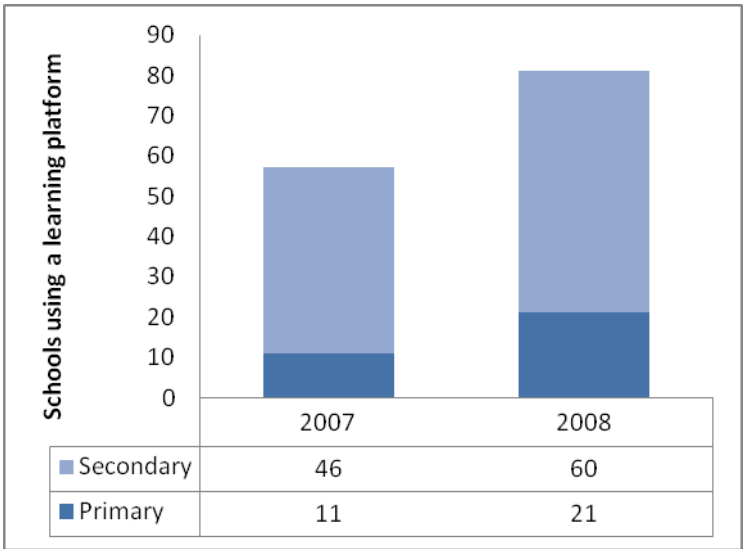
There seems to be a prevailing view that home access schemes have the potential for bringing about changes to teaching and learning, but respondents are understandably cautious about identifying such changes at present.

Learning platforms

The year 2008 has been a key target date for the expansion of the numbers of schools acquiring and using learning platforms, and for the provision of personalised learning spaces for pupils and students.

Both the ICT co-ordinators' survey and the teachers' questionnaire included direct questions about learning platforms, although the emphasis in the ICT co-ordinators' survey was more on the technical aspects of learning platforms. Despite the differences in emphasis, some common themes relating to the use of learning platforms emerged. These can be summarised as follows:

- The use of learning platforms is increasing. The percentages of schools in all sectors that possessed a learning platform had increased from the percentages in 2007 (Figure 8).
- The possession and use of learning platforms vary by sector. Overall, almost three-fifths of secondary school respondents had access to a learning platform, compared with just under one-fifth of primary school



respondents and one-third of special school respondents.
- The most common use for a learning platform, confirmed by both ICT co-ordinators and teachers, is as a repository for documents for learning and teaching (particularly learning resources for learners). Just under a quarter of teachers said that they uploaded and stored digital learning resources at least once a week (and this proportion applied in each of the three school sectors).
- Home access for teachers via a learning platform is increasing. Compared with 2007, an increased proportion of teachers reported that they could access their schools' networks from home, but the increase was small for primary schools. The proportion of secondary school respondents able to take advantage of home access had risen from 27 per cent in 2007 to 40

per cent in 2008; in primary schools, 8 per cent of teachers said that they had home access compared with 6 per cent in 2007.

Figure 8: ICT co-ordinators' responses on whether schools use a learning platform (%)

Both the ICT co-ordinators' and the teachers' questionnaires provided a definition of a learning platform to make sure respondents understood the term.

ICT co-ordinators were asked whether they used a learning platform in their schools and, if they did, to provide details of which one they used. Just over a third of all respondents (37 per cent) said that their schools used a learning platform. This was more the case for secondary schools than for primary and special schools. Twenty-one per cent of respondents in primary schools and 30 per cent in special schools said that their schools had a learning platform. This compared with 60 per cent of respondents in secondary schools. These are increases on the 2007 survey findings which indicated that 11 per cent of primary schools and 46 per cent of secondary schools had a learning platform.

Findings from the teachers' questionnaire were similar to those from the ICT co-ordinator survey: 41 per cent of teachers said that their schools had a learning platform, 32 per cent said that they did not, and 28 per cent did not know or did not respond. As with the ICT co-ordinators', teachers in secondary schools were more than twice as likely as those in primary schools to report that they had access to a learning platform. Overall, almost three-fifths of secondary school teachers had access to a learning platform, compared with just under one-fifth of their primary school counterparts and one-third of special school respondents.

Thirty-two primary schools, 105 secondary schools and 56 special schools responded to the question asking which learning platform their schools operated. Of the 208 ICT co-ordinator respondents who said that their schools used a learning platform, 193 named the learning platform: for just under a quarter of all respondents, this was Moodle. Moodle was the most frequently reported learning platform across each of the school sectors: 22 per cent of primary schools, 31 per cent of secondary schools and 13 per cent of special schools. All other named learning platforms were each used by less than 10 per cent of schools.

ICT co-ordinators were asked how their learning platforms were purchased. Of the schools that reported using a learning platform, just under a quarter said that their learning platforms had been purchased by or via the local authority. Primary and special schools reported this to be the case more frequently than secondary schools. In secondary schools, 22 per cent of respondents said their learning platforms had been purchased by/via the local authority. Among ICT co-ordinators in secondary schools, 27 per cent said that their schools had purchased the learning platforms, compared with 3 per cent of primary schools and 6 per cent of special schools.

A further question identified the most common features of learning platforms and asked ICT co-ordinators to indicate how the learning platforms were used. The highest proportion of responses related to using learning platforms as repositories of documents for learning and teaching. Within this category, 40 per cent of respondents said they used learning platforms as repositories for learning resources for learners, just under a third used them for lesson plans, and a quarter used them for teaching software. Just under a quarter of respondents used learning platforms for storing pupil work, and around a fifth reported using it for social networking.

In a similar vein, teacher respondents who reported that they had access to a learning platform were asked which features they found most useful. Overall, the most useful features of a learning platform were reported to be, firstly, that it was a repository of documents for learning and teaching (particularly learning resources for learners) and, secondly, that it was a means for accessing information about pupils' progress for management and teaching staff. Access to documents such as lesson plans, learning resources for learners and teaching software were more frequently regarded to be a very useful or useful feature of a learning platform by respondents in all three school sectors. Almost two-thirds of primary school respondents said that teaching software was a useful feature, while in secondary and special schools, a similar proportion of respondents indicated that learning resources for learners were useful.

Around a third of teacher respondents in all three sectors said that assessment of and for learning were useful features, whereas a lower proportion of all respondents thought that hosting e-portfolios was useful. This latter feature was, however, not part of the learning platform in around two-fifths of schools in the survey sample.

The use of a learning platform for setting homework was reported to be more common among secondary school respondents compared with those in primary schools and, especially, special schools. Within the secondary school sample, almost half of all respondents said that storing pupils' homework was a very useful or useful feature of a learning platform, while a slightly lower proportion of secondary school respondents thought that sharing homework or having a dialogue with pupils was useful.

Wikis, blogs, podcasting and social networking were not included as a feature in learning platforms in around a third of primary and secondary school sample groups and over two-fifths of special schools. Of those respondents who reported that these features were available, about a quarter of primary and of secondary school respondents said that they were useful, while fewer special school teachers said that these were useful features.

Respondents to the teachers' survey were asked how often they stored digital learning resources on the school's network. The same proportion of teachers (just under a quarter) in all three school sectors said that they uploaded and stored digital

learning resources at least once a week. In the primary school sample, 45 per cent of respondents said they did this at least once a month, compared with 38 per cent of respondents in 2007. In secondary schools, the percentage-point increase in respondents who said they upload and store digital learning resources at least once a month is even greater, having risen from 42 per cent in 2007 to 51 per cent in 2008.

Teachers were asked whether they could access their schools' networks from home. A greater proportion of respondents indicated that they could not access their schools' networks from home (58 per cent) than could (25 per cent), but there were variations between the three sectors. More teachers in the secondary school group indicated that they were able to access the school's network from home. The proportion of secondary school respondents able to access a network from home has also risen since the 2007 survey, from 27 per cent to 40 per cent. In primary schools, 8 per cent of teachers said that they had home access, compared with 6 per cent in 2007. Around one in 10 teachers in each of the three school sectors said that they did not know whether they could access the school's network from home.

Personalising learning

There has been much discussion about what the terms 'personalising learning' or 'personalised learning' mean. The requirements for schools to have learning platforms and online learning spaces for all students by spring 2008, and for greater use of e-portfolios, have stimulated this debate further. Becta has provided a set of seven key elements for personalising learning and has stressed that: 'The use of technology can greatly support and enhance all of these seven elements' (Becta, 2007, p.2). The seven elements are as follows:

- The learning and teaching dynamic
- Assessment
- Flexible curriculum
- Learning environment
- Support networks
- Personalised content
- Responsive infrastructure.

The theme of personalising learning runs through the Harnessing Technology strategy and can be linked with the need for every child to benefit from ICT. Personalising learning is summed up as follows in the e-strategy document (DfES, 2005, p.43): 'ICT enables learning to be tailored to the needs of the pupil. They can learn where and when they want to, at a pace and in a style that best suits their needs.'

The school leaders' survey revealed that, although using technology for personalising learning did feature as an important ICT-related strategy for more than

half of school managers, it was not one of the top five priorities. The most frequently identified priorities, as highlighted in Chapter 3 of this report, were as follows:

- replacing equipment (81 per cent)
- teachers' continuing professional development (72 per cent)
- investments in ICT infrastructure (69 per cent)
- e-safety (57 per cent)
- acceptable use policies (54 per cent)
- using technology for personalising learning (51 per cent).

It seems that the use of technology to support personalising learning is on the agenda for school leaders, but it is not the main priority. Having the ICT infrastructure in place and developing the necessary teacher skills are more important for this year.

A question for teachers about the impact of ICT on personalised learning elicited a mixed response. Although more than half of those who expressed an opinion on this agreed or strongly agreed with the statement that 'ICT has a positive impact on personalising learning', around two-fifths of respondents neither agreed nor disagreed, and some respondents (5 per cent or less) disagreed. The highest level of neutral or negative responses related to the impact of ICT on personalised learning for Key Stage 1 pupils, and the highest level of agreement related to Key Stage 4 pupils.

It is important to bear in mind that there are likely to be differences by subject taught: a statistically significant relationship was found between responses to the statement that ICT helps in personalising learning and the subject that teachers primarily taught or were responsible for. For example, of the teachers who strongly agreed with this statement, almost a quarter (24 per cent), were English teachers.

Learners' use of e-portfolios is an important element of personalising learning, and there has been much debate about what form e-portfolios should take and whether they bring significant benefits for learners. Progress towards the policy objective of giving every pupil access to a personalised learning space with the potential to support an e-portfolio continues to be rather slow, and there has been very little change since the 2007 survey. There has been more progress in this area in the secondary school sector compared with primary and special schools.

7. Overview

This chapter brings together the findings from previous chapters to map out an overview of the current landscape of ICT in schools. One way of doing this is to consider the features of the current landscape as they relate to the Harnessing Technology strategy. For example, in the light of all the survey findings:

- what features have been changing in this landscape?
- what remains largely the same?
- are any features or aspects of the landscape that are underdeveloped and that may need particular attention in the near future?

Changing features

It seems that, in many respects, the landscape has not changed dramatically since 2007. Where there have been changes, these have been important in that they reflect positive developments in the use of, and attitudes towards, technology for teaching and learning.

Several longer and shorter term trends have continued. One of the most noticeable of these is probably the continued improvement in the ICT infrastructure and in the numbers of devices available for schools. For example, average numbers of interactive whiteboards have increased considerably, in both primary and secondary schools, since 2007, pupil–computer ratios have continued to improve, and the number of learning platforms in use has increased. The vast majority of teachers reported that their computers were connected to a network, and there were good levels of satisfaction with internet access, speed and reliability. In addition, more than nine out of 10 schools now have their own websites.

These technical developments have been accompanied by important ongoing changes in attitudes towards, and confidence in, the new technologies, particularly among teachers and school leaders. The survey findings revealed that a majority of teachers, across all school sectors, are confident and enthusiastic about using ICT. Perhaps one of the most significant survey findings was that teachers' use of digital learning resources is increasing, with a quarter of teachers uploading digital learning resources at least once a week. There have also been increases in the proportions of teachers creating their own resources and sharing digital resources.

Teachers are positive about the benefits and the potential contribution of new technologies to learning. For example, a substantial majority of teacher respondents took the view that pupils enjoy lessons more if they use ICT than if they do not. Across all three sectors, there was agreement generally that ICT plays a positive role in engaging pupils in learning, having an impact on attainment and in terms of personalising of learning.

All of this suggests steady but significant progress in terms of technical infrastructures and with respect to underlying beliefs about the current and potential benefits of using ICT for teaching and learning, and motivation. The fact that a large majority of teachers feel confident and enthusiastic about ICT is an important foundation for the next stages of the Harnessing Technology strategy. (In addition, National Foundation for Educational Research (NFER) findings from other projects, including an evaluation of the Computers for Pupils scheme, suggest that parents

and pupils are equally enthusiastic about these benefits.) Although there is always scope for improvement, the adoption stage of the Harnessing Technology strategy has progressed well. There have been continuing improvements in the capability and capacity of teachers to make use of the new technologies for the benefit of learners.

Adoption or transformation?

There is evidence that infrastructures, technologies and constructive attitudes of practitioners towards ICT are becoming embedded in schools, and that the sharing of good practice, though perhaps more within than between schools, is also progressing. In this respect, the Harnessing Technology strategy has enabled schools and practitioners to make good progress through the adoption stage, but it seems that there are important barriers to be overcome before the ambition of transformation can occur. Indeed, the research findings from these surveys of schools in England are consistent with the findings from a report into ICT use in schools in Wales, which concluded that there had been: 'Good progress… but not transformation' (Department for Children, Education, Lifelong Learning and Skills, 2008, pp.1–18).

Other findings further suggested that schools' use of ICT is not yet at a transformational stage (and that the landscape, in some respects, is not changing). These findings were predominantly related to the special themes discussed in Chapter 6:

- **Home access**: The school leaders' survey revealed that the estimated mean proportion of pupils across all three school sectors who did not have home access to a computer was 30 per cent. In this respect, there is a still a digital divide, which is seriously hampering progress towards the goals of closing the gap between those from disadvantaged backgrounds and their peers, and bringing the full benefits of ICT to every child.
- **Learning platforms**: Although, as noted above, the use of learning platforms by schools is increasing, progress is limited. Substantial proportions of schools still do not have learning platforms. Furthermore, the most common uses for a learning platform are as a repository for documents for learning and teaching and, secondly, as a store for digital learning resources, both of which could be seen as passive uses. There is evidence that the culture of classroom technology use is still geared primarily towards display and presentational functions.
- **Personalising learning**: Although a majority of teachers were optimistic about the potential contribution of ICT to the personalising of learning, it would also be true to say that teachers have mixed views. Furthermore, although the use of technology to support the personalising of learning was important for school leaders, it was not their top priority. Confusion about what personalised learning is and uncertainty about how

technologies can support such learning may partly account for these mixed views.

Future priorities

These issues (home access, use of learning platforms, and personalising of learning) are not new to Becta or to other stakeholders involved in this field of education. Indeed, it is important to acknowledge that, to some extent, these problems have already been recognised and measures have been initiated to address them. For example, the Computers for Pupils scheme targets pupils from socio-economically deprived areas, and Becta has commissioned research on reducing social inequity with technology. There is also a considerable amount of ongoing work in the area of using technology for personalising learning.

An overview of the Harnessing Technology Schools Survey findings for 2008 suggests some important areas that would merit further attention. The two most prominent of these are:

- There is a need to look further at how technology can be used for developing partnerships between parents and schools. The evidence from the survey suggests that community access to schools' ICT facilities is still somewhat limited and that, even where technological and virtual forms of communications with parents exist, these tend to be one way and not interactive. The whole area of community–parent–child–teacher–school communication is important, especially in the current context of the Children's Plan and the Every Child Matters (ECM) agenda.
- Secondly, there appears to be a need to support and encourage teachers and schools to use technology in ways that are more engaging for learners. Understandably, embedding new technologies takes time, and the simpler technological functions are inevitably used first, but there does seem to be evidence to suggest much potential for the more engaging use of learning platforms, school networks, and devices. Formal training sessions for school staff, greater use of mobile devices and of social software, and more active forms of assessment, for example, may help encourage better learner engagement.

There are some obvious barriers to developments in these areas: with regard to engaging learners, for example, teachers have frequently cited the need for more time to try out digital resources and the technologies used to deliver them. There are also cultural barriers – it is clear, for example, that in some school subject departments, and even whole schools, technological innovation rarely features, whereas in others it is fully embraced. But these barriers are not insurmountable, and it is to be hoped that the findings presented here will assist Becta and others to take ICT in schools forward into the transformational stage of the Harnessing Technology strategy, for the benefit of both teachers and learners.

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