ICT and e-learning in Further Education

the challenge of change

A report to Post-16 E-learning Policy and Project Board

Becta
ICT Research

September 2005

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1 Management summary

1.1 The purpose of the study

This study is the sixth in a series that assesses progress in the provision of ICT within further education (FE) and sixth form colleges since 1999. It also forms part of the evidence base that will inform the development of the post-16 e-learning programme by examining the integration of this provision into the teaching and learning process.

1.2 Key messages

In the FE and sixth form colleges sector, e-learning activity continued to improve. Staff skills and access to ICT, colleges' ability to access and produce electronic resources, and the extent to which e-learning is deployed have all moved steadily forward. The level of access to ICT both for students and for staff has been maintained at an adequate level. However, the large increase in full-time-equivalent (FTE) students over the last few years has put a strain on the level of access available to students and on the college infrastructure as a whole. All measures of student access have declined since 2003.

Some 87% of the £0.25 billion expenditure on ICT (on systems, hardware, software and training) in FE colleges came out of the general college budget. This grew from 73% in 2003. Colleges themselves therefore have a major influence on the direction of ICT and e-learning development at a local level.

Blended learning activity has become more widespread, seemingly at the expense of the use of ICT in traditional courses and as a support outside scheduled lessons. This may be due to redefinition of some activities, as blended learning can be more readily converted into extra guided learning hours.

Learndirect programmes are now delivered in just over half of colleges, compared with nearly three-quarters in 2003. This has contributed to reducing the number of colleges delivering remote learning programmes from 79% in 2003 to 68% in 2005.

The gap between teachers' skills in their personal use of ICT and their skills in using ICT with learners narrowed between 2000 and 2003, but has remained more or less constant since. Focusing on those teachers who have skills in word processing or spreadsheets but lack skills and confidence in the classroom should produce quick wins.

Virtual learning environments (VLEs) are able to deliver a wide range of learning activity. However, the weakness of these packages is in linking to colleges' management information systems (MISs), which is vital for colleges to manage ICT and change.

1.3 ICT infrastructure

We estimate that the total number of computers in the 392 English colleges was around 370,000 in 2005 – more than double the estimated total in 1999. The rapid growth of colleges' computer stock between 1999 and 2001 gave way to a more gradual net increase until 2004. The purchase of 70,000 new computers in 2004-5, accompanied by a continued reluctance to part with the oldest computers, resulted in a large net increase of 50,000 computers to the national stock.

During 2004-5, the United Kingdom Education and Research Networking Association (UKERNA) began a phased programme of bandwidth upgrades of JANET connections for FE and sixth form colleges to 4Mbps or 10Mbps. At the time of the survey, 20% of colleges still had 2Mbps bandwidth, with many of these respondents expecting change in the near future.

Local area network (LAN) specification improved steadily between 1999 and 2004. A large number of colleges upgraded their LANs between 2004 and 2005, perhaps to make best use of the new bandwidth upgrades. Gigabit Ethernet has become the dominant feature of FE college networks. 100Mbps Ethernet declined dramatically over the last year and 10Mbps Ethernet disappeared from the sample. Two colleges in the survey had LAN backbones in excess of 1Gbps, signalling the beginning of a further phase of LAN development.

> "The target of one internet-connected computer for every permanent member of teaching staff was achieved or bettered by 47% of colleges"

1.4 Access to ICT

An adequate level of access to the ICT infrastructure is the foundation of a college's ability to deliver e-learning effectively. The FE and sixth form college sector was set targets for access in 1999 aimed at achieving this adequate level. The two key targets were to achieve ratios of one internet-enabled computer for every five FTE students, and one internet-connected computer for every permanent member of teaching staff.

The median ratio of FTE students per internet-enabled computer was 4.7:1 at the time of the survey in 2005. This is a vast improvement on the 1999 ratio of 21:1, but a continued decline from 2003 when this ratio was 4.1:1. However, this current ratio remains comfortably within the target of 5:1, with two-thirds of colleges at or below this level. Colleges' success in recruiting and retaining more students is a major determinant of these worsening ratios in the face of increasing numbers of computers.

The target of one internet-connected computer for every permanent member of teaching staff was achieved or bettered by 47% of colleges. This has improved from a level of 26% of colleges in 2003, and 15% in 2001. This achievement is further reflected in the median figure for the ratio of internet-connected computers to permanent teaching staff. This stood at the target level of one member of staff for every machine in 2005, compared to three members of staff per machine in 2000.

Just under half the institutions surveyed (47%) reported that they could not cope with the demand for computers in 1999. This level stood at 40% in 2005, having increased again from its lowest level in 2001. Improvements in access to the internet also declined. Some 42% of respondents described access to computers for internet use as easy at any time. This was a fall from 53% of respondents in 2003, and is similar to the 44% recorded in 2001 – further evidence of the impact of increased numbers of FTE students.

1.5 Teaching and learning resources

College intranets and networks continued to be extensively used for learning. Commercial VLEs, though less widely used than these other platforms, were used by three-quarters of colleges in 2005 compared to 59% in 2003. However, not only did use of these VLEs increase across colleges, they were also more widely cited as a college's main platform.

Colleges made heavy use of all three types of learning platform as repositories for course documents. However, more than 70% of colleges with a VLE used it across a wide range of learning activities. The ability of a learning platform to link with a college's MIS is not an outstanding feature of any platform. The difficulty of linking to an MIS is a significant weakness of VLEs. Only 25% of colleges with a VLE say that this platform is linked to the college's MIS.

E-learning materials tended to be used at the discretion of the individual teacher. This was the case in 58% of the colleges surveyed. Planning for the use of these materials at a higher level was far less widespread. Only 17% of colleges had college-wide plans and 23% had department- or course-level plans.

The internet was again the most frequently used source of learning materials, being used in 95% of colleges. Some 92% of colleges stated that they made use of in-house-developed materials. Only one college in the sample stated that it did not support members of staff who wished to develop materials.

The reuse of e-learning materials is also taking place in colleges. Interestingly, materials were likely to be updated before reuse, an activity identified by 88% of respondents, and as a regular occurrence by 31%. Given the extent of updating and repurposing identified, ease of modification is clearly a key element for materials reuse.

1.6 ICT in the teaching and learning process

ICT remained more widely used for learning support and independent learning than for formal delivery. However blended learning became more widespread between 2004 and 2005. Most other approaches fell back, some to a level lower than in 2003. These changes may be the result of redrawing boundaries between blended learning and other categories in the light of funding priorities. As use of ICT for learning support takes place outside any scheduled learning, and classroom technologies are used entirely within scheduled learning, they are both funding-neutral. Blended learning, on the other hand, offers greater scope for increasing guided learning hours by scheduling in learners' use of ICT.

Fewer colleges offered learndirect programmes in 2005 than in 2003. Almost three-quarters of colleges offered these programmes in 2003, but by 2005 only slightly more than half were doing so.

The average number of staff considered to be competent or advanced in their personal use of ICT grew steadily after 2000 to a level of 77%. Alongside this an average of 59% of college staff were reported to be competent or advanced in using ICT with learners (e-learning skills). Both sets of skills have improved, though whereas the gap closed between 2000 and 2003, it has remained at a steady level of just below 20% since.

1.7 Policies and strategies for ICT and e-learning

Colleges have increasingly relied on their own general budgets for ICT spend. Around three-quarters of the total expenditure in 2001-2 came from the general budget, but by 2004-5 this proportion had increased to 87%. This is a trend that looks set to continue. Total budgeted expenditure on ICT hardware, software, systems and training for 2004-5 was £0.23 billion, around 6% of the total allocation to colleges from the Learning and Skills Council (LSC).

In 2005, colleges were more conservative in their approach to replacing computers. Far fewer sought to replace their computers at three years old than in the previous year – some 7% of colleges had a policy to do this as opposed to 19% in 2004.

Some 80% of colleges collaborated with other organisations on ICT-related activities. Colleges most frequently collaborated with other FE colleges, and almost as frequently with schools. Well over half of colleges collaborated with either or both FE colleges and schools.

One way that a college translates its strategy into action is through setting targets. Some 29% of colleges set formal targets for the use of ICT and e-learning across all programmes. A further 43% set targets where they considered these appropriate, and 25% did not set targets for ICT and e-learning at all. This situation has steadily worsened since 2003, further suggesting a dislocation between strategy and action in many colleges.

Students' access to a reasonably robust infrastructure gives access to electronic resources. Limited resources, taken up by individual enthusiasts, can begin to produce e-learning. However, management time has to be committed to facilitate access, and to plan and set targets, and information has to flow from the teaching and learning process to the management process. Teaching staff also need access to ICT, and their competence and confidence with ICT need to be improved. They could then engage with e-learning and develop their own resources. All these developments need to be in place so that e-learning can be widely implemented and begin to transform teaching and learning.

2 The survey

2.1 Context and purpose of the study

Becta carried out this study in January and February 2005 on behalf of the LSC. The survey assesses progress in the provision of ICT within the further education (FE) and sixth form college sector, along with the extent to which this provision is integrated into the teaching and learning process (e-learning).

Five previous studies, undertaken in 1999, 2000, 2001, 2003 and 2004 provide comparative data against which to judge the impact and development of the ICT infrastructure and e-learning in this sector.

2.2 Survey methodology and response

The study took the form of a survey by questionnaire of all 392 FE and sixth form colleges in England. Two separate questionnaires were sent out. The main questionnaire (the ICT and e-learning survey) explored quantitative issues relating to infrastructure, management and practice. A second questionnaire (the ICT expenditure survey), directed to each college's finance director, concerned expenditure on ICT and the sources of funds for this expenditure. The two questionnaires were published and disseminated simultaneously in both paper-based and web-based formats.

A total of 163 colleges (42% of the sector) submitted completed ICT and e-learning survey questionnaires in time to be included in the analysis. Fewer responses to the ICT expenditure survey were received. A total of 68 colleges (17% of the sector) submitted completed ICT expenditure questionnaires.

The profiles shown in the tables below, together with the good response rate for the ICT and e-learning survey, lead us to a high degree of confidence in the data. The survey was detailed and conducted to a tight timescale, so it is understandable that some returns were incomplete in some sections. For this reason the basis of calculation in the report varies from the sample maximum at times. Unless otherwise stated, all tables and charts are based on the percentage of all respondents to the survey.

2.3 Profiles of the colleges in the survey

Table 1 shows the breakdown of respondents to the survey by type of college.

The breakdown by college type reveals that sixth form colleges are slightly over-represented in the sample, and the more specialised colleges are somewhat under-represented. The actual number of art and design colleges (5) and specialist designated colleges (12) in the total population prevents us from making specific observations about them as groups. The relative proportions of general colleges and sixth form colleges is close enough to the distribution of colleges in the population to ensure a high level of confidence in any inferences drawn from the data.

Table 1 Respondents by college type

College type	Sector		Respondents	
	No.	%	No.	%
General further education and tertiary college	253	65%	103	63%
Sixth-form college	103	26%	51	31%
Agricultural and horticultural college	19	5%	7	4%
Art, design and performing arts college	5	1%	0	0%
Specialist designated college	12	3%	2	1%
Total	392	100%	163	100%

Table 2 Respondents by regional location

Region	Sector		Respondents	
	No.	%	No.	%
South West	34	9%	11	7%
South East	67	17%	27	17%
Greater London	55	14%	18	11%
Eastern region	34	9%	15	9%
East Midlands	27	7%	10	6%
West Midlands	49	13%	24	15%
North West	62	16%	31	19%
Yorkshire and Humber	41	10%	20	12%
North East	23	6%	7	4%

The regional breakdown of respondents to the survey is shown in Table 2. In general a higher proportion of colleges from the Midlands and North of England submitted responses along with a correspondingly lower proportion from the South. However, the general profile of the respondents still mirrors the sector quite closely.

Table 3 Respondents by college size

FTE band	Sector		Respondents	
	No.	%	No.	%
0–750 FTEs	20	5%	6	4%
751–1,750 FTEs	111	28%	46	28%
1,751–3,000 FTEs	88	23%	39	24%
3,001–5,000 FTEs	97	25%	39	24%
5,001 FTEs and over	76	19%	32	20%

Table 3 shows the profile of colleges responding to each survey, grouped according to numbers of full-time-equivalent (FTE) students enrolled at each college. Again, the survey shows a reasonable match with colleges as a whole.

Infrastructure

3.1 College computer stock

In February 1999, Becta's original survey found that only 38% of computers available for learning purposes had a Pentium II processor or better. Pentium II was arbitrarily chosen as being an acceptable specification for use with internet applications at that time. Chart 1 shows that by 2005, 88% of the installed stock of computers in colleges exceeded that specification. Only 1% of college computer stock was of a lower specification than the 1999 benchmark.

However, these figures reflect the rapid improvements in technical specifications available in the marketplace. Newer applications may require improved speed and memory, which may in turn render obsolete even relatively recent purchases.

These improvements in computer specification have been accompanied by a parallel increase in the absolute numbers of computers in colleges. Chart 2 illustrates this increase. We estimate that the actual number of computers in English further education (FE) colleges stood at around 370,000 in 2005 – more than double the 1999 estimate. The rapid growth of computer numbers between 1999 and 2001 resulted in an annual net increase of around 50,000 computers. This situation gave way to a more gradual net increase of around 20,000 computers a year between 2001 and 2004. The purchase of 70,000 new computers in 2004-5, accompanied by a continued reluctance to part with the oldest computers, resulted in a further net increase of 50,000 computers to the national stock.

Chart 3 (below) shows the type of availability of computers averaged across all colleges. As might be expected, computer availability was at its greatest in the daytime, decreased in the evening, and was at its lowest at weekends. A higher proportion of open-access computers than classroom-access computers remained available beyond daytime hours, with around one-third of these open-access machines available for use at weekends. These proportions have remained broadly unchanged since availability was first investigated in 2003. However, though colleges may wish for a greater proportion of computers to be open access, the actual space available in college buildings may prove a constraint.

Chart 1 College computer stock (% of total)

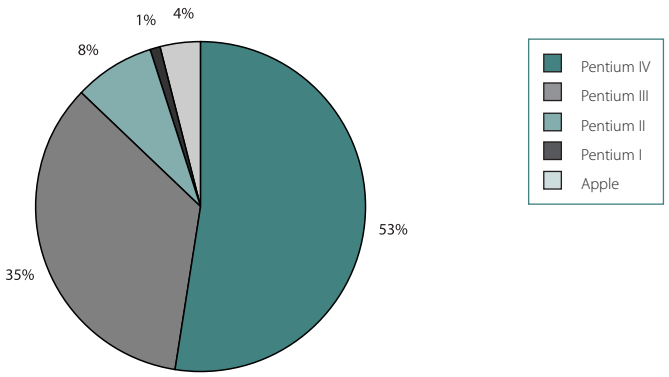
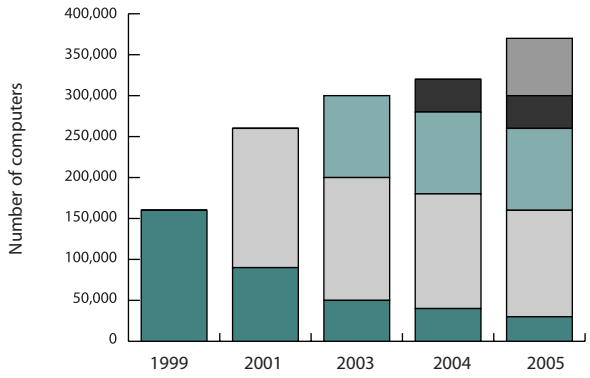


Chart 2 Estimated change in computer stock over time

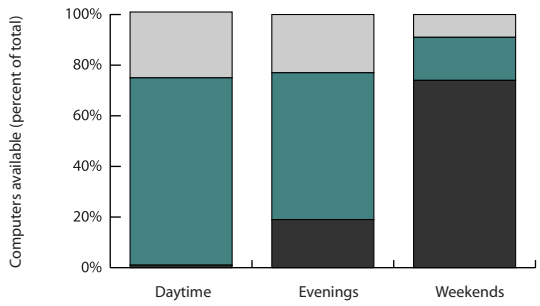


	1999	2001	2003	2004	2005
2004-5 purchases					70,000
2003-4 purchases				40,000	40,000
2002-3 purchases			100,000	100,000	100,000
2000-1 purchases		170,000	150,000	140,000	130,000
Pre-2000 purchases	160,000	90,000	50,000	40,000	30,000

3.2 Internet connectivity

During 2004, the United Kingdom Education and Research Networking Association (UKERNA) began the process of upgrading colleges' free 2Mbps internet connections via JANET as part of the National Learning Network (NLN) initiative. At the time of the survey, colleges were migrating to upgraded bandwidth of either 4Mbps or 10Mbps, a decision based on a college's aggregated overall traffic flow. Table 4 (below) shows the extent to which this migration had taken place by 2005. Only 20% of colleges still had 2Mbps bandwidth at this time, with many respondents flagging up change in the near future.

Chart 3 Computer placement

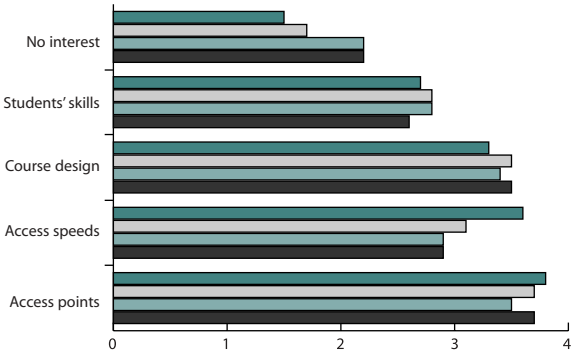


	Daytime	Evenings	Weekends
No access	1%	19%	74%
Classroom access	74%	58%	17%
Open access	26%	23%	9%

Table 4 Total planned bandwidth

Bandwidth	2000	2003	2005
2Mbps	59%	67%	20%
2-3Mbps	12%	2%	0%
4Mbps	19%	14%	33%
6Mbps	1%	2%	2%
8Mbps	1%	1%	2%
10Mbps and more	4%	11%	38%

Chart 4 Constraints on increased use of the internet



	No interest	Student skills	Course design	Access speeds	Access points
1999	1.5	2.7	3.3	3.6	3.8
2001	1.7	2.8	3.5	3.1	3.7
2003	2.2	2.8	3.4	2.9	3.5
2005	2.2	2.6	3.5	2.9	3.7

Weighted score

Given this state of flux, it is difficult to identify the number of colleges that have chosen to contract other internet service providers (ISPs) to provide additional connectivity over and above any free JANET connection. However, 19% of colleges identified a range of different ISPs providing them with some connectivity.

3.3 Constraints on internet use

Colleges were asked to rank a list of possible constraints on expansion of internet use in the order of their significance to the college. The results are shown in Chart 4. The weighted scores are derived by giving a score of 5 for every time a constraint is ranked first, 4 if it is ranked second and so on.

The number of access points remained the most important perceived constraint, despite the large influx of internet-capable machines into colleges. Access speeds, however, declined considerably as a constraint – a result of the early investment in high-specification computers and local area network (LAN) capability to support the now universal JANET. The idea that course design does not encourage internet use has maintained second place in the rankings since 2000. Lack of interest remained in fifth place, but has grown in importance over the years, perhaps the result of trying to embed internet use in more recalcitrant areas of the curriculum.

We asked colleges to state any other factors restricting growth in use of the internet. Inappropriate use continued to be the most widely cited constraint. This included the problem of restricting access to unsuitable sites and the possibility, when doing this, of inadvertently restricting access to suitable sites. Some 9% of all respondents mentioned this, compared with 15% in 2004 and 11% in 2000.

Bandwidth was cited as a constraint by another 6% of respondents. 'We estimate that to maintain and cope with increased demand, then we will need to increase our bandwidth even further despite an increase this year.' Some colleges complained of delays in upgrading the college's connection, 'We desperately need the proposed upgrades to FE internet connections.' Another two colleges mentioned problems caused by bandwidth-hungry online testing applications, 'Many internet applications (eg online testing) place a high demand on our internet connection, and to move the source of demand (ie to host the service locally) has a capital finance implication which is high in relation to the college's available revenue.'

The physical constraints imposed by college buildings, and the balance of access between classroom and open-access computers were cited by 3% of respondents. Low staff skills and lack of knowledge were mentioned by 4% of respondents. One respondent commented that the educational benefit of the internet was as yet 'unproven', and another questioned the

desirability of direct internet access, 'the effectiveness of "raw" material versus "processed" learning materials – high direct internet access may not be desirable.'

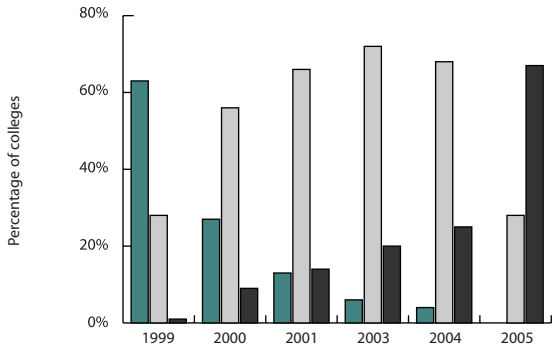
3.4 LANs

While 39% of the colleges surveyed were single-site institutions, a further 31% operated out of two or three major sites, and 19% out of four or five sites. The largest multi-site college in the sample operated out of 19 major sites.

Most sites were networked. Some 94% of colleges had all their major sites connected to the college network. Of the remaining nine colleges in the survey, five had one major site that was not networked and another three had three sites not networked. One college had six major sites not networked.

Chart 5 shows how improvements in LAN specification have risen over the years. This is broadly in line with the specification and volume of the computers that they support. A large number of colleges upgraded their LANs between 2004 and 2005, perhaps to make best use of the internet upgrade mentioned above. This has resulted in Gigabit Ethernet becoming the dominant feature of FE college networks. 100Mbps Ethernet declined dramatically over the last year and 10Mbps disappeared from the sample. Two colleges also recorded LAN backbones in excess of 1Gbps, signalling the beginning of a further phase of LAN development.

Chart 5 LAN backbone

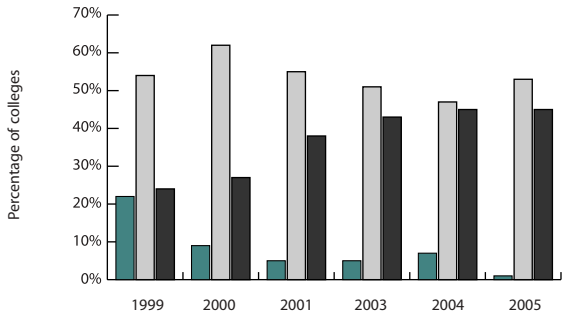


	1999	2000	2001	2003	2004	2005
10Mbps Ethernet	63%	27%	13%	6%	4%	0%
100Mbps Ethernet	28%	56%	66%	72%	68%	28%
Gigabit Ethernet	1%	9%	14%	20%	25%	67%

3.5 LAN performance

The steady improvement in LAN specification between 1999 and 2004 was associated with a concomitant improvement in performance and in capability to meet demand. However, Chart 6 shows that the dramatic improvement in specification between 2004 and 2005 has been associated with only a relatively modest improvement in capacity. In 1999, only 24% of colleges had the capacity to meet an increase in demand on their networks, while 22% could not cope with existing calls upon them. By 2004, 45% of respondents said that they could cope with a significant increase in traffic. However, despite the dramatic improvement in LAN specification in 2005, this percentage remained unchanged.

Chart 6 Network capability to meet demand

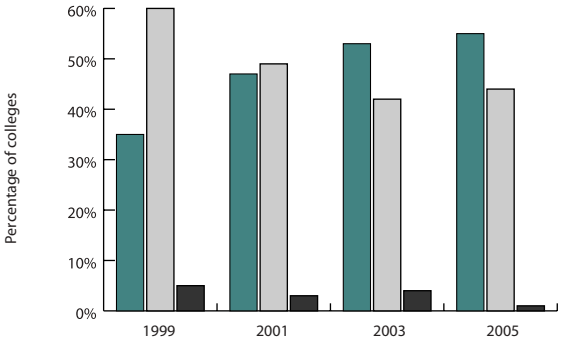


	1999	2000	2001	2003	2004	2005
Overstretched	22%	9%	5%	5%	7%	1%
At capacity	54%	62%	55%	51%	47%	53%
Spare	24%	27%	38%	43%	45%	45%

On the other hand, the proportion of colleges struggling to meet demand fell in 2005 to 1%. While we might expect some delay between technical improvements and the identification of any resultant benefits, this may also confirm that the notion of a 'motorway effect', which sees traffic rapidly adjust upwards each time an additional lane is opened, still applies to the nature of demand for ICT in colleges.

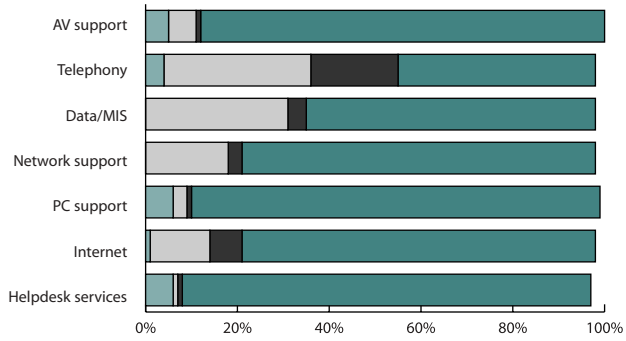
The data must be seen against a backcloth of substantial increases in demand on networks. Not only must each college network support its share of the additional 210,000 machines we estimate to have been added since 1999, but it must also deal

Chart 7 Network performance



	1999	2001	2003	2005
Always smooth	35%	47%	53%	55%
Slow at busy times	60%	49%	42%	44%
Slowness a problem	5%	3%	4%	1%

Chart 8 Technical support services



	AV support	Telephony	Data/ MIS	Network support	PC support	Internet	Helpdesk services
Not offered	5%	4%	0%	0%	6%	1%	6%
Partly outsourced	6%	32%	31%	18%	3%	13%	1%
All outsourced	1%	19%	4%	3%	1%	7%	1%
In-house	88%	43%	63%	77%	89%	77%	89%

Percentage of colleges

with the increased proportion of the total that are networked (97%) rather than stand-alone. The burden is further increased, moreover, by the increasing use of networked applications.

Colleges continued to restrict network traffic in bandwidth-hungry applications. Three-quarters (75%) of colleges identified large files as an actual or potential source of problems on the network, and sought to control their use. Despite the continuing improvement in colleges' technical infrastructure, this percentage is only 9% fewer than the 84% that cited large files as a problem in 1999. 'Bandwidth hungry' is of course a relative term and, in a further demonstration of the 'motorway effect', ever more voracious applications eat into newly increased LAN capacity.

Chart 7 shows a rise over the period 1999-2005 in the proportion of colleges that describe their network performance as smooth, accompanied by a decline in those that reported their network performance to be slow at busy times or to be a frequent problem. However, the most dramatic changes took place between 1999 and 2003, the overall trend tending to plateau since that time. Students in 44% of colleges, the networked learning of which 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.

There have clearly been considerable technical improvements to connectivity and college networks over the last year. However, at the time of the survey, these improvements had not been translated into a dramatic improvement in perceived performance.

3.6 Technical support services

FE colleges employ technical staff to deliver a wide range of services. in 2005, the median number of technical staff directly employed by colleges was eight, and the median ratio of computers to employed technicians was 100:1.

In-house technical support tended to be concentrated in the area of end-user computing. PC support, audiovisual support and technical helpdesk services were the services most often provided by in-house staff. Around 90% of colleges delivered these services entirely in-house (see Chart 8). Around three-quarters of colleges delivered internet and network support services in-house. Most of the remainder partially outsourced these services. Data services, including management information systems (MISs), and telephony support were most likely to be at least partly outsourced. Data services were handled in-house by 63% of colleges, and telephony by only 43%.

Access to ICT

4.1 Access for learners

As shown in Section 3 of this report, the further education (FE) and sixth form college sector has continued to strive to maintain a robust ICT infrastructure. Widespread demand for this technology and increasing student numbers may, however, consume any future increase in capacity. Access to this infrastructure is therefore a key determinant of a college's ability to deliver teaching and learning effectively.

The survey requested an actual count of computers available in the college. Based on this data, calculations were made of the availability of computers for both students and staff within colleges. The proxy variables that have been calculated to estimate this are the ratios of computers to students and to staff. All five previous studies used these measures, and comparisons over time can be drawn. These ratios were used by the Learning and Skills Council (LSC) to define the targets for access to computers that it encouraged colleges to achieve by 2002.

There is no single unambiguous measure of student numbers that can safely be used to calculate access ratios. Full-time-equivalent (FTE) student data allows for total hours of attendance, which other possible measures such as a simple count of student numbers do not. We therefore used this data for our calculations. This allowed us to get closer to the underlying question – how easy is it for a student to access a computer within the institution? We have not tried to distinguish particular groups of students, or to separate out attendance mode, pattern or site, although we recognise that in practice these may also have an influence in determining access.

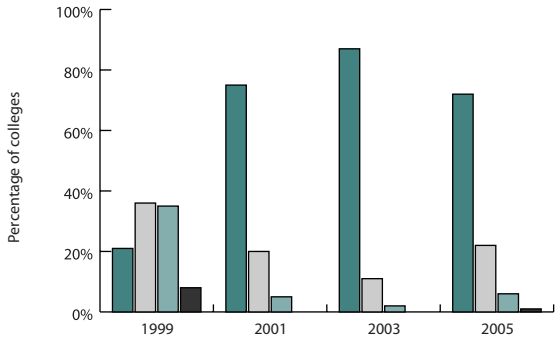
We used the latest complete set of FTE student data available from the LSC, which covers student numbers for the academic year 2003-4. The numbers of FTE students have risen markedly over the past few years, reflecting the greater levels of recruitment and retention of students across FE. The total number of FTE students stood at 0.9 million in the academic year 2000-1, but had increased to 1.15 million by 2002-3. By 2003-4 this had increased further to 1.28 million. If student numbers have continued to grow in the intervening period, then comparing student numbers in 2003-4 with computer numbers in 2005 will distort the apparent ratio, rendering it slightly more optimistic than it is in reality. However, such an effect is likely to be minimal and, given that year-old FTE figures have been consistently used by this series of surveys, their value for comparison over time will not be affected.

We have examined two key statistics:

- the ratio of FTE students to all computers in the college
- the ratio of FTE students to internet-enabled computers.

This latter statistic has allowed the LSC to monitor its target for colleges of one internet-enabled computer for every five FTE students.

Chart 9 Ratio of FTE students to all computers



	1999	2001	2003	2005
5:1 and below	21%	75%	87%	72%
6:1 to 7:1	36%	20%	11%	22%
8:1 to 11:1	35%	5%	2%	6%
12:1 and above	8%	0%	0%	1%

4.2 Access to computers

The change since 1999 in the availability of computers for students is shown in Chart 9. The mean number of FTE students per computer was 8.2:1 in 1999. This figure was most favourable in 2003, when it was 4.1:1. However, it has since crept back to a level

of 4.7:1 in 2005. The median number of FTE students per computer was 4.4:1 in 2005 (from 4.0:1 in 2003 and 7.6:1 in 1999). As the median value is not distorted by extreme results, it is likely to be the better estimate of the typical situation in colleges, and to offer a better value for comparison over time. The highest value calculated for 2005 was 12.4:1 at a single college, with only 7% of the respondents having ratios of 8:1 or worse, a similar level to the previous two years. This compares with 43% that had ratios of 8:1 or worse in 1999.

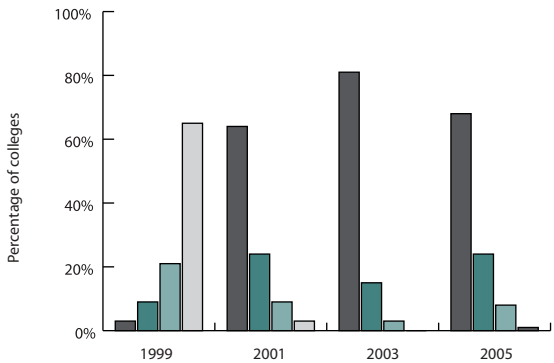
Colleges have had to face the challenge of maintaining their technological infrastructure to keep it reasonably up to date. At the same time they have had to meet the demand created by growing numbers of FTE students. Comparing the rate of increase of FTE students to the rate of increase of numbers of computers available for students shows that the large number of computer purchases between 1999 and 2001 reduced the student:computer ratios considerably. Since that time, numbers of FTE students have increased at a higher rate than the net increases in computer numbers. During 2004, one additional computer was purchased for every 6.25 additional FTE students recruited across the sector. However, this situation eased during 2005 when one additional computer was purchased for every five additional FTE students.

The disparity noted in earlier surveys between different types of college in terms of levels of resources continued to widen in 2005, having closed in 2003. The median ratio of FTE students to computers for sixth form colleges slightly improved to 3.5:1 from the level of 4.1:1 in 2003. On the other hand, this ratio for general FE colleges deteriorated to 4.9:1, having been 3.9:1 in 2003. The median ratio for land-based colleges stood at 5.1:1, slightly worse than the 2003 level of 4.6:1. Again, the increase in numbers of FTE students, which was more pronounced in general FE colleges than in sixth form colleges, would account for this.

4.3 Access to internet-enabled computers

Chart 10 shows the dramatic increase in internet access in the FE sector between 1999 and 2001. The chart also demonstrates a steady improvement to 2003, followed by some deterioration, resulting in a profile in 2005 similar to that in 2001. The median number of FTE students to computers with internet access was 4.7:1 in the current study. This was a further deterioration from the level of 4.1:1 in 2003, though still vastly improved on the level of 21:1 in 1999. More than two-thirds of colleges remained within the LSC target level of 5:1, although the number of colleges within the target level had declined from a proportion in excess of three-quarters of colleges in 2003.

Chart 10 Ratio of FTE students to internet-connected computers



	1999	2001	2003	2005
5:1 and below	3%	64%	81%	68%
6:1 to 7:1	9%	24%	15%	24%
8:1 to 11:1	21%	9%	3%	8%
12:1 and above	65%	3%	0%	1%

4.4 Managing demand for student access

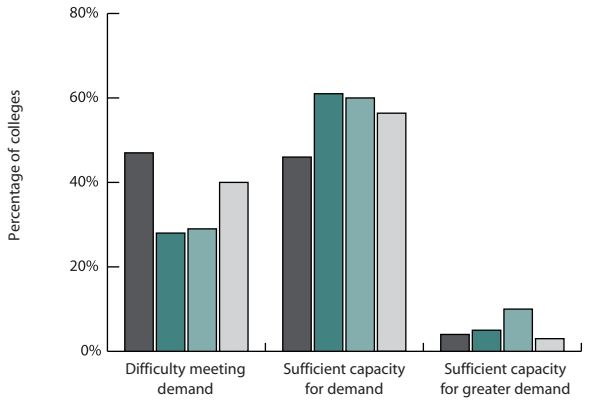
In 1999, colleges overwhelmingly described student demand for computers as widespread. Since that time demand has clearly continued to grow in the face of a greatly increased number of high-specification computers available for use by learners. Just under half of institutions (47%) reported that they could not cope with the demand for computers in 1999. As Chart 11 shows, this level now stands at 40%. This proportion has increased again from its lowest level in 2001. Also, the number of colleges reporting that they are able to cope with increased demand

has declined to 3% from a peak of 10% in 2003. These figures mirror the increase in the ratio of FTE students per computer reported above.

The same general picture applies to meeting demand for internet access. Table 5 indicates that the number of colleges that were unable to meet demand fell from just over half in 1999 to one-quarter in 2001. This proportion increased again in 2005 to around one-third. Colleges appear more able to meet demand for access to 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.

Improvements in access to the internet also seem to have declined in the last few years. In 2005, 42% of respondents described the use of computers for internet access as easy at any time. This represented a fall from the peak of 53% of respondents in 2003, to a level similar to the 44% recorded in 2001. Around 52% reported in 2005 that learners were likely to queue at busy times, a rise from 44% in 2003 and, again, close to the 2001 level of 56%.

Chart 11 Meeting student demand for computers



	Difficulty meeting demand	Sufficient capacity for demand	Sufficient capacity for greater demand
1999	47%	46%	4%
2001	28%	61%	5%
2003	29%	60%	10%
2005	40%	56%	3%

4.5 Access for staff

The improvement in the provision of computers for the exclusive use of staff identified in previous studies has been maintained at a similar level to that in 2004. The National Learning Network (NLN) target of one internet-connected computer for every permanent member of the teaching staff was achieved or bettered by 47% of colleges, a similar level to that in 2004, though improved from a level of 26% in 2003, and 15% in 2001.

The attainment of the target for staff access to computers had proved slower to achieve than the target for student access. This is in accord with a preference, expressed in many strategy documents submitted by colleges to Becta in 2000, for giving early priority to resources for students rather than staff. This position was reaffirmed by the strategy updates for 2001, and its translation into practice is clearly demonstrated by achievement of the student access ratios reported above.

The actual achievement of colleges in providing computers for staff is reflected in the median value of the ratio of internet-connected computers to permanent teaching staff, which improved from 3:1 in 2000, to 1:1 this year. The figure imputed for 1999 (when the question was not directly asked) was 7:1. (See Table 6.)

Table 6 also shows the improvement in access to internet-enabled computers for all teaching staff, which is of particular significance given the heavy reliance by colleges on sessional staff to deliver programmes of learning. The ratio of teaching staff to internet-enabled computers has fallen from 12.0:1 to 1.7:1. We have chosen not to report separately the ratios for staff and all computers, including those without internet capability, because these now differ little from the figures given in Table 6.

Table 5 Meeting student demand for internet access

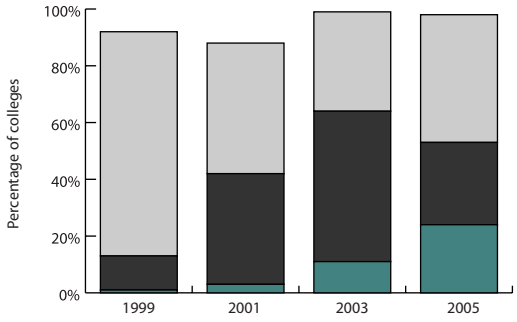
College capability	2005	2003	2001	1999
Cannot cope with current demand	33%	25%	25%	54%
Can cope with current demand	56%	63%	58%	25%
Can cope with greater demand	10%	11%	11%	5%

Table 6 Median ratio of teaching staff to internet-connected computers

	2005	2003	2001	1999
All teaching staff	1.7:1	2.4:1	3.5:1	12.0:1
Permanent staff	1.0:1	1.4:1	1.9:1	*7.0:1

* Estimate based on 1999 data

Chart 12 Priority given to providing teaching staff with access to own designated computer



	1999	2001	2003	2005
Not a priority	79%	46%	35%	45%
Priority	12%	39%	53%	29%
Achieved	1%	3%	11%	24%

The improvement in access to internet-enabled computers has come about from the increasing connection of staff computers to the college network. In 2005, 75% of all computers set aside for staff use were networked desktop machines, and 24% were laptops. Only 1% of staff computers were stand-alone desktop machines.

This improvement has accompanied a trend towards giving each member of teaching staff their own designated computer. Chart 12 reveals college priorities changing in the light of the increase in available resources. By 2005, sole use of a computer for teaching staff had been achieved by 24% of colleges, increased from 11% in 2003. However, sole use has declined as a priority over the last year, having been reported as a low priority by 45% of colleges. The achievement of sole use of a computer for teaching staff by 24% of colleges may appear to sit awkwardly with the other reported achievement of a ratio of teaching staff to computers of 1:1 by 47% of colleges. Although many colleges have enough computers for all permanent teaching staff, these machines are not designated for the sole use of a particular individual.

Sole access to a computer for learning support staff is seen as less of a priority for colleges than sole access for teaching staff. Even so, 25% of colleges had achieved this type of access in 2005, which is almost the same percentage as had achieved sole access for teaching staff. However, 50% of all colleges did not regard sole access as a priority for their learning support staff.

Taking colleges as a whole, the level of access to ICT both for students and for staff has been maintained at a reasonable level. However, the large increase in FTE students over the last few years has continued to put a strain on the level of access available to students and on the college infrastructure as a whole.

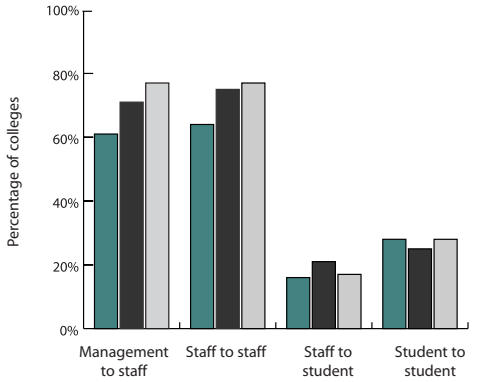
Teaching and learning resources

5.1 Electronic communications

Almost all colleges use email and other electronic communication tools. About 99% of the colleges surveyed used email for communication with and between staff and for communicating with students. A smaller number of colleges, 88% of the total, said that their email facility was used for student-to-student communication. This figure has increased from 69% in 2003. However, estimating the extent of students' use of web-based email such as Hotmail would be an impossible task. Therefore we would assume that these figures underestimate the actual level of student-to-student electronic communication.

Chart 13 shows the extent to which respondents regarded such communication to be common practice within their colleges. Email as a tool for staff communication is becoming increasingly prevalent, reflecting practice across all sectors of the economy. However, the use of this technology to communicate with students has remained at a low level in most colleges.

Chart 13 Email and other e-communications described as 'common practice'

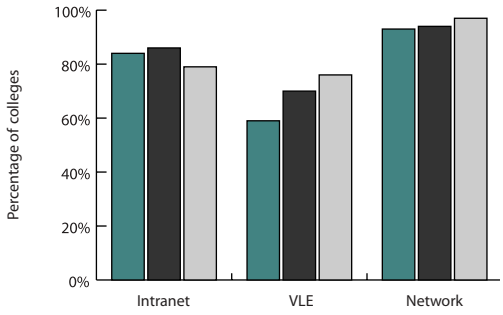


	Management to staff	Staff to staff	Staff to student	Student to student
2003	61%	64%	16%	28%
2004	71%	75%	21%	25%
2005	77%	77%	17%	28%

5.2 Learning platforms

We asked colleges to indicate the types of learning platform in use. A learning platform could be the college intranet, a commercially produced or open-source virtual learning environment (VLE), or the general college network (using joint drives or public folders, for example). Colleges also indicated whether this usage could be described as frequent and also, if frequent, whether the particular learning platform could be described as the college's main platform. Chart 14 shows the change in use of the different platforms over the years 2003-5. In the last year, college networks remained as extensively used as in the previous two years, while college intranets were less widely used in the last year. VLEs remained the least widely used, but were used in 76% of colleges compared to 59% in 2003.

Chart 14 College learning platforms

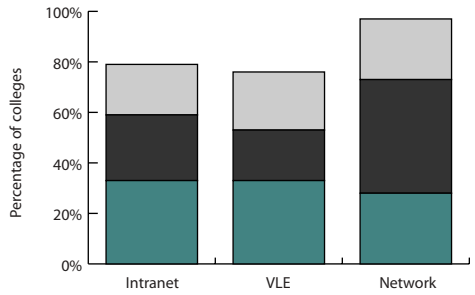


	Intranet	VLE	Network
2003	84%	59%	93%
2004	86%	70%	94%
2005	79%	76%	97%

Chart 15 below shows the extent of use of these three types of platform in 2005. VLEs not only increased in use in colleges, they were more widely cited as a college's main platform. VLEs were the main platform in 23% of colleges as opposed to 16% in 2004. Intranets continued to be used as the main learning platform in 20% of colleges, whereas college networks were the main platform in 24% of colleges, compared with 40% in 2004.

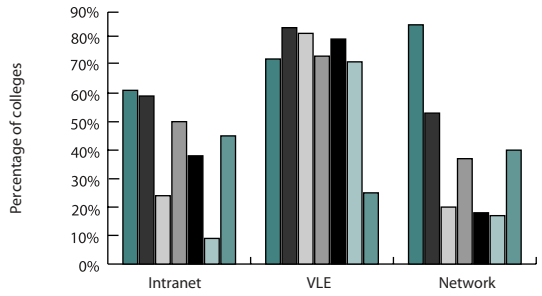
The increase in VLE use appears to have been achieved partly at the expense of the other two types of platform. In 2005, the proportion of colleges frequently using the college network remained the same as in the previous year, but there was a sizeable decrease in colleges claiming the network as their main platform. Intranets, on the other hand, were the main platform in the same percentage of colleges as in 2004, but with fewer making frequent use of them. Some 43% of colleges frequently used a VLE or used it as their main platform, almost double the 2003 level of 22%.

Chart 15 College learning platforms – frequency of use



	Intranet	VLE	Network
Main platform	20%	23%	24%
In frequent use	26%	20%	45%
In use	33%	33%	28%

Chart 16 Use of college learning platforms



	Intranet	VLE	Network
Store course docs	61%	72%	84%
Deliver learning activity	59%	83%	53%
Discussion	24%	81%	20%
Remote staff access	50%	73%	37%
Remote learner access	38%	79%	18%
Tracks student activity	9%	71%	17%
Links to MIS	45%	25%	40%

In order to identify the uses of these different learning platforms, we asked respondents to select from a list of features of learning platforms. These features were derived from a typology published in the recent Joint Information Systems Committee (JISC)/National Institute of Adult Continuing Education (NIACE) report on choosing and using a learning platform in adult and community learning (Powell and Minshull 2004). Chart 16 shows the range of uses of the different platforms in 2005. The figures shown for each type of use are the percentages of those colleges that have each of the three platform types. Colleges made heavy use of all three types of learning platform as repositories for course documents. However, more than 70% of colleges with a VLE used it across a wide range of learning activity. The ability of a learning platform to link with a college's management information system (MIS) is not an outstanding feature for any platform. The difficulty of linking to an MIS is a significant weakness for VLEs. Only 25% of colleges with a VLE said that this platform was linked to the college's MIS.

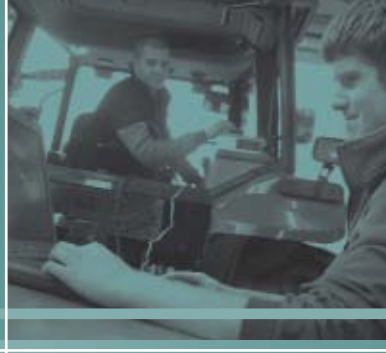
5.3 Electronic learning materials

E-learning materials continued to be most often used at the discretion of the individual teacher. This was the case in 58% of the colleges surveyed. The use of e-learning materials was directed by a college-wide plan in only 17% of colleges and by a plan at department or course level in 23%. These proportions remained broadly the same between 2004 and 2005.

Chart 17 (below) shows the main sources of learning materials used with students. The internet was again the most frequently used source of learning materials, being used in 95% of colleges (94% in 2003) and in common use in 45% (43% in 2003). Of the 87% of colleges that used National Learning Network (NLN) materials, 13% described their use as common practice. This is an increase from 4% describing the use of NLN materials as common practice in 2003. However, the overall reported use of e-learning materials by colleges has remained fairly static since 2003.

Some 83% of colleges offered staff development programmes to support staff who wished to develop or adapt e-learning materials. Around 72% offered support from e-learning 'champions' and 64% offered support from technical staff. These proportions have remained broadly the same over the last few years. Of the 20% of colleges that offered other support, a number mentioned support from other members of staff, often on a one-to-one or mentoring basis. Several colleges also mentioned the deployment of a dedicated materials development team. Others offered some remission of time, loan of laptops or other equipment, and sometimes funding. A number also mentioned involvement in projects, often with sector agencies, as a source of support.

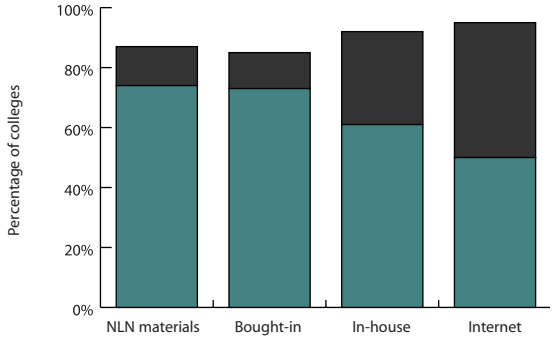
Some 93% of respondents stated that their college had no policy on the reuse of e-learning materials. The extent of reuse that did occur (see Chart 18 below) may therefore be taken to be largely driven by a bottom-up desire rather than by top-down edict.



Unmodified reuse, where materials are taken 'back off the shelf' for use with learners, is clearly widespread within the sector, with 82% of respondents identifying this activity within their college, and 22% describing such reuse as a regular occurrence. However, materials were more likely to be updated before reuse, an activity identified by 88% of respondents, and as a regular occurrence by 31%. Repurposing of learning materials, where materials are modified for different learning contexts, was only slightly less widespread than unmodified reuse, identified by 79% of respondents and described as a regular occurrence by 15%. Given the extent of updating and repurposing identified, ease of modification is clearly a key element for materials reuse.

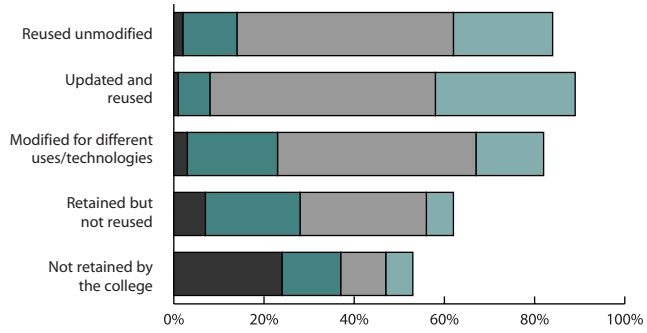
A far greater proportion of respondents either did not know or did not respond to the questions asking for the extent of material being retained but not reused (38%) or materials not being retained (45%). These statistics indicate the lack of college-level repositories which would be necessary to give a definitive answer here.

Chart 17 Source of e-learning materials used with students



	NLN materials	Bought-in	In-house	Internet
This is common practice	13%	12%	31%	45%
We do this	74%	73%	61%	50%

Chart 18 Reuse of e-learning materials



	Reused unmodified	Updated and reused	Modified for different uses /technologies	Retained but not reused	Not retained by the college
Regularly	22%	31%	15%	6%	6%
Sometimes	48%	50%	44%	28%	10%
Rarely	12%	7%	20%	21%	13%
Never	2%	1%	3%	7%	24%

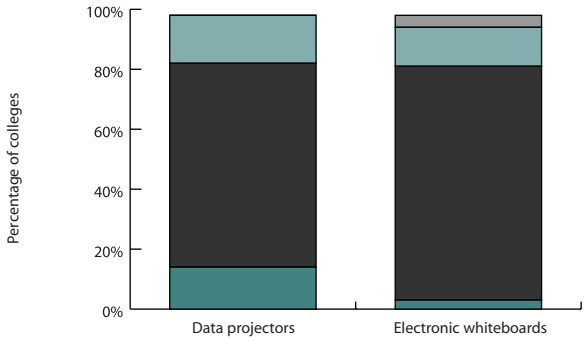
Percentage of colleges

Use of ICT in the teaching and learning process

6.1 Display screen technologies

Display screen technologies have made significant inroads into teaching practice. All the colleges that replied to the question about display screen technologies (98%) used data projectors, and only 4% of colleges stated that electronic whiteboards were not available. Chart 19 shows the extent of availability of these technologies in colleges. Both technologies were sited in at least some teaching rooms in over 80% of colleges, and data projectors were available in all or most teaching rooms in 14% of colleges. This pattern of availability, while demonstrating the spread of these technologies in teaching, also gives an idea of how far colleges still have to go in embedding technology in the classroom.

Chart 19 Availability of display screen technologies



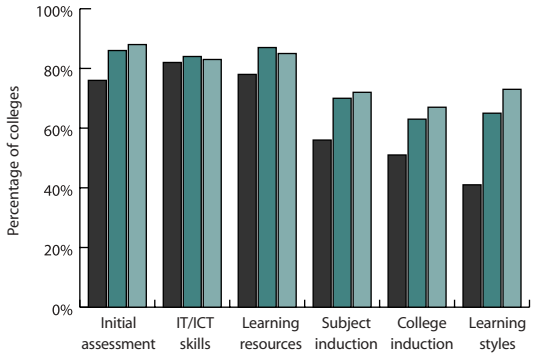
	Data projectors	Electronic whiteboards
Not available	0%	4%
Bookable equipment/rooms	16%	13%
In some rooms	68%	78%
In all or most rooms	14%	3%

6.2 ICT in student induction

Chart 20 shows the proportion of colleges that used ICT in the student induction process. Respondents were asked to indicate whether ICT was used for a variety of activities. One set of activities involved using ICT to share basic information about the college, about the subject under study or about the availability and use of learning resources. The other set of activities were diagnostic and skill oriented, assessing learners' knowledge, skills and learning styles. All the induction activities showed increases from 2003, although, with the exception of evaluating learning styles, there was no significant change from 2004 to 2005.

This relatively static picture does mask some widening of ICT use for induction within colleges, however. The numbers of colleges that indicated that they made common use of ICT in initial assessment, college induction, and the evaluation of learning styles increased between 2004 and 2005 (see Chart 21 below).

Chart 20 Total use of ICT in student induction



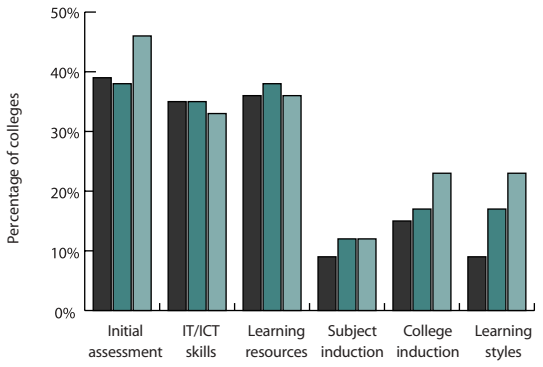
	Initial assessment	IT/ICT skills	Learning resources	Subject induction	College induction	Learning styles
2003	76%	82%	78%	56%	51%	41%
2004	86%	84%	87%	70%	63%	65%
2005	88%	83%	85%	72%	67%	73%

6.3 ICT and e-learning in mainstream programmes

We asked colleges to identify the extent to which they used e-learning in mainstream college programmes. The model of e-learning developed by Jenny Scribbins and Bob Powell (Becta, 2002) was used to structure, for the purposes of the questionnaire, the variety of ways in which electronic media and resources can enable and support effective teaching and learning. It is worth noting that this model of e-learning is a descriptive one and does not seek to prescribe a set of activities that all colleges must follow. Each e-learning activity can aid high quality effective teaching and learning when it is appropriate to the needs of the learner.

Chart 22 shows the numbers of colleges that used these approaches to e-learning in all or most of their programmes. A curious pattern has emerged with blended learning and remote learning becoming more widespread between 2004 and 2005. All the other approaches fell back, some to a level lower than in 2003.

Chart 21 Common use of ICT in student induction



	Initial assessment	IT/ICT skills	Learning resources	Subject induction	College induction	Learning styles
2003	39%	35%	36%	9%	15%	9%
2004	38%	35%	38%	12%	17%	17%
2005	46%	33%	36%	12%	23%	23%

Chart 22 Use of ICT in all or most mainstream college programmes

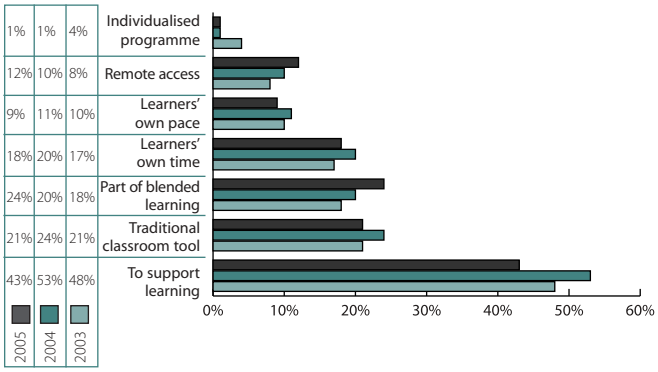


Table 7 Use of ICT to track progress

	2003	2004	2005
Scheme of work	12%	16%	13%
Whole programme	21%	17%	28%
Assignments and assessments	42%	47%	60%
Completion of an element of the programme	27%	27%	34%
Tutorials	18%	15%	26%

The use of ICT to support learning remained clearly the most frequent use, which featured in all or most programmes in 43% of colleges. This type of activity typically takes place outside scheduled learning and complements or supports the main programme. The kind of ICT use envisaged here includes using the internet for research, and technology-based exercises for revision or practice. These activities also require the least formal input from the colleges, and in many cases may be carried out entirely at the initiative of the student. However, this type of activity fell from 53% in 2004 and 48% in 2003.

A similar picture emerged in the use of ICT as a traditional classroom tool, a category that would include the use of display screen technologies. Widespread use of ICT for this type of activity was identified by 21% of respondents, a similar level to that in 2003, and down from 24% in 2004.

On the other hand, use of ICT and e-learning with traditional learning resources to produce blended learning was seen as widespread by 24% of colleges, an increase from 20% in 2004.

Taken together, these changes may be the result of a redrawing of boundaries between blended learning and the other categories in the light of funding priorities. As use of ICT for learning support takes place outside any scheduled learning, and classroom technologies are used entirely within scheduled learning, they are both funding-neutral. Blended learning, on the other hand, offers greater scope for increasing guided learning hours by scheduling in learners' use of ICT.

A similar mixed picture emerged for the more learner-focused uses of ICT, albeit on a smaller scale. Widespread use of ICT for remote access to learning increased slightly, while at the same time there was some decline in the use of ICT to enable learners to access some or all of their programme at a convenient pace or time. However, these changes remain within possible sampling error.

in 2005, just over half (53%) of colleges delivered learndirect courses (see Chart 23). However, this percentage fell from 72% in 2003 and 66% in 2004. On the other hand, remote learning not delivered via learndirect was offered by 50% of colleges in 2005. This figure has remained relatively static over the period since 2003, when it stood at 55%. Some 32% of colleges offered neither form of remote learning, a proportion that has grown from 21% in 2003.

Table 7 shows the extent to which colleges used ICT to track students' academic progress. Several of these progress-tracking activities became more embedded within colleges. Tracking against assignments or assessments took place in 60% of

colleges in 2005. This continued to be the most widespread use of ICT for student tracking, used by nearly twice as many colleges as the second most widespread use (tracking against completion of an element of the programme).

The use of electronic information to support teaching and learning also progressed. In 2005, 48% of colleges commonly used electronic information to support personal tutorials, an increase from 35% the previous year. Information from tutorials was recorded electronically in 29% of colleges, again increased from 19% in 2004. Electronic student portfolios or records of achievement were maintained in 27% of colleges, a small increase from 24% in 2004.

6.4 ICT and online assessment

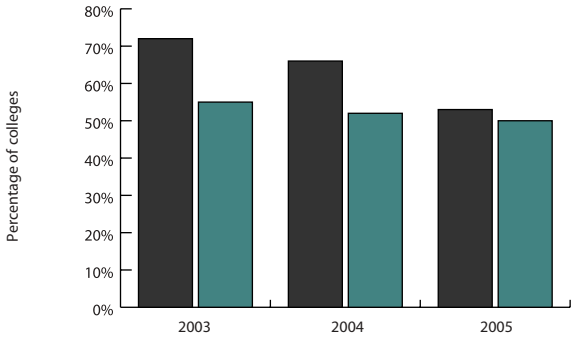
Online assessment was considered insignificant or limited to individual enthusiasts in 35% of the colleges surveyed. It was a widespread activity in only 6% of colleges. These figures were higher than in the previous two years, when online assessment was considered insignificant or limited in 50% of colleges and widespread in only 2%.

This small increase in the use online assessment is reflected in the extent to which the assessment activities are seen as common practice in Chart 24. All the assessment activities identified in the chart became more widely used in colleges, but the extent of common usage remained small. The most extensive use of ICT remained being to store and record outcomes of assessment, which occurred in 81% of colleges. However, only 14% described this as common practice. The use of ICT for assessment activities that lead to formal certification remained the least widespread type of activity. Only 60% of colleges did this at all, and 4% described it as common practice.

6.5 Staff ICT and e-learning skills

We asked respondents to estimate the general skills levels of staff in their college. They identified the proportion of staff with low, medium or high levels of skill (beginner, competent, advanced), both in their personal use of ICT (for example, word processing or using spreadsheets) and in their use of ICT with learners (e-learning skills). We left definitions within these broad classifications to the judgement of respondents on grounds of practicality. We considered the identification of suitably bounded criteria to be a daunting task, if not impossible within the timescale. We also felt that while respondents' assessments of the categories would not be identical, respondents would share sufficiently similar understandings of degrees of competency to enable comparisons and judgements to be drawn from the results.

Chart 23 Delivery of remote learning in colleges



	2003	2004	2005
Delivers learndirect programmes	72%	66%	53%
Delivers other remote learning	55%	52%	50%

Chart 24 Online assessment activities

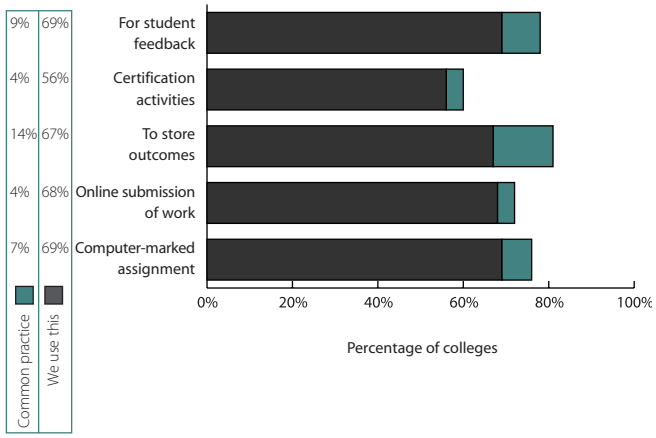
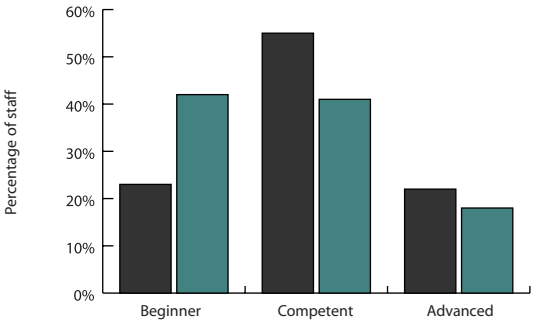
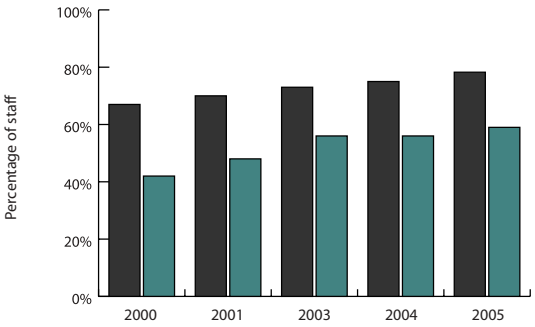


Chart 25 Teaching staff's ICT and e-learning competence



	Beginner	Competent	Advanced
ICT skills	23%	55%	22%
E-learning skills	42%	41%	18%

Chart 26 Teaching staff considered competent and advanced at ITC/e-learning



	2000	2001	2003	2004	2005
ICT skills	67%	70%	73%	75%	77%
E-learning skills	42%	48%	56%	56%	59%

However, it is worth noting that the lack of a commonly agreed and well understood set of definitions of e-learning competences, taken together with the uncertainty about what constitutes good practice and effective pedagogy for e-learning, may have led many respondents to overstate the e-learning skills levels of staff.

We calculated an average of the values estimated by each college for each category. The results for teaching staff are shown in Chart 25. Across the sector as a whole, respondents considered that 77% of staff were competent or advanced in their personal use of ICT, compared with 67% in 2000. However, in the use of ICT with learners, only 59% of college staff were considered competent or advanced (in 2000 the figure was 42%). This suggests that a little under one-fifth of staff considered competent or advanced in their personal use of ICT were regarded as low-skilled in the application of ICT with learners. However, the trend for both sets of skills has been upward, as shown in Chart 26. The gap between ICT competence and e-learning competence narrowed between 2000 and 2003, but has remained more or less constant since.

6.6 Staff development activities

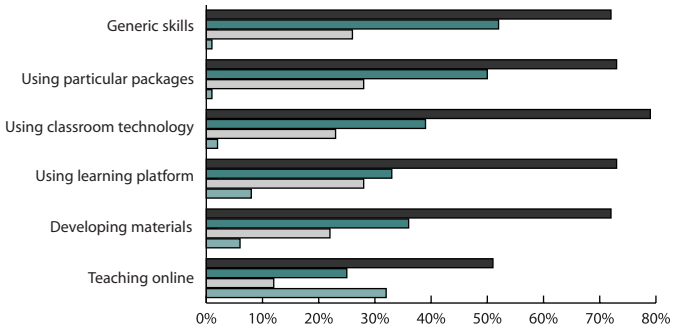
We asked respondents to identify the mode of delivery of various ICT development opportunities offered to teaching staff at their college. The results are shown in Chart 27 below. Face-to-face delivery was by far the most common method of delivering staff development to teaching staff. Blended learning solutions were the next most commonly deployed, with self-study options (either electronic or paper-based) offered by a smaller, though still significant number of colleges.

Generic ICT skills, along with training in particular packages or applications, were the most widely offered areas for skills development, offered by 99% of colleges. These are the skills necessary to build baseline competence and confidence in the personal use of ICT, and are widely addressed in colleges. However, over 90% of colleges offer some development opportunities in using classroom technologies and learning platforms, and in developing learning materials. These skills can be readily deployed with learners in a college setting. The skills needed for teaching online were offered far less widely, with almost one-third of colleges (32%) not offering development in this area. The colleges not offering this development were not restricted to those that did not offer remote learning programmes, but were spread across the whole sector.

Colleges were somewhat less likely to offer ICT development programmes to managers than to teaching staff (see Chart 28). Again, development activities that address baseline ICT competence and confidence were offered to managers in almost all colleges. However, around one in eight colleges did not offer manager development in using ICT for financial control or for planning, and over one-fifth of colleges did not offer manager development in using ICT for quality assessment.

Managers are a notoriously difficult cadre to train across many sectors of the economy. Colleges may then be no different to other organisations, with managers either being reluctant to undergo training, or regarding use of ICT as a specialist technical role.

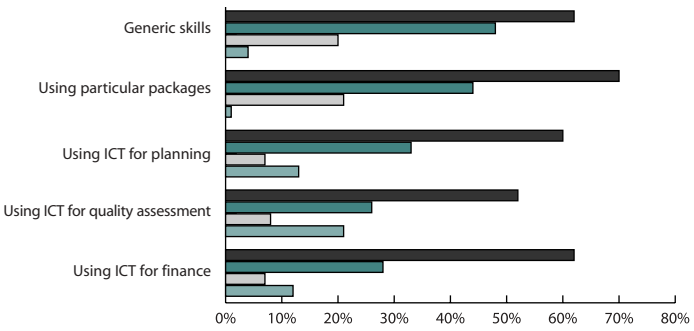
Chart 27 ICT skills development offered to teaching staff



	Generic skills	Using particular packages	Using classroom technology	Using learning platform	Developing materials	Teaching online
Face-to-face courses	72%	73%	79%	73%	72%	51%
Blended learning	52%	50%	39%	33%	36%	25%
Self study	26%	28%	23%	28%	22%	12%
Not offered	1%	1%	2%	8%	6%	32%

Percentage of colleges

Chart 28 ICT skills development offered to managers



	Generic skills	Using particular packages	Using ICT for planning	Using ICT for quality assessment	Using ICT for finance
Face-to-face courses	62%	70%	60%	52%	62%
Blended learning	48%	44%	33%	26%	28%
Self study	20%	21%	7%	8%	7%
Not offered	4%	1%	13%	21%	12%

Percentage of colleges

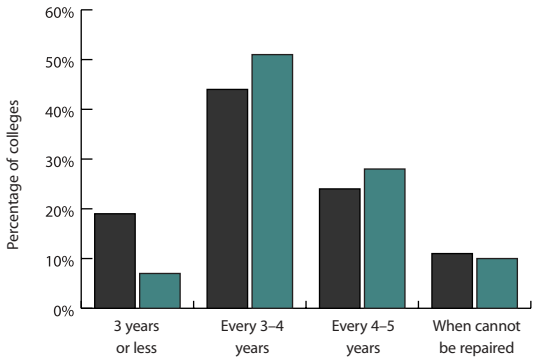
Policy and strategy

7.1 Replacement of computers

Typically, computers are depreciated financially over three years. Chart 29 shows that in 2005, colleges were far less likely to seek to replace their computers at this early stage than they were in 2004. Some 58% of colleges had a policy to replace computers within four years, compared to 63% in 2004.

Some 10% of colleges took the pragmatic view that computers would be replaced when they could no longer be economically repaired; a similar level to the previous year. However, even colleges with stated policies for replacement appeared to take a pragmatic view when faced with an older computer adequately fulfilling its function. Around 50% of colleges with a three-year replacement policy still had some of the older Pentium I and II machines in use. Though no linear correlation was found, Table 8 shows that – as one might expect – colleges with shorter-term replacement policies were less likely to have older computers in use.

Chart 29 Replacement policy for college computers



	3 years or less	Every 3–4 years	Every 4–5 years	When cannot be repaired
2004	19%	44%	24%	11%
2005	7%	51%	28%	10%

Table 8 Colleges with older computers in use

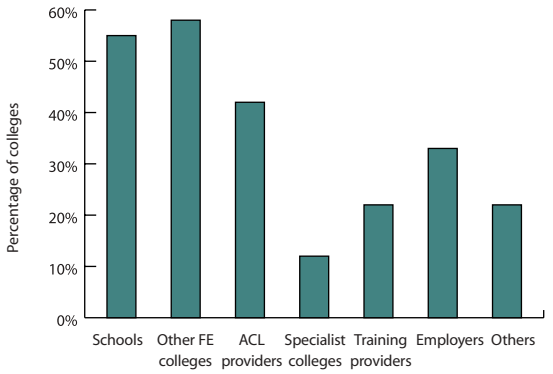
Replacement policy	Have Pentium I and II computers in use
3 years or less	50%
Every 3–4 years	54%
Every 4–5 years	59%
When they cannot be repaired	81%

7.2 Inter-organisation collaborations

Some 80% of colleges were collaborating with other organisations on ICT-related activities. Chart 30 shows the different types of organisation involved. Colleges most frequently collaborated with other further education (FE) colleges, and almost as frequently with schools, with well over half of colleges involved in either or both. The small number of collaborations with specialist colleges reflects the small number of these colleges overall (around 60 across England). Higher education institutions made up over half of the 'other' category, with a range of public and charitable bodies making up the rest.

Table 9 (below) shows in more detail the types of collaboration involved. Joint infrastructure projects were least common, perhaps because they require amounts of capital funding and a longer-term commitment to the collaboration upfront. Curriculum-development projects were more common than information sharing in collaborations with schools or colleges. However, with other types of partner, information sharing was more frequent.

Chart 30 Replacement policy for college computers



Schools	Other FE colleges	ACL providers	Specialist colleges	Training providers	Employers	Others
55%	58%	42%	12%	22%	33%	22%

7.3 Identifying the impact of ICT and e-learning

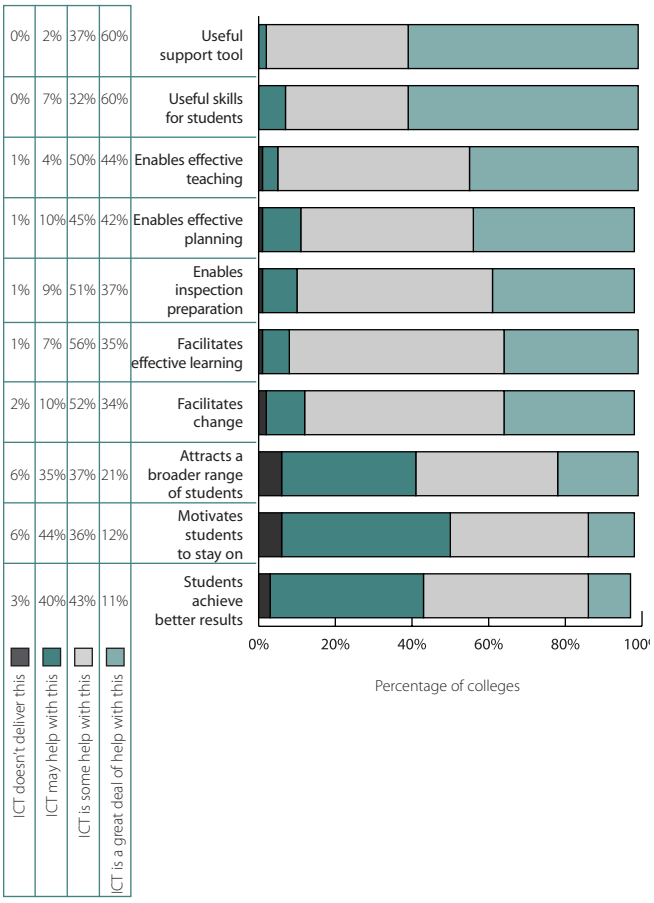
In 2004, we asked colleges to tell us their vision or mission statement for ICT and e-learning. We used the themes identified in these statements to draw up a list of general statements about what ICT could deliver. Respondents were then asked to identify the extent to which they felt each statement applied in their college. The results are shown in Chart 31 below.

Respondents were largely unequivocal in their view that ICT was a useful tool in the

Table 9 Types of ICT collaboration with other organisations

Partner organisations	Joint curriculum development	Joint infrastructure development	Data/information sharing
Schools	39%	9%	34%
Other FE colleges	42%	10%	37%
Adult and community learning providers	24%	9%	26%
Specialist colleges	5%	1%	9%
Training providers	9%	4%	15%
Employers	16%	5%	21%
Others	13%	8%	14%

Chart 31 What does ICT deliver?



teaching and learning process. Some 60% agreed that ICT was a great deal of help in giving students a useful set of skills, and 60% agreed that it was a great deal of help as a support tool for teachers. These results are unsurprising. The link between ICT use and its outcome is relatively easy to recognise, as ICT use impacts here directly on its users.

The next five statements related to the general operation of the college. These were that ICT enabled more effective teaching, that it enabled managers to plan effectively, that it enabled planning for inspection, that it enabled students to learn more effectively, and that it enabled the college to implement change. Respondents were still largely confident about the ability of ICT to deliver these. However, fewer (between 34% and 44%) thought that ICT was a great deal of help.

Respondents were far more equivocal about the final three statements. These related to the overall strategic direction of the college and the sector as a whole. These statements were that ICT allowed the college to attract a broader range of students, that it motivated students to stay on at the college, and that students who use ICT achieve better results. Far fewer respondents agreed that ICT was a great deal of help with these (between 11% and 21%), and up to half of respondents felt that either ICT did not help here or that it only may help.

For these more strategic outcomes, the impact of ICT use is necessarily indirect. It is therefore harder for practitioners to recognise any potential impact. This may be especially true for those directly involved in ICT use.

7.4 A strategy for ICT and e-learning

In summer 2000, the then Further Education Funding Council (FEFC) required colleges to submit for monitoring an ILT strategy, and the following year colleges were required to revise their strategies. However, in 2004, 3% of colleges reported to PricewaterhouseCoopers (PwC) that they had no strategy for ICT and e-learning, and a further 5% reported that they only had an informal strategy (PwC, 2004).

A key way that colleges translate their strategies into action is through setting targets. Some 29% of colleges set formal targets for the use of ICT and e-learning across all programmes. A further 43% set targets where they considered these appropriate, and 25% did not set targets for ICT and e-learning at all. Chart 32 shows that this situation has steadily worsened since 2003, further suggesting a dislocation between strategy and action in many colleges.

A written strategy, if it is not translated into action, quickly becomes a dead document. If we are asked to describe an organisation's strategy, we look to its actions, rather than to the document on the Chief Executive's desk. Strategy, says Henry Mintzberg, is 'a pattern in action over time' (Mintzberg, 1987).

7.5 A model of e-learning implementation

In order to build a picture of e-learning implementation, we constructed a model consisting of five broad dimensions. Each of these dimensions was arrived at by combining four measures derived from the survey data. All the measures were treated equally. Each dimension produced a score out of 20, and when added together, these dimensions gave an overall score out of 100 for each college. The dimensions were:

Access: This dimension describes students' access to the college infrastructure. The measures of access consist of:

- A college's nearness to achieving a ratio of five full-time-equivalent (FTE) students to each internet-enabled computer.
- A college's capacity to meet students' demands for computers.
- The capacity of a college's local area network (LAN) to meet demand.
- A college's capacity to meet students' demands for internet access.

Workforce: This dimension describes the skills of the teaching staff and their ability to access ICT for their work. The measures for this dimension are:

- A college's nearness to achieving a ratio of one permanent member of staff to each internet-enabled computer.
- The extent to which staff having a computer for their own personal use is seen as a priority.
- Perceived skills of teaching staff in their personal use of ICT.
- Perceived skills of teaching staff in using ICT with learners.

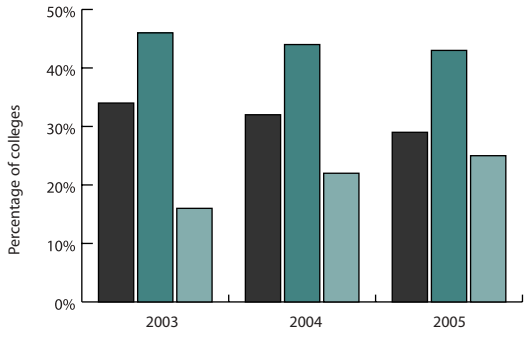
E-learning: This dimension describes the extent to which ICT is deployed for teaching and learning purposes. This is measured by:

- The extent to which e-learning is used for induction.
- The extent to which e-learning is used for assessment.
- The extent to which e-learning is used for teaching purposes.
- The extent to which e-learning is used to support learners.

Resources: This dimension describes a college's ability to access, produce and deliver educational content. The measures here are:

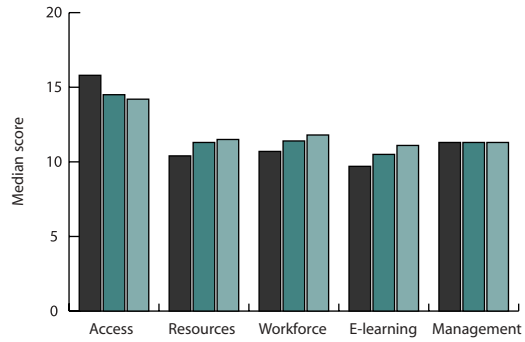
- Use of in-house-developed resources.
- Support for in-house development of resources.
- Use of acquired resources from a variety of sources.
- Use of a Virtual Learning Environment (VLE) learning platform.

Chart 32 Extent to which formal targets are set for e-learning



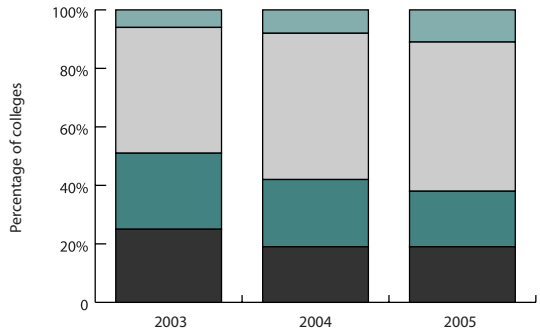
	2003	2004	2005
All programmes	34%	32%	29%
Where appropriate	46%	44%	43%
No targets	16%	22%	25%

Chart 33 Measures of e-learning implementation



	Access	Resources	Workforce	E-learning	Management
2003	15.8	10.4	10.7	9.7	11.3
2004	15.0	11.3	11.4	10.5	11.3
2005	14.2	11.5	11.8	11.1	11.3

Chart 34 Spectrum of e-enablement



	2003	2004	2005
E-enabled	6%	8%	11%
Enthusiastic	43%	50%	51%
Ambivalent	26%	23%	19%
Late adopters	25%	19%	19%

Management: This dimension describes the extent to which ICT is used for management information and the extent to which e-learning activities are planned for at college level. This dimension is measured by:

- The ease with which the college learning platform links with the college's management information system (MIS).
- The extent to which the LAN is allowed to be freely used.
- The level at which the use of e-learning resources is planned.
- The use of targets to encourage e-learning.

Chart 33 shows the median values for each dimension as they changed between 2003 and 2005. The declining level of students' access to the ICT infrastructure described in Section 4 of this report is demonstrated graphically here. However, alongside this the other measures have shown steady rises, except for management which has remained constant.

The overall scores produced for each college resulted in a continuum stretching from a minimum score of around 40 to a maximum score of around 80 in each of the three years. Chart 34 shows the percentage of colleges in each of four categories of college taken from the PwC study (PwC 2004). Scores for colleges at both the high and low ends were more spread out than the majority in the middle, making the most and least e-enabled colleges relatively easy to identify. Colleges with overall scores above 70 were therefore designated 'e-enabled', and those below 52 were designated 'late adopters'. For the majority, however, there were no discontinuities evident in the data, so the median figure for 2003 was chosen to distinguish the 'enthusiastic' and 'ambivalent' groups. We used the PwC categories here because the 2004 proportions closely mapped on to the proportions found in that study.

The picture here is one of a steady sector-wide movement towards e-enablement. By 2005, 62% of colleges were e-enabled or enthusiastic, from half of all colleges in 2003. However, at the level of individual colleges, the picture is much more volatile. For example, of the 80 colleges that had completed the survey for all three years, only one had maintained its position in the 'e-enabled' category over that time.

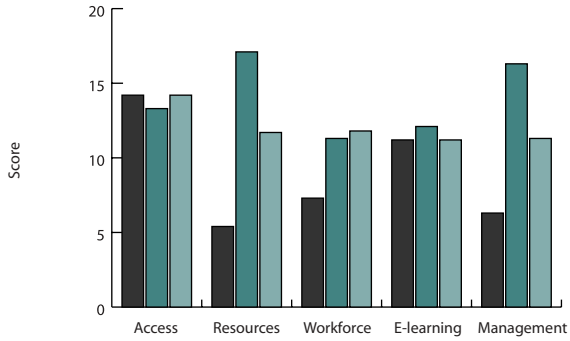
A college's position on this continuum from late adopter to e-enabled did not map on to a college's success in other areas. Chart 35 compares two medium-sized general FE colleges, each with good Ofsted reports, with the national median. In this particular case, the e-enabled college outperformed the late adopter college in four of the five dimensions, and was significantly further ahead on the resources, workforce and management dimensions. In the areas of access and e-learning, the late adopter college achieved scores at around the national median level. In the area of access, the e-enabled college was slightly below the national figure.

As e-learning is the only dimension on the output side of the equation, it seems that a reasonable level of e-learning output can be achieved with limited levels of input in the other four dimensions. The late adopter college seems to have drawn here on the energies of a group of enthusiasts who have achieved results with minimal resources, training or management input. On the other hand, the e-enabled college has deployed significant resources and management input. It has moved e-learning on significantly, though there is still some way to go.

Chart 36 compares the median scores for each dimension of e-learning implementation for colleges that fall within each category. An interesting pattern emerges. As we move from late adopters through to e-enabled colleges, the greatest improvements occur in the resources and management dimensions. Students' access to ICT shows the least improvement between the categories of college.

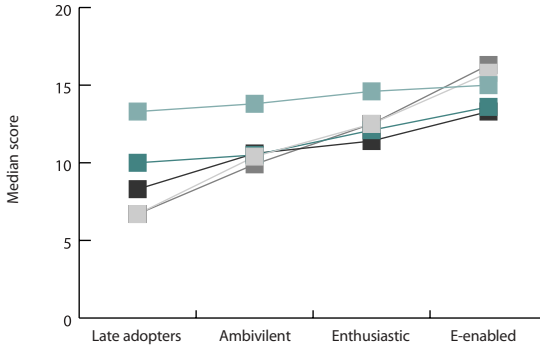
The pattern emerging here suggests a model describing how these dimensions act together to drive forward the implementation of e-learning. Students' access to a reasonably robust infrastructure is the foundation upon which this is built. This allows access to electronic resources for students and staff. Even limited resources, taken up by individual enthusiasts, can begin to produce e-learning. However, if e-learning is to be widely implemented, management time has to be committed to facilitate access, and to plan and set targets, and information has to flow from the teaching and learning process to the management process. Teaching staff also need access to the technology, along with improved competence and confidence in order to engage with e-learning as well as develop their own resources. It is once these are all in place that e-learning can be widely implemented and can begin to transform teaching and learning.

Chart 35 Comparison of two colleges



	Access	Resources	Workforce	E-learning	Management
Late adopter college	14.2	5.4	7.3	11.2	6.3
E-enabled college	13.3	17.1	11.3	12.1	16.3
National median	14.2	11.7	11.8	11.2	11.3

Chart 36 Categories of e-enablement vs dimensions



	Late adopters	Ambivilent	Enthusiastic	E-enabled
Access	13.3	13.8	14.6	15.0
Resources	6.7	10.4	12.5	15.8
Workforce	10.0	10.5	12.1	13.6
E-learning	8.3	10.6	11.4	13.3
Management	6.7	9.9	12.5	16.3

8 Expenditure on ICT and e-learning

8.1 Difficulties in identifying ICT expenditure

Colleges found the expenditure survey difficult – identifying particular items of expenditure with particular funding streams proved a daunting task. For most colleges, once funding has been received it is subsumed within the overall budget, and unless tracking back is a specific requirement, it can prove to be very difficult. As a result, the response rate of 68 colleges (17% of the sector) was disappointingly low for this section.

ICT-related direct staffing costs proved especially problematic. Several colleges found the task of extricating ICT-related staff costs from the overall staff budget impossible, and therefore left the field blank. Others argued that because ICT was the responsibility of everyone within the college, it was only a marginal element of the staffing budget anyway. The figure for staff with ICT as a key element of their role was therefore so problematic we left it out of the analysis. It is, however, worth remembering that staffing is a necessary and not an insignificant part of the cost of any investment in ICT.

Some £27 million of National Learning Network (NLN) funding was allocated to colleges. This could be spent in the two years to July 2005. This amount is roughly one-third of all earmarked funding for ICT and e-learning in colleges. More than half of this allocation was targeted at the development of locally produced materials, development tools for producing materials, plus procurement of and subscription to externally produced materials.

The NLN and Learning and Skills Council (LSC) were by far the most frequently cited sources of funding. Other funding sources included LEAs, regional development agencies, the Standards Fund and Single Regeneration Budget, and other European funding sources.

Numbers of full-time-equivalent (FTE) students are the key determinant of college funding and costs, therefore we assumed that ICT expenditure would increase broadly in line with college size. The expenditure figures for the sector, shown in Table 10, were calculated by weighting the survey responses according to the college size bands given in Table 3 of this report.

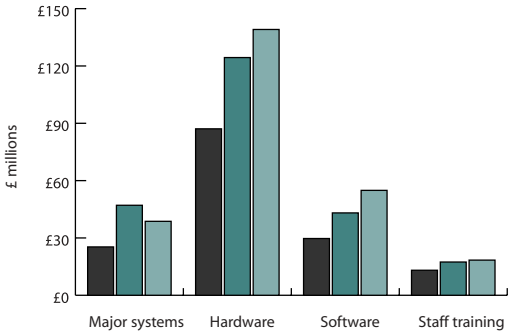
The small sample size, taken along with the assumptions underlying our calculations, mean that the expenditure figures presented in this section are indicative only. They present a broad picture of the general scale of expenditure and the relative amounts spent under particular categories. They do not in any way present an auditable 'account'.

8.2 The pattern of ICT expenditure

The total figure for ICT expenditure of £232 million for the year 2003-4 translates to 6% of the total allocation to the college sector of £4 billon in that year. Excluding the £17.4 million training expenditure brings this percentage to around 5%. Chart 37 shows the relative total expenditure figures collected this year for the year 2003-4, along with projected budget figures for 2004-5. These are compared to figures for 2001-2, which were collected as part of the 2003 survey.

Expenditure on hardware continued to dominate the picture, accounting for more than the sum of expenditure on the other three items (major systems, software and staff training). Colleges budgeted less for major systems in 2004-5 than the expenditure in 2003-4. Apart from this, all totals show continuing increases over time. The more detailed figures presented in Table 10 show that as these totals increased, the proportions spent on systems, hardware, software and training remained broadly the same.

Chart 37 ICT expenditure over time



	Major systems	Hardware	Software	Staff training
2001 – 2 expenditure	25.3	87.1	29.7	13.1
2003 – 4 expenditure	47.1	124.4	43.1	17.4
2004 – 5 budget	38.7	139.1	54.9	18.4

Colleges increasingly relied on their own general budgets for ICT spend. Around three-quarters of the total expenditure in 2001-2 came from the general budget, but by 2004-5 this percentage had increased to 87%. This is a trend that looks set to continue.

Earmarked funding accounted for a large proportion of training expenditure in 2001-2. Most of this amount was Standards Fund monies, a fund that required matched funding from recipients. Since that time, the Standards Fund has ceased to be a source of earmarked funds for training, and additional funding has been added to the general college allocation. The figures presented here show that ICT-related training has continued within colleges despite the disappearance of this fund. There was a significant increase in earmarked funding for software and learning materials in 2004-5. This was caused by the targeting of NLN monies in this area mentioned above.

Table 10 ICT expenditure in further education (£ millions)

	2001-2 expenditure				2003-4 expenditure				2004-5 budgeted expenditure			
	College	Earmarked	Totals		College	Earmarked	Totals		College	Earmarked	Totals	
Major information systems												
Student records	11.4	0.7	12.1		23.2	7.8	31.0		19.1	0.5	19.6	
Human resources	2.2	0.3	2.5		4.0	0.3	4.3		9.3	0.3	9.6	
Finance	4.5	0.3	4.8		7.0	0.3	7.3		5.0	0.3	5.3	
Other	4.1	1.9	5.9		3.8	0.6	4.5		4.1	0.0	4.1	
Total info systems	**22.2**	**3.2**	**25.3**	**16%**	**38.1**	**9.0**	**47.1**	**20%**	**37.6**	**1.1**	**38.7**	**15%**
	88%	12%			81%	19%			97%	3%		
Hardware												
Classroom equipment	38.0	16.4	54.3		64.8	19.1	83.9		69.4	13.1	82.5	
Learning resource centre (LRC) equipment	6.5	2.7	9.2		9.2	3.3	12.5		12.3	2.0	14.3	
Other	16.7	6.9	23.6		23.9	4.0	27.9		37.8	4.5	42.3	
Total hardware	**61.1**	**26.0**	**87.1**	**56%**	**98.0**	**26.3**	**124.4**	**54%**	**119.5**	**19.6**	**139.1**	**55%**
	70%	30%			79%	21%			86%	14%		
Software												
Externally produced learning materials	1.5	0.9	2.4		3.5	1.1	4.6		4.6	2.3	6.9	
Internally produced learning materials	2.9	3.5	6.4		4.1	1.3	5.4		6.0	4.7	10.7	
Learning management software	3.4	1.9	5.4		5.6	1.1	6.7		4.7	0.9	5.6	
LCR software and licences	2.2	0.5	2.8		3.9	0.6	4.6		4.7	0.7	5.4	
Other software and licences	11.5	1.2	12.7		20.3	1.6	21.9		22.4	3.9	26.3	
Total software	**21.6**	**8.1**	**29.7**	**19%**	**37.4**	**5.7**	**43.1**	**19%**	**42.4**	**12.5**	**54.9**	**22%**
	73%	27%			87%	13%			77%	23%		
Technical support training												
Technician training	0.7	0.9	1.6		1.5	0.1	1.6		1.8	0.1	1.9	
Externally provided training	0.9	0.6	1.5		1.5	0.0	1.5		2.2	0.0	2.2	
Training staff costs	0.9	0.6	1.5		2.8	0.0	2.8		1.7	0.0	1.7	
Total technical support training	**2.5**	**2.1**	**4.7**	**3%**	**5.9**	**0.1**	**6.0**	**3%**	**5.6**	**0.1**	**5.7**	**2%**
	55%	45%			98%	2%			98%	2%		
Staff ICT/e-learning training												
Externally provided training	1.6	1.2	2.8		3.5	0.1	3.6		3.7	0.1	3.8	
Training staff costs	3.6	2.1	5.7		7.6	0.2	7.8		8.7	0.2	8.9	
Total staff ICT training	**5.2**	**3.3**	**8.5**	**5%**	**11.1**	**0.3**	**11.4**	**5%**	**12.4**	**0.3**	**12.7**	**5%**
	62%	38%			98%	2%			97%	3%		
Totals	**112.7**	**42.6**	**155.3**		**190.5**	**41.4**	**231.9**		**217.4**	**33.7**	**251.1**	
	73%	27%			82%	18%			87%	13%		

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ISBN 1 85379 463 5

10/DD05-06/2033/146/WP/2k