November 2009

Becta leading next generation learning

Harnessing Technology Review 2009

The role of technology in education and skills

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Introduction

Technology now touches almost every aspect of life. This reach, and the range of applications, is likely only to increase. It is vital that learners are well prepared for this changing world and that those supporting them can use what technology offers to achieve the best outcomes possible.

This review brings together a range of research evidence and data from England to look at what has been achieved in implementing technology to support learning. Most of the data presented here was collected through studies conducted in early 2009.

Much has changed since 2008. Online information for parents and use of learning platforms represent two examples of significant progress for schools. In FE the increased integration of technology systems puts the sector in a healthier position to deliver benefits such as administrative efficiencies and support for multi-site learners. Furthermore those who work in these sectors are reporting greater benefits from technology, including time savings and positive impact on attainment.

Though the overall picture is positive, it remains important to tackle challenges and issues identified in the next section. That way the full benefits from technology investment can be realised. The review has two sections: schools and FE and Skills. The broad questions covered are:

Technology-confident effective providers

Can education and training providers make effective use of technology to achieve the best outcomes for learners?

Engaged and empowered learners:

Are learners and parents able to access technology and the skills and support to use it to best effect inside and outside formal learning?

Confident system leadership and innovation

Do education leaders use technology to support their priorities and deploy innovative solutions to improve services?

Enabling infrastructure and processes

Does the technology infrastructure offer learners and practitioners access to high quality, integrated tools and resources?

Improved personalised learning experiences

Do technology-enabled improvements to learning and teaching meet the needs of learners?

Impact of technology

To what extent does technology impact on the broader aims of raising achievement, supporting the vulnerable and improving quality and efficiency

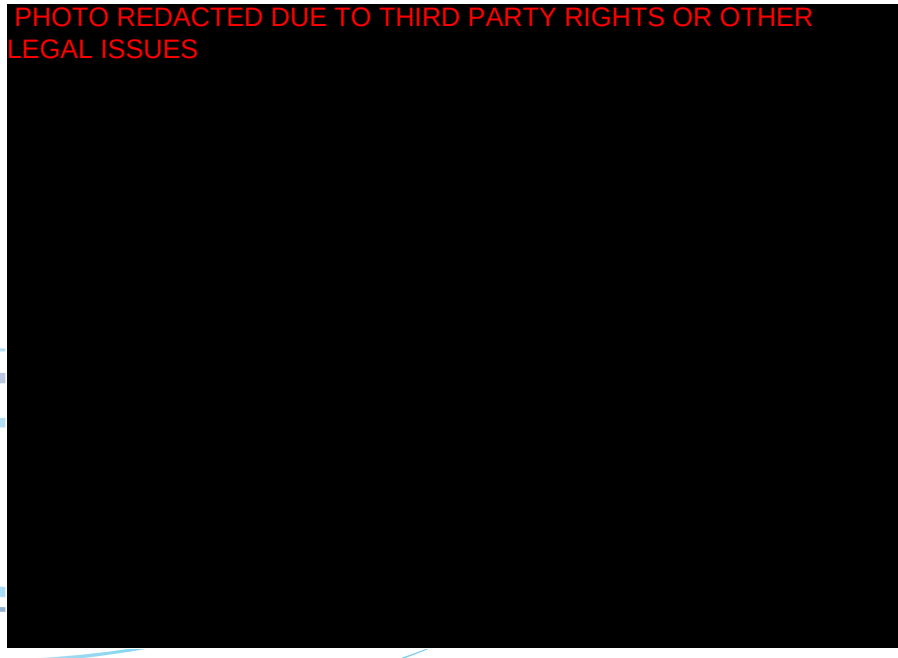
Challenges and issues identified from the research

Real change, but sector differences

Across a range of areas there has been a considerable increase in the integration of technology to support learning, teaching and management. There has been particularly strong growth in the use of learning platforms in schools, for example. This review has identified a doubling of schools' online reporting to parents, significant increases in the use of technology to support assessment and big improvements to the integration of management information and learner systems in further education. These and many more examples offer evidence of a genuine change in the approach to technology within schools, colleges and learning providers. There is related evidence of increased benefits from technology, particularly the proportion of practitioners reporting time-saving benefits.

As last year there remains a small core of 'late adopter' or 'beginning' institutions across all sectors, though this is showing real signs of reduction. However, what is most notable compared to last year's review is the difference between sectors. Overall progress in the primary sector has been more limited than elsewhere.

When we look at the data more closely, we see some interesting findings. Overall, teachers' use of technology in the primary classroom is relatively mature compared to other sectors. Yet on a range of other indicators primary schools falls behind. The signs are that primaries are finding institutional-level change and infrastructure development more difficult than secondary schools. This is reinforced by the finding that those who have reached a good level of technological maturity have drawn on Becta's Self Review tools to support them.



Building from the low base: primary schools reporting online to parents

Last year this review noted 'low bases but big opportunity' in relation to parental engagement. This year has seen strong growth in secure online reporting to parents from that low base, particularly in the primary sector where one in ten schools now offer parental reporting via a learning platform (this was 1 per cent). Though this represents a strong change over one year, it needs to be set in the context of parents' and learners' uses of technology more generally and expectations based on their experience of other sectors and services.

An increasing range of both commercial and public services are supported online, offering access to personal and other information when and where it is required by users and supporting customer transactions. Developments of this kind in the primary school sector will be critical to improving home-school links and supporting parents' and pupils' decisions and choices. So this remains an important area for development.

Routine access to online pupil information for all parents of primary-aged children will take some time and will require support and help from others who work with the primary sector. Smaller institutions face particular challenges in implementing institution-wide technology-based change, as they often lack specialist expertise. So finding ways for primary schools to ease the path of introducing and integrating online information systems will be important over the next couple of years.

Access to management information

Over several years this review has identified challenges in relation to MIS (Management Information Systems) and the use of and access to management and learner information for practitioners. Successful integration of and access to information represents probably the most important step towards realising significant benefits from technology-based systems, both in terms of administrative streamlining and supporting learning.

Within the FE sector there are strong indications that problems integrating management and learner systems are reducing. The percentage of colleges with learning platforms which integrate with their MIS has risen considerably over the last year to 63 per cent (from 47 per cent). It will be interesting to look next year at the impact of this on professional practice as this development opens up significant opportunities for automating and improving information and business processes.

The picture is different for schools. A key indicator of integration of MIS comes from data on whether teachers can get access through a non-administrative network. Sadly the picture of many staff having MIS access purely through an administrative network, rather than other workstations or remotely, has changed little over the last year. Only 29 per cent of secondary teachers and 9 per cent of primary teachers are able to access the MIS remotely. While systems providers are increasingly addressing system capability for integration and online access, the change is not feeding through to schools in ways that would be anticipated. There is a need for continued action in this area.

Learning and teaching: the problem of transition

One of the most notable findings in this review is the evidence of some stark differences in the use of technology to support learning and teaching. Put in the context of children and young people's transitions from primary to secondary sectors, and for some into FE, there are interesting patterns.

In the context of what children, young people and adult learners tell us about how they learn and how they prefer to learn, this is significant. We know, for example, that children and young people increasingly cite using computers as a preferred way of learning.

Yet practice within and between sectors is highly variable. The starkest difference is experienced in the transition from primary to secondary school. Use of technology in core subjects is increasingly a regular feature of learning and teaching in primary schools, with upwards of a third of young people experiencing this at least once a week. However, this drops sharply in secondary schools, with fewer than 10 per cent of students offered the opportunity to use technology in core subjects at least once a week.

Differences between secondary and FE college learning depend largely on subject studied, as the largest within-institution variations occur within the FE sector. Nonetheless, given that the use of learning platforms is relatively mature in FE, the experience is generally one of improvement in terms of access to online information and resources. Work-based learning is a mixed bag, but in general offers increased opportunities for online learning.

Overall there is an increasing need to reflect on and address learners' experience of technology in the context of transition between stages and sectors.

Realising the efficiency premium

Over several years this review has identified efficiency benefits in relation to the use of practitioner time. These benefits have been coming through more strongly every year as the maturity of providers and their technology systems improves. Positive indications in relation to integration of systems within the FE sector signal further benefits in the future as the infrastructure matures to a degree that enables a range of processes to be supported and streamlined. Among many other processes, technology can support large improvements to the efficiency and effectiveness of institution-based information and assessment processes, including setting, submission and return of work and all aspects of recording and reporting of information. It has never been more important for leaders and managers in these more mature technology contexts to focus attention on the changes in practice required to achieve benefit.

There are in fact considerable opportunities for cashable efficiencies given the current maturity of systems in the FE sector and increasing technology maturity in schools. Current readiness to take advantage of this is unclear, however. As it stands, across all sectors, leaders' priorities for technology focus on reform and improvement priorities such as engaging with parents, and supporting low attainers through remote study support. It is encouraging that leaders across education and skills increasingly see technology as critical to enabling improvement and improving effectiveness. However, as yet the issue of technology-related cashable efficiencies is not high on the agenda of most institutional leadership teams.

Thus it is likely where there is a good degree of technological maturity that opportunities are being missed to reduce energy and printing costs, save on space, reduce administrative overheads and realise efficiencies in delivering learning.

Conclusion

It is heartening to see a developing technology maturity in schools, FE and the broader skills sector, and similarly heartening to find greater benefits being realised where a level of maturity has been reached. This review tells us that across much of education and skills we are at a stage where there are significant opportunities to realise further benefits from this maturity. The opportunity to achieve considerable service improvement and efficiency benefits is there for the taking. What is required is informed and focused leadership to make it happen.

The role of technology in primary and secondary schools

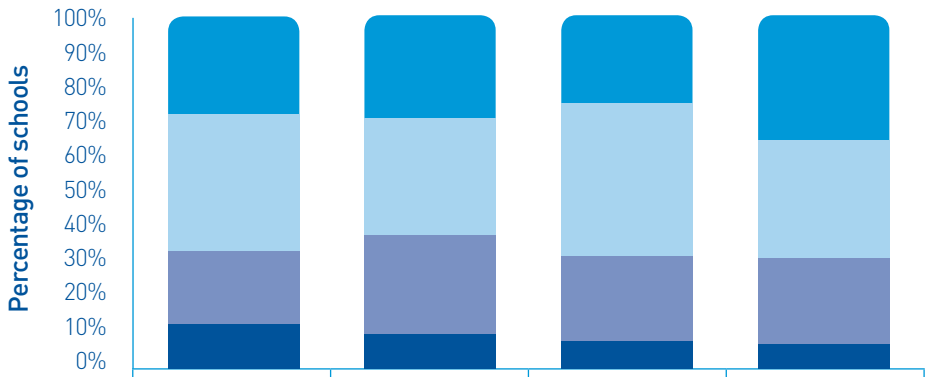
1.1 Technology-confident, effective providers

Overall e-enablement

The last few years have seen steady improvement in schools' e-enablement. The term 'e-enablement' indicates integration of technology across the school, and is in effect a 'low hurdle' version of broader e-maturity. To genuinely support improvement, technology must play its part across a range of school activities, so these measures combine survey data to give a composite, overall picture for each school. School e-maturity measures are derived from 12 responses to the Harnessing Technology schools survey (Smith *et al* 2008, Teeman *et al* 2009) by heads and ICT co-ordinators. These are measures of technology infrastructure, school capability, leadership and uses of ICT for learning, measures that reflect the range of institutional challenges identified in the Harnessing Technology strategy. While they do not offer an exhaustive description of e-maturity, they act as a good set of indicators of the overall level of development and embedding of technology in a school.

In the academic year 2008–09, the average level of e-maturity of primary schools remained about the same as the previous year. Secondary schools, however, did show some progress, with around one third of schools being classed as e-mature. As we noted last year, there continues to be a long 'tail' of schools in the lower, ambivalent and late-adopter categories. Some 38 per cent of primary schools were in these lower categories and 31 per cent of secondary schools.

School e-maturity



	Primary 2007–08	Primary 2008–09	Secondary 2007–08	Secondary 2008–09
e-enabled	28%	29%	25%	35%
enthusiastic	39%	33%	43%	33%
ambivalent	21%	28%	24%	24%
late adopters	13%	10%	8%	7%

Becta has looked at the factors which best predict whether a school is e-mature, looking at a range of questions asked in the annual Harnessing Technology Schools survey and other data such as school type and size.

Participation in the Becta SRF as part of the school's technology strategy is the biggest predictor of e-maturity, demonstrating that co-ordinated planning, integrated into school improvement, is important to achieving change. 62 per cent of e-mature schools have this as opposed to 29 per cent of those in the late adopter category.

CPD is a further important predictor of e-maturity. If leaders have confidence in funding for ICT CPD or CPD for teachers is in the technology strategy, schools are far more likely to have integrated technology than if this is not the case.

Personalised learning being a school priority for ICT is a further key factor. Some 73 per cent of e-mature primary schools state this, as opposed to 36 per cent of enthusiastic and 23 per cent of ambivalent and late adopter schools.

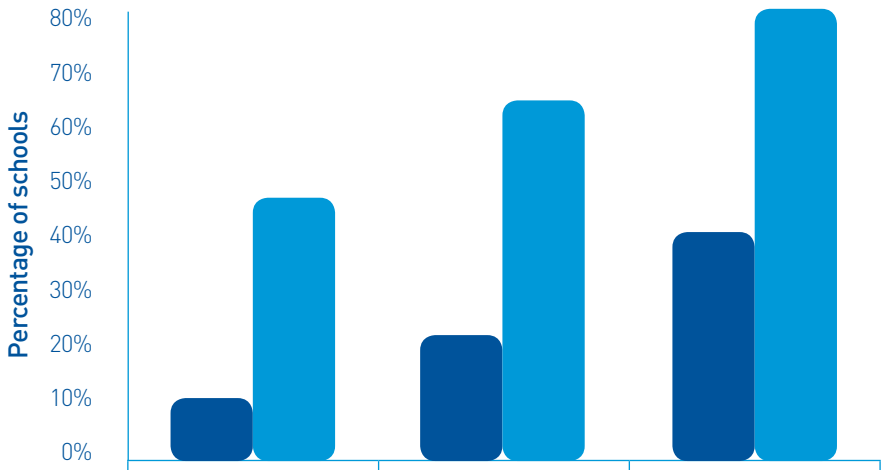
Having a wireless or mixed network accessible to pupils is another strong predictor of e-maturity level for primary schools. It is interesting to note that having a better than average pupil-computer ratio is a poor predictor of e-maturity. Similar proportions of schools have 'better' or 'worse' ratios at all levels of e-maturity, indicating that ICT provision does not guarantee integration and use of technology.

The use of a learning platform seems to be particularly important for primary schools' e-maturity and is likely to be a key aspect of integrating technology across the school. Some 59 per cent of e-mature primary schools as opposed to 28 per cent of enthusiastic schools have a learning platform.

Parental reporting and learning platforms

During the last year schools have made considerable progress in the adoption of learning platforms – more than has been seen in previous years. Integration of learning platforms appear to be high on the list of concerns for school leaders, particularly in the secondary sector. Some 79 per cent of secondary schools had a learning platform in 2008–09. This rose from 63 per cent in 2007–09 and 46 per cent in the previous year. A far lower percentage of primary schools reported that they support a learning platform, 40 per cent in 2008–09. However, this proportion has more-or-less doubled over each of the past two years. (Teeman *et al* 2009)

Schools with a learning platform

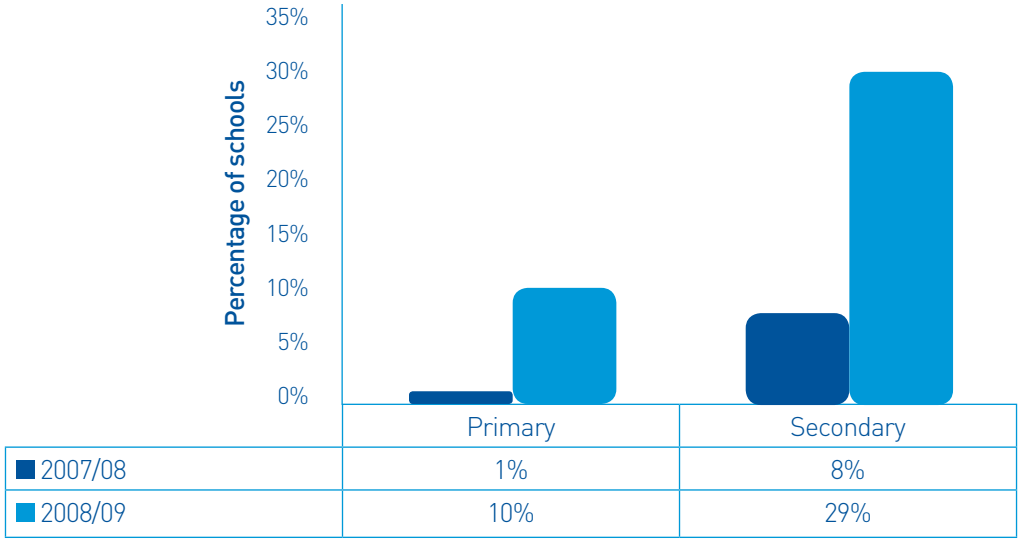


	2006–07	2007–08	2008–09
Primary	11%	22%	40%
Secondary	46%	63%	79%

However, having a learning platform is just the first step, and is not necessarily an indicator of use. A lower percentage of teachers report making regular use of a learning platform. Some 40 per cent of secondary teachers and 13 per cent of primary teachers use their school's learning platform a few times a month or more (Teeman *et al* 2009). The reported experience of secondary school students seems to concur with this. Some 46 per cent of secondary learners said they used their school's 'website and online work areas' at least once a week. However, 53 per cent of primary learners reported this, indicating a fairly high use of online resources and websites provided by the school (not necessarily via a learning platform. (Keating *et al* 2009).

Similarly schools have made considerable progress in providing online reporting to parents over the last year. There has been a large increase in the number of schools reporting that parents use the school's learning platform to access pupil information. However, there is still some way to go with 29 per cent of secondary schools reporting this and only ten per cent of primary schools. (Teeman *et al* 2009). Given the strong trend in adoption of learning platforms, however, it is likely that most secondary schools will be reporting online to parents by the end of 2010.

Parents access online pupil information (via learning platform)



	Primary	Secondary
2007/08	1%	8%
2008/09	10%	29%

Workforce competence and confidence

Increasing numbers of teachers are making use of ICT resouces in their lessons. Interactive whiteboards and other display technologies have been in wide use for some time now. Some 86 per cent of primary teachers use these at least once a day, compared to 73 per cent of secondary teachers. Other types of technology resources are also heavily used by teachers. Around half of teachers in both sectors make daily use of the internet in their work, for example.

In line with this, ICT co-ordinators are positive about teachers' use of technology in lessons, particularly in the primary sector with 88 per cent of primary co-ordinators and 78 per cent of secondary co-ordinators being 'quite' or 'very' confident that they make best use. However, only 25 per cent of primary and 14 per cent of secondary co-ordinators are 'very' confident about this, indicating a lower proportion of schools with consistently good practice and difference between the sectors in this respect.

Though the picture is increasingly positive in relation to classroom use, ICT co-ordinators are less confident that teachers are making best use of technology in other ways. 23 per cent (primary) and 28 per cent (secondary) are 'quite' or 'very' confident about teachers using technology well to communicate with parents and 52 per cent (primary) and 50 per cent (secondary) are 'quite' or 'very' confident that teachers use technology well for assessment of learning.

1.2 Engaged and empowered learners

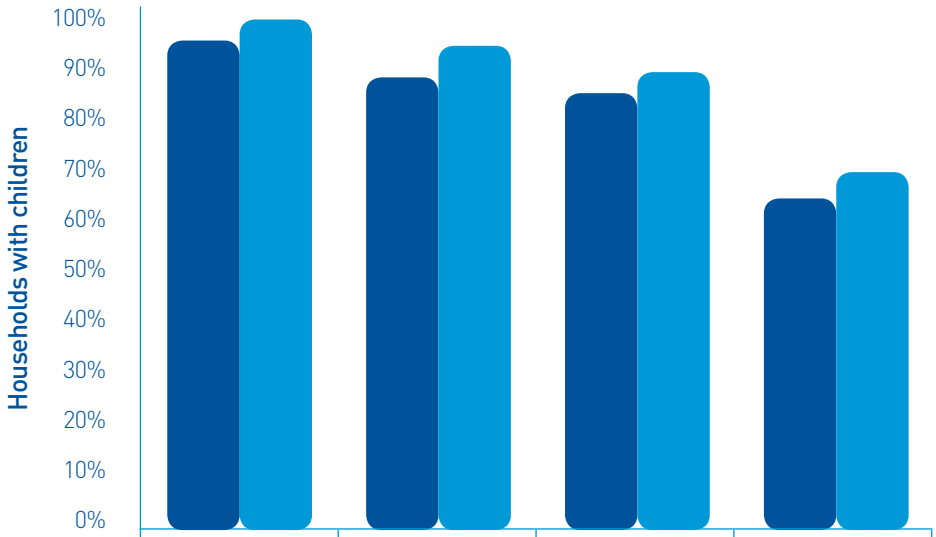
Digital inclusion

Ofsted recently commented on the benefits gained by learners through using ICT. It concluded that technology was contributing positively to the personal development and future economic well-being of pupils and students. It developed their skills of working both independently and cooperatively and was in most cases motivating and engaging. (Ofsted 2009a)

Trends in the consumer market have ensured that, on the whole, children and young people have good access to technology and connectivity at home relative to the population as a whole. Some 84 per cent of households with school-aged children had access to the internet and a computer at home. (Ofcom 2009)

However, this figure masks some significant differences between groups. For school-aged learners, not having access to the internet at home is still strongly related to social class. While 97 per cent of children from social classes A and B had internet access at home, only 68 per cent of children from social classes D and E had this. While there has been some change, the gap between these groups has changed little in the last year or so.

Internet access at home by social grouping



	AB	C1	C2	DE
2008	93%	86%	83%	63%
2009	97%	92%	87%	68%

Internet use and engagement with other technologies also increases with age. Other factors often associated with digital divides (ethnicity, religiousness, disability, having a first language that is not English) were found not to be significant in the use or non-use of technology by young people. The use of technology is not just explained by socio-economic factors. Attitudes towards technology and friends' engagement with technology is also important. A child's age, and their friends' engagement in technology were the only significant predictors of use or non-use across all technology types (Davies *et al* 2009).

Differences between young people

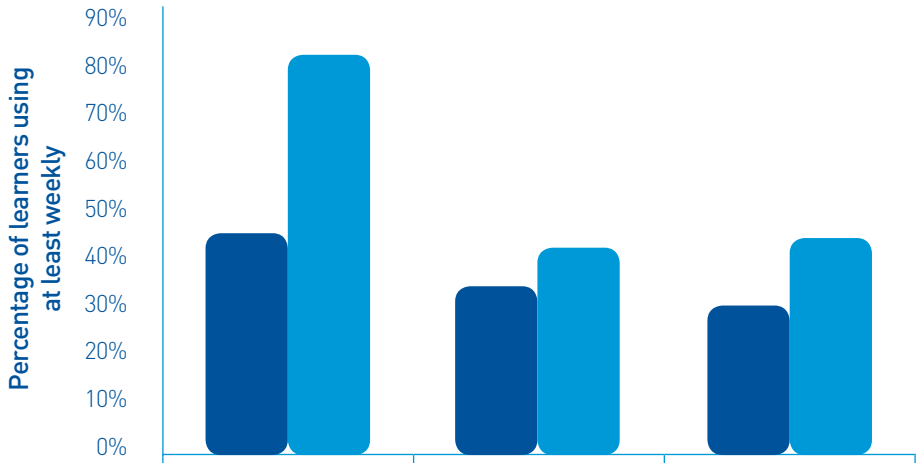
In general, young people hold positive attitudes about technology and tend to view the Internet, books and magazines and visual and auditory tools as important for learning. Age and gender are important in understanding young people's attitudes towards technology. For example, girls tend to see print media as more important for learning than boys; and 8 year olds rated computers and the internet as less important for learning new things compared to 12, 14 and 17–19 year olds. (Davies *et al* 2009)

Young people generally rate themselves highly in their ability to use technologies, although there are gender and age differences. With the exception of using computer and console games, those from the younger age groups rate themselves less highly than other age groups. Boys are also likely to rate their internet skills more highly than girls. However, the extent to which boys are, in fact, more skilled or just more confident remains an open question. However, an important aspect of beliefs about personal ability to use technology is the extent to which a problem-solving approach is taken to technology. Boys and those belonging to the older age groups are more likely to employ a problem-solving approach to technology.

Use of technology at home

Most primary and secondary learners stated that finding information online was one of the most frequent uses of a home computer. Some 72 per cent of primary learners did this at least once a week, as did 81 per cent of secondary learners. A similarly large number of secondary learners (83 per cent) used computers to write their homework at least once a week, compared to 46 per cent of primary learners, probably reflecting the less frequent demands of homework in primary schools (Keating *et al* 2009). Similarly, the lower figures for using computers to revise for tests may reflect the less frequent timetabling of tests as compared to other homework.

Children and young people's use of computers at home



	Write homework	Find info on the internet	Revise for tests
Primary	46%	35%	31%
Secondary	83%	43%	45%

This is also reflected in the percentage of teachers who set homework requiring access to a computer or the internet. This was again more common in secondary schools than primary schools. Some 30 per cent of primary school teachers compared to 77 per cent of secondary school teachers set homework that requires a computer either often or sometimes. Just over a third (35 per cent) of primary school teachers and nearly eight out of ten (78 per cent) secondary school teachers set homework often or sometimes that required access to the internet. (Teeman *et al* 2009)

Secondary learners with a computer in their bedroom made more frequent use of it than those who had access elsewhere in the home. Also these learners used the computer for a different pattern of tasks, being more likely to use it for leisure purposes; sending email to friends, downloading video clips and using CD-ROMs or DVDs (Keating *et al* 2009).

Learners' e-safety

Learners indicated that teachers and parents are their main sources of e-safety advice. Some 70 per cent of secondary school learners had received e-safety advice from parents or carers, and 64 per cent from teachers. In primary schools 81 per cent of learners had received e-safety advice from parents or carers and 73 per cent from teachers. (Keating *et al* 2009)

However, learners' responses to questions on a number of ethical and safety issues suggest that there is scope for such provision to be improved by schools, especially in the primary sector. In particular, a considerable number of primary learners indicated that they were not sure about key issues relating to e-safety.

Gender, e-access at home, e-skills, and attitudes towards school, learning and using technologies for learning can influence e-safety behaviours. Among primary level learners, socio-economic status and exposure to using technologies for learning may also play an important role.

The majority of the schools visited by Ofsted taught their pupils and students about the risks associated with using the internet. However, Ofsted noted that few schools evaluated the effectiveness of this (Ofsted 2009a).

1.3 Confident system leadership and innovation

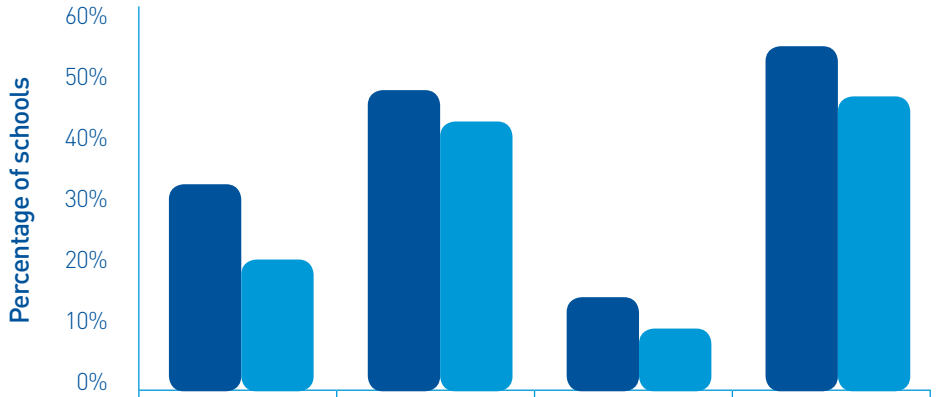
Leaders' priorities

Headteachers in half of schools placed the use of learning platforms among their top three immediate priorities from areas addressed in their technology strategy. Other priority areas included the replacement of equipment (36 per cent), teacher CPD (33 per cent) and investments in ICT infrastructure (27 per cent). (Teeman *et al* 2009)

There are differences in the priorities of primary and secondary school leaders. A higher proportion of secondary school leaders said that the use of learning platforms was a priority. Some 71 per cent of secondary school leaders said this was a priority, as opposed to 42 per cent of primary leaders. Also a higher proportion of secondary leaders (28 per cent) placed online reporting to improve parental engagement among their top three priorities. On the other hand, this was a top-three priority for only 7 per cent of primary schools. These findings are not surprising given the recent emphasis placed on these policy areas for secondary schools.

School leaders were also asked to identify areas that were a high priority over the next three years. The proportion of leaders identifying each of these areas as a high priority either remained the same or fell since 2008. Here the proportion of leaders that prioritised using technology to improve communication with parents fell for both secondary and primary schools. In 2009, 43 per cent of secondary leaders and 21 per cent of primary leaders prioritised this, as opposed 48 per cent and 33 per cent in 2008. Also the proportion of leaders identifying using technology for remote access study support also fell. Some 47 per cent of secondary leaders and 10 per cent of primary leaders said this was a high priority in 2009. In 2008 these percentages were 55 per cent and 15 per cent.

Heads give high priority to use technology...



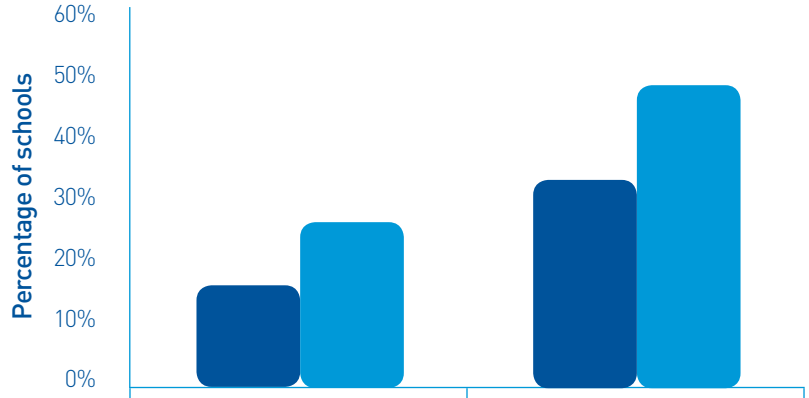
	Primary	Secondary	Primary	Secondary
	to improve parent communication		to provide remote study support	
2007/08	33%	48%	15%	55%
2008/09	21%	43%	10%	47%

The decline in these figures may represent a happy situation in which schools have either achieved these or are expecting to achieve them in the current year. In many instances, this is the case. Some 49 per cent of secondary schools and 38 per cent of primary schools have an electronic system capable of communicating with parents to at least some extent. Online reporting to parents is expected to be implemented in all secondary schools by 2010 and primary schools between 2010 and 2012. We can therefore assume that this policy priority still has a limited profile at some schools, especially primary schools.

Quality of school leadership of ICT

Ofsted found that the leadership of ICT had improved and the schools they visited had made ICT a high priority for development. Leaders were providing a vision for the place of ICT in learning and were investing significantly in infrastructure, resources and staff training. Investment in resources had improved teaching, but had still not made ICT a part of everyday learning. Many schools were seeking to make ICT resources more readily available to pupils and students in classrooms. Some schools were not getting best value in purchasing ICT equipment. Also only around half of the schools were systematically evaluating the impact of ICT in improving learning and raising standards across the curriculum. (Ofsted 2009)

Collaboration with other schools on curriculum and resource development



	Primary	Secondary
2007/08	16%	33%
2008/09	26%	48%

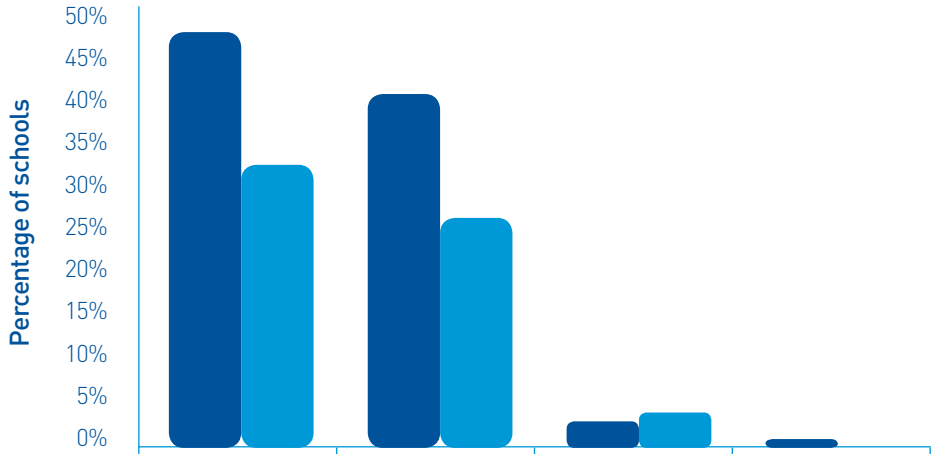
1.4 Enabling infrastructure and processes

Access and sustainability

The average number of pupils per computer in schools has changed little over the past few years. The mean number of learners for each computer in primary schools 6.6 and in secondary schools is 4.2 (Teeman *et al* 2009).

Over 70 per cent of schools in each sector gave replacing equipment as one of the elements of their current technology strategy (Smith *et al* 2008). However, far fewer schools saw this as a current priority, 40 per cent of secondary schools and 26 per cent of primaries. The safe disposal of obsolete equipment appeared in the strategies of less than 30 per cent of primary schools and less than 40 per cent of secondary schools. This was a current priority for very few indeed. Both these aspects of sustainability have declined as priorities for schools.

Items prioritised in school ICT strategies



	Replacement of equipment		Disposal of equipment	
	2007/08	2008/09	2007/08	2008/09
Primary	47%	40%	3%	1%
Secondary	32%	26%	4%	0%

Purchasing

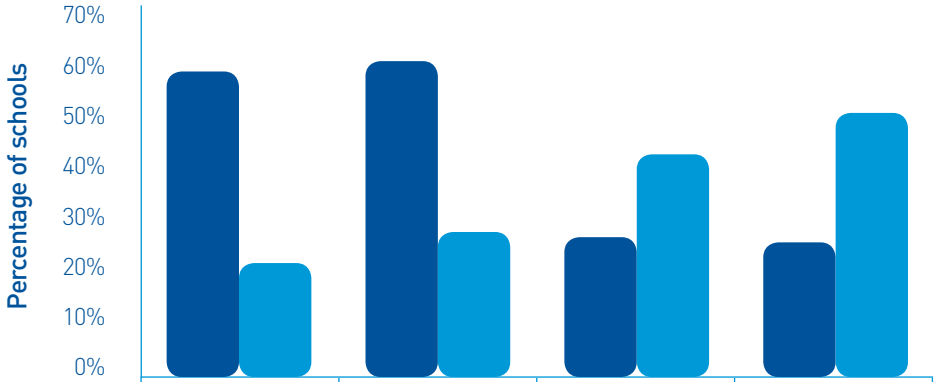
Some 43 per cent of primary schools and 27 per cent of secondary schools plan to use their local authority (LA) purchasing framework. This is by far the dominant route for schools wishing to use aggregated purchasing. Less than ten per cent of primary schools and 15 per cent of secondary schools use any other single aggregating framework. (Teeman *et al* 2009)

There was an increase in the number of 'other independent sources' used to purchase hardware since 2007–08, with an accompanying decrease in local authorities and ICT suppliers. This may suggest that schools, especially larger schools, have become more autonomous, and less dependent upon LAs in their purchasing decisions.

Management information systems

Almost all secondary schools use a management information system (MIS), as do around 90 per cent of primary and special schools. However, many schools offer access to their MIS via a separate admin network only, indicating that integration of management information across staff groups is at an early stage. In around half of secondary schools (51 per cent) access is restricted to specific workstations. On the other hand well over half of primary schools (61 per cent) restrict access to a separate administration network. In a minority of schools, teachers were able to access their school's MIS remotely. Some 29 per cent of secondary teachers were able to do this and nine per cent of primary teachers. (Teeman *et al* 2009)

Staff have access to MIS...



	Primary 2007–08	Primary 2008–09	Secondary 2007–08	Secondary 2008–09
via separate admin network	59%	61%	27%	26%
via specific work stations	22%	28%	43%	51%

Some 81 per cent of secondary headteachers used their MIS to a great extent, as opposed to 67 per cent of primary headteachers. Similar proportions of secondary and primary heads used electronic systems to record learner attendance and attainment. Some 82 per cent of secondary heads and 67 per cent of primary heads also said that attendance management had improved through using electronic recording. The use of electronic systems to record behaviour issues was less frequently reported. Around half of secondary heads (51 per cent) did this to a great extent and only seven per cent of primary heads.

Digital resources

School teachers' use of digital resources has grown over recent years. Around three quarters of secondary teachers (73 per cent) use self-created resources, compared to around half in 2007–08. In primary schools around half of teachers (53 per cent) create their own resources, compared to about a third in 2007-8. They use digital resources created by colleagues less frequently. Primary school teachers adapt learning resources from other people more frequently than other teachers.

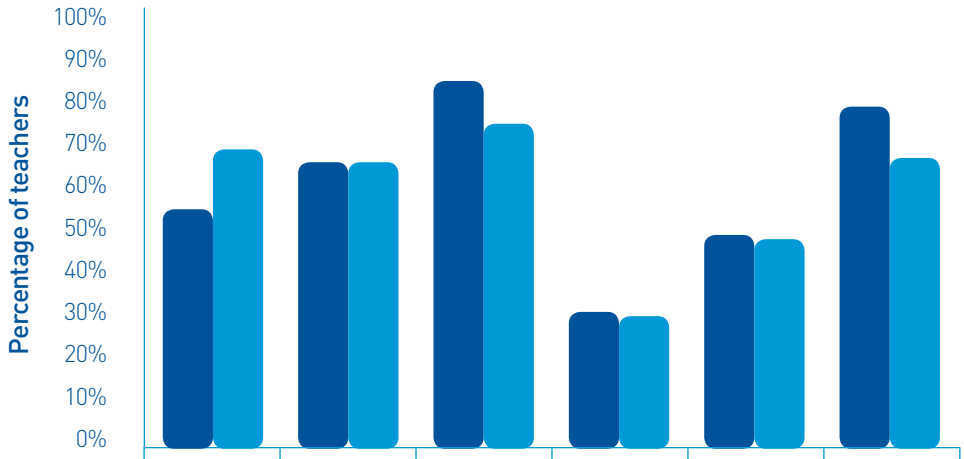
Teachers are also using digital resources more often and appear reasonably satisfied with their fitness for purpose. Some 86 per cent of primary teachers and 70 per cent of secondary teachers rated curriculum software as quite good or very good, figures that have hardly changed from 2007–08.

1.5 Improved personalised learning experiences

Range of use

There has been progress in teachers' use of technology-based tools to support learning and teaching over the years. Technology is widely used for whole-class work in schools. While the most common use with learners is for research and information gathering, increasing numbers of both primary and secondary teachers are making broader use of technology with learners, with an increasing proportion using technology to support learners being creative and solving problems. (Teeman *et al* 2009)

Teachers making some use of ICT with learners to...

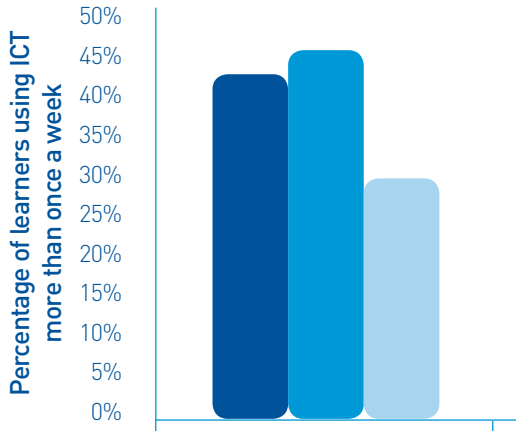


	2006/07	2007/08	2008/09	2006/07	2007/08	2008/09
	Primary			Secondary		
Be creative	56%	67%	86%	32%	50%	80%
Solve problems	70%	67%	76%	31%	49%	68%

Subject use

The use of technology in the core subjects of English, mathematics and science falls off markedly between primary and secondary schools. There are a number of likely explanations for these differences. Core subject lessons in primary schools are likely to be daily, whereas this will not be the case in secondary schools. The reduced number of lessons per subject in secondary schools may also partly explain some of the apparent declines in technology use. Also, it is likely that secondary learners will receive core subject lessons from discrete teachers (maybe even more than one per subject) whereas primary learners are likely to have one class teacher for all the core subjects. Therefore, in order for the high levels of technology use to be replicated at secondary level it would be necessary for many more individual teachers to have personally embraced and encouraged the use of the technologies. (Keating *et al* 2009)

Children and young people's use of technology in core subjects



	Primary	Secondary
English	43%	8%
Maths	46%	7%
Science	30%	10%

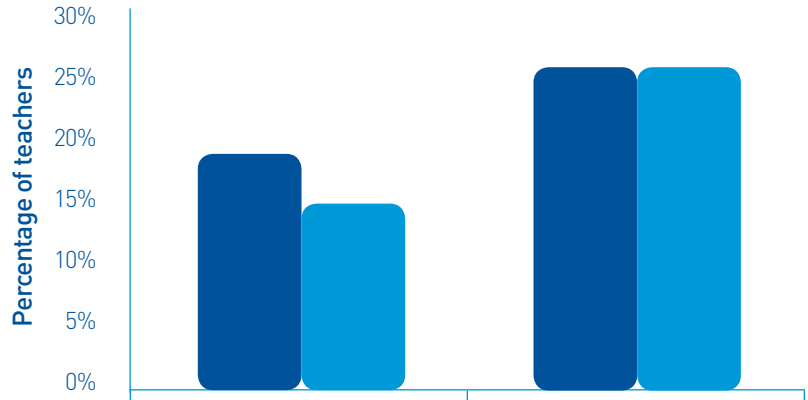
Also in secondary schools there are a larger number of discrete subjects taught. The subject area where technology is used most frequently by learners was unsurprisingly ICT. Some 98 per cent of secondary learners used technology in this subject at least once a week. Technology use was also high among Business Studies learners. Technology use was especially low in secondary PE and RE lessons: 70 per cent of learners reported that they never used technology in these lessons. (Keating *et al* 2009)

Secondary learners were also asked if they felt enough technology was used in the subjects they studied. For 10 of the 15 subjects listed, over 50 per cent of learners felt that technology could be used more. Those subjects where fewer than 50 per cent of students suggested that technology use could increase were the two subjects which already had the most frequent use of technology: ICT and Business Studies, and the creative subjects of Music, Art and Design and Design Technology.

Value in supporting learning

Teachers were largely positive about the contribution of technology to learning in the classroom. For example, over 80 per cent of teachers in both primary and secondary schools either agreed or strongly agreed that technology is particularly useful in helping to support the diverse learning needs of learners. Similar numbers either agreed or strongly agreed that technology makes learning more effective. (Teeman *et al* 2009)

Teachers strongly agree ICT makes learning more effective



	2007/08	2008/09
Primary	19%	26%
Secondary	15%	26%

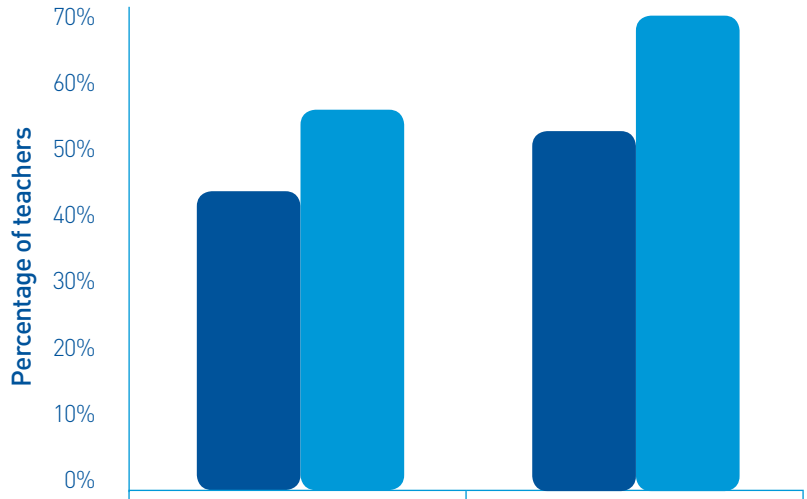
Over the last decade, the popularity of learning through doing practical things has increased dramatically among young people. Some 56 per cent of 11–16 year-olds stated this in 2008, compared to 35 per cent in 1998. Over a third (37 per cent) of young people liked to learn using computers, as opposed to 18 per cent preferring to learn by seeing things done and 17 per cent from a teacher. (Campaign for learning, 2009)

However, most new learning continues to happen in the classroom. Some 80 per cent of young people said they learn most about new things in class at school. This percentage has remained more-or-less the same since 1998, when it was 78 per cent, as has the percentage who say they learn new things at home. This was 29 per cent in 2008, compared to 30 per cent in 1998. Unsurprisingly, computers and the internet have grown considerably as sources of new learning. Some 45 per cent learned about new things on the internet in 2008, as opposed to 12 per cent in 1998. There was a smaller increase in those who learned on a computer. In 2008, 34 per cent learned about new things on a computer, compared to 27 per cent in 1998.

Use for assessment

Secondary school teachers were more likely to strongly agree that technology helped them to use a wider range of assessment tasks. Some 21 per cent of secondary teachers strongly agreed with this compared to only nine per cent of primary teachers. Around a third (36 per cent) of primary school teachers agreed that technology helped give individualised feedback to learners, whereas over half (59 per cent) of secondary schools teachers agreed with this statement. Teachers in special schools were more likely than their primary and secondary counterparts to strongly agree that technology helps them to personalise the learning of each learner (29 per cent compared to 10 per cent in primary schools and 15 per cent in secondary schools). (Teeman *et al* 2009)

Teachers agree ICT helps them use a wider range of assessment tasks



	2007/08	2008/09
Primary	44%	53%
Secondary	56%	70%

Teachers in secondary schools use technology more frequently for assessment purposes than teachers in primary schools. For instance, 28 per cent of teachers in secondary schools compared to 13 per cent of teachers in primary schools reported using technology to give feedback to learners at least a few times a week. Secondary school teachers also reported using electronically stored learner assessment data more often than primary school teachers. For example, around a third of secondary school teachers (35 per cent) reported using electronically stored information to share information with other staff at least 'a few times a week', compared with only eight per cent of primary school teachers.

Ofsted judged that assessment was the weakest aspect of ICT teaching and was inadequate in one fifth of schools inspected. The schools visited rarely tracked the progress of individuals in ICT, established their attainment on entry to secondary school or took into account their achievement outside school. Although the use of ICT in other subjects was increasing in secondary schools, the skills were rarely assessed. As a result, ICT teachers rarely knew how well students applied their ICT skills elsewhere. (Ofsted 2009)

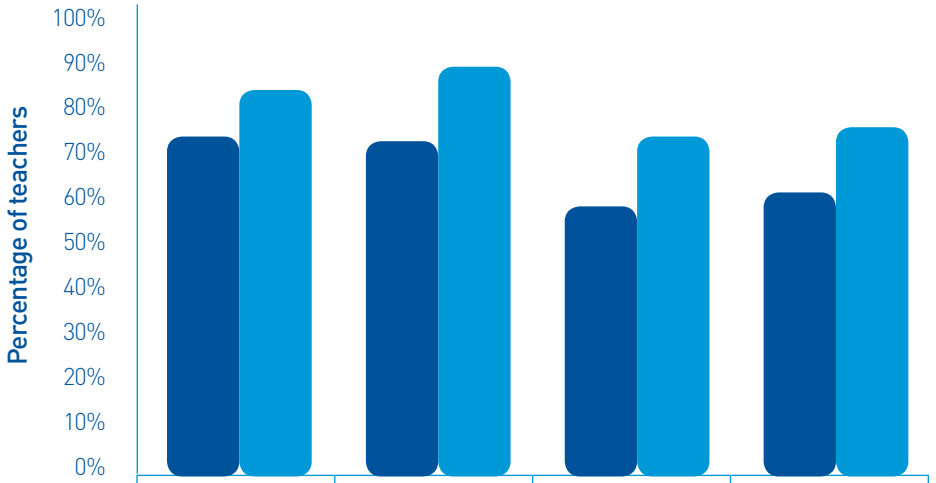
1.6 Impact of technology

Over the last few of years, independent studies have analysed the relationship between technology and learning outcomes for school-age learners. These have included interactive whiteboard evaluation studies in primary (Somekh *et al* 2007a) and secondary schools (Moss *et al* 2007), the ICT Test Bed evaluation (Somekh *et al* 2007b), and the 2002 Impact2 study (Harrison *et al* 2002). The relationship is not a simple one. Time taken to embed the use of technology, school-level planning and learners' skills and models of learning are all important in mediating the impact of technology on outcomes. Some new findings add more positive evidence of the benefits of technology for learning.

A recent analysis from the Institute of Fiscal Studies has analysed data from the DCSF Longitudinal Survey of Young People in England (LSYPE), looking at both attainment and behaviour differences between socioeconomic groups. The model used data from 15,000 teenagers born in 1989 and 1990. The analysis found that computer and internet access at home is important in explaining the achievement gap, and plays a role in some behaviour outcomes. (Chowdry *et al* 2009)

After controlling for KS3 results, the availability of a computer at home is significantly positively associated with Key Stage 4 test scores. This association amounts to around 14 GCSE points (equivalent to 2 GCSE grades in a single subject). Losing access to a computer is associated with a reduction of 20 GCSE points, even after controlling for prior attainment. Gaining access to the internet is associated with 10 GCSE points, again controlling for achievement at KS3. Young people with a computer at home are also less likely to play truant at ages 14 and 16 than those without computer access.

Teachers that agree ICT has a positive impact on pupils' attainment

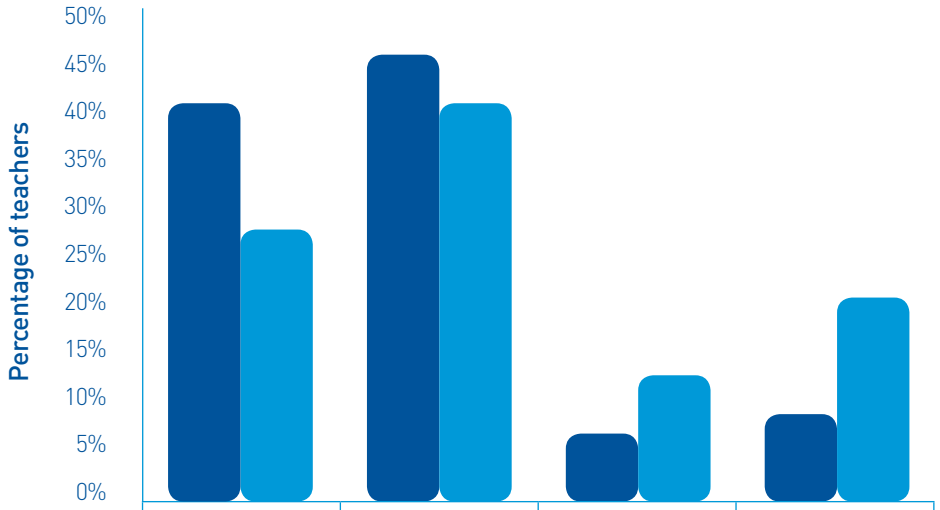


	Key Stage 4	Key Stage 3	Key Stage 2	Key Stage 1
2007/08	73%	72%	58%	61%
2008/09	83%	88%	73%	75%

Teachers overwhelmingly agreed that using technology can have a positive impact on the attainment of specific groups of learners. Teachers across all key stages were more positive than in 2007–08. Around 90 per cent of teachers in primary, secondary and special schools agreed that technology can have a positive impact on learners with special educational needs. More teachers felt that technology had an impact on these learners than any other group. (Teeman *et al* 2009)

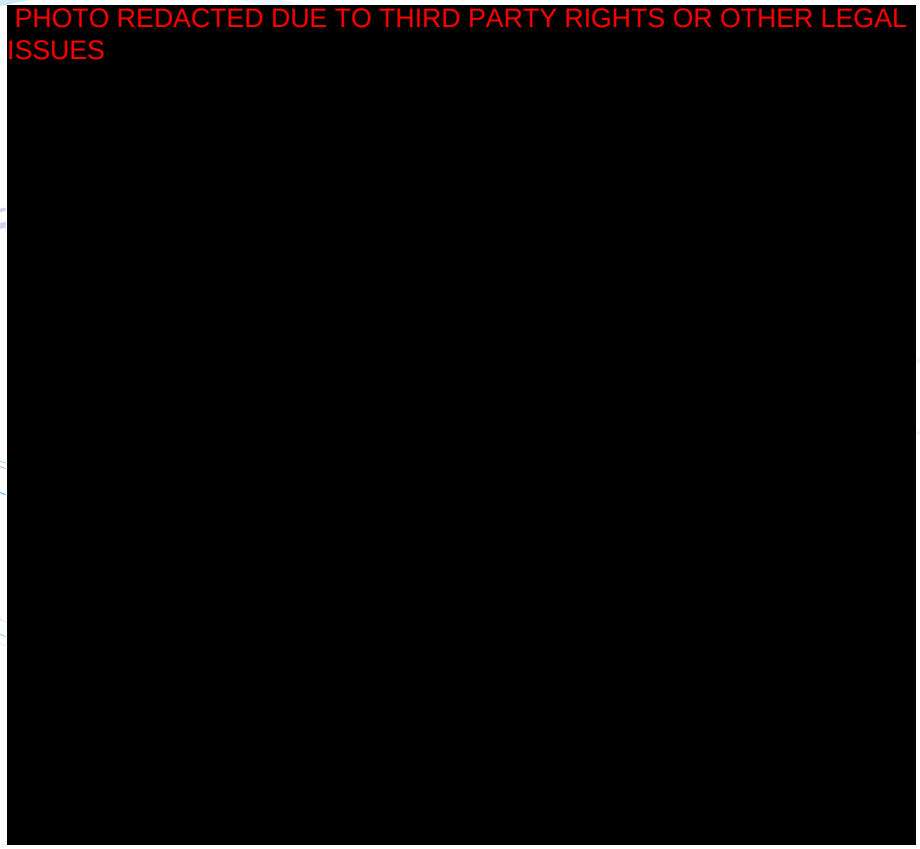
The strongest general impact of technology across education relates to improvements in efficiency, notably impacting on the use of teachers' and practitioners' time. Studies have demonstrated that practitioners generally re-invest time they save into core tasks (PwC, 2004), thus quality benefits arise from this. Technology has delivered significant benefits to teachers in the use of their time. For example, overall around half of teachers who use technology for lesson planning report gains in time from use of technology, with just one in ten reporting losing time. Around 60 per cent of teachers in both primary and secondary schools, report saving time reporting on pupil progress, while fewer than 8 per cent report losing time. Far fewer teachers report that they have lost time from using technology across a range of uses than in 2007–08. Teachers do not generally report time savings from the use of learning platforms, however, but these are at an early stage of use within many schools. (Teeman *et al* 2008)

Teachers saving at least an hour a week



	2007–08	2008–09	2007–08	2008–09
	Lesson planning		Marking/assessment	
Primary	41%	46%	7%	9%
Secondary	28%	41%	13%	21%

Lesson planning and report writing emerged as the two tasks for which respondents reported that they had saved the most time through the use of technology. More than 40 per cent of teachers in both primary and secondary schools report saving at least an hour a week on lesson planning through using technology. Secondary school teachers were more likely to save over one hour by using technology for marking and assessment compared to their primary school counterparts. On the other hand primary school teachers were more likely to save more than two hours by using technology for report writing (30 per cent compared to 17 per cent in secondary schools).



Cross-sector comparison	Primary Schools	Secondary Schools
E-mature providers:		
• E-enabled	29%	35%
• Enthusiastic	33%	33%
• Ambivalent/late adopters	38%	31%
Learners per computer	6.6	4.2
School has a learning platform	40%	79%
MIS accessible from main network	39%	74%
Teachers have access to:		
• Learning platform	39%	69%
• MIS	46%	85%
• Electronic whiteboard	96%	84%
• Online resources	99%	95%
Teachers feel effective in using ICT for:		
• Lesson delivery	91%	87%
• Assessment	69%	76%
• Personalised learning	51%	61%
School has a strategy that addresses using ICT for:		
• Teacher CPD	67%	72%
• Online reporting to parents	15%	58%
• E-safety	57%	65%
Headteachers place a high priority on:		
• Improving communication with parents	21%	43%
• Providing remote access study support	10%	47%
Parents can access online pupil information	10%	29%
Teachers regularly access pupil information	17%	32%
Learners have ICT skills to support learning	28%	48%
Curriculum-related software rated 'very good' by teachers	18%	13%

Cross-sector comparison	Further Education colleges	Work-based learning providers
E-mature providers:		
• Pioneering/performing	35%	37%
• Developing	41%	36%
• Beginning	38%	27%
Learners per computer	4.5	7.2
Organisation has a learning platform	92%	36%
Integrated MIS/learner systems	35%	n/a
Practitioners have access to:		
• Learning platform	71%	45%
• MIS	78%	73%
• Electronic whiteboard	67%	44%
• Online resources	92%	88%
Practitioners are competent or advanced:		
• ICT user skills	77%	75%
• Using ICT with learners	65%	62%
Organisation has a strategy that addresses using ICT for:		
• Practitioner CPD	96%	68%
• Management and administration	94%	83%
• System security	96%	88%
Organisation allows remote access for learners	80%	38%
Organisation offers remote technical support	73%	14%
Practitioners using ICT to create individualised programmes	24%	n/a
Providers using online testing and submission of assignments	87%	90%
Learners with ICT skills to support learning	40%	n/a

The role of technology in further education and skills

2.1 Technology-confident, effective providers

Overall e-maturity

The proportion of e-mature further education (FE) colleges[1] has improved steadily since 2003. These measures combine survey data to give a composite, overall measure for each college. E-maturity has been calculated by aggregating responses to the annual Becta survey of ICT in FE colleges (Becta 2003, 2004, 2005, 2006, LSN 2008, Sero 2009). At the same time, a different set of measures were developed from responses to the surveys of ICT in work-based learning (WBL)[2] providers (Mackinnon 2006, 2007, 2008, 2009).

While these two sets of measures are built upon slightly different component data, they both represent broad measures of technology infrastructure, college or provider capability, leadership and uses of technology for learning, reflecting the range of institutional challenges identified in the Harnessing Technology strategy. While they do not offer an exhaustive description of e-maturity, they act as a good set of indicators of the overall level of development and embedding of technology in the college and work-based learning sectors.

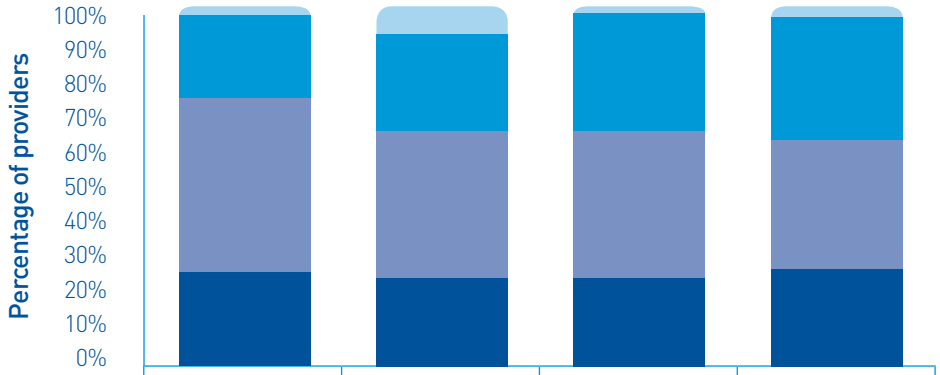
Becta's consultation with the sector last year led to a new e-maturity framework linked to the *Generator* self-review tool, with redefined categories. A new 'pioneering' category was introduced to recognise providers who were transforming learning and teaching with technology. Together the new 'pioneering' and 'performing' categories reflect those previously given the single label 'e-enabled'. The old 'ambivalent' and 'late adopter' categories have been combined to form the 'beginning' category.

Similar mappings have been made with the old work-based learning categories. The old 'transformative', 'embedded' and 'innovative' map to 'developing', 'performing' and 'pioneering' respectively. 'Localised' and 'coordinated' have been combined to form 'beginning'.

[1] Throughout the rest of this report we will use the term 'FE colleges' as a generic term for further education colleges and sixth-form colleges.

[2] The work-based learning (WBL) providers in this report are LSC-funded providers, either private training providers or FE colleges.

E-maturity in FE and WBL



	FE colleges		WBL providers	
	2007–08	2008–09	2007–08	2008–09
Pioneering	2%	8%	2%	3%
Performing	23%	27%	33%	34%
Developing	48%	41%	41%	36%
Beginning	26%	25%	25%	27%

In the year 2008–09, the level of e-maturity of WBL providers remained about the same as the previous year. FE colleges, however, did show some progress, with around one third of colleges being classed as pioneering or performing. There does, however, continue to be around a quarter of both types of provider in the lower, beginner category.

Strengths and weaknesses

The weakest measures for colleges were in the area of leadership and innovation. Even the most advanced colleges were conscious that they might not be at the leading edge of using technology with learners. They also felt that they did not adequately reward staff leading technology developments. College size was also a factor, with larger colleges being more advanced in their technology use. Smaller land-based colleges made least progress, less than the more homogenous sixth-form colleges, and considerably less than the larger general FE colleges. (Sero 2009)

Work-based learning providers, on the other hand, were weakest in the area of learner support, and strongest in areas of management, learning resources and staff development. (Mackinnon 2009)

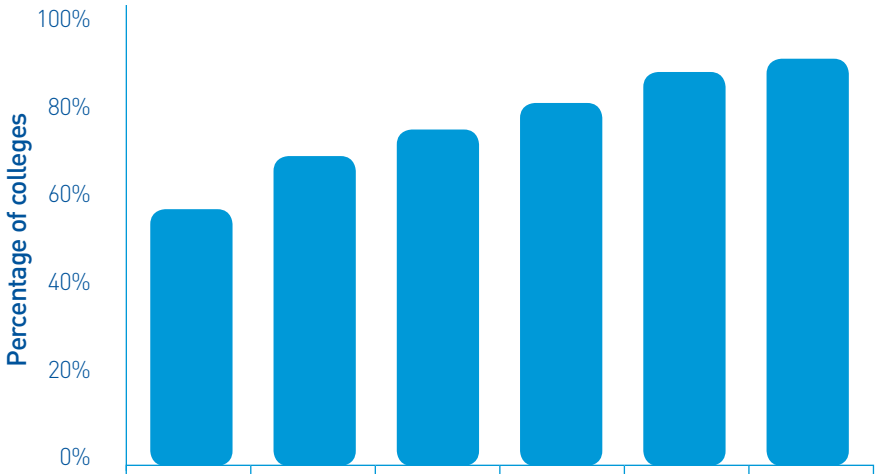
Within the adult and community learning (ACL) sub-sector the application of technology varies considerably between providers and contexts. These providers are mainly driven by principles of social justice, and are influenced by related policy agendas, e.g. Informal Adult Learning, Family Learning, Community Cohesion, and Digital Inclusion. Attempting to describe e-maturity within this sub-sector has produced an array of measures related to the different contexts of the work of ACL, the staff profile, pattern of dispersed delivery and the multiple policy contexts involved.

Adult and community learning is delivered through a wide variety of locations, not all of which have the potential to support high levels of e-maturity. Low levels of development for off-site support, and variable levels of development across implementation areas indicate that provision is likely to be highly affected by both the environment within which it occurs, and the learners to which it is delivered. This is highly likely to be more the case when one looks to the wider sub-sector and those organisations involved in informal learning and community development. (NIACE 2009)

Learning platforms and remote learning

FE colleges continued to make progress in the adoption of learning platforms or virtual learning environments. Some 92 per cent of colleges had a learning platform in 2008–09, having risen steadily from 58 per cent in 2003–04 (Sero 2009). A far lower percentage (36 per cent) of work-based learning providers reported that they support a learning platform.

Colleges with a virtual learning environment



	2003	2004	2005	2006	2007	2009
With VLE	58%	70%	76%	82%	89%	92%

In a report on 25 FE colleges, Ofsted found that frequently the learning platform was still at the stage of being a repository for teaching materials, though sometimes with an email facility to upload or download assignments and assessments. Fewer than a quarter of the colleges were using them to support independent learning, for example by planning courses or modules around chosen topics to re-enforce areas that students needed to develop, or to track progress through exercises and assessments linked to individual learning plans. Seven of the colleges were implementing their second choice of virtual learning environment, having had a poor experience with their first choice. Most were nevertheless making good use of the experience in introducing their new version. (Ofsted 2009b)

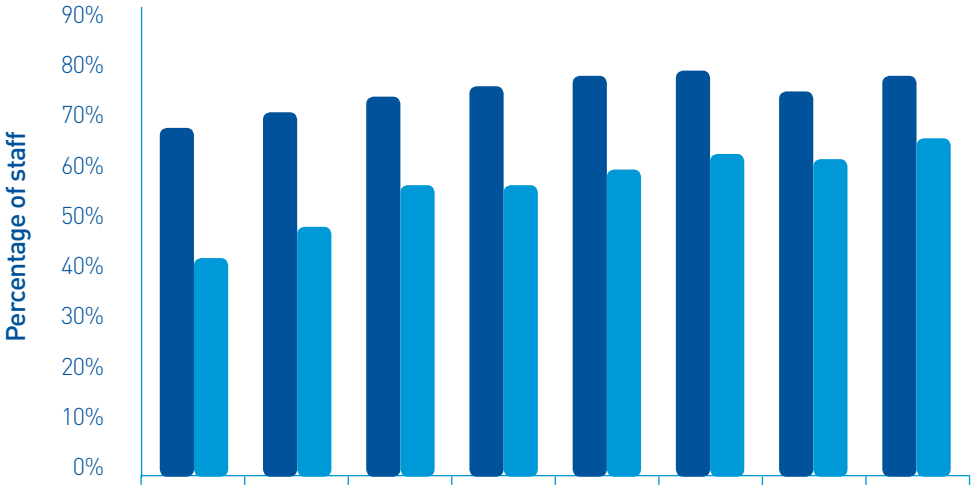
Not surprisingly, FE colleges that provide work-based learning were much more likely to have a learning platform than other WBL providers. Some 81 per cent of colleges that provide work-based learning had a learning platform, compared to 29 per cent of national providers, 26 per cent of regional providers and only 20 per cent of other local providers. Far fewer WBL practitioners reported using a learning platform than the previous year. Some 23 per cent of practitioners reported using one in 2008–09 as opposed to 40 per cent in 2007–08. However, this is likely to be because a higher proportion of the 2007–08 sample were from FE colleges where learning platforms are more common. (Mackinnon 2009)

A large number of ACL providers now report that they make learning platforms available to their staff. However, for 60 per cent of providers, this is either at an early stage of development or has only been partially implemented. The actual use of these online learning spaces is also underdeveloped. Even where the majority of the infrastructure and software investment has been made, the effective engagement of staff to use this technology remains a challenge. (NIACE 2009)

Practitioner skills

Practitioners working in both colleges and work-based learning providers are reported as having higher skills in their general ICT user skills than in using ICT with learners. This is not surprising given that personal ICT skills are a prerequisite for using technology in the classroom. Also use of e-learning is still spreading in the FE and skills sector, meaning that some staff are still catching up with their colleagues.

FE teaching staff considered competent or advanced in ICT/e-learning



	2000	2001	2003	2004	2005	2006	2007	2009
ICT user skills	67%	70%	73%	75%	77%	78%	74%	77%
e-learning skills	42%	48%	56%	56%	59%	62%	61%	65%

In both FE colleges and work-based learning providers, the management view is that on average around three-quarters of staff are competent or advanced in ICT user skills, and around two-thirds of staff are at a similar level in using ICT with learners. Colleges felt that on average 77 per cent of their teaching staff were competent or advanced users of ICT, and 65 per cent were competent or advanced in using ICT with learners (Sero 2009). For WBL providers, these figures were 75 per cent and 62 per cent respectively (Mackinnon 2009). Practitioners working in both types of provider had a more optimistic view of their skill levels, perhaps indicating that less confident staff were less likely to respond to these surveys.

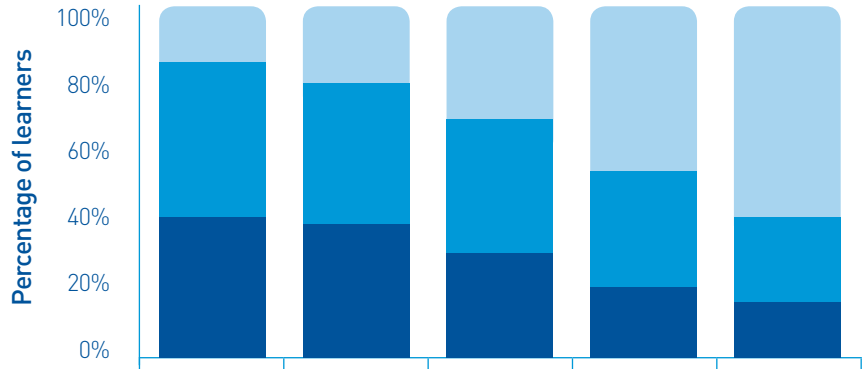
Some 61 per cent of ACL providers felt that the majority of their staff had good general ICT skills, however, only 25 per cent of providers felt most staff were skilled at using ICT with learners. More training was available to teaching staff than was available to learning support staff, with generic ICT skills training and software specific training being the two most frequently cited type available. Training related to developing and supporting online learning was the least available type. (NIACE 2009)

2.2 Engaged and empowered learners

Learner e-maturity

The capability of FE learners to use technology in a range of tasks and within their learning was also related to age. For example, nearly half of learners in the 16 to 18 age group were very confident in using technology, compared to only one fifth of those over 45. Capability appears linked to level of general technology use, with younger learners also being higher general users of technology. However, the level of college e-maturity appears to also be a key factor in learner capability. In late adopter colleges, for example, 39 per cent of learners have low capability compared to 28 per cent in e-enabled colleges (GfK NOP, 2007b). This may have implications for the future earning potential of FE students. (Dolton et al 2007)

Learner e-maturity by age



	16–18	19–24	25–34	35–44	45+
Low e-maturity	16%	22%	32%	47%	60%
Medium e-maturity	44%	40%	38%	33%	24%
High e-maturity	40%	38%	30%	20%	16%

Some 42 per cent of adult learners most like to learn by doing practical things, a figure that is unchanged since 1998. However, now almost a quarter (23 per cent) mentioned using computers, mobile phones and the internet, not feasible options for most in 1998. (Campaign for learning, 2009)

Learner experience

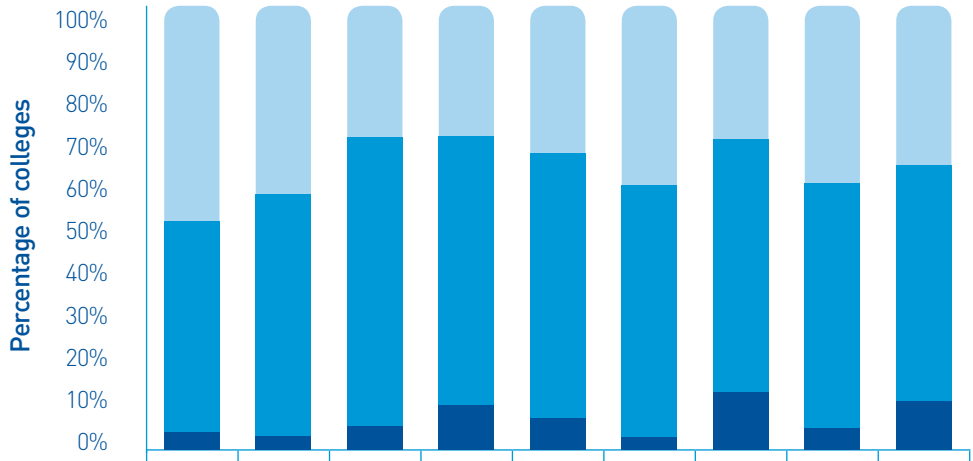
Colleges use technology in a variety of ways to broaden and extend learners' experiences. Over one third (38 per cent) use technology to gain access to a greater range of learning materials, while smaller numbers use technology to help learners understand their progress (18 per cent) or to record and analyse events both inside and outside the classroom (13 per cent). Around one third of colleges (32 per cent) make use of multiple approaches. Just under a quarter of FE practitioners (24 per cent) used technology to create individualised programmes for learners. A small number of colleges (15 per cent) do not allow students to use their own devices in college. However, 43 per cent either encourage learners to use their own devices, or take account of these opportunities in their plans. (Sero 2009)

In work-based learning providers, there have been some large increases in learner-focused uses of technology, albeit from a low base. Some 31 per cent of providers used technology to help learners monitor their own progress, an increase from just 19 per cent in 2007–08. Also WBL practitioners reported more frequent use of technology to help learners collect evidence, manage individual target setting and communicate with learners in the workplace. (Mackinnon 2009)

Meeting demand

In 1999, colleges overwhelmingly described student demand for computers as widespread. Since that time demand has clearly continued to grow in the face of a greatly increased number of high-specification computers available for use by learners. Just under half of institutions (47 per cent) reported that they could not cope with the demand for computers in 1999. Ten years later, this level now stands at 36 per cent. Also, the number of colleges reporting that they are able to cope with increased demand has is 13 per cent. The chart illustrates the fluctuations in colleges' response to changes in demand and student numbers. (Sero 2009)

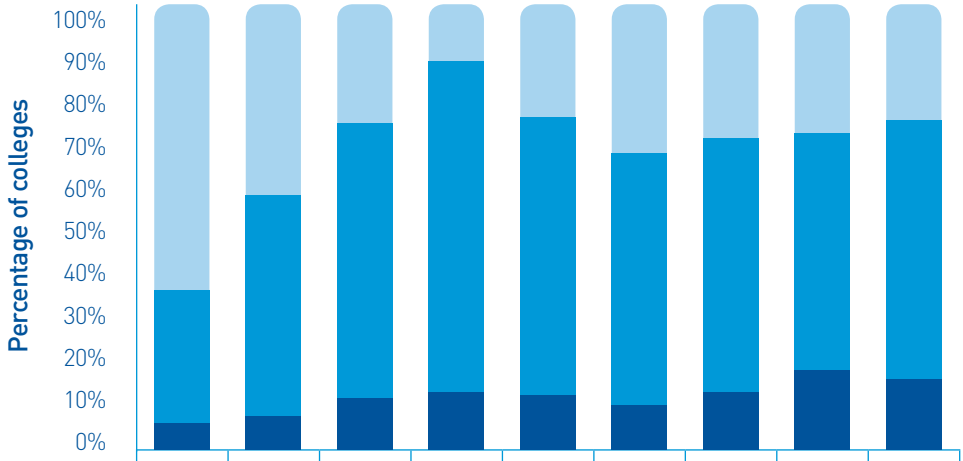
Meeting student demand for computers



	1999	2000	2001	2003	2004	2005	2006	2007	2009
Difficulty meeting demand	47%	39%	28%	29%	33%	40%	30%	40%	36%
Sufficient capacity for current demand	46%	50%	61%	60%	59%	56%	57%	55%	53%
Sufficient capacity for greater demand	4%	3%	5%	10%	7%	3%	13%	5%	11%

A similar but slightly less volatile picture applies to meeting demand for internet access. The number of colleges that were unable to meet current demand fell rapidly from over half in 1999 to 11 per cent in 2003. This proportion increased again to reach 33 per cent by 2005 but has fallen steadily since to a level of 26 per cent in 2009. Over the decade, colleges have been more able to meet demand for the internet than for computers per se. Given that access to computers is necessary for access to both the internet and all other applications, this discrepancy is to be expected.

Meeting student demand for internet access



	1999	2000	2001	2003	2004	2005	2006	2007	2009
Difficulty meeting demand	54%	39%	25%	11%	25%	33%	30%	29%	26%
Sufficient capacity for current demand	25%	45%	58%	63%	61%	56%	57%	53%	58%
Sufficient capacity for greater demand	5%	7%	11%	11%	12%	10%	13%	18%	16%

There have clearly been considerable technical improvements to connectivity and college networks over the last ten years. However, these improvements have only been translated into modest improvements in perceived performance. In some 11 per cent of colleges, slowness is seen as a frequent problem, and in a further 29 per cent networks are slow at busy times. In a substantial minority of colleges therefore, the student experience of technology will be affected. Those whose networked learning is scheduled at busy times will face a worse experience than the winners in the lottery of timetable slots, who are scheduled to use the network when traffic is low.

The majority of ACL providers agreed that technology had a positive impact on learners' experiences. Providers were most confident that technology had contributed to creative teaching and learning; learners' access to relevant content; and flexibility of delivery. Providers were least sure about impacts on learner attainment, progression and retention. (NIACE 2009)

2.3 Confident system leadership and innovation

Strategy and planning

Although the processes for the day-to-day management of technology vary considerably from one college structure to another, around one fifth (21 per cent) have a whole-college plan which operates across all departments. (Sero 2009)

Around a third of FE colleges (34 per cent) now state that technology developments are an integral part of all appropriate annual planning processes. A third of colleges use a cross-college committee to oversee the technology elements of strategic and operational plans with 26 per cent designating a senior manager for ensuring that technology is included in annual planning processes. In 41 per cent of colleges all managers discuss their technology training needs in appraisals. Over 60 per cent of colleges claim to use benchmarking regularly, with 37 per cent specifically using it to check their adoption and use of technology.

Seven colleges out of 25 recently visited by Ofsted were making very good use of data to set and monitor targets for retention and success. However, development was not consistent even between these providers. Only four of the colleges were routinely using value-added measures to assess their performance and set targets. The use of this type of data was most well established in sixth form colleges. Three of these colleges were making particularly good use of student feedback. (Ofsted 2009b)

Nearly all work-based learning providers (92 per cent) have a written strategy addressing at least some use of technology. Around half of providers (51 per cent) have a written strategy (either as part of a wider strategy or on its own) covering all six aspects of providers' use of technology that were given in the survey. This study also found that having clear management responsibility and planning processes for the implementation of technology was associated with more effective and efficient use of technology. Providers were better able to identify how to use technology to support learners, identify the costs and benefits involved and ensure their organisation has the right skills. (Mackinnon 2009)

The majority of work-based learning providers (84 per cent) believe they have senior managers with the skills and knowledge to make effective use of technology. Around three-quarters (75 per cent) have clear management and planning process for its implementation (75 per cent). However, there is a small core of providers where this is not the case and the survey suggests that the size of this minority has not changed over the last few years.

Partnership

A high proportion of work-based learning providers have worked in partnership with other organisations on technology projects. Around two-thirds of providers (66 per cent) have worked with technology suppliers and half (50 per cent) have worked with other WBL providers. Around two fifths have worked with employers (39 per cent) or industry bodies (44 per cent). Some 40 per cent of providers have worked with partners to develop computer-based learning resources.

However, few providers have found partnerships effective in helping them harness technology generally. Providers have found that working with employers, industry bodies and other FE colleges has been least effective. In addition, one fifth of providers (21 per cent) working with technology suppliers report that this has not been very effective and 58 per cent report it as being average. This suggests that providers are building partnerships and working together but that these partnerships are not yet being very effective.

Almost all ACL providers have e-strategies or strategic documents in place, the majority of which made explicit objectives related to ACL. The majority of these were updated annually as a minimum, and communicated to staff at least as frequently as they were updated. Communications were achieved through multiple mechanisms, though most often through a learning platform, intranet or shared drive. However, over half of providers felt that 50 per cent or fewer of their ACL staff were aware of their e-strategy. Teacher CPD, use of learning platforms, replacement of equipment and investment in ICT infrastructure were either being currently addressed, prioritised for next year, or both. Over 70 per cent of providers either agreed or strongly agreed that "there is strategic commitment to the integration of technology within every aspect of the organisation." (NIACE 2009)

2.4 Enabling infrastructure and processes

Access and sustainability

The mean number of FTE students per networked computer in colleges is 4.5 and the median, which is not distorted by extremes, is 3.8 (LSN, 2008). There are still a few providers with relatively high numbers of FTE students per computer. Moreover, the ratio for FTE students per computer *available outside teaching hours* is much higher, with a mean of 28.7. (LSN, 2008).

Most colleges (81 per cent) regularly review their technology resources in light of demand. Most of the remainder (13 per cent) only review capacity when necessary, and the last 7 per cent have no policy to review capacity (SERO 2009).

Work-based learning is primarily focused on learning in the workplace. Despite this nearly all of providers (95 per cent) have computers on their premises for work-based learners' use and 84 per cent have computers with fast internet connections. (Mackinnon 2009)

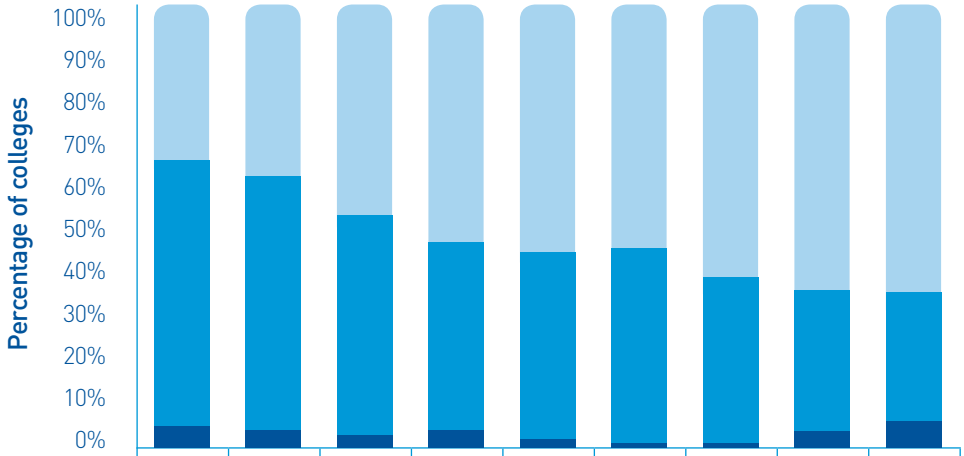
Work-based learning providers have a median of 26 computers on-site per provider. This is similar to previous years (22 in 2007) and 24 in 2006). The number of computers varies considerably with one provider reporting they had 2,000 computers available while another reported just two. This results in a mean average of 86 computers per provider. The median of work-based learners per on-site computer is 7.2:1. This result is slightly worse than previous years (6.7 in 2007 and 6.5 in 2006). The mean average of learners per computer is 19.

There are on average 93 computers available for use by ACL staff on the premises, however answers ranged from 2 to 500. Almost all providers felt that tutors had some access to these, though this tended to be shared, with only some staff having sole access. (NIACE 2009)

Networks

The improvement in FE college network specification over the last decade has been associated with an improvement in performance and in capability to meet demand. However, these technical improvements have been associated with relatively slow improvement in capacity. For example, a large number of colleges upgraded their LANs between 2004 and 2005, but though the very small number of colleges that reported being overstretched did decrease, there was hardly any increase in colleges reporting that they could meet greater demand. In 1999, only 24 per cent of colleges had the capacity to meet an increase in demand on their networks, by 2004, 45 per cent of respondents said that they could cope with a significant increase in traffic. In 2009 comfortably more than half of colleges (56 per cent) reported this. (Sero 2009)

Network performance



	1999	2000	2001	2003	2004	2005	2006	2007	2009
Always smooth	35%	38%	47%	53%	56%	55%	61%	67%	65%
Slow at busy times	60%	56%	49%	42%	42%	44%	37%	33%	29%
Slowness a problem	5%	4%	3%	4%	2%	1%	1%	4%	6%

There has been a steady improvement in network performance over the decade. A clear majority of colleges (65 per cent) described their network performance as always smooth, and 29 per cent reported their network performance to be slow at busy times. This is a reversal of the situation in 1999. However, the most dramatic changes took place between 1999 and 2003, the overall trend slowing since that time. Also, the small number of colleges reporting that slowness is a frequent problem has risen to 1999 levels following a steady decline to 2005 and 2006.

Management information systems

The integration of management information and learner systems in FE colleges has developed over the last few years. Some 63 per cent of colleges reported good links in 2008–09, compared to 47 per cent the year before. However, in over one third of colleges, these connections are limited at best. All the colleges responding to the 2009 survey offer some degree of remote access to college systems. However, this access is limited in a large minority of colleges (42 per cent), but a little under one third of colleges (29 per cent) offer remote access at all times. (Sero 2009)

Over two thirds of WBL providers (70 per cent) have a network remotely accessible by staff, although just over one third (38 per cent) have a remotely accessible network for learners. The number of providers with different types of infrastructure has remained unchanged compared to last year, although the proportion of WBL providers offering remote access to learners, with virtual learning environments and dedicated websites to support learners has increased since 2005. (Mackinnon 2009)

Other technology

WBL providers have a range of other technology. Around two thirds have data projectors (69 per cent) and digital cameras (61 per cent) whilst over half (54 per cent) have electronic whiteboards. The latter represents an increase since 2005 when only 30 per cent reported having electronic whiteboards. However, FE colleges are much more likely to have data projectors (83 per cent) and electronic whiteboards (81 per cent) than other types of providers. The use of mobile devices for learning has also continued to increase to nearly one third (31 per cent), placing further demands on college networks. (Mackinnon 2009)

Overall, around three quarters of WBL providers (75 per cent) are satisfied or very satisfied that their staff have access to the appropriate technology that they need. One tenth are dissatisfied. Tutors, assessors and verifiers confirmed this view. Over three quarters of practitioners (77 per cent) responding are satisfied or very satisfied that they have access to appropriate technology and digital resources. Just 12 per cent are dissatisfied. This again provides the same picture as last year.

Networks are a mix of wireless and wired in 60 per cent of ACL providers, and entirely wireless in 32 per cent. Transfer of large files was possible across most networks, though not necessarily supported by organisations, and access to online activities were not equal across organisations' learning locations, suggesting variable access to the internet. Nearly half (48 per cent) of ACL providers were satisfied with the technology access available to their staff. However, 26 per cent were dissatisfied. (NIACE 2009)

Digital resources

As with previous surveys NLN and publicly-funded materials are used less frequently in FE colleges than materials developed in-house or downloaded from the internet. Some 85 per cent of FE practitioners used materials that were developed in-house and 81 per cent used materials downloaded off the internet. On the other hand, only 30 per cent used NLN materials, however this may be explained by the limited range of materials available from this source. (Sero 2009)

Most work-based learning providers (79 per cent) use computer-based learning resources in some of their learning programmes and this proportion has changed little over the last three years. Providers are using electronic learning resources across all types of work-based learning delivery and all employer groups. (Mackinnon 2009)

WBL providers get their computer-based learning materials from a wide range of sources. Over three quarters of providers that are using computer-based learning resources (77 per cent) have bought them commercially, although a large proportion (63 per cent) are using resources that are freely available online. In addition nearly two thirds (63 per cent) have developed their own resources. Smaller providers, and particularly those that are regional, local or voluntary/community based providers, are less likely to develop their own resources in-house or in partnership with others.

ACL staff created their own networked learning resources in nine per cent of providers, and standalone resources in 14 per cent. This occurred most frequently in ICT courses, language courses, family learning and arts and crafts. Where resources were used, providers identified the main benefits as the ability to share resources, the ability to save on preparation time, the ability to enhance learner engagement and accessibility of digital resources, when compared to more traditional resources. (NIACE 2009)

2.5 Improved personalised learning experiences

Support for learners

To support learners in using technology, over 70 per cent of colleges offer self-help materials, an email helpdesk and a website as sources of support. A large majority of colleges use a mixture of ad-hoc personal support, stand-alone ICT classes, online packages and drop-in sessions. Two thirds of colleges are confident that this support is effective. However, this means that the remaining third are not. (Sero 2009)

Personalising learning

For more than a third of colleges (36 per cent), email correspondence between teachers and learners is the main way they report that technology supports personalising learning. 8 per cent of colleges consider the development of e-portfolios to be their most significant contribution to personalisation, and a further 19 per cent identify the use of technology to tailor resources to the needs of the individual learner. The remaining 38 per cent of colleges employ a variety of strategies, including the use of hand held and mobile technology for recording learning situations. (Sero 2009)

Some 40 per cent of FE practitioners reported using e-learning with all their learners. However, it is worth noting that this may be a relatively sophisticated group of staff, as they report their skills as higher than the college view of all staff. Some 69 per cent of these practitioners reported using e-learning as a traditional classroom tool, only 25 per cent use e-learning to create individualised programmes.

Adult and community learning practitioners make use of online collaborative tools fairly frequently, with 25 per cent of them using online collaborative tools on a daily basis and a further 21 per cent using them at least once a week. Practitioners appear to use diverse media (such as game based learning and podcasting) less frequently with only 22 per cent of the practitioners using it on a daily/weekly basis. (NIACE 2009)

Currently two fifths of work-based learning providers (41 per cent) provide some of their learners with an online personal learning space allowing them to learn when and where they choose. However, over two thirds of these providers offer this across just some of their WBL programmes or courses. Provision of online learning space has not changed over the last year. (Mackinnon 2009)

Assessment

The majority of FE colleges use technology for learner induction activities: only 2 per cent did not use it at all, and 74 per cent use technology for some induction activities with most, or all learners. Well over 90 per cent of colleges use technology for initial assessments and over three quarters use it for induction to learning resources. Two thirds of colleges use it for an induction to ICT resources, and by around half of colleges for subject induction. More than three quarters of the colleges in the sample are either confident, or very confident that technology adds value to learner assessment. (Sero 2009)

WBL providers have increased their use of technology for assessment. Online tests and onscreen key skills tests are now used by nine out of ten providers and in around half of providers they are used for all of their courses or programmes. Over half of providers now use technology for online evidence management compared with one third four years ago, however only 8 per cent of providers are using this across all of their provision. (Mackinnon 2009)

In addition, just over one quarter of WBL providers (26 per cent) have introduced an integrated learner management system which lets learners manage their evidence portfolios online. Larger providers are more likely to have introduced these systems.

Nearly two thirds of WBL providers (65 per cent) that have introduced these systems agreed that they have improved learner support and over half (58 per cent) agreed they had improved learner outcomes. However, over one third (35 per cent) disagreed that the systems had reduced administrative costs. This reinforces previous findings that providers are unconvinced of the financial business case for introducing new learner management systems.

Around half of ACL practitioners use technology on a daily or weekly basis to assess learner's work (54 per cent). Practitioners do not appear to be making much use of e-portfolios with learners, with 63 per cent of the respondents stating that they have never used e-portfolios with learners. It should be noted that this may be due to practitioners' understanding of what constitutes an e-portfolio. (NIACE 2009)

2.6 Impact of technology

There is a statistically significant positive association between FE college e-maturity scores and Ofsted outcomes. The strength of leadership in the e-mature colleges, rather than the strength of the e-maturity overall, was a key predictor of better Ofsted results. In the most e-mature colleges, ICT is embedded in their culture, is inter-woven across all subject areas and is driven by strong leadership from the top. (NCC Group 2009)

However, there is a weaker link at college level between e-maturity and learner outcomes. This is no surprise as much evidence over the years has pointed to the variability in use of technology within college environments, based much of the time at Department level. Therefore impact on learners will be highly variable within a single college setting.

The impact of technology on running a college can be seen in terms of the changes it brings to the overall management of the college business and to the improvement in existing business processes such as student recruitment. There is strong evidence that the increased availability of data across the college allows them to be more pro-active in managing their business. For example, they might use real-time information to monitor and manage key indicators such as student attendance at course, group and student level. This rigour was delivering real benefits such as improved course attendance, and re-adjusting group sizes throughout the year to take into account changing student numbers. (NCC Group 2009)

Changing teaching and learning models are also starting to make e-mature colleges reconsider their traditional core metrics. Measures such as core contact time, group sizes, teaching and learning space requirements and room utilisation are being called into question. New building and estates redevelopment have also been triggers for this, as have financial constraints. Colleges are starting to track the utilisation of equipment and teaching rooms and using the information to shape their planning and investment priorities.

E-mature colleges were at different stages of systems integration. Some are using external suppliers to develop bespoke solutions to provide them with greater flexibility. They felt that the college was at its most vulnerable in the middle of the journey, characterised by 'where ICT fails, the college fails'. Past that point there was a more sophisticated and robust infrastructure in place, including a more standardised approach across the college.

College views are evenly divided on whether technology is being used effectively to further personalisation, with just over 50 per cent unconfident and just under 50 per cent confident that technology is having a positive impact. This is likely to reflect the level of maturity of different providers. However, colleges express greater confidence about positive impact on learning, with over 70 per cent confident or very confident that this is happening, and just under 30 per cent more sceptical. (Sero 2009)

Some 74 per cent of work-based learning providers reported that technology has led to more efficient management and administration of learning. In addition, over half reported that technology increased the choice of methods of learning for learners (59 per cent); improved the quality of learning delivered (54 per cent); led to more effective assessment of learning (53 per cent); saved time for tutors, assessors and verifiers (53 per cent). Providers are more likely to identify impacts on processes than outcomes, perhaps because the impact of technology is difficult to isolate. Fewer providers identified impacts on achievement (39 per cent), completion (32 per cent) or retention (28 per cent). They are least likely to report that their use of technology has had any impact on recruitment either in terms of attracting more (16 per cent) or different learners (15 per cent). (Mackinnon 2009)

Work-based learning practitioners' views were similar to those of WBL managers. Over three quarters think that technology has allowed greater choice in learning opportunities for learners (78 per cent) and increased efficiencies in delivery and administration (77 per cent). Over two thirds believe it has improved staff continuing professional development (74 per cent); learner satisfaction (67 per cent); staff satisfaction (67 per cent). Fewest (52 per cent) feel it has helped, to a large extent or a bit, to improve engagement with employers or learner retention.

Similarly 85 per cent of ACL practitioners believed that the use of technology had allowed learners greater choice in learning opportunities as well as improving opportunities for innovation in learning and teaching. Some 68 per cent of ACL practitioners felt that technology had improved learner satisfaction, whereas 59 per cent felt that technology had improved staff satisfaction. (NIACE 2009)

Work-based learning practitioners were asked how much time each week technology saves them. Around three fifths (59 per cent) of practitioners that use online resources find they save time, whilst just 9 per cent find they lose time. Nearly half (44 per cent) find management information systems (MIS) save time, whilst around one fifth save time using interactive whiteboards (22 per cent) and learning platforms (18 per cent). However, only 45 per cent of practitioners responding use the latter two technologies. Management information systems and online resources can save practitioners significant time during a week. Nearly one fifth of practitioners (18 per cent) report online resources save them over two hours per week, whilst 14 per cent using MIS report it also saves over two hours. (Mackinnon 2009)

Some 67 per cent of ACL practitioners stated that the use of technology had allowed them to save time in lesson planning and preparation and 59 per cent of the practitioners stated that the use of technology had saved time in record keeping. A smaller number of practitioners felt that the use of technology saved time in lesson delivery, (45 per cent) and assessments (44 per cent). However, a similar number of practitioners reported that technology had made no difference on the time spent on lesson delivery (37 per cent) or assessments (40 per cent). Only 40 per cent of the practitioners felt that the use of technology saved time in communicating with learners remotely. (NIACE 2009)

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