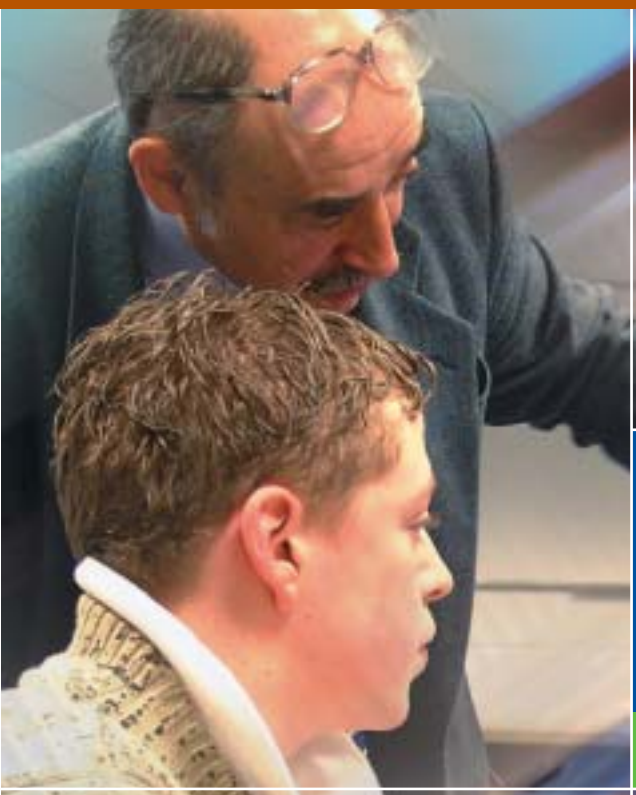

ICT and e-learning in Further Education

embedded technology, evolving practice

A report to the Learning and Skills Council

Becta ICT Research

September 2004

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1 Management summary

1.1 Key messages

Taken as a whole, the FE sector has a robust information and communications technology (ICT) infrastructure capable of delivering a wide range of electronically-mediated learning experiences. Demand for this technology is clearly widespread and may continue to grow and consume any future increase in capacity.

Access to ICT both for students and for staff has reached the target levels set by the National Learning Network (NLN). However, the large increase in full-time equivalent (FTE) students over the last few years has clearly put a strain on the level of access available to students and the demands made of the college infrastructure as a whole.

The use of virtual learning environments (VLEs) as a learning platform is increasing in colleges, and those that use VLEs find them easier to use than other learning platforms. However, in most colleges VLEs and electronic learning materials are not extensively used.

There is some evidence of the use of ICT in traditional teaching, and some blended learning is taking place. However, ICT and e-learning are still largely peripheral to classroom teaching and are most widely used for additional support activities to extend independent learning.

Colleges are able to identify their ability to adopt innovation with regard to ICT and e-learning, and, over time, innovations have spread effectively throughout the sector.

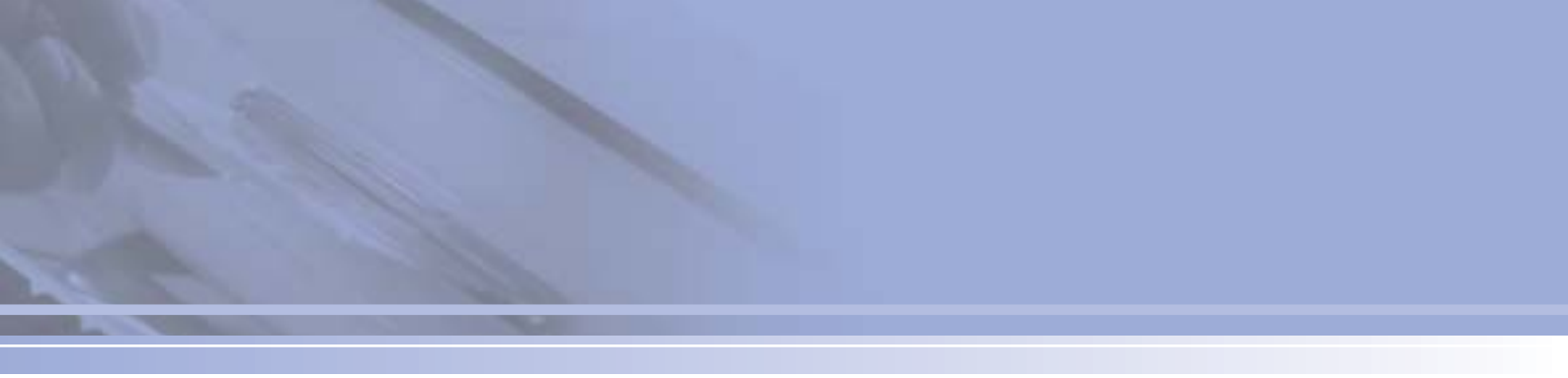
The current level of investment in additional and replacement computers appears to be at sustainable levels. However, additional increases in investment must be considered if numbers of FTE students increase further.

1.2 ICT infrastructure

We estimate that the total number of computers in the 395 English colleges is around 320,000 – double the 1999 estimated total. The rapid growth of the sector's computer stock between 1999 and 2001 resulted in an annual net increase of around 50,000 computers a year. This situation appears to have given way to a more gradual net increase of around 20,000 computers a year since that time. Around an eighth of the current stock is now over five years old and is probably nearing the end of its useful life. This total is more or less the same as the number of machines purchased last year.

LAN specification has improved steadily since 1999. Gigabit Ethernet accounts for one quarter of FE college networks and 100Mbps Ethernet remains the most common specification, being used by 68% of colleges. Some 45% of respondents say that their network could cope with a significant increase in traffic, compared to 24% in 1999. The number struggling to meet demand remains at a similar level to last year but, at 7%, still represents a significant improvement from 22% in 1999. Despite the improvement in LAN specification, however, over half of the sector is still stretched to full capacity.

All colleges were provided with a free 2Mbps internet connection via JANET as part of the NLN initiative. Around a third of these colleges have, or plan to have, additional bandwidth. There continues to be evidence of a growing polarisation between the majority of colleges that seem relatively content with 2Mbps, and the third that have invested in extra bandwidth and seem hungry for more. UKERNA has begun a phased programme of bandwidth upgrades of JANET connections for FE and sixth-form colleges to 4Mbps or 10Mbps.



> Access to the ICT infrastructure is a key determinant of a college's ability to deliver teaching and learning effectively.

1.3 Access to ICT

Access to the ICT infrastructure is a key determinant of a college's ability to deliver teaching and learning effectively. The NLN adopted a target for the FE sector of achieving a ratio of one internet-enabled computer for every five student full-time equivalents (FTEs). The median ratio of FTE students per internet-enabled computer is currently 4.5:1 (21:1 in 1999), and the median number of FTE students per computer (both networked and stand-alone) is 4.3:1 (7.6:1 in 1999).

These are at a similar level to the 2003 ratios. However, these figures remain comfortably within the target ratio, and indicate that access has been maintained in the face of increased student FTEs.

Just under half the institutions surveyed (47%) reported that they could not cope with the demand for computers in 1999. This level now stands at 32%, having increased again from its lowest level in 2001. Improvements in access to the internet also seem to have declined. Some 41% of respondents now describe the use of computers for internet access as easy at any time. This is a fall from 53% of respondents last year, and is similar to the 44% recorded in 2001 – further evidence of the impact of increased numbers of FTE students.

The NLN target of one internet-connected computer for every permanent member of teaching staff has been achieved or bettered by some 46% of colleges, from a level of 26% last year and 15% in 2001. The 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 has fallen from 3.0 staff for every machine in 2000 to the target level of 1.0 this year.

1.4 Teaching and learning content

College intranets and networks remain as extensively used for learning as last year. Some 86% of colleges use their intranet as a learning platform and 94% use shared areas on the college network. Commercial virtual learning environments (VLEs) remain less widely used than these other platforms, but are now used in 70% of colleges compared to 59% a year ago. All three types of learning platform (intranet, network and VLE) are heavily used as repositories for course documents, though colleges use their networks and VLEs to a far lesser extent for learner support and guidance. The functionality of a VLE appears to enable the tracking of learner activity far more easily than the other two platforms.

Electronic learning (e-learning) materials are most often used at the discretion of the individual teacher: this was the case in 56% of the colleges surveyed. The use of e-learning materials is directed by a college-wide plan in only 14% of colleges and by a plan at department or course level in 25%. The internet remains the most frequently used source of learning materials, being used in 97% of colleges (94% in 2003) and in common use in 58% (43% in 2003). Of the 84% of colleges that use NLN materials, 9% describe their use as common practice. This is an increase from 5% describing the use of NLN materials as common practice in 2003, and reflects the early stage in embedding the use of these materials.

1.5 ICT in the teaching and learning process

ICT remains more widely used for learning support and independent learning than for classroom delivery. Electronic communications are more often used between college staff than with students. ICT in induction is often focused on areas that already have inherent IT content.

In mainstream programmes by far the most frequent use of ICT is to support learning outside of scheduled teaching, being used in all or most programmes in 54% of colleges (48% last year). However, 24% of colleges see ICT as widespread as a traditional classroom tool, and some 20% of colleges consider the use of ICT with traditional learning resources to produce blended learning as widespread.

Two thirds of colleges deliver learndirect courses. Just over one half of colleges conduct some remote learning that is not delivered via learndirect, however, with remote learning described as widespread in only 10% of colleges.

The mean figure reported by colleges for staff considered to be competent or advanced in their personal use of IT is 75%. This compares to 67% in 2000. However, in using ICT with learners (e-learning skills), a mean of 56% of college staff is reported to be competent or advanced (in 2000 this was 42%). Both sets of skills are improving and the overall trend is for the gap between IT competence and e-learning competence to narrow.

1.6 Policies and strategies for ICT and e-learning

Currently 58% of colleges review their ICT and e-learning strategies annually and a further 23% revise their strategies every two years. Typically colleges use multiple channels – electronic, hard copy and face-to-face – to communicate these strategies internally. In 20% of colleges, staff work objectives are derived from the college strategy. Some 32% of colleges have set formal targets for the use of ICT and e-learning across all programmes, and a further 44% set targets where they feel these are appropriate.

Some 25% of respondents regard their colleges as innovators with regard to ICT and e-learning and a further 49% regard their colleges as early adopters of established good practice. Another 25% regard their colleges as cautious adopters of new technology and the remaining 1% say that ICT and e-learning is peripheral to their college's mission. While this may appear an optimistic view of the sector's readiness for innovation, there does seem to be some correlation between perceived innovativeness and the adoption of new technologies and practices.

The further education sector has budgeted for the purchase of about 80,000 computers in the current year. We estimate that, allowing for replacement of older machines, the total computer stock for the sector will increase next year by around 30,000 computers to a total of 350,000. Assuming that three quarters of these computers will be for student use, and assuming an increase in student numbers to 1.25 million FTEs, the ratio of student FTEs to each computer would still better the Learning and Skills Council (LSC) target of 5:1.

The current level of computer purchase (80,000 a year) would appear to be adequate to maintain computer numbers in the sector at more or less this level. However, to maintain access at an acceptable level in the face of sustained increases in the number of FTE students would of course require additional computers.

2 The survey

2.1 Context and purpose of the study

Becta carried out this study in January and February 2004 on behalf of the Learning and Skills Council. The survey seeks to assess progress in the provision of information and communications technology within the sector, along with the extent to which this provision is integrated into the teaching and learning process. Four previous studies, undertaken in February 1999, September 2000, September 2001 and February 2003, provide comparative data by which to judge the impact of the deployment of NLN monies for the development of ICT infrastructure and e-learning in the sector.

2.2 Survey methodology and response

The study took the form of a survey by questionnaire of all 395 further education colleges in England. The questionnaire explored quantitative issues relating to infrastructure, management and practice. A total of 202 colleges (51% of the sector) submitted completed questionnaires in time to be included in the analysis.

The profiles shown in the tables below, together with the high response rate for the survey, lead us to a high degree of confidence in the data. The survey was detailed and conducted to a tight time scale, 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 respondents to the survey. In some cases the percentages shown in the tables may not total 100; this is due to rounding of individual figures.

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 the sample 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. The actual number of art and design colleges (4) and specialist designated colleges (5) in the sample reflects the small number in the sector, but also prevents us from making specific observations about them as a group.

The regional breakdown of respondents to the survey is shown in Table 2. A higher proportion of colleges from the North East and a disappointingly low proportion of colleges from London submitted responses. However, the general profile of the respondents still mirrors the sector quite closely.

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

Table 1 Respondents by college type

College type	Sector	Respondents
General further education and tertiary college	66%	65%
Sixth-form college	26%	27%
Agricultural & horticultural college	5%	4%
Art, design & performing arts college	2%	2%
Specialist designated college	2%	2%

Table 2 Respondents by regional location

Region	Sector	Respondents
South West	9%	8%
South East	17%	17%
Greater London	14%	10%
Eastern Region	9%	9%
East Midlands	7%	8%
West Midlands	13%	13%
North West	16%	16%
Yorkshire and Humber	10%	10%
North East	6%	9%

Table 3 Respondents by college size

FTE band	Sector	Respondents
0–750 FTEs	7%	8%
751–1,750 FTEs	32%	32%
1,751–3,000 FTEs	23%	22%
3,001 FTEs and over	38%	38%

Table 4 Numbers of CoVEs per FE college		
Number of CoVEs at the college	Sector	Respondents
1 CoVE	80%	75%
2 CoVEs	18%	21%
3 CoVEs	2%	4%

Table 5 Specialism of CoVEs		
CoVE specialism	Percentage of all CoVEs	Percentage of survey CoVEs
Business/administration/management/professional	11%	9%
Construction	15%	19%
Engineering/technology/manufacturing	22%	19%
Health/social care/public services	12%	13%
Hospitality/sports/leisure/travel	13%	17%
ICT	8%	12%
Land-based provision	4%	4%
Visual/performing arts/media	10%	8%
Others	5%	1%

Half of the respondents stated that their college had at least one Centre of Vocational Excellence (CoVE). This compares to 46% of FE colleges which are lead providers in CoVEs, though if we include all colleges involved in CoVEs as secondary partners in consortia, this figure becomes 49%. There may therefore be a small amount of double counting of CoVEs in the survey if more than one partner has claimed a CoVE as its 'own'. This may also be reflected in the slightly greater proportion of respondents who state that they have more than one CoVE at their college compared to the sector as a whole (see Table 4).

Table 5 shows the broad specialism of the CoVEs in the survey as a percentage of the total number of CoVEs. While there is some divergence from the national picture here, the proportions are not greatly out of line with the wider picture.

Infrastructure

3.1 College computer stock

In February 1999 Becta's original survey found that only 38% of computers available for learning purposes were Pentium II or better. The Pentium II specification was (arbitrarily) chosen as being of an acceptable standard for use with internet applications. Chart 1 shows that 80% of the current installed stock of computers in colleges now exceeds that specification. Only 2% of college computer stock is now 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 render obsolete even relatively recent purchases.

Perhaps a more dramatic statistic than the relative changes described above is the increase in absolute numbers of computers in colleges. A very rough estimate that can be inferred from the data is that the actual number of computers in the 395 English colleges is now around 320,000 – approximately 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 appears to have given way to a more gradual net increase of around 20,000 computers a year since that time. An equally rough calculation, illustrated in Chart 2, suggests that around an eighth of the current stock is now over five years old and may reasonably be expected to be nearing the end of its useful life. This total is similar to the number of machines purchased in the last year.

Chart 1 College computer stock (% of total)

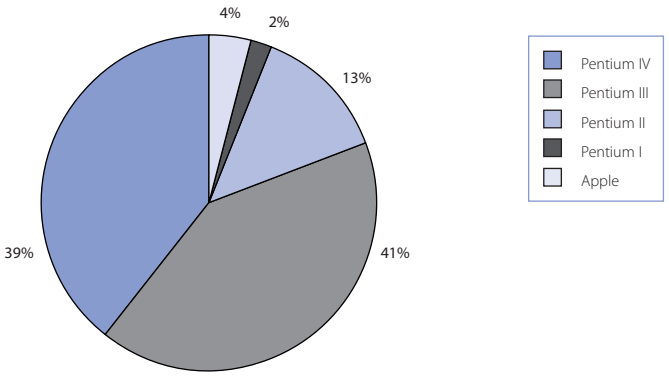
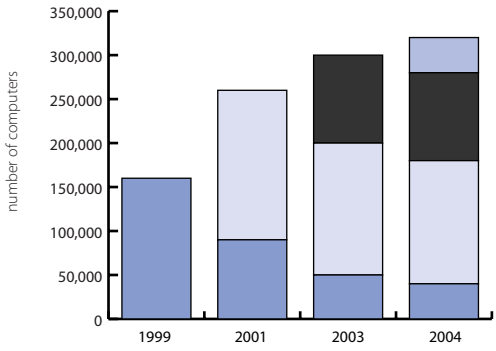


Chart 2 Change in computer stock over time (numbers of computers)



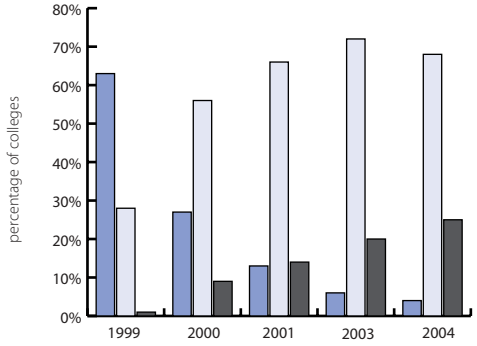
	1999	2001	2003	2004
Pre-2000	160,000	90,000	50,000	40,000
2000–01		170,000	150,000	140,000
2002–03			100,000	100,000
2003–04				40,000

3.2 Local area networks (LANs)

While 38% of colleges are single-site institutions, a further 32% operate out of two or three major sites and 16% out of four or five sites. The largest multi-site college in the sample operates out of 20 major sites. Most sites are networked. Some 88% of colleges have all their major sites connected to the college network; 7% have one major site that is not networked and another 2% have two sites not networked. Most of the remaining 3% have between three and six major sites not connected to the network, with one college claiming 10 major sites not networked.

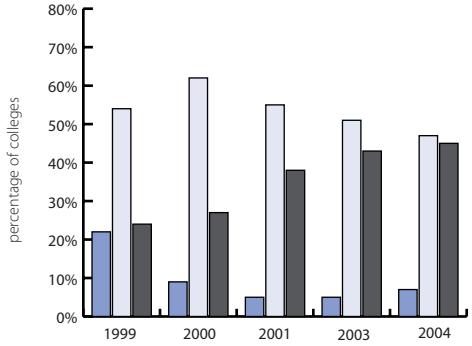
The specification of college LANs has continued to rise in line with the specification and volume of the computers that they support – fewer than 3% of all college computers are now stand-alone. Chart 3 shows the improvements in LAN specification since 1999. Gigabit Ethernet is a growing feature of FE college networks, whereas 100Mbps Ethernet, having peaked in its growth, has reached its maturity as a technology. Now an old technology, 10Mbps has declined to a mere 4% of the sector. The relative share of college networks occupied by Gigabit and 100 Mbps technologies now roughly mirrors the respective shares of 100Mbps and 10Mbps in 1999.

Chart 3 LAN backbone



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

Chart 4 Network capability to meet demand



	1999	2000	2001	2003	2004
Over-stretched	22	9	5	5	7
At capacity	54	62	55	51	47
Spare capacity	24	27	38	43	45

Table 6 Network performance

	2004	2003	2001	2000	1999
Always smooth, without appreciable delay	56%	53%	47%	38%	35%
Generally works well, but slow at busy times	42%	42%	49%	56%	60%
Slowness/unreliability a frequent problem	2%	4%	3%	4%	5%

3.3 LAN performance

The improvement in LAN specification suggests a concomitant improvement in performance and in capability to meet demand. Chart 4 shows that there has indeed been such an improvement.

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 say that they could cope with a significant increase in traffic. However, despite the improvement in LAN specification, over half of the sector is either stretched to full capacity or unable to meet demand. The number of those struggling to deliver has in fact increased slightly in the last year to 7% of colleges. This seems to confirm that the notion of a 'motorway effect', which sees traffic rapidly adjust upwards each time an additional lane is opened, is still an appropriate description of 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 160,000 machines we estimate to have been added since 1999, but it must also deal 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 continue to restrict network traffic in bandwidth-hungry applications. Some 73% of colleges identify large files as an actual or potential source of problems on the network, and hence look to control their use. This is only 11% fewer than the 84% who cited large files as a problem in 1999.

Table 6 shows that frequent problems continue to affect a small percentage of sector colleges. More dramatic, however, has been the rise to 56% in the proportion of colleges that describe their network as always smooth, without appreciable delay, and the decline to well below half of all colleges that report the network performance to be slow at busy times. Those students whose networked learning is scheduled at such busy times, however, almost certainly find their experience systematically worse than the winners in the lottery of timetable slots, who are scheduled to use the network when traffic is low. Nevertheless, the improvement since 1999 is impressive – particularly given the increased demands on the network described above.

3.4 Internet connectivity

All colleges have been provided with a free 2Mbps internet connection via JANET as part of the National Learning Network (NLN) initiative. Table 7 shows that around one third of these have, or plan to have, additional bandwidth. This has fallen slightly from around four fifths of colleges that stated an

intention in 2000 to go beyond 2Mbps. Most of this fall is accounted for by the reduction of those colleges planning to have between 2Mbps and 3Mbps. It seems plausible to infer that most of these colleges decided that the benefits arising from relatively small amounts of additional bandwidth did not justify the cost, and therefore rationalised their provision. For colleges with 4Mbps or more, however, the tendency is towards increased bandwidth, with 15% of colleges planning 10Mbps or more.

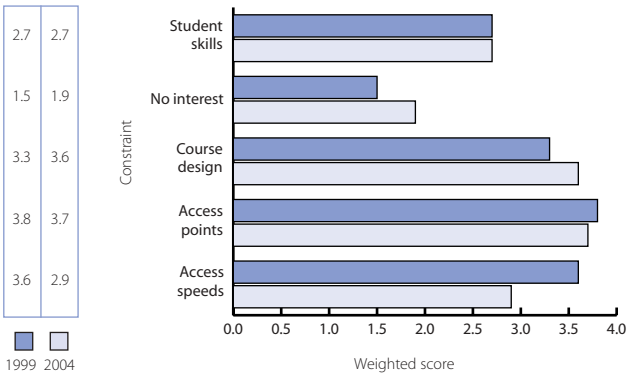
The profile of colleges planning bandwidth of 4Mbps and above shows a continuing tendency for larger bandwidth options to be sought by larger colleges. Of these colleges 83% are larger than the sector median value of FTE student numbers, and all of those seeking bandwidth in excess of 10Mbps are larger than the sector median. Also all the 10% of largest colleges now have or intend to take on greater bandwidth.

While a number of different internet service providers (ISPs) are contracted to provide the additional connectivity, JANET has increased its dominance with 66% of these colleges, an increase from 53% in 2001.

Table 7 Total planned bandwidth

Bandwidth	2004	2003	2000
2 Mbps	65%	67%	59%
2–3 Mbps	2%	2%	12%
4 Mbps	13%	14%	19%
6 Mbps	1%	2%	1%
8 Mbps	1%	1%	1%
10 Mbps and more	15%	11%	4%

Chart 5 Constraints on increased use of the Internet



3.5 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 within the college. The results are shown in Chart 5. 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 remains a key constraint, despite the large influx of internet-capable machines into colleges. Access speeds have, however, declined considerably as a constraint – a result of the investment in high-specification computers and LAN capability to support the now universal JANET. As technical hurdles are surmounted and as use of the internet becomes commonplace, pedagogical issues have grown in importance. For staff, course design and planning to exploit the possibilities of the web maintains a high place in the rankings, together with the student skills needed to engage effectively with the internet as a tool. Lack of interest remains in fifth place, but has increased in importance over the years, perhaps the result of trying to embed internet use in more recalcitrant areas of the curriculum.

Colleges were invited to list other factors restricting growth. Inappropriate use, including restriction of access to unsuitable sites and the potential for inadvertently restricting suitable sites, continued to be the most important constraint. Some 15% of all respondents mentioned this, compared with 11% in 2000 and 2001. The 2Mbps bandwidth was cited as a constraint by another 8% of respondents, a similar level to those citing it in 2000 and 2003. The physical constraints imposed by college buildings, and the balance of access between classroom and open-access computers were cited by 7% of respondents. Some 4% of respondents reported perceiving no constraints to using the internet with students in their particular colleges, and feeling that the constraints listed above were no longer relevant. Staff skills were mentioned by only 1% of respondents, compared to 4% last year.

Access to ILT

4.1 Access for learners

As shown in Section 3 of this report, the FE sector has a robust infrastructure capable of delivering a wide range of electronically-mediated learning experiences. Demand for this technology is clearly widespread and, taken with increasing student numbers, may continue to grow and 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. These measures were used in the four previous studies and allow comparisons to be drawn. They are also the format used by the LSC to define the targets for access to computers that it encouraged colleges to seek to achieve by 2002.

There is no single unambiguous measure of student numbers that can safely be used to calculate access ratios. The use of FTE student data as a basis for calculations reflects a recognition that they make an allowance for total hours of attendance, which other possible measures such as a simple count of student numbers do not. This allows 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 have a significant influence in determining access.

The analysis used the latest complete set of FTE student data available from LSC, which covers student numbers for the academic year 2002–03. Student FTEs have risen markedly over the past few years. Total student FTEs stood at 0.9 million in the academic year 2000–01, but had increased to 1.15 million by 2002–03. If student numbers have continued to grow in the intervening period, then comparing them with computer numbers in 2004 will distort the apparent ratio. However, such effect is likely to be minimal, in that the calculated ratios are a reasonable reflection of the actual situation in colleges in Spring 2004.

We have examined two key statistics:

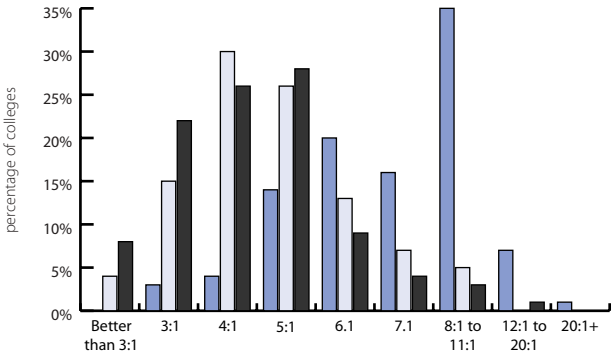
- FTE students to all computers in the college
- FTE students to internet-enabled computers.

This latter statistic has allowed the NLN to monitor its target for the sector of one internet-enabled computer for every five student FTEs.

4.2 Access to computers

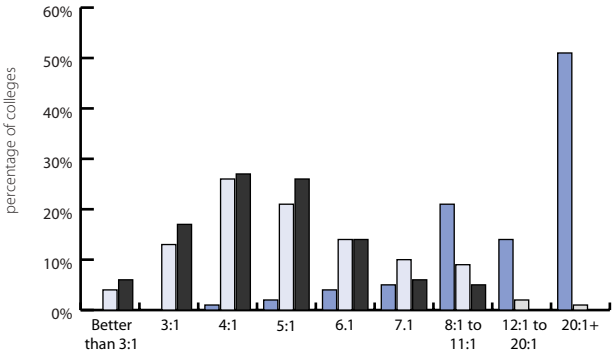
The improvement since 1999 in the availability of computers for students is shown in Chart 6. The mean average number of FTE students per computer has fallen from 8.2:1 in 1999 to 4.4: 1 in 2004. The median value (the ratio of colleges at the middle of the range of values) is 4.3: 1 (7.6:1 in 1999). The dispersion of values remains far less than in 1999, with fewer colleges having very high ratios. The highest value calculated for 2003 was 9.4:1 at a single college, while only eight colleges (4% of the respondents) had ratios of 8:1 or greater. This compares with 43% that had ratios of 8:1 or worse in 1999. The median value is nonetheless likely to be the better estimate of the typical situation in colleges.

Chart 6 Ratio of FTE students to all computers



	Better than 3:1	3:1	4:1	5:1	6.1	7.1	8:1 to 11:1	12:1 to 20:1	20:1+
1999	0	3	4	14	20	16	35	7	1
2001	4	15	30	26	13	7	5	0	0
2004	8	22	26	28	9	4	3	1	0

Chart 7 Ratio of FTE students to internet-connected computers



	Better than 3:1	3:1	4:1	5:1	6.1	7.1	8:1 to 11:1	12:1 to 20:1	20:1+
1999	0	0	1	2	4	5	21	14	51
2001	4	13	26	21	14	10	9	2	1
2004	6	17	27	26	14	6	5	0	0

The current situation represents a marginal increase on the 2003 ratios, though this increase remains within possible sampling error. However, comparing the rate of increase of student FTEs to the rate of increase of computer numbers offers an explanation for any possible increase. As stated in 3.1 above, the large number of computer purchases between 1999 and 2001 reduced these ratios considerably, but since that time student FTEs have increased at a higher rate than the net increases in computer numbers. The figures suggest that, in the last year, one additional computer was purchased for every 6.25 additional student FTEs recruited across the sector.

The disparity noted in earlier surveys between different types of colleges in terms of level of resource has widened again, having closed in 2003. This is again accounted for by increased numbers of student FTEs, which is more pronounced in general FE colleges than in sixth-form colleges. The median ratio for sixth-form colleges has slightly improved to 3.8:1 (from the level of 4.1:1 in 2001 and 2003) and the ratio for general FE colleges is 4.6:1 (similar to the 2001 level of 4.5:1) and the median ratio for land-based colleges is now 5.1:1 (5.7:1 in 2001).

4.3 Access to internet-enabled computers

The improvement in access to internet-enabled computers is significant, as Chart 7 shows. The median number of FTE students to computers with internet access is now 4.5:1, with three quarters of colleges having achieved the LSC target of 5:1. In 1999 the median for this was 21:1. Also in 1999 85% of FE colleges achieved FTE student: internet-enabled computer ratios of 106:1 or better. This year 85% of colleges achieved ratios of 6.3:1 or better. This single statistic, in revealing the extent to which colleges have transformed the computing facility available to learners over the period of the NLN initiative, allows us to put the slight increase of the last year into context.

4.4 Managing demand for student access

Over the years since 1999 the increased number of high-specification computers available for use by learners has transformed the capability of colleges to deal with a level of demand for ICT which they overwhelmingly describe as widespread. Just under half of institutions (47%) reported that they could not cope with the demand for computers in 1999. As Chart 8 shows, this level now stands at 32%. The 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 7% from a peak of 10% in 2003. These figures mirror the slight increase in the ratio of student FTEs per computer reported above.

The same general picture applies to meeting demand for internet access. Table 8 indicates that the number of colleges that are unable to meet current demand fell from just over a half in 1999 to exactly one quarter in 2001. This proportion has remained the

same since then. Colleges appear more able to meet demand for the internet than for computers *per se*. Given that access to computers is necessary for access to both internet and all other applications, this discrepancy is to be expected.

Improvements in access to the internet also seem to have declined. Some 41% of respondents now describe the use of computers for internet access as easy at any time. This is a fall from 53% of respondents last year, and is similar to the 44% recorded in 2001. Around 54% now report that learners are likely to queue at busy times, a rise from 44% last year and, again, close to the 2001 level of 56%.

4.5 Access for staff

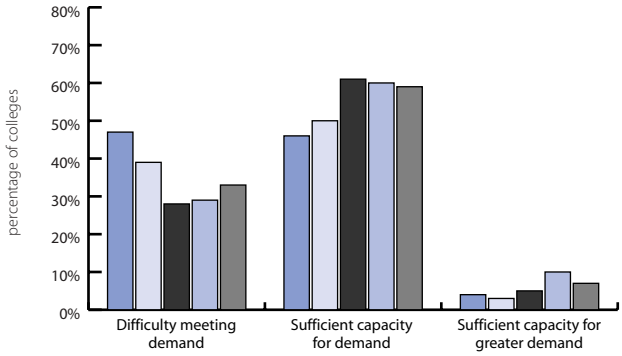
The provision of computers for the exclusive use of staff has continued its steady improvement. The NLN target of one internet-connected computer for every permanent member of the teaching staff has been achieved or bettered by some 46% of colleges, from a level of 26% last year, and 15% in 2001. The attainment of this target has proved slower to achieve than the target for student access. This accords with a general preference, expressed in the strategy documents submitted by colleges to Becta during summer 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 better reflected in the median value of the ratio of internet-connected computers to permanent teaching staff, which has fallen from three staff for every machine in 2000, down to one this year. The figure imputed for 1999 (when the question was not directly asked) is 7:1.

Table 9 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. This has fallen from 12 staff for each internet-enabled computer down to 1.9. We have chosen not to report separately the ratios between staff and all computers, including those without internet capability, because they now differ little from the figures given in Table 9. This has come about from the increasing connection of staff computers to the college network. Some 75% of all computers set aside for staff use are networked desktop machines, and 23% are laptops. Only 2% of staff computers are stand-alone desktop machines.

The improvement in staff access has accompanied a move towards giving staff their own designated machine. Chart 9 reveals college priorities changing in the light of the increase in available resource. Sole use of a computer for teaching staff has been achieved by 19% of colleges, increased from 11% last year. This might seem to sit awkwardly with the reported achievement of a ratio of teaching staff to computer

Chart 8 Meeting student demand for computers



	Difficulty meeting demand	Sufficient capacity for demand	Sufficient capacity for greater demand
1999	47	46	4
2000	39	50	3
2001	28	61	5
2003	29	60	10
2004	33	59	7

Table 8 Meeting student demand for internet access

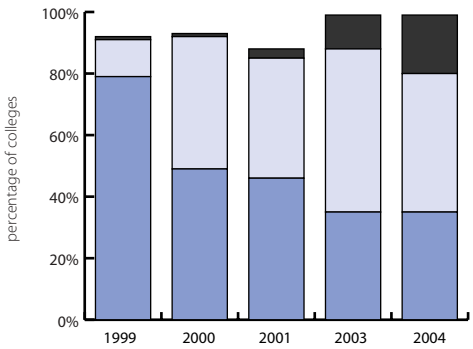
College capability	2004	2003	2001	2000	1999
Cannot cope with current demand	25	25	25	39	54
Can cope with current demand	61	63	58	45	25
Can cope with greater demand	12	11	11	7	5

Table 9 Median ratio of teaching staff to internet-connected computers

	2004	2003	2001	2000	1999
All teaching staff	1.9	2.4	3.5	4.1	12.0
Permanent staff	1.0	1.4	1.9	3.0	** 7.0

** Estimate based on 1999 data

Chart 9 Priorities for teaching staff access to own designated computer



	1999	2000	2001	2003	2004
Not a priority	79	49	46	35	35
Priority	12	43	39	53	45
Achieved	1	1	3	11	19

of 1:1 by some 46% of colleges. However, many colleges may have enough computers for all permanent teaching staff, but these machines are not designated for the sole use of a particular individual. Over the years, the achievement of this goal has increased as a priority for colleges, though sole use remains a low priority for 35% of colleges.

Sole access to a computer for learning support staff is seen as less of a priority for colleges, however. Even so, 19% of colleges have achieved this type of access, the same proportion as for teaching staff, although 45% of all colleges do not regard sole access as a priority for their learning support staff.

Taking the FE sector as a whole, the level of access to ICT both for students and for staff is at a reasonable level. However, the large increase in student FTEs over the last few years has clearly put a strain on the level of access available to students and the demands made of the college infrastructure as a whole.

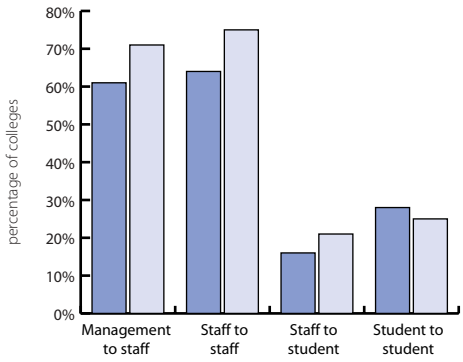
Teaching and learning content

5.1 Electronic communications

The use of email and other electronic communication tools is well embedded in almost all colleges. About 99% use email for communication with and between staff and 92% use it for communicating with students. In contrast, only 76% of colleges said that their email facility was used for student-to-student communication. This reflects the greater control exercised by colleges over student use of college networks, and also the difficulty of estimating the extent of students' use of other email facilities such as Hotmail and the prevalent use of SMS (text messaging) informally amongst the student body.

Chart 10 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 remains at a low level in most colleges.

Chart 10 Email and other e-communications described as 'common practice'



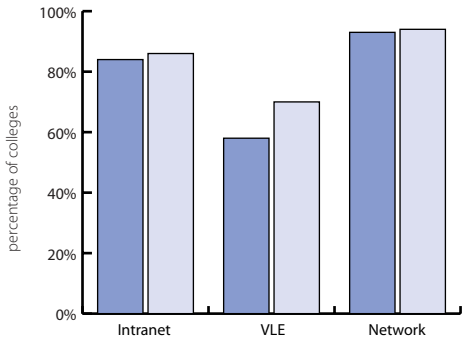
	Management to staff	Staff to staff	Staff to student	Student to student
2003	61	64	16	28
2004	71	75	21	25

5.2 Learning platforms

Colleges were asked to indicate the types of learning platform in use at their college. These could be the college intranet, a commercially-produced virtual learning environment (VLE), or the general college network (using joint drives or public folders, for example). They were also asked to indicate 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 11 shows the change in use of the different platforms over the last year. The use of college intranets and networks remains as extensive as last year. VLEs remain less widely used, but are now used in 70% of colleges compared to 59% a year ago.

Chart 12 overleaf shows the extent of use of these three platforms. All three platforms are more frequently used than last year, with VLEs again showing the greatest increase. Some 31% of colleges now often use a VLE or use it as their main platform, as opposed to 22% in 2003.

Chart 11 College learning platforms

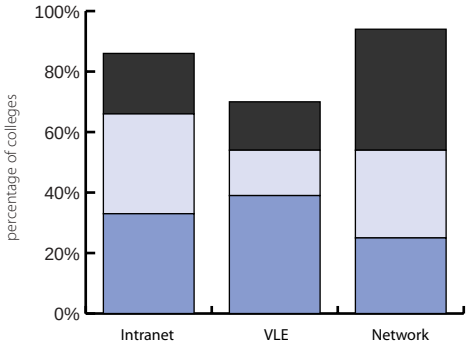


	Intranet	VLE	Network
2003	84	58	93
2004	86	70	94

The three types of learning platform are heavily used as repositories for course documentation. Chart 13 indicates that colleges use their networks and VLEs to a far lesser extent for learner support and guidance. College intranets, on the other hand, are used for learner support more than for course documentation. Again, the wider use of VLEs in colleges is reflected in the increased use of this type of platform (63% use a VLE for course documentation and 38% for learner support, compared to 50% and 26% last year).

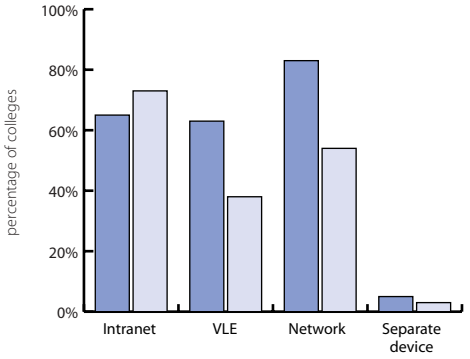
The data presented in Table 10 indicates that uploading materials is a relatively easy task for the users of college learning platforms. Tracking learners through any programme of study and linking to the college MIS system appear more problematic. These figures are little changed from last year – the most significant change being the increase from 78% to 83% of those finding it easy to upload materials.

Chart 12 College learning platforms – frequency of use



	Intranet	VLE	Network
Main platform	20	16	40
In frequent use	33	15	29
In use	33	39	25

Chart 13 Use of college learning platforms



	Intranet	VLE	Network	Separate device
Course documents	65	63	83	5
Support and guidance	73	38	54	3

Table 10 Ease of use of main college learning platform

	Upload materials	Track learner activity	Link to college MIS
Easily	83%	37%	33%
With difficulty	14%	26%	27%
Not at all	1%	31%	36%

However, when we identify what the main platform is in each case, some interesting differences emerge. The data presented in Table 11 is derived from the separate responses of those who use each type of platform as their main learning platform. The figures given are the percentages of colleges with each type of platform that found these operations 'easy'. We can see that all these activities are much easier for those who use a VLE than for those who use the college intranet or those who use the college network. The functionality of a VLE appears to enable the tracking of learner activity far more easily than the other two platforms. Linking to the college MIS system seems only slightly easier for a VLE than for the other platforms, and the level of 33% for all platforms may be due to local solutions found by particular skilled members of staff.

An interesting change from last year is the decline in the proportion of colleges that found it easy to upload materials to the intranet. Around 94% of colleges found this task easy in 2003, whereas 76% found it easy this year. Given the small numbers in the data set (35 this year and 32 in 2003), relatively few colleges can cause such percentage swings (8 colleges found uploading materials difficult, as opposed to 1 last year). However, it is a large enough swing to suggest that the experience of uploading greater volumes of materials over the last year, or perhaps the opportunity to compare their intranet to a VLE, may have led some respondents to change their minds.

5.3 Electronic learning materials

Electronic learning materials are most often used at the discretion of the individual teacher. This was the case in 56% of the colleges surveyed. Their use is directed by a college-wide plan in only 14% of colleges and by a plan at department or course level in 25%. Chart 14 shows the main sources of learning materials used with students. The internet is the most frequently used source of learning materials, being used in 97% of colleges (94% in 2003) and in common use in 58% (43% in 2003). Of the 84% of colleges that use NLN materials, 9% describe their use as common practice. This is an increase from 5% describing the use of NLN materials as common practice in 2003, and reflects the relatively early stage in embedding the use of these materials.

Colleges were also asked to rank these sources of learning materials in order of importance. The ranking followed the level of use, with internet resources ranked as most important and NLN materials ranked fourth.

Some 87% of colleges offer staff development programmes to support staff who wish to develop or adapt electronic learning materials. Around 75% offer support from e-learning champions and 74% offer support from technical staff. Of the 32% of colleges that offer other support, many offer support from other members of staff, often on a one-to-one or mentoring basis.

Several colleges also mention the deployment of a dedicated materials development team. Others offer some remission of time, loan of laptops or other equipment, and sometimes funding. A number also mention the JISC Regional Support Centres as a source of support.

Respondents were asked to state the amount budgeted for electronic learning materials for the current year. However, only 134 of the 202 respondents answered this question. Several colleges stated that electronic learning materials were not separately budgeted for, so this figure could not be obtained. We can therefore only presume here that intended expenditure on e-learning materials for these colleges is broadly in line with colleges of similar size that did respond.

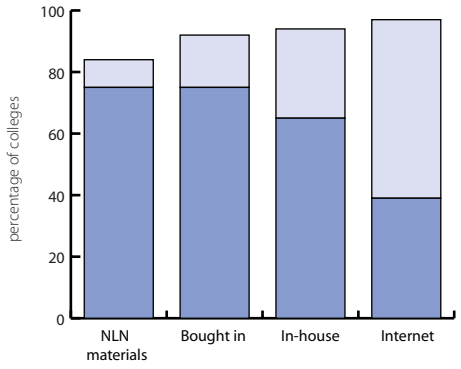
The total budgeted expenditure on electronic learning materials for the sector, estimated on the basis of the smaller number of responses and weighted to account for college size, is £7.5m. This is somewhat less than the figure for expenditure in the year 2001–02 of £8.8m obtained in last year's survey, and considerably less than the figure of £18.7m obtained in a survey carried out in 1999. However, the 1999 figure included an estimate of staff time spent on developing materials in-house, so this figure could be significantly revised downwards.

Table 11 Tasks considered 'easy' for each college learning platform

	Upload materials	Track learner activity	Link to college MIS
College intranet	76%	17%	26%
VLE	96%	77%	37%
College network	82%	21%	31%

Data = percentage of users of each 'main platform'

Chart 14 Electronic learning materials used with students



	NLN materials	Bought in	In-house	Internet
This is common practice	9	17	29	58
We do this	75	75	65	39

Use of ICT in the teaching and learning process

6.1 Display screen technologies

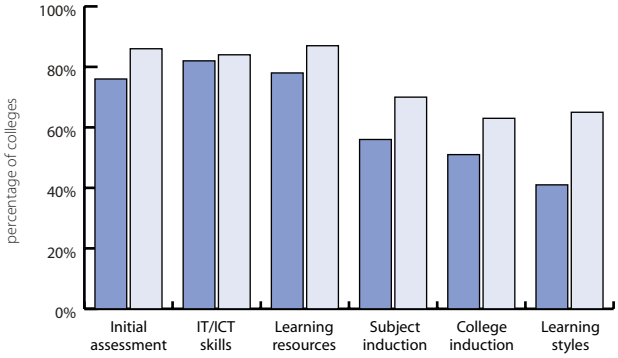
Display screen technologies have made significant inroads into teaching practice. Some 98% of colleges use data projectors, and 66% describe their use as frequent – a situation hardly changed from last year. Around 91% of colleges now use electronic whiteboards (EWBs), an increase from 81% last year. Of these, 31% say they use EWBs frequently, which is an increase from 21% last year. However, it is worth repeating that these figures probably overstate the extent of the use of these technologies. A few EWBs frequently used in even a modest-sized college will not necessarily have a widespread impact on embedding ICT in the teaching and learning process.

6.2 ICT in student induction

Chart 15 shows the extent to which ICT is used in the student induction process in colleges. All the induction activities show some increase on last year, most particularly in the areas where ICT is used least. Two of the three most frequently cited activities – learning resources and IT/ICT skills – are areas that have an intrinsic technology element. The third – initial assessment – is an area where the 'number-crunching' ability of information technology allows the quick and timely deployment of assessment instruments.

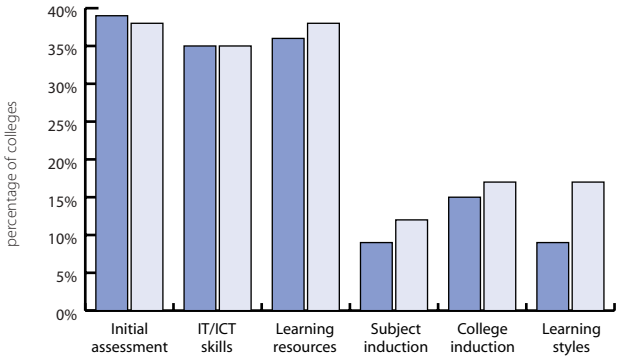
The increases indicated above have not been translated into any widespread use in colleges, however. The number of colleges indicating that they made common use of ICT in student induction is little changed on last year. The evaluation of learning styles is the one area where a substantial increase has occurred – albeit from a very low level.

Chart 15 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

Chart 16 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

6.3 ICT and e-learning in mainstream programmes

Colleges were asked 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 (2002)[1] was used to structure 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 17 shows the numbers of colleges that use these approaches to e-learning in all or most of their programmes. All approaches show a small increase on last year, except using ICT for individualised learning, which shows a slight fall.

By far the most frequent use of ICT is to support learning, which features in all or most programmes in 54% of colleges (48% last year). 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-

[1] A fuller exposition of this model can be found in *Managing inspection and ILT*, Becta 2003

Chart 17 Use of ICT in all or most mainstream college programmes

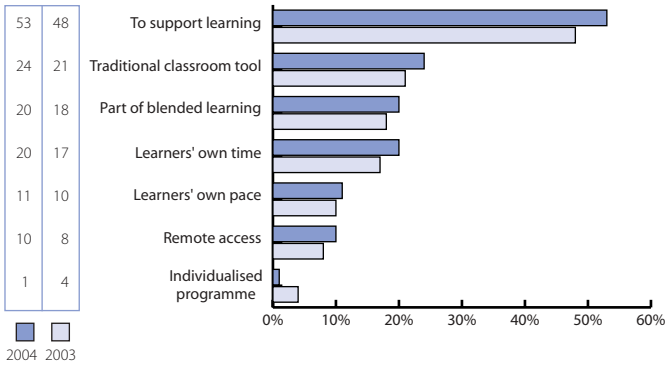


Table 12 Use of ICT to track progress

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

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.

ICT is widespread as a traditional classroom tool in 24% of colleges. This category includes the use of display screen technologies: the level of use indicated here perhaps gives a better picture of the current use of these technologies than the level of frequent use cited above. Using ICT and e-learning with traditional learning resources to produce blended learning is seen as widespread in some 20% of colleges. Some 20% of colleges also report the use of ICT to enable learners to access some or all of their programme at a time convenient to them.

The use of ICT for remote access or to produce an individualised programme of study are the least common applications of e-learning in colleges; 24% of colleges make no use of ICT to enable individualised study, and 18% do not use ICT for remote learning. However, these percentages have decreased from 34% and 28% in 2003, indicating that more colleges are experimenting in this way with ICT and e-learning. Remote learning is currently dominated by learndirect, with two thirds of colleges delivering learndirect courses. However, just over one half of colleges conduct some remote learning that is not delivered via learndirect.

The extent to which colleges use ICT to track student academic progress is shown in Table 12, indicating that this type of activity still has to be fully embedded within the sector. Little or no progress has been made since last year, indicating that colleges do not see it as a priority. Tracking against assignments or assessments continues to be the most widespread use of ICT for student tracking, which takes place in some 47% of colleges.

The use of electronic information to support teaching and learning is at a similar modest level. Around 35% of colleges commonly use electronic information to support personal tutorials, and information from tutorials is recorded electronically in 19% of colleges. Electronic student portfolios or records of achievement are maintained in 24% of colleges. Again, this is little changed since last year.

6.4 ICT and online assessment

Online assessment, taken in the context of each college's whole programme, is considered insignificant or limited to individual enthusiasts in 50% of the colleges surveyed. It is seen as a widespread activity in only 2% of colleges. These figures remain unchanged from last year. This low level of use is reflected in the extent to which the assessment activities are seen as common practice in Chart 18. The most extensive use of ICT is to store and record outcomes of assessment, which happens to some degree in 65% of colleges, though only 12% describe this as common practice. The use of ICT for assessment activities that lead to formal certification is the least widespread type of activity, with only 55% of colleges doing this at all, and 1% describing it as common practice. Given the early stage of ICT use in college programmes generally, it is to be expected that the use of ICT in assessment – and formal assessment especially – will lag behind. The adoption of new and potentially untried techniques in this area may need a period of evaluation against existing methods.

6.5 Staff IT and e-learning skills

Respondents were asked to estimate the proportion of staff with low, medium or high levels of skill (beginner, competent, advanced), both in their personal use of IT and in their use of ICT with learners (e-learning skills). Definitions within these broad classifications were left to the judgement of respondents on grounds of practicality. The research team considered the identification of suitably bounded criteria to be a daunting task, if not impossible within the timescale. More significant, however, was the belief that while respondents' assessments of the categories would not be identical, they would share sufficiently similar common understandings of competency to enable comparisons and judgements to be drawn from the results. An average of the values estimated by each college was calculated for every category.

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 skill level of staff.

The results for teaching staff are shown in Chart 19. Across the sector as a whole, respondents considered 75% of staff to be competent or advanced in their personal use of IT, compared with 67% in 2000. However, in the use of ICT with learners, only 56% of college staff are considered competent or advanced (in 2000 the figure was 42%). This suggests that around a quarter of staff who are competent or advanced in their personal use of IT are regarded as low-skilled in the application of ICT with learners. However, the trend for both sets of skills is improving and the gap between IT competence and e-learning competence has narrowed over the years, as shown in Chart 20 overleaf.

Respondents were asked to name the main skills that teaching staff currently need to develop, and any development programmes that would help to address these needs. Some 23% of colleges cited the integration of ICT and e-learning into the curriculum and classroom practice, while 33% cited the technical skills necessary to use particular packages or applications. A further 23% cited the skills needed to use a VLE and 4% mentioned use of the college intranet. Materials development skills were mentioned by 4%, and 10% of respondents felt that development was necessary to build motivation and confidence in using ICT. The Ferl Practitioners' Programme (FPP) – cited by 14% of respondents – was the most frequently mentioned development programme, while 3% mentioned ECDL (European Computer Driving Licence).

Respondents were asked to state the amount budgeted for ICT- and e-learning-related staff development for the current year. Several respondents stated that this figure was included in the global staff development figure for the college and could not be separated out. As a result, only 144 of the 202 colleges answered this question. However, the total budgeted expenditure on ICT- and e-learning-related staff development for the sector,

Chart 18 Online assessment activities

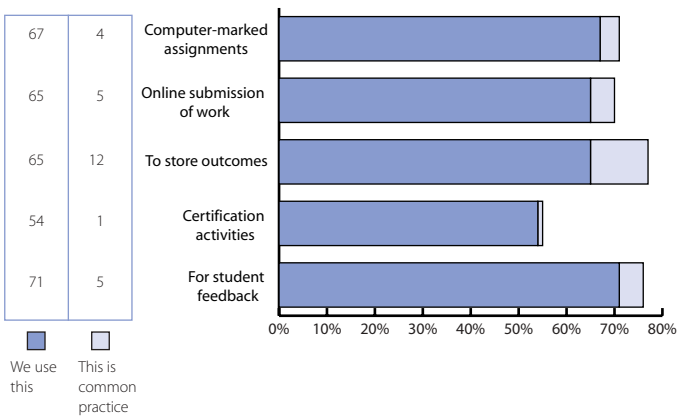
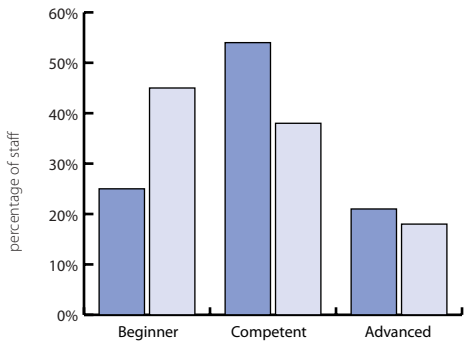
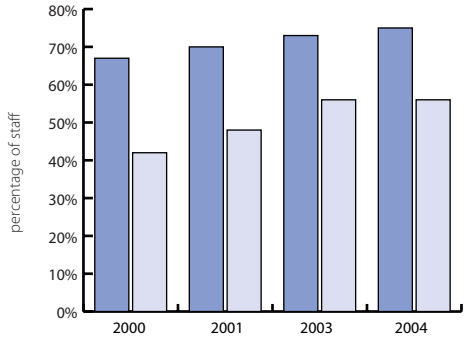


Chart 19 Teaching staff IT and e-learning competence



	Beginner	Competent	Advanced
IT skills	25	54	21
E-learning skills	45	38	18

Chart 20 Teaching staff considered competent and advanced at IT/e-learning



	2000	2001	2003	2004
IT skills	67	70	73	75
E-learning skills	42	48	56	56

estimated on the basis of these responses and weighted to reflect college size, is £8.2m. This is broadly similar to the figure of £8.5m for expenditure in the year 2001–02 obtained in last year's survey. Given the impact of the Standards Fund on the 2001–02 figures (£3.1m of the total, plus associated matched funding), the total budgeted expenditure on this item has held up well in the absence of the Standards Fund.

Policy and strategy

7.1 A strategy for ICT and e-learning

In Summer 2000 the then FEFC required colleges to submit for monitoring an ILT (information and learning technology) strategy, and the following year colleges were required to revise their strategies. Though these strategies have not been monitored in the intervening years, there has been an expectation that colleges maintain them as valuable working documents. Currently 58% of colleges continue to review these strategies annually, a further 23% revise their strategies every two years and 15% every three. The remaining colleges comprise three (1.5%) that revise their strategies less often and four (2%) that report they will revise their strategies when the LSC asks to see them.

Typically colleges use multiple channels to communicate their strategies for ICT and e-learning internally. Electronic copies are made available to all staff in 80% of colleges. Hard copies are made available for inspection in 47% of colleges, are distributed to all managers in 32% of colleges and circulated to all staff in 2%. Alternative channels used by colleges consist of face-to-face briefings, meetings and consultation groups (6%); and 1% of colleges distribute it as a section of the wider college strategy. Some 19% of colleges distribute their strategy for ICT and e-learning on a need-to-know basis. In 20% of colleges staff work objectives are derived from the college strategy.

Some 32% of colleges have set formal targets for the use of ICT and e-learning across all programmes. A further 44% set targets where they consider these appropriate and 22% do not set targets for ICT and e-learning at all.

7.2 A vision for ICT and e-learning

Some 76% of colleges have a vision and/or mission statement for ICT and e-learning. Colleges were asked to provide these statements as part of the survey: 125 colleges (62% of respondents) did so. The statements vary in length from three words to 941. Table 13 below shows the number of statements submitted, categorised by length.

Table 13 Vision or mission statements

Length	Total number of statements	Statements of objectives
9 words and fewer	5	1
10–49 words	61	0
50–99 words	30	4
100 words and over	29	10

Data = submitted statements

Becta distributed guidelines for producing an ILT strategy to colleges in 2001 to support the strategy review process. The guidelines define a vision for ILT as taking into account 'the distinctive mission, values and strategic goals that you have developed and the needs of the communities that you serve. The vision should articulate how ILT will contribute to learning, to the management of learning and to the management of the business of the college' (Powell, 2001). Clearly an effective statement should not be too short, as such a statement would convey little of the distinctiveness of the college. On the other hand, statements that are over long tend not to offer a memorable vision but are likely to lose the reader in detail. The median length of vision statement is 46 words. However, statements that are much shorter than this tend to be too general and could apply to any college.

The challenge in producing a mission or vision statement is to write something that is both meaningful in the context of a particular college and memorable enough for staff to know the key messages. Several respondents did not think such a statement was worth while, one claimed that 'mission statements are generally vacuous nonsense', and another said that at their college a list of objectives for ICT and e-learning was more useful. In fact, 12% of the statements submitted would better be described as a series of objectives rather than a vision statement as defined above. As illustrated in Table 13, all but one of

these statements of objectives was longer than the median length and two thirds were over one hundred words in length.

Taking the definition of a vision for ILT given above as a guide, each statement was coded in accordance with how it addressed two questions:

- What is ICT and e-learning to deliver for the college?
- How will ICT and e-learning deliver these things?

Clearly the length of each statement had a bearing on the number of answers to these questions that could be addressed in the space available. Shorter statements offered fewer answers and longer statements offered more. The researcher found it impossible to code any statements of fewer than 10 words.

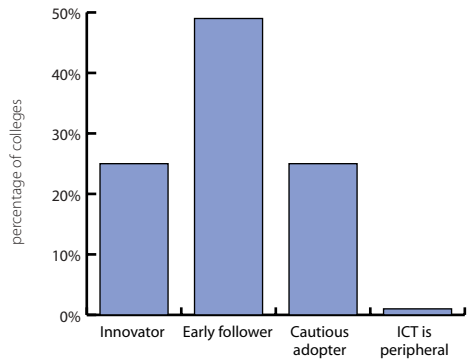
- **What does ICT and e-learning deliver?**

Many statements stressed the support role played by ICT and e-learning. This was usually expressed in general terms, either as a support for teaching and learning (31% of statements), for staff and student needs (10%), or as a support for the wider college strategy (27%). ICT and e-learning are seen as directly contributing to the sector objectives of widening participation (13%), increased achievement (12%) and – but to a much lesser extent – student retention (2%). Some 11% envisaged ICT and e-learning as a means to help students cope in an ever-changing world, and another 2% saw ICT as a change agent in its own right, heralding new ways of teaching or working. A further 2% offered statements that, while allowing for the use of ICT and e-learning, were sceptical about its ability to deliver.

- **How does ICT and e-learning deliver?**

Though most statements described what ICT and e-learning could deliver, the way in which it was to deliver proved more difficult for colleges to report. About 13% saw ICT expressly as an extra weapon in the teacher's armoury. What this weapon allows is a more enriched student experience (6%), learning outside formal lessons (6%) and further differentiation of teaching (2%). Another 2% also showed an awareness of the potential of ICT for personalised learning. Some 12% also saw ICT and e-learning as offering new skills and approaches to teaching, thereby allowing the development of the workforce. Around 16% felt that ICT delivered by allowing access to learning, facilitating participation and change. Being innovative is seen as an enabler in 8% of the statements, especially with regard to operating in a changing world.

Chart 21 College approach to ICT



	Innovator	Early follower	Cautious adopter	ICT is peripheral
% colleges	25	49	25	1

7.3 ICT, e-learning and innovation

Respondents were asked whether they would describe their college as an innovator with regard to ICT, or an early follower of established good practice, whether they were a cautious adopter of new technology, or whether ICT is peripheral to their college's mission. The results are shown in Chart 21.

Clearly, in a strictly technical sense, three quarters of the sector cannot be innovators and early adopters, as early adoption would imply being ahead of the crowd. Everett Rogers' (1995) model of the diffusion of innovation suggests that innovators would be some 2.5% of a population, and early adopters some 13.5%, both of which would be subsumed within the innovator category here. On the other side of the distribution Rogers' laggards (16%) would account for most of the cautious adopters (25%).

There may be some 'innovation inflation' here, with colleges tending to think of themselves as more innovative than perhaps they are. However, given the rapid nature of change in educational technology and the annualised cycle of budgeting and decision making in education, take-up of any technology will be 'lumpy'. With new technology, while a very small number of colleges may be ahead of the game, those that take up the technology in budget year 1 may reasonably be described as innovative, those that do it in budget year 2 could be said to be early followers, and those that adopt in the third budget year or later will not be taking on an unproven technology and may therefore be said to be cautious. It would be impossible to arrive at more differentiated categories that respondents would recognise.

No linear relationship was found between colleges regarding themselves as innovators and the size of colleges. However, far fewer of the largest colleges regard themselves as cautious with regard to ICT. Only 20% of cautious adopters have more than 3,000 student FTEs, whereas well over 40% of innovators and early adopters have more than 3,000 FTEs. This seems reasonable, as larger colleges have more resource at their disposal and can pilot new approaches with minimal disruption to the general work of the college. Innovators are also more likely to have a vision for ICT and e-learning: 86% have such a statement, as opposed to 46% of cautious adopters.

Innovation is a process. As technologies mature, they become more widespread. Table 14 illustrates this process. The proportion of newer (Pentium IV) or older (Pentium I and II) computers in relation to the total computer stock in each college is at a similar level regardless of how innovative colleges see themselves. Computers are a mature, stable technology that are now routinely bought and replaced across the sector. However, looking at more recent technologies such as data projectors and electronic whiteboards, the extent to which these are widely used varies more noticeably, depending on level of innovativeness.

A similar picture emerges if we consider staff skills. Table 15 illustrates the extent to which technical IT skills have reached a similar level across the sector regardless of innovativeness. However, if we consider staff skills with regard to the use of ICT in teaching and learning, the cautious adopters tend to lag behind.

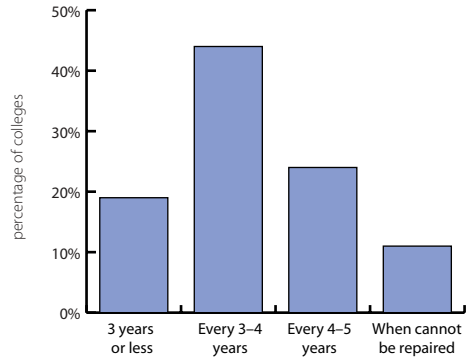
Table 14 Innovativeness compared to technology use

Level of innovativeness	Median percentage of Pentium IV out of all computers	Median percentage of Pentium I and II out of all computers	Percentage of colleges making common use of EWB	Percentage of colleges making common use of data projectors
Innovators	36%	7%	44%	74%
Early followers	38%	8%	32%	69%
Cautious adopters	31%	8%	14%	52%

Table 15 Percentage of staff considered competent or advanced

Level of innovativeness	Median level of IT skills	Median level of e-learning skills
Innovators	80%	60%
Early followers	80%	60%
Cautious adopters	80%	40%

Chart 22 Replacement policy for college computers



	3 years or less	Every 3–4 years	Every 4–5 years	When cannot be repaired
% colleges	19	44	24	11

7.4 Replacement of computers

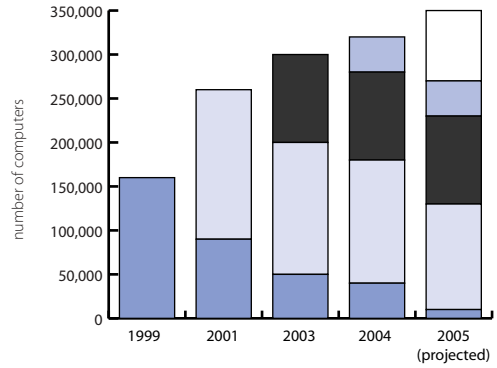
Typically, computers are depreciated financially over three years. Chart 22 shows that only around one fifth of colleges seek to replace their computers at this time, though 63% of colleges have a policy to replace within four years.

Some 11% of colleges take the pragmatic view that computers will be replaced when they can no longer be economically repaired. However, even colleges with stated policies for replacement appear to take a pragmatic view when faced with an older computer adequately fulfilling its function. Around 57% of colleges with a three-year replacement policy still have some of the older Pentium I and II machines in use at the college.

Table 16 Colleges with older computers in use

Replacement policy	Have PI and II computers in use
3 years or less	57%
Every 3–4 years	66%
Every 4–5 years	78%
When they cannot be repaired	86%

Chart 23 Projection of computer stock changes



	1999	2001	2003	2004	2005 (projected)
Pre-2000	160,000	90,000	50,000	40,000	10,000
2000–01		170,000	150,000	140,000	120,000
2002–03			100,000	100,000	100,000
2003–04				40,000	40,000
2004–05					80,000

Though no linear correlation was found, Table 16 shows that – as one might expect – colleges with shorter-term replacement policies are less likely to have older computers in use.

Respondents were asked to state the amount budgeted for additional and replacement computers for the current year. Of the 202 colleges, 170 (83%) answered this question. The total budgeted expenditure on computers for the sector (estimated on the basis of the smaller number of responses and weighted to account for college size) is £49.2m, of which £35.6m is to be spent on student computers and £13.6m on staff computers.

Taken as a whole, the sector has therefore budgeted for about 80,000 computers, assuming an average price of around £600 each. (The median price paid by colleges for a computer in 2003 was £650: down from £700 in 2001.) Comparing colleges' proposed spend to their existing stock of computers, only six colleges (4%) have insufficient budget to replace all Pentium I computers and 46 colleges (27%) have insufficient budget to replace all Pentium II computers. We estimate that the replacement of 10,000–12,000 of the oldest computers has not been budgeted for this year. However, if colleges replace the rest of these older machines this year, the total computer stock for the sector will increase by around 30,000 computers to a total of 350,000. Chart 23 shows this projected increase. If three quarters of these computers are for student use and assuming an increase in student numbers to 1.25m FTEs, the ratio of student FTEs to each computer would still better the LSC target of 5:1.

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