

Evaluation of Curriculum Online

Report of the qualitative study of schools year 1

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The research team

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Executive summary

Background

Curriculum Online has been developed as part of the Government's drive to encourage the use of ICT and digital content resources to help improve standards in schools. The programme consists of funding for digital materials in the form of e Learning Credits and a dedicated website providing information about Curriculum Online accredited resources.

The programme is being evaluated over a four-year period. This qualitative study forms part of a strand of research looking at the educational impact of Curriculum Online, comprising a baseline and two further surveys and two follow-up qualitative studies. The baseline survey was published in 2002. The first follow-up survey was published in autumn 2004. This report sets out the findings from the first of the follow-up qualitative studies.

The study was based on in-depth interviews with 34 ICT co-ordinators and teachers across five primary and five secondary schools. The schools and teachers were purposively sampled so that, together, they reflected a wide range of relevant qualities and characteristics. Qualitative research such as this allows for in-depth discussion of issues and an exploratory approach. It can help to identify and increase understanding of how policies are implemented and the way in which they impact.

Contextual factors affecting how schools responded to the Curriculum Online programme

- The schools within the sample varied in a number of ways that influenced the nature of their response to the Curriculum Online programme. The role of the ICT co-ordinator; the level of strategic leadership for ICT; the level, quality and location of ICT provision; arrangements for technical support; teacher skills and confidence; and opportunities to share learning and good practice were all important in shaping the way in which schools responded to the Curriculum Online programme and the extent to which ICT and digital content resources are used in teaching across the curriculum.
- The role of the ICT co-ordinator varied in terms of whether there was dedicated time given to carry out the role, the degree to which there was strategic and senior support and whether there were technical staff employed. The role of the ICT co-ordinator in primary

schools tended to be less formalised and less well supported while the role varied more widely across secondary schools.

- Some schools had explicit policies on using ICT in teaching. These included, in the primary schools, targets for how long children would spend on a computer and, in the secondary schools, procedures for monitoring the amount of ICT being planned into lessons.
- The schools within the sample varied in terms of their computer:pupil ratio, the age and specification of computers, the standard of networks, and the location of computers and ICT equipment. On the whole, the primary schools were at a less developed stage in their ICT provision than the secondary schools, although resources in the secondary schools varied widely.
- Many teachers had received a range of training in ICT, including through the New Opportunities Fund and National Grid for Learning. In other cases, teachers said that they had not received training recently or described themselves as self-taught. In some schools there were arrangements in place to allow teachers to share good practice and learning.
- There was a wide range of skills and confidence among teachers and this did not always reflect the amount or type of training received. In fact, some of the most skilled teachers described themselves as self-taught. Teachers with high levels of skill and confidence were more commonly found in secondary schools. Poor levels of skill and confidence were found in both secondary and primary schools. There was some concern expressed about classroom assistants having low levels of skill and confidence which made it difficult for teachers to support children using ICT and manage the rest of the class.
- The schools in this study varied in their performance against national performance measures. In secondary schools there was a relationship between performance and the degree of development of ICT provision.

Spending e Learning Credits

- ICT co-ordinators were aware of e Learning Credits (eLCs), understood what they could be spent on and were generally aware of the amount of funding that their school had. Teachers who had been involved in selecting digital materials for purchase with eLCs were also aware of eLCs, referred to the eLCs logo and were aware of either the overall level of funding or the

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funding available for their department or year group. Staff that were not involved in purchasing were less likely to be aware of the level of eLCs funding.

- All of the schools appreciated having additional funds for software and respondents spoke positively about the generous level of funding. Some felt constrained in spending their eLCs by the nature and standard of their existing hardware and the time required to evaluate materials thoroughly and embed them in teaching.
- Procedures for spending eLCs ranged from the highly centralised, where the headteacher alone decided how eLCs would be spent, to more devolved arrangements, where staff or departments were given their own eLC budget. Arrangements in between these two extremes included where the headteacher or ICT co-ordinator made spending decisions in consultation with staff or where the ICT co-ordinator 'checked' departmental spending plans against technical and strategic criteria. In secondary schools more devolved arrangements were associated with more strategic support and direction for the ICT co-ordinator role, better technical support and well-developed hardware resources.
- Many respondents discussed explicit criteria for selecting digital content resources. These included filling gaps in the curriculum, hardware or network requirements, quality, usability, the degree to which they supported pupils working independently, the cost of site licences and value for money.

Curriculum Online website and other sources

- ICT co-ordinators were generally aware of the existence of the Curriculum Online website although only some used it regularly. Department heads and subject co-ordinators were more likely to be aware of the website than general class and subject teachers.
- Many respondents had poor recall of the website and their comments were often vague. It was also not always clear whether teachers were commenting on earlier or more recent versions of the website. Those who had used the website recently commented on some difficulties with the search function generating too many returns but appreciated having all eLC accredited resources in one place.
- ICT co-ordinators and teachers preferred to use other sources of information including catalogues, marketing materials, personal recommendations and other

specialist internet sources. The reasons respondents had for preferring these sources included familiarity, the fact that they implied or included an element of evaluation, and ease of access and use.

Use of ICT across the curriculum

- The use of ICT and digital content resources to support teaching in literacy and numeracy was well established in primary schools although how far ICT was used in other subjects tended to vary from teacher to teacher. There were greater differences between secondary schools in how far ICT was used across the curriculum and variation within secondary schools tended to be greater at subject level than at the level of the individual teacher.
- There were a number of factors that inhibited (or, where schools were well placed with regard to these factors, facilitated) progress towards greater use of ICT across the curriculum. These included the type and location of hardware resources that affected how readily teachers could incorporate digital content resources into their lessons. They also included the reliability of hardware and technical support, the skill and confidence of individual teachers and, overall, the degree of strategic leadership for ICT development.
- Curriculum Online had made a contribution to extending the use of ICT and digital content resources across the curriculum, in particular, through the provision of eLCs. Some respondents commented on how the programme had allowed them to extend the reach of digital materials to cover previously under-resourced areas. However, some schools felt that they needed more investment in hardware or in time to evaluate and embed resources before they could benefit fully from their eLC allocation.
- Respondents who were more experienced at using ICT in the classroom discussed the importance of embedding and deepening the use of ICT and digital content resources in teaching. Respondents felt that this required thorough evaluation of resources and a period of familiarisation and development with specific resources. They stressed the need to not use ICT for the sake of it but to ensure ICT was used where relevant to actively support learning objectives.
- Teachers thought that developing lessons which included digital content resources took more time since they had to become familiar with the package

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and identify how it could be best used to support the aims and objectives of a particular lesson. However, they thought it improved the quality of lessons and that as teachers grew familiar with the resources, it would take less time.

ICT and pupil engagement, motivation and attainment

- Some teachers felt that the use of ICT and digital content resources had raised attainment and pointed to increased performance at GCSE and individual examples where they thought pupils had benefited.
- Others were less sure although they thought ICT could motivate and engage if used well and that their presentation and explanation of material was generally better as a result of using ICT.
- Teachers felt that ICT was better able to engage children with different learning styles, that it could bring subjects alive and that it enabled pupils to concentrate on concepts rather than calculations.
- ICT gave children access to a greater volume of information which, if mediated effectively by teachers, could support learning and skills such as the ability to evaluate sources of information.
- ICT was considered to be helpful in allowing pupils to work at their own pace and a number of teachers said that it was helpful for low ability or special educational needs children or for more advanced pupils who could take on more stretching tasks.
- Some teachers said that the repetition in some programs was useful reinforcement in learning, particularly for those children who had already grasped a concept or task.
- However, a number of teachers warned against the view that using ICT in teaching, in itself, would necessarily motivate pupils or improve attainment. Teachers referred to the importance of skilful mediation, for example. There were also examples given of over-use of particular software where pupils were becoming bored. Only teachers were really able to make a judgement about why a child was failing to learn something and intervene to help him or her understand.
- There was a view that there was scope to improve pupils' engagement, motivation and attainment even more in future as greater understanding is gained of how ICT can be used most effectively in teaching.

Conclusions

- Curriculum Online has made an important contribution by allowing schools to make a significant investment in digital content resources and there was evidence that schools were using these funds to extend use of ICT to previously under-resourced areas.
- In primary schools, the further development of ICT in teaching may primarily depend upon improvements in hardware and technical support and the development of strategic leadership for ICT and the ICT co-ordinator role.
- Some secondary schools are well positioned to extend and refine the use of ICT and digital content resources across the curriculum and to capitalise fully on the opportunities for development presented by the Curriculum Online programme.
- In secondary schools that are lagging behind in extending the use of ICT and digital content resources across the curriculum, there may be a number of factors that are inhibiting more rapid development. These factors include strategic leadership for ICT, the nature of the ICT co-ordinator role, the level, quality and location of ICT hardware, arrangements for technical support, and the ICT skills and confidence of teachers. The specific issues are likely to vary from school to school and will influence schools' capacity to respond to the Curriculum Online programme.
- With regard to spending eLCs, the evidence suggests that headteachers and ICT co-ordinators had well-founded reasons for both engaging teachers in purchasing decisions and for retaining strategic oversight. It may, therefore, be that the most successful models are semi-devolved models that incorporate both levels of input.
- Teachers reported that it took longer to plan lessons involving digital content resources although there was a view that this level of input would be reduced as teachers grew more familiar with ICT, software and digital materials and that it was an investment for the future.
- Evidence from this study suggests that a lack of awareness of the Curriculum Online website, and of its particular features and functions, could be restricting use. The DfES may want to consider how it could increase awareness of the website among teachers. As part of this effort it may want to consider how it might develop and promote Curriculum Online as a resource that can be used effectively in conjunction

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with other sources, especially catalogues and personal recommendations.

- Those involved in supporting the development of ICT in schools may wish to consider ways of helping schools strengthen strategic leadership for ICT and develop the ICT co-ordinator role. For example, one suggestion made by respondents in this study was to allow part of the eLC funds to be spent on providing cover for ICT co-ordinators and others to spend time on the strategic evaluation of potential purchases.
- The DfES and partner agencies involved in supporting the development of ICT in schools will want to ensure that the range of support they are offering schools for developing their ICT infrastructures is effective so that the greatest benefit possible is gained from digital content resources purchased with eLCs.
- The DfES and partner agencies may want to give further consideration to how they can help schools provide other forms of more responsive support to teachers in the classroom in order to consolidate skills gained through ICT training and increase confidence.
- The DfES and partner agencies may want to explore how the sharing of effective practice in using ICT in teaching can be further facilitated and supported.
- The DfES and partner agencies should consider what ways might be available to support teachers in developing lesson plans incorporating ICT in order to better help them make the transition towards more ICT-based teaching approaches.
- The follow-up study in 2005 will look at developments and changes in the contextual factors discussed in this report. And it will examine, in more detail, the implications of schools differing with regard to these contextual factors. The impact of different models for spending eLCs will also be explored further in the follow-up study. The follow-up study will also look at developments in the types of digital materials purchased and, in greater detail, at how teachers identify digital content resources and apply relevant criteria when making their selections. It will also consider in more depth the rationales for, and sustainability of, different types of purchase and look at developments in how the use of ICT and digital content resources impact on teachers' workloads. In addition, the next round of research will look at developments in teachers' and ICT co-ordinators' use and views of the Curriculum Online website.

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1 Introduction

1.1 Background

Curriculum Online has been developed as part of the Government's drive to encourage the use of ICT and digital content resources to help improve standards in schools. A programme of investment in ICT infrastructure was launched in 1998 through the National Grid for Learning (NGfL) programme. In 2003, the Government published the paper *Fulfilling the Potential: Transforming Teaching and Learning Through ICT in Schools*¹. This set out the way forward for schools to advance the development of e-learning and clarified the contribution that using ICT could make to the school reform agenda.

Curriculum Online has provided funding for the purchase of digital content resources in the form of e Learning Credits (eLCs) which can be used to purchase digital content resources from accredited suppliers. The first tranche of funding was released in autumn 2002, and by 2006 a total of £330 million will have been received by schools. A dedicated website was launched in 2003 where teachers can search for digital content resources which meet their requirements. The site has been developed since its launch. It houses information on all digital content resources sold by Curriculum Online accredited suppliers and can be searched to find resources fitting specific criteria (such as key stage, subject area, topic area, supplier name, etc). It also contains teacher reviews of products, and some free resources, such as lesson plans. The intention of Curriculum Online is to provide access to a wide range of digital material to support teaching and learning in schools. Of particular importance in this aim is extending the use of ICT and digital content resources across the curriculum. Curriculum Online also aims to make it quicker and easier for teachers to produce high quality lessons using ICT and, as a result, to raise pupil motivation and attainment.

In 2002, the Department for Education and Skills (DfES) commissioned the National Centre for Social Research (NatCen) and the University of Bristol to conduct a four-year evaluation of Curriculum Online in order to assess:

- the educational impact of Curriculum Online in schools
- the operational effectiveness of the programme
- the impact of the programme on suppliers of educational digital content resources.

The educational impact of Curriculum Online is being measured through a series of surveys in schools and follow-up qualitative studies. A baseline survey was conducted in winter 2002 prior to the launch of the Curriculum Online website and the report of this survey was published in 2003². The second survey was conducted between October and December 2003 and the findings published in autumn 2004. This report sets out the findings from the first stage of qualitative follow-up work, which was carried out between January and July 2004.

1.2 Aims of the qualitative research

The qualitative studies aim to build on the survey work, examining in more detail how schools have responded to the Curriculum Online programme and exploring teachers' perceptions of the impacts of Curriculum Online on teaching and learning. A second tranche of qualitative work is to be conducted in spring 2005 to explore developments and impacts over time.

More specifically, the qualitative research aims to:

- understand how and why purchasing decisions using eLCs are taken
- understand how ICT co-ordinators and other teachers in schools use the Curriculum Online website
- explore the perceived impact of Curriculum Online on the use of ICT and digital content resources across the curriculum
- explore the perceived impact of Curriculum Online on teacher workload
- explore the perceived impact of Curriculum Online on pupil motivation and attainment
- understand how and why differing school contexts shape the use and impacts of Curriculum Online.

¹ *Fulfilling the Potential* (DfES 2003, <http://dfes.gov.uk/ictinschools>)

² *Evaluation of Curriculum Online: Report of the Baseline Survey of Schools*
http://www.becta.org.uk/page_documents/research/curriculum_online/evaluation_report.pdf

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1.3 Sample and recruitment

The robustness of qualitative research and the ability to draw wider inference from qualitative studies is highly dependent on rigorous purposive sampling. It is neither necessary nor desirable for qualitative samples to be as large as survey samples or statistically representative. Rather, it is essential that samples are selected to reflect the range and diversity of key characteristics present in the target population.

The criteria for sampling schools and teachers were chosen on the basis of representing the range of factors that might influence programme outcomes. The research has then sought to explore, explain and map the range of experiences or views within these different sub-groups.

The study team conducted in-depth interviews with teachers in 10 schools in England. These schools were five primary and five secondary schools. In each primary school, the ICT co-ordinator and two year group teachers were interviewed. In each secondary school, the ICT head or co-ordinator (referred to throughout as the 'ICT co-ordinator' for simplicity) and three subject teachers from humanities, languages and maths or science were interviewed.

The sample criteria were two-fold. Firstly, at the school level, the following criteria were used:

- school size
- school funding type
- computer to pupil ratio (coded into three bands – see Table 1 right for details)
- national performance figures
- geographical diversity.

The sample of teachers aimed to include:

- teachers with different levels of teaching experience
- teachers in primary schools who work at both Key Stages 1 and 2

- teachers in secondary schools who teach across different subject groups (as teachers tend to teach a subject across Key Stages 3 and 4 in secondary schools)
- some teachers who also have subject co-ordinating responsibilities (primary schools) and department head responsibilities (secondary schools).

The recruitment for this study was conducted in two stages: firstly, recruiting the school, and secondly, arranging interviews with teachers. Given the high number of refusals from schools, some compromise over sample criteria was required. However, a slight imbalance in some areas of the sample was thought preferable to not securing agreement from enough schools within the study timetable.

Table 1: Achieved sample of schools

Sample criteria	Primary schools (5)	Secondary schools (5)
Size of school		
>200 pupils	2	0
200-300 pupils	2	0
<300 pupils	1	0
>800 pupils	0	1
800-1200 pupils	0	2
<1200 pupils	0	2
Type of school		
Community funded	2	2
Voluntary aided	2	1
Voluntary controlled	1	1
Foundation school	0	1 ³
Single gender	0	1
Computer:pupil ratio⁴		
1:>7.7 computers per pupil	1	2
1:7.7-9.9 computers per pupil	3 ⁵	2
1:<10 computers per pupil	1	1
League table performance⁶		
Above average	2	2
Around average	1	1
Below average	1	1

³ The foundation school included here was also the single sex school.

⁴ This spread of ratios reflected that used in the baseline survey (2002). Averages for computer to pupil ratios have improved since this time.

⁵ Although a spread of computer to pupil ratios was sought, refusals by schools meant that schools in the middle band were over-represented and those in the other two bands, under-represented.

⁶ One primary school was a juniors only school, therefore standard performance measures did not exist.

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Table 2: Achieved sample of teachers

Sample criteria	Primary schools (14)	Secondary schools (20)
Teaching role		
ICT co-ordinator/head	6	5
Maths and science	0	5
Humanities	0	5
Languages	0	5
Subject co-ordinator/department head	5	7 ⁷
Length of teaching experience⁸		
Under 5 years	4	5
Teachers with 5-10 yrs experience	4	5
Teachers with over 10 yrs experience	5	10
Key stage focus (primary schools only)		
KS1	7 ⁹	0
KS2	5	0
TOTALS		
ICT co-ordinator/headteacher	6	5
Subject/class teachers	8	15

Schools were approached through an initial letter to headteachers, containing information sheets about the study which could be passed to teachers who might take part. Agreement in principle was sought via follow-up phone calls with headteachers. This often required more than one phone call to allow headteachers the time to discuss the research with ICT co-ordinators and other staff members. In discussions, headteachers were asked to identify the most knowledgeable person in school with whom to discuss eLCs; this person was identified as the ICT co-ordinator in each school (which in one case was also the headteacher). Once agreement in principle had been secured, a researcher liaised with ICT co-ordinators in schools, explaining the types of teachers to be included in the study and arranging dates and times to conduct the interviews. A payment was made to each school to meet the costs of supply cover in order to release teaching staff for interviews.

1.4 Conduct of interviews

Fieldwork was conducted between late March and July 2004. All interviews were conducted by the research

team. Interviews took place in schools, with all interviews in any school happening over the same school day. Interviews lasted an hour, with some slightly shorter (eg 50 minutes) to fit into lesson timetabling. Interviews were conducted using two topic guides, designed in consultation with the DfES: one for ICT co-ordinators, and a second for other teachers. All interviews were tape-recorded and transcribed verbatim for analysis.

1.5 Analysis

The data from the study was comprehensively and systematically analysed using 'Framework'. Framework is a qualitative analysis method developed at NatCen, which uses a thematic approach to classify and support the interpretation of qualitative data. Framework involves a number of stages. First, key themes are identified using the topic guide and by identifying key areas of inquiry emerging in the data through familiarisation with transcripts. A series of thematic charts or matrices are set up relating to each thematic issue. The columns in each chart or matrix represent the key sub-themes or topics while the rows represent individual participants. Data from each respondent is then summarised into the appropriate cell. The context of the information is retained and the page of the transcript from which it comes noted, so that it is possible to return to a transcript to explore a point in more detail or to extract text for verbatim quotation. The charts allow the full pattern of an individual's behaviour or attitudes to be reviewed. They also display the range of views or behaviours described by participants and allow the accounts of different participants or groups of participants to be compared and contrasted.

1.6 Coverage of the report

This report consists of this introduction and six subsequent chapters. Chapters 2, 3 and 4 are largely descriptive, setting out details about the schools and their ICT contexts, and discussing how eLCs and the Curriculum Online website have been introduced and used in schools.

⁷ Subject co-ordinator and department head responsibilities were held in addition to class teaching duties.

⁸ The emphasis given in the sample to teachers who had over 10 years' experience was not ideal, but was due to recruitment difficulties and the need to be flexible in allowing schools to choose respondents whose lesson times fitted with interviews.

⁹ This figure includes ICT co-ordinators who have class teaching responsibilities, but excludes headteachers who do not teach a year group class.

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- Chapter 2 looks at differences between the schools in terms of their ICT context.
- Chapter 3 considers how eLCs were introduced into schools and how they have been managed and spent.
- Chapter 4 looks at awareness, use and views of the Curriculum Online website, comparing this with other sources used by teachers to identify and purchase digital content resources.
- Chapter 5 looks at the factors inhibiting or facilitating the effective spending of eLCs and, more generally, the factors inhibiting or facilitating the greater use of digital content resources across the curriculum. It also looks at the effects of the increased use of digital content resources in teaching on teacher workloads and the impacts on pupil motivation, engagement and achievement.
- Chapter 6 pulls out some key findings from the study, looks at their implications and outlines areas for exploration in the second qualitative study planned for 2005.

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2 The schools and their ICT provision

This chapter looks across the sample of schools that participated in the study and describes how the schools varied in terms of:

- strategic management of ICT and the role of the ICT co-ordinator
- policies for using ICT in teaching
- hardware facilities
- technical support
- training and support in ICT
- skills and confidence of teachers in using ICT
- special status
- school performance.

2.1 Strategic management of ICT and the role of the ICT co-ordinator

The ICT co-ordinator role varied between schools, especially between secondary schools. In particular, ICT co-ordinators had differing responsibilities, different amounts of dedicated time to devote to these responsibilities and various levels of strategic support.

Primary schools

In primary schools, individuals tended to have the ICT co-ordinator role as one of a number of non-teaching roles, such as subject co-ordinator, special educational needs co-ordinator, and school health and safety officer. Time available for ICT co-ordination was included in the individual's general time for non-teaching work rather than there being clearly delineated time for ICT co-ordination. ICT co-ordinators, consequently, sometimes described having difficulty in making time for their work in ICT, especially when other roles required particular attention.

ICT co-ordinators in primary schools varied in how far they felt supported by their headteacher in the ICT co-ordinator role and, in some cases, felt that their headteacher did not understand how much work the role entailed.

"I think some heads that are not very au fait with ICT do not realise how big a job it is. The head here, she's very good, but I don't think she really realises how much time it takes, 'cos she's not

very IT orientated. I think it does help. I think if the head really knows a lot about ICT, I think that really does help. The good thing about [name of headteacher] is that she does listen to you... Otherwise I think I would find it quite difficult, because I don't think she'd realise that it's a much more demanding area than any other of the curriculum areas; it's not the same."

(ICT co-ordinator, primary school)

However, even where headteachers were described as supportive, the ICT co-ordinator tended to work in isolation and there were few, if any, formal structures in place to provide them with strategic support, such as regular team-based meetings.

The ICT co-ordinator role in primary schools covered such tasks as checking through lesson plans prepared by class teachers and advising on use of ICT, writing medium-term plans and the school ICT policy, troubleshooting technical problems and co-ordinating external training for teaching staff in using ICT. In addition, ICT co-ordinators were usually involved in decisions around purchasing hardware and digital content resources or managed these budgets themselves.

Primary school ICT co-ordinators all described finding 'cluster meetings' – meetings within the LEA of local ICT co-ordinators where experiences and learning are discussed and shared – a useful support to them in their roles. Some ICT co-ordinators in primary schools also described having close and supportive relationships with LEA ICT advisers.

Secondary schools

The ICT co-ordinator role in secondary schools varied more than the role in primary schools. In particular, some ICT co-ordinators worked with a significant level of senior involvement and strategic support. One school, for example, had set up an ICT group consisting of the ICT co-ordinator, the headteacher, the deputy headteacher, a librarian and the network manager. This group met twice a term to discuss ICT strategy and developments and to take decisions about spending on ICT. In addition, each department within the school had an ICT representative, who liaised with the ICT co-ordinator. This ICT co-ordinator had clear and dedicated non-contact time for this role.

However, in another secondary school the ICT co-ordinator was responsible for planning and overseeing ICT

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across the curriculum but did this in his general non-teaching time. Funding for ICT was managed and controlled by the headteacher with little or no involvement from the ICT co-ordinator. In this case, the ICT co-ordinator described feeling demoralised and unsupported.

Other secondary schools varied between these two extremes, with varying levels of dedicated time for the ICT co-ordinator role and varying levels of support and involvement from senior management. For example, in one secondary school the ICT co-ordinator had termly meetings with the headteacher and deputy headteacher in charge of curriculum. The frequency of these meetings was sometimes more when the need arose, such as deciding which subject areas to concentrate eLC spending in. This ICT co-ordinator had dedicated weekly time for his role and was in the process of establishing a member of each department to become an ICT liaison person for their departments. In another school, the ICT co-ordinator was a deputy headteacher and, although he had many other demands on his time, he did have a proportion of time specifically dedicated to ICT. He felt supported by his headteacher and frequently discussed ICT with him and other members of staff in senior management meetings.

The ICT co-ordinator role in secondary schools covered planning ICT across the curriculum, working through lesson plans or departmental ICT plans, organising external training for staff members, organising and delivering internal training for staff, and attending 'best practice' meetings in departments. Unlike in primary schools, ICT co-ordinators were not usually required to 'troubleshoot' technical problems as they all had technical support staff in school who they also often line-managed. ICT co-ordinators in secondary schools had varying involvement in budget management and spending decisions around hardware and digital content resources. The evaluation and researching of digital content resources was often part of the role of ICT co-ordinators and many of them commented on how hard it was to find the time to do this well. ICT co-ordinators in secondary schools rarely mentioned attending LEA or area support meetings.

2.2 Policies for using ICT in teaching

Schools had various policies around using ICT in teaching. In primary schools there were policies that encouraged the use of ICT and digital content resources in teaching. Commonly this took the form of a prescribed amount of time that each pupil was supposed to spend on a computer (eg half an hour a week), although in some cases this target was not met due to the limitations of the hardware or limited space in computer suites.

Some secondary schools had policies and practices in place for promoting the use of ICT and digital content resources across the curriculum. For example, in one case lesson plans had to be submitted to the ICT co-ordinator a term in advance. The ICT co-ordinator would then work with individual teachers or departments to ensure enough, and appropriate, use of ICT was built into departmental lesson plans. This type of approach was associated with schools that had more strategic structures and support for the ICT co-ordination role.

In schools with little or no strategic support and little or no dedicated time given to the ICT co-ordinator role, policies in ICT, where they existed, tended more to focus on the teaching of ICT as a discrete subject rather than on the cross-curricular use of ICT. However, in these schools there were often plans to develop school policies on the cross-curricular use of ICT in teaching in forthcoming years.

2.3 ICT hardware

Schools were sampled on the basis of computer to pupil ratios, drawn into three bands (see Table 1: Achieved sample of schools). These reflect the bands used in the baseline survey of schools (winter 2002). There were, however, in addition to the number of computers, other issues that were an important part of schools' hardware context. These included the ages of computers, the locations of computers, network issues, the number and location of interactive whiteboards, as well as levels of other types of hardware such as pixies, turtles¹⁰, digital cameras and camcorders.

Primary schools tended to be at a less developed stage in their ICT resources than secondary schools.

¹⁰ Pixies and turtles are programmable toys used in early years and primary teaching in learning basic IT skills and teaching about distances, directions and giving instructions.

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Respondents in several primary schools described having a mix of older and newer computers in classrooms, or computers of different specifications such as PCs and Macs. And not all of the primary schools had networks installed, although there were plans for the schools to be networked in the near future. They usually had one or two interactive whiteboards and were planning to acquire more. Secondary schools had more extensive ICT resources than primary schools, including more established school networks, and tended to have been developing their ICT provision over a longer period. Secondary schools had larger numbers of interactive whiteboards and, in most cases, were planning to acquire more.

Respondents in primary schools and secondary schools alike described the location of computers as important in how ICT could be used in teaching and learning. In primary schools, computers were either in individual classrooms only (ranging from two to four computers in a class) or in a small ICT suite as well as in classrooms (one or two per classroom). One teacher in a school with an ICT suite with nine computers felt this was too small as it was not possible to take whole classes to the suite. Another primary school was hoping that building expansion would allow them to set up an ICT suite, but also planned to retain computers within classrooms. Primary schools did have interactive whiteboards located in classrooms but the numbers were often small and not all teachers felt that they had sufficient access to them.

Secondary schools had ICT suites in more than one location with at least 20, and usually more, networked computers in each suite. There were sometimes also stand-alone computers in some classrooms, although this was more unusual. Several ICT co-ordinators in secondary schools mentioned that networking had been substantially extended in recent years. In well-resourced schools (those with better pupil to computer ratios), there were examples of departments having their own dedicated ICT suites or computer areas. An issue for many teachers, however, was advance booking of ICT suites, which teachers sometimes found difficult to plan and organise their teaching around. One school, though, had overcome this issue by designating some ICT suites as 'non-bookable'.

Example 1: School profiles – Comparison of secondary schools' hardware resources

School 1: This school is becoming a specialist school in computing in the forthcoming academic year. It has between 800 and 1,200 pupils and has very high performance figures, well above the national average. The school is equipped with around 260 personal computers, and on top of this most teachers have allocated laptops. One school department also has 20 laptops kept on a trolley which can be moved into lessons as needed. The school has broadband internet access running on a wireless connection. This means that teachers can access the internet from their laptops almost anywhere within the school. A network manager looks after the school network and technical problems are dealt with by the full-time technician. There are interactive whiteboards in all departments within the school, although not in every classroom. There are plans to install video conferencing and webcams in the future. There are various computer suites and areas around the school. Most departments have their own dedicated computer areas and there are open access computer areas that pupils can use at breaks or after school. These areas, unlike other suites, cannot be booked in advance and teachers are welcome to take their classes there as and when it suits them.

School 2: This school has just under 800 pupils, and has below average performance figures. It has 150 computers in the school, some of which are stand-alones in classrooms around the school. All teachers have laptops allocated to them. The school has been trialling some interactive whiteboards and would like to invest in more in the future but the ICT co-ordinator sees the priority being to upgrade existing computers first. The school has an intranet maintained by the ICT co-ordinator. The school technician is highly skilled but over-stretched. There are three computer suites, two within the IT department and one in languages. The computer rooms in the IT department are used exclusively for teaching ICT and teachers from other subject areas experience difficulties in booking a computer room.

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2.4 Technical support

Secondary schools

The level of technical support in secondary schools varied, but all employed technical staff. For example, one secondary school employed a team of seven staff: a network manager, an IT technician, a trainee technician, a community IT technician, an internet author working full-time and two part-time IT technicians. This school was able to fund this level of support through its specialist status for ICT. Other secondary schools employed a single IT technician, several technicians or a technician and a network manager. The ICT co-ordinators had responsibility for network management where there was not a network manager, sometimes alongside the technician. In schools with higher levels of technical support, teachers were often able to rely on them to set up equipment for teaching, such as a laptop and portable interactive whiteboard. In schools with less technical support, teachers were expected to set up equipment themselves. This made some teachers reluctant to use ICT in their lessons.

Primary schools

None of the primary schools employed a full-time technician although one had a part-time technician. One primary school employed an ICT support assistant, but this role was for supporting pupils in using ICT in the classroom rather than for providing technical support. Primary schools often paid a fee for having access to technical support in a pool with other schools. Technical support was then called in to the school when there were specific problems that ICT co-ordinators were unable to solve. Typically, this service was bought in from the LEA. This type of service was sometimes described as quite slow. In one case an ICT co-ordinator described waiting for two months for the installation of a broadband internet connection. Others described waiting weeks for problems with particular computers to be addressed. Another issue with this type of service in a particular school was that technicians would arrive during school hours, so that where there was a problem with a computer in a specific classroom, this meant that the technician needed to disturb lessons.

2.5 Training and support in ICT

There were repeated reports of external training among primary school teachers. Teachers referred to New Opportunities Fund (NOF) training, training related to the

National Grid for Learning (NGfL), LEA training and training in the use of specific software or equipment such as interactive whiteboards. Teachers also reported having been introduced to particular digital content resources, for example, in special educational needs.

In secondary schools, some teachers had attended NOF training a few years previously, although views were mixed as to how useful this training was. Few teachers mentioned recent external training. However, a textiles teacher had been on two courses recently, one about using ICT in textiles and another on using a particular design package. One languages teacher had also recently been trained by a supplier on using their software with an interactive whiteboard. Other teachers talked about getting training in their own time, often after school, because of difficulties in arranging and funding cover. One teacher referred to this as 'twilight training'. Several teachers also spoke of having funded training from their own pocket. Other teachers described their ICT skills as self-taught.

The level of internal training and support offered by schools varied. In primary schools, some ICT co-ordinators held sessions on good practice at staff meetings or gave a brief training session on new equipment or resources coming into the school. In one primary school, the ICT co-ordinator had paired staff up, matching staff who were skilled and confident in using ICT with those who were less so. This was a new scheme and it was too early for staff to say how well it was working. However, teachers reported valuing having informal and ad hoc support available from the ICT co-ordinator, technical staff or experienced colleagues, saying that it made them feel more confident.

In secondary schools, where there was strategic support and dedicated time for the ICT co-ordinator's role, there was also often a more developed culture of sharing good practice and training. For example, there were slots at faculty meetings to share good practice and ICT co-ordinators frequently ran lunchtime and after-school training sessions in particular equipment or digital content resources. In some cases, schools had held inset days that included the sharing of good practice in using ICT in the classroom. ICT co-ordinators who had more dedicated time for their role also found it easier to make time to go through things with staff on a one-to-one basis. Where there was less strategic support and dedicated time for the ICT co-ordinator role, there was

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less of a structure for the provision of internal training and support and more reliance on ad hoc or informal support from either the ICT co-ordinator or more experienced colleagues.

2.6 Skills and confidence of teachers in using ICT

In all of the schools there was a wide range of skills and confidence in using ICT among the teachers. Teachers with particularly high skill levels were more commonly found in secondary schools, where some teachers had written their own software and built their own intranet sites. However, teachers with low levels of confidence and skill were found at both primary and secondary levels. Some teachers, especially older teachers, were reluctant to use ICT in teaching and were concerned about looking foolish in front of pupils and of losing control of the class.

"I suppose there would be teachers of a certain age range, teachers of a certain background or training, teachers that have worked in a subject area for a long time are typically the ones that [struggle with using ICT], and you can tell the horror on their face straight away. 'I am not a specialist, the students will know more than me, I will not be in control.' And that I think is always the first hurdle."

(ICT co-ordinator, secondary school)

A small number of teachers felt uncomfortable using ICT administratively as well as in teaching and preferred, for example, to draw lesson plans by hand or were just beginning to learn to use basic computer packages as laptop computers were allocated to them. Skill and confidence levels did not always seem to be related to levels of training with some of the most skilled ICT users describing themselves as self-taught and some of the least skilled users having attended training courses.

Low levels of skill and confidence were often seen to be related to age with older teachers being, on the whole, less able with ICT (although there were clear exceptions to this). Newer teachers, comparatively, were more likely to have used ICT throughout their early training. However, ICT co-ordinators identified willingness to learn and to 'have a go' as important and these qualities were not always restricted by age.

2.7 Special status

Some of the schools in the study had special status of one sort or another. There were secondary schools with specialist status in technology and computing. Some secondary schools also held specialist status, or had been awarded it for the forthcoming academic year (2004-05), in maths, media, arts and music. One secondary school had also just moved out of a period of being on special measures. The sample also included a Beacon school and a school with a partnership arrangement with a City Learning Centre.

While this study did not attempt to calculate the level of financial resources dedicated to ICT overall, there were clearly differences between schools in the level of funding dedicated to ICT development and provision. Those secondary schools with specialist status in technology and computing described how this status had resulted in additional spending within ICT, for example, to employ a team of technical support staff, improve hardware, develop networks and the school intranet, and install wireless internet connections. There was also mention that schools had channelled resources into specific areas in order to gain the specialist status, as well as having additional resources as a result of it.

2.8 School performance

The sample of schools in this study purposively reflected a wide range of performance against national performance measures. In secondary schools, in particular, there was a strong association between performance measures and the schools' ICT context, with those schools with above average performance against the national measure of the percentage of pupils gaining five A*-C GCSEs having better developed and supported ICT co-ordinator roles, clearer strategic management of ICT, better hardware and ICT facilities, more technical support and better structures for sharing good practices. Those schools at the average performance level or lower were those with a less well-developed ICT provision and which tended to focus on teaching ICT skills rather than using ICT teaching across the whole curriculum. These relationships between ICT context and performance were less apparent in primary schools.

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3 Spending e Learning Credits

Curriculum Online has provided funding to schools for the purchase of digital content resources in the form of e Learning Credits (eLCs). This chapter looks at the way in which eLCs were introduced into schools and how they have been used. In particular, this chapter covers:

- awareness of eLCs
- views of eLCs
- structures for spending eLCs
- criteria for choosing digital content resources
- types of purchase bought with eLCs.

The existence of eLCs has borne some impact on the way other types of funding in schools has been used. This is described in the final section of this chapter.

3.1 Awareness of eLCs

ICT co-ordinators in primary and secondary schools were aware of eLCs. They were aware that they could only be used for accredited digital content resources and that they could not be spent on hardware. Often they mentioned that any unspent eLCs would be lost at the end of the academic year. They were also generally aware of the level of eLC funding, although how precisely they were able to recall the amount their school had received varied. In a single case, where the ICT co-ordinator had little or nothing to do with purchasing decisions, he was not aware of the level of funding the school received but believed it to be thousands of pounds.

The extent to which other staff were aware of eLCs varied more widely. Those involved in recommending or selecting digital content resources for purchase were aware of eLCs. They were also aware that they were for digital content resources, were largely aware that they were not for any other use, and sometimes they were aware of the level of funding that their school received. Teachers often mentioned the eLC logo on catalogues, supplier websites or leaflets and understood that eLCs could only be spent on products that bore this symbol. Where eLC funding was formally devolved, teachers or department heads knew the level they had available to them. In these schools staff recalled being told about eLCs in staff and departmental meetings.

Where purchasing was carried out centrally, staff other than the ICT co-ordinator were less likely to be aware of

the level of eLCs. They had often heard of them but knew little more than that they were funding for digital content resources. There was an example of one teacher believing that eLCs could also be spent on hardware. Sometimes teachers had only heard about eLCs outside the school such as during training courses or through talking to friends.

There were some examples of teachers being unaware of eLCs in any form. These were generally newer staff in schools and included a newly qualified teacher (NQT) in a primary school.

3.2 Views of eLCs

All schools appreciated having additional funding for digital content resources and often thought that the level of funding was generous. In cases where ICT co-ordinators felt it was too much, this was because there were barriers to spending, particularly around the quality of hardware and finding enough time to evaluate and embed digital materials in teaching. Chapter 5 identifies facilitators and barriers to using ICT across the curriculum and, in the course of this discussion, looks at these issues in greater depth.

There were mixed views on the ring-fenced nature of eLCs. Some ICT heads and co-ordinators felt it was of real benefit to have money marked out for digital content resources in order to ensure that a significant investment was made in this area since it had not always attracted significant funding in the past. Others felt that the ring-fenced nature of eLCs could be a barrier to effective spending, feeling that being able to spend part of the funding on the staff time needed to evaluate, select and embed digital content resources or on upgrading hardware would be more useful.

In one secondary school, a head of history felt that the range of accredited resources was too narrow. He was particularly interested in specialist website subscriptions and sources of 'raw' data for history, which eLCs do not cover.

"[eLCs] seem to be very poor on subscription websites which are the sort of things I would use a lot... So it seems it's suiting the software supplier rather than the subscription websites which tend to be a bit more specialist. I mean, it's lovely to help us buy things but it would be good as well if we could buy more of the raw material online resources which we need to."

(Head of history department, secondary school)

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Respondents from secondary schools sometimes reported that digital content resources they had wanted to purchase had not been accredited. Normally, however, accredited alternatives were found or the ICT co-ordinator had been able to find other funding and, overall, respondents felt that the types of products they wanted were eLC-accredited.

3.3 Arrangement for spending eLCs

The school survey in autumn 2003 found that the majority of schools were holding their eLCs centrally, with a minority of schools (8% of primary schools and 20% of secondary schools) allocating eLCs between departments. The introduction of eLCs appeared to have led to an increasing number of secondary schools moving towards centralised systems for purchasing software, with 63% of secondary schools stating that teachers submitted software requests centrally, compared with 43% in the baseline survey. The qualitative interviews revealed more complex structures. Schools fell somewhere along a continuum that ran from completely centralised, with purchasing decisions taken by one or two people, to more devolved structures, where all teaching staff had an input, or where eLCs were devolved to subject or department heads.

Diagram 1 (overleaf) shows examples of schools along this centralised to devolved continuum of purchasing structures.

Centralised purchasing structures involved either one or two decision-makers, or sometimes a small group of decision-makers. Staff who took sole responsibility for purchasing decisions included ICT co-ordinators and headteachers. One of the primary school ICT co-ordinators had taken more responsibility for purchasing decisions, having previously had a more devolved arrangement. This was because she felt that staff were making decisions reactively in response to attractive marketing rather than engaging in proactive decision-making based on identified criteria and need.

"...the teachers will say, oh yeah, I like that, I quite like that [from marketing materials sent in to the school]. And you end up paying for it, and it's not necessarily the best... Well, the staff said yeah, that's fine, I'll have that, but it wasn't necessarily the best piece of software. So I prefer to go on recommendation... I'll talk to other schools in the area and to staff there using different pieces of software."

(ICT co-ordinator, primary school)

Another primary school ICT co-ordinator took on greater responsibility for purchasing decisions this year compared to last year in order to purchase an electronic library or suite of cross-curricular resources. She reported that in the previous year teachers had made individual requests but she felt that, this year, this type of purchase would be of most benefit to the school. She did, however, invite the supplier into school to demonstrate the resource and invited all teaching staff to attend and make comments before the final purchasing decision.

In some secondary schools a headteacher had made decisions in virtual isolation. Staff in these schools expressed some dissatisfaction. They had usually not been informed about eLCs in school but had heard about them at area meetings, through friends, in the press or on training courses. There was a feeling, particularly from department heads and, in one case, an ICT co-ordinator, that they should have been involved and offered the opportunity to input.

"The rep from the book company that I was buying my new course from said 'You might be able to use your eLCs', and I said 'What are they?' so the rep explained to me what they were. And then I went to see the head here and he said to talk to the bursar... I think there's an awful lot of finance out there, there's an awful lot of things available that we never hear about... I felt a little bit annoyed that there's this stuff available and I'm hearing about it from a rep... That's how I felt about it, I was a bit miffed really."

(Assistant head of department, languages, secondary school)

Further along the centralised to devolved continuum were schools where ICT co-ordinators or headteachers had asked teachers to make requests for digital content resources. This invitation had been made to subject co-ordinators only or, in other cases, to all teaching staff. ICT co-ordinators, headteachers and network managers then took the list of requests made and worked through it, looking at the overall needs of the school, at network compatibility, and in some cases researching alternative products.

Fully-devolved arrangements included where the eLC budget had been allocated directly to teaching staff or department heads. In one primary school each teacher was allowed to spend £250 on eLC-accredited digital content resources. The ICT co-ordinator in this school felt

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it was important for all teaching staff to input into purchasing decisions in order to engage and motivate staff to use more ICT in the classroom. Similarly, in one of the secondary schools, each department was given £2,000 worth of eLCs. The responsibility for each devolved budget rested with the department head. Some departments within this school engaged teachers in purchasing decisions whereas in other departments, department heads made the purchasing decisions alone.

In more devolved purchasing structures, particularly in secondary schools, ICT co-ordinators had sometimes acted as 'consultants' to those involved in purchasing decisions by making themselves available for staff to talk to about their needs, making suggestions for products or researching alternatives on their behalf.

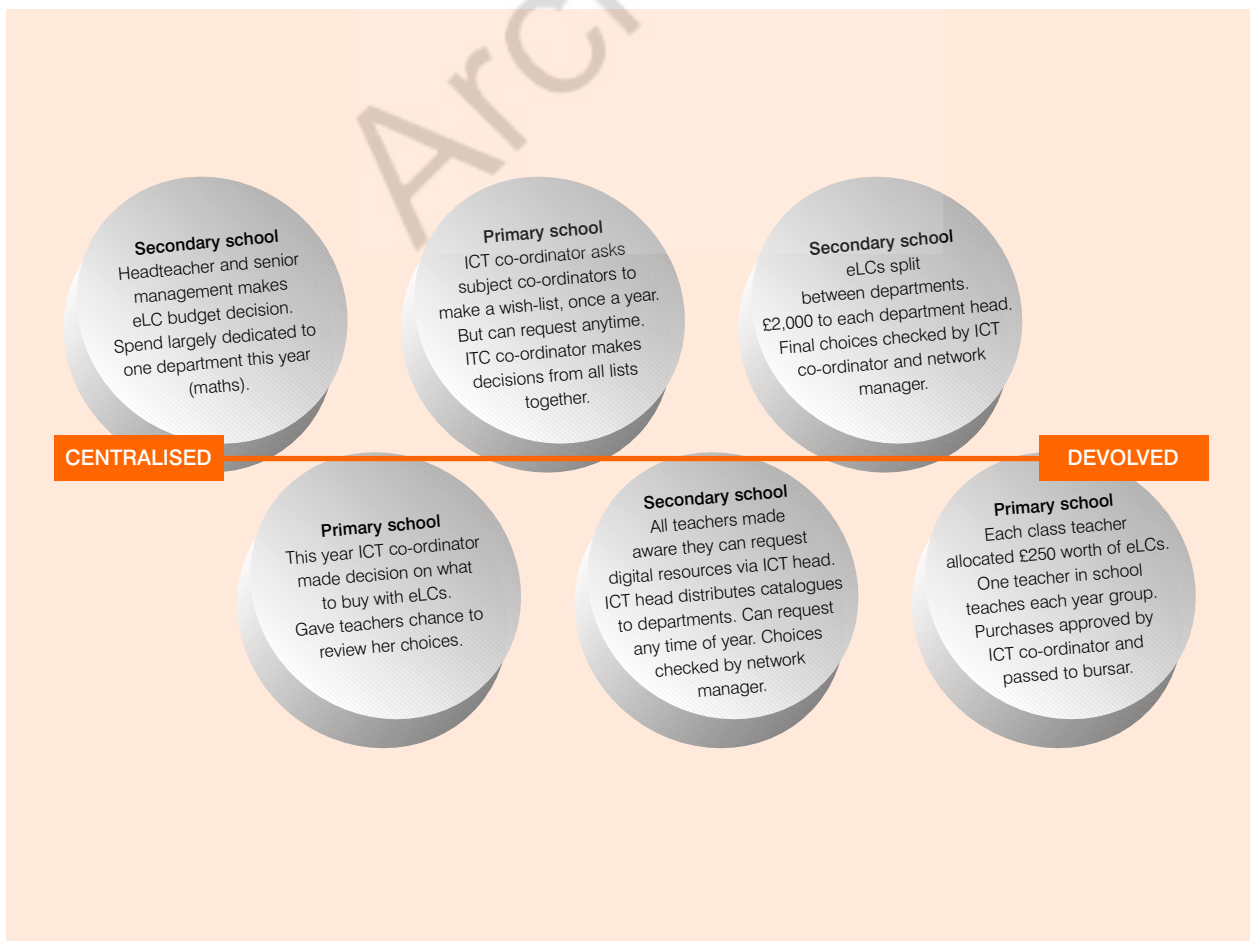
Staff in schools with the most devolved structures were most aware of eLCs. Staff in these cases recalled

hearing about eLCs within the school, for example, through staff meetings.

In secondary schools, more devolved eLC spending structures were also associated with more strategic support and direction for ICT, a well-supported ICT co-ordinator role, better technical support and well-developed hardware resources. These were also schools with above average performance figures.

These same relationships were not evident in primary schools. This may reflect the fact that secondary schools are larger and have more developed subject leadership than primary schools, making highly centralised purchasing structures less appropriate. In primary schools, centralised purchasing arrangements generally appeared to facilitate strategically informed purchasing decisions, whereas in secondary schools, this seemed to be associated with less developed strategic leadership for ICT.

Diagram 1: Schools purchasing structures



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3.4 Criteria for choosing digital content resources

Teachers often made requests or purchases in response to having seen marketing materials, after coming across a software program at a training course or network meeting or being recommended a program by friends or colleagues. In other cases, teachers had a specific need and proactively searched among alternatives, for example by attending the BETT exhibition or using online searches, including the Curriculum Online website. All of these respondents referred to a range of criteria for choosing digital materials although these were sometimes informally, rather than formally, applied. The main criteria discussed were:

- curriculum requirements and 'gap filling'
- hardware or network requirements
- quality and usability
- value for money.

3.4.1 Curriculum requirements and 'gap-filling'

Respondents discussed choosing resources to meet curriculum needs and to fill gaps where there were currently few digital content resources in particular subject and topic areas.

At the departmental or subject level, teachers looked for resources that covered parts of the curriculum which were not currently well served with digital content resources.

"Obviously now I've got massive gaps where I have very little software on... for example industry... there are things out there on industry but... because it's not many, they do seem to be quite dear and it just is the way."

(Geography teacher, secondary school)

A number of teachers referred to recommendations made in QCA¹¹ documents for using ICT across different parts of subject curricula. Senior management staff were also sometimes involved in identifying priority subject areas; in one primary voluntary-controlled school, the board of governors identified science and geography as areas in which more resources should be channelled. In the case of one secondary school, the ICT head, headteacher and deputy headteacher in charge of the curriculum had held regular meetings at the beginning of

the year. Here, they identified areas where resources were needed to help students meet achievements laid out in the school's ICT policy. The ICT head described the way these meetings had worked:

"It started from that fact that we needed to look at how ICT could best be taught in a cross-curricular way. [In] Key Stage 3, it was always a case of looking at... we need the students to achieve this in ICT, and where would be the best place for them to do that? So that then leads to identifying the subjects, which were english and maths. And then asking english and maths, what software was it you felt you needed to be able to do this? All through discussion and negotiation..."

(ICT co-ordinator, secondary school)

Sometimes schools focused the majority of their eLCs and (where relevant) other ICT-based funding on subject areas that did not have as much digital material as other areas, where it was felt there would be greater benefit or where areas of the curriculum lent themselves to more usefully employing ICT in teaching and learning. For example, a head of maths in a secondary described how graphs packages in maths allowed pupils to see and construct graphs from data without spending a good deal of time drawing up graphs by hand, thus allowing more time to be spent on exploring the concepts than on presentation. In primary schools, areas that had less digital content resources dedicated to them were often foundation subjects such as science, history and geography, as schools reported already having a good deal of resources in literacy and numeracy. Within subject areas, subject co-ordinators sometimes identified topic areas that *"haven't been looked at for a while and need a good push"* (teacher and maths and music co-ordinator, primary school).

Some secondary schools also might have focused on a particular subject area because the school was seeking, or had gained, specialist status in that area. For example, in a school where the head had made purchasing decisions with eLCs, a large proportion of funding had been dedicated to maths. The school had won specialist status in maths for the forthcoming year and was also building a relationship with the local City Learning Centre in sharing resources in maths.

¹¹ QCA is the Qualifications and Curriculum Authority, a non-departmental public body sponsored by the DfES. The QCA maintains and develops the National Curriculum and associated assessments, tests and examinations; and accredits and monitors qualifications in colleges and at work.

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3.4.2 Hardware or network requirements

Both primary and secondary schools talked about how hardware or network requirements constrained what digital content resources they could buy. Secondary schools were more likely to want to purchase digital content resources with a site licence and to install them on the school network. Digital content resources, therefore, needed to meet network criteria. This often meant that a network manager was passed a potential purchasing list to check through. In some cases, particular software and school networks were found to be incompatible. For example, one secondary school ran on a particular branded network which gave some issues with particular kinds of software:

"And it does work very well... locks out all the things that can let the little darlings change settings and install their own programs, et cetera... but it does create problems with certain pieces of software. And typically one of our biggest areas of problems is our special needs software... If it's running off a CD it loves to be able to write data to the C-drive and likes to update things, et cetera, et cetera. And on an [name of] network all that is locked out... And the biggest area of conflict is special needs software. That's the way it tends to be written. Most other pieces of software you can work around. You can build an installation package for it. But for some reason, special needs seems to give us a few problems. The type of interactivity that they require... they tend to create problems with the [name of] system."

(ICT co-ordinator, secondary school)

Primary schools were sometimes looking to install resources on a network but were just as frequently also looking for resources to be used in classrooms with stand-alone computers. The choice of digital content resources was, therefore, restricted by the computers, which were often of a variable age, running any combination of Windows 95 to XP, and in some cases were a combination of PCs and Macs in the same classroom.

Only a few teachers in primary schools, if any, had interactive whiteboards permanently in their classrooms. Mostly teachers had to book out portable interactive whiteboards or shared them with other classes. It was only a couple of the secondary schools that had interactive whiteboards in all departments and in a

significant number of classrooms. However, most of these schools were in the process of expanding the number of interactive whiteboards they had and so software was often bought with a view to being used with an interactive whiteboard.

3.4.3 Quality and usability

Quality and usability were criteria discussed by year group teachers, subject teachers, subject co-ordinators and department heads much more than they were by ICT co-ordinators. These were discussed from the teacher's point of view and from the pupil's point of view. Some staff mentioned looking for resources that had easy-to-use drop-down menus and easy-to-learn shortcuts. And staff in both secondary and primary schools discussed the importance of digital content resources in the classroom being easily navigable by pupils without needing a high level of teacher input. This was particularly important in primary schools where teachers needed to set children up to work on short computer-based tasks while managing the rest of the class in another activity. In secondary schools it was felt that the use of ICT and digital content resources should promote independence in learning, therefore it was desirable to use resources requiring minimal teacher support. Teachers also spoke about the need for resources to be interactive and multimedia, with visual and audio elements, in order to maintain pupil engagement. These elements of usability and interactivity denoted good quality to teachers using them in the classroom.

"I've got one program and it's [name of software program] again and when I first got it, I couldn't work it out myself, because there was no help or instructions on it. I couldn't... to print it, there was no print button and so it was like control something and it wasn't until about six weeks that someone in reception went: 'Oh that's how you do it!' So that program's not very good. So I think some programs aren't very helpful and I've got another one that's [name of another software program]. And that's impossible and I can't do it and the children just... and I can't explain it to the children, so I don't get these out either. But if they are quite good, you know, quality software and they've got instructions, say teaching instructions and growthways and stuff, that is helpful, definitely."

(Teacher, primary school)

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There were also some primary teachers who had preferred suppliers. Previous good experience of a supplier's product led teachers to trust that all their products would be of high quality and easy to use.

3.4.4 Value for money

ICT co-ordinators and department heads, in particular, were often concerned with value for money. Value for money in this context meant ensuring that purchases would be well used, that a resource would not just be used once a year in one topic area for a particular class, but that it would get use in several year groups or contained enough resources to be used in more than one particular lesson. In schools where teaching staff contributed requests to a central list of purchases, ICT co-ordinators sometimes asked teachers to explain what kind of use they expected to get out of each purchase in order to justify it. ICT co-ordinators spoke about this criterion in relation to software programs that contained differing levels of interactive tasks – for example, so it could be used throughout ability levels within a class or for different year groups – and with regard to resources where the content was wide enough to be used in more than one particular lesson.

"It's if there are subjects that have always actively booked into ICT rooms and you can clearly see the link between the work they're doing and what they need to achieve on their schemes of work and their programmes of study, and how it matches the ICT programmes of study, then that would be looked at more favourably than a one-off piece of software where a teacher might say, well, it might be good to use it once every year. Then, well, sorry, can't justify the money for getting that installed. If it's only going to be once over a year that sounds a bit too specialised. So generally it was always looking for software where we felt it had the widest possible range of uses."

(ICT co-ordinator, secondary school)

However, in one secondary school, which had a large range of existing digital content resources, this criterion was less of a concern.

The costs of site and user licences were also a consideration for staff involved in purchasing decisions. Secondary schools were often committed to installing resources on their networks, requiring them to buy site licences rather than single-user licences. The cost of

purchasing a site licence made the issue of value for money more salient, making it important to ensure that a product would be well used. In primary schools, site licences were bought where schools had installed, or would soon be installing, a network. In these cases, too, it was important to ensure that resources purchased could be used in a range of areas or at a range of ability levels. Some primary schools bought resources with single-user licences for particular computers within particular classrooms (for example, a Year 2 teacher had resources installed on the two computers in her classroom that were not installed elsewhere). Where this was the case, the cost of single-user licences was compared to other similar resources to ensure the purchase was value for money.

3.5 Types of purchase bought with eLCs

Schools used their eLCs to buy different types of digital content resources. This study did not attempt to take a complete inventory of products purchased with the 2003-04 eLC funding, but did ask respondents about what they were aware the school had bought. ICT co-ordinators, as would be expected, were generally the most knowledgeable in this area. However, where a headteacher took responsibility for purchasing, the ICT co-ordinator was sometimes less clear about what had been bought.

3.5.1 CD-ROMs and DVDs with single-user or site licences

These were bought by both primary and secondary schools. They were frequently bought by those primary schools that ran computers in classrooms as stand-alones rather than as networked computers. Secondary schools were more likely to buy this type of product with a site licence (rather than single-user licences) and to install it on the network. In both primary and secondary schools, this type of purchase was associated with a more devolved purchasing structure, for example, where the school bought in digital content resources requested by individual year group teachers, subject co-ordinators or department heads. In some cases, schools used their eLCs to purchase updated versions of products already used in the school. There were also primary schools who bought an electronic library or suite of resources, then spent the remainder of the eLC allowance on several CD-ROMs and single-user licences. In one primary school, there had been a number of CD-ROM and DVDs bought over a period of time but these were not necessarily being used, including purchases made with eLCs.

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"I know I put in for [name of package] and I thought about it and I never used it. I never find these things... [laughter] I know it's in school somewhere... Oh, there is probably a lot of stuff, frankly, that we haven't used... When I have something, I tend to stick to it for quite a while, because the children get familiar with it and the different things on it. But it depends on what we're doing..."

(Teacher and subject co-ordinator in maths and music, primary school)

3.5.2 Website subscriptions

Schools that had bought CD-ROMs and DVDs also often bought "a few" website subscriptions. In secondary schools, language teachers, in particular, mentioned using subscription websites as did primary school teachers in teaching geography, science, and some literacy and numeracy. One primary school had a policy of not subscribing to websites due to the poor quality of its internet connection and because many of the stand-alone PCs were not connected to the network. Primary school teachers also often described feeling nervous about using the internet in class, even to go to a particular site, in case children came across something inappropriate despite knowing that filters and protective measures had been installed on the school system.

"I get a hot sweat on when I start doing web-based things, 'cos I get so worried that something's going to flash up that shouldn't. So I tend to use... even though I know [name of particular] website. I don't put them on a lot on to the internet, because I get so worried that they'll find something that they shouldn't do. I direct them towards that. They don't really look for themselves. We did do some research on seashores. I let them research that themselves. But I had my [classroom assistant] sitting right behind them, checking what was coming up..."

(NQT, primary school)

3.5.3 Electronic libraries of resources (installed on network server)

Schools also described obtaining libraries of cross-curricular resources that were stored on a cache server as part of the school network. This allowed resources to be accessed immediately without the download delays associated with the internet.

This type of purchase was associated with more centralised purchasing structures. Several respondents in primary schools felt that this type of purchase was value for money as it also tended to come with installation and training from the software supplier, provided resources for a wide range of subject areas, and was cheaper than buying and renewing site licences for a range of different programs over time.

"I know some schools went down the road of allocating a certain amount of money to each subject manager... [I] didn't really want to do that. Because I felt that would give everyone, alright, some money to spend, but perhaps not enough to buy programs and then site licences. So we went down the route of [name of an electronic suite of resources], which is an expensive resource, but a lot of the expense is a one-off, kind of buying the technology to start off with. Then there's an ongoing cost involved in the maintenance of that, which is less. But it's cross-curricular, so it actually, in terms of value for money, was better than just giving curriculum leaders a particular pot of money."

(ICT co-ordinator, primary school)

In secondary schools, the details of this type of purchase were less clear in some cases. This was primarily because researchers interviewed ICT co-ordinators (at the recommendation of headteachers). However, these purchases were made in those schools with highly centralised purchasing structures and, in these schools, ICT co-ordinators were not always involved in spending eLCs. However, there was mention in interviews of a cross-curricular suite of digital content resources in one secondary school and of a suite of digital maths resources in another. In the latter school, it seemed that a decision had been taken to spend eLCs predominantly on maths this year including the purchase of a library of maths resources housed on the school server. This was to help in creating an ICT-based maths GCSE suitable for adult learners as well as young people as part of the City Learning Centre partnership and in order to gain specialist status in maths.

3.6 Impact of eLCs on other funding

Having eLCs has freed up funding in other areas that was previously spent on digital content resources. Primarily this has impacted on ICT in Schools funding and subject or departmental budgets.

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ICT in Schools funding has previously been used in schools on both hardware and software. With the arrival of eLCs this funding was mentioned in some schools as being freed entirely for spending on hardware.

As well as ICT in Schools funding, spending on digital content resources had previously come from departmental or subject budgets. These budgets were often small, in the region of hundreds of pounds at most. Here, in the past, staff had needed to weigh up the value of, for example, a set of new text books compared to the cost of a digital resource. Having eLCs removed the caution some department heads or subject co-ordinators had previously felt in using departmental budgets for digital content resources.

Archived

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4 Curriculum Online website and other information sources for choosing digital content resources

The Curriculum Online programme also included the establishment of the Curriculum Online website which aims to provide a single source of information for all eLC-accredited products. This chapter looks at awareness, use and views of the Curriculum Online website. It also looks at other sources of information that teachers use to identify and assess digital materials and explores why teachers prefer some sources, or types of sources, above others.

4.1 Awareness of the Curriculum Online website

ICT co-ordinators were generally aware of the existence of the Curriculum Online website. They recalled, with varying detail, being informed about the website through either letters or emails from the DfES, via their LEA, or at regional ICT co-ordinator cluster meetings. ICT co-ordinators were generally aware that the Curriculum Online website provided information on digital content resources to support teaching across the curriculum. A number of those ICT co-ordinators who used the website more often were aware that it provided information about all of the eLC-accredited resources. They also occasionally mentioned that it contained free as well as purchasable resources, and that it provided teacher-written evaluations of different products.

Teachers more generally were less aware of the Curriculum Online website. Subject co-ordinators, in primary schools, and department heads, in secondary schools, were more likely to be aware of the website than other (class and subject) teachers. In schools where class or subject teachers were aware of the site, they had usually heard about it through the ICT co-ordinator and ICT co-ordinators also reported having communicated information about the website to staff in staff meetings, or by notices in their pigeon holes. Class and subject teachers who were aware of the website, however, were rarely aware that there was a link between the website and eLCs.

There was also a sense from some teachers that they felt they should be aware of the Curriculum Online website

and some teachers seemed reluctant to say that they were not aware of it or that they had not visited it.

"I have to say, I mean I feel a bit guilty saying this, I don't know what else Curriculum Online is about. I don't know if it has teaching materials for example, I probably should know..."

(Teacher and SEN co-ordinator, primary school)

There were also, sometimes, clear misperceptions of the website. For example, some teachers seemed to think Curriculum Online was a supplier website or, itself, an online subscription service – a primary school subject co-ordinator said they had used the site during the last academic year, but explained that they had spent their eLCs on other things and did not think the school could afford access to the Curriculum Online site this year. Other teachers reported having used the website but were then unable to recall anything about it. The second school survey in autumn 2003, which sampled subject co-ordinators in primary schools and department heads in secondary schools, found that 74% and 77% respectively were aware of Curriculum Online. The qualitative interviews suggest that levels of awareness were much lower among class or subject teachers and that awareness of Curriculum Online did not necessarily entail familiarity with the website.

4.2 Use of Curriculum Online website

ICT co-ordinators and ICT heads were split between those who had used the website recently, those who had only looked at it briefly when they first heard about it, and those who had no recollection of using it at all. Staff who had used the website had done so for differing reasons. ICT co-ordinators visited the website most and had used it to check information about the digital content resources on the request lists submitted by subject co-ordinators, to look at teacher-written evaluations of products or, more generally, to look for software across the curriculum. Occasionally, other staff had used the website. For example, a department head in history in a secondary school had used the website to find appropriate software in order to make a request for funding.

Other staff had used the website when they first heard about it, but before the website had undergone later developments. Others thought they had been taken to the Curriculum Online website through links in other websites, but had not had the time to browse it thoroughly at those points.

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Some respondents did not think that there was a need for them to visit the website, especially where they were not involved in the selection of digital content resources. In other schools, especially in primary schools, ICT co-ordinators had sought suggestions for spending eLCs by passing around catalogues to staff and asking them to use them to make choices in purchasing digital content resources. However, awareness of the free resources such as lesson plans was low among these staff and assumptions about lack of reason to visit the website meant that they were not accessing these resources.

4.3 Views of the Curriculum Online website

People's views of the usability of the website were difficult to pin to particular time periods, except in the case of more frequent users. This makes it hard to ascertain whether their views related to the website in its current form or to an earlier version.

Earlier users or those who had used the website "months ago" had generally found it difficult to use. They had wanted evaluations of the materials which, at that time, had not been there and they had not been able to refine their searches as much as they would have liked. However, these respondents had difficulty in recalling details about how the website worked and, consequently, their views were sometimes quite vague.

One ICT co-ordinator said that he had not communicated information about the website to staff, as he felt they would struggle to use it, and that using catalogues was quicker and easier.

More frequent users noted that the site had improved over the last academic year, and in particular that the search function had improved. This was especially useful for users who wanted to look at products matching specific criteria (such as year group, subject or topic area).

Some respondents felt that the search functions could be further improved. In particular, it was felt that the volume of returns to a search request was burdensome and that searches were too word-sensitive. One ICT co-ordinator, who looked up things her staff asked for, said she sometimes had trouble finding resources she knew to be on the site. This may be an issue of practice and familiarisation with types of search function, such as the ability to use partial words. Other respondents were able to search the website easily, experiencing only minor and infrequent difficulties. Respondents who were familiar

with the website (and were involved in purchasing) thought it was valuable to have all eLC-accredited resources in one place.

"There are better sites for history, one that has a brilliant teachers' forum... lots of good lesson plans, lots of articles... so I thought that was much better than Curriculum Online for general browsing... but it [Curriculum Online website] was useful for looking, finding all these things I could use for e Learning Credits because it had everything in one place, which is much better than going to a supplier's website, finding what they do, then, do they do e Learning Credits? The descriptions on Curriculum Online were a bit long-winded, and it was hard to do something like a shopping list, but these are minor criticisms."

(Head of history, secondary school)

Where respondents said they did not use the Curriculum Online website to search for digital content resources, interviewers asked what features they would want in order to become users of the site. For some staff a paper-based resource, such as a catalogue, was preferable (see section 4.5). Those who were open to the idea of using a website said that it would need to have a full search function allowing them to search by topic, subject and year group, and that there should be evaluations of specific products by teachers. Given that the Curriculum Online website includes the features respondents saw as desirable, this suggests that use may be limited by lack of awareness of the site and its current design.

4.4 Other sources of information for choosing digital content resources

ICT co-ordinators and other staff members alike had sources other than Curriculum Online which they used to select digital content resources. These included:

- supplier catalogues and marketing materials
- personal recommendations
- other internet sites.

4.4.1 Supplier catalogues and marketing materials

The second schools survey found that suppliers' catalogues were the most commonly-used means of selecting digital content resources, with 91% of ICT co-ordinators in primary schools and 93% in secondary

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schools using them. There were reports in the qualitative interviews of an increase in the level of promotional materials sent to schools since the advent of Curriculum Online. These included supplier catalogues and flyers for specific products as well as advertising emails. This type of mail was often opened by the school administrative staff and placed in the pigeon holes of appropriate subject co-ordinators or department heads. Department heads and ICT co-ordinators felt that this promotional material arrived in a “*steady stream*” and some staff felt “*bombarded*” by it.

For many teachers and ICT co-ordinators, however, both in primary and secondary schools, catalogues were often seen as a convenient way of choosing digital content resources. In some schools catalogues were passed around at a particular time in the year when the ICT co-ordinator asked staff to contribute their choices to a purchasing list. Teachers, particularly in primary schools, sometimes also passed a flyer to their ICT co-ordinator, asking if it could be bought as it looked useful. The high level of paper-based information being circulated could discourage teachers and ICT co-ordinators from looking at materials beyond catalogues.

4.4.2 Personal recommendations

Recommendations from teachers, or other colleagues were an important source of information about digital materials for teachers. Recommendations came from many sources:

- LEA cluster groups (predominantly primary schools)
- LEA ICT advisers (primary schools)
- training courses – subject related and ICT skills
- other teachers, friends or people known to staff professionally
- QCA (predominantly primary schools)
- the BETT exhibition¹² (secondary schools)
- professional publications – either ICT-related magazines or subject and teaching magazines
- consultants and advisers (secondary schools).

In some cases recommendations were sought proactively in order to gain advice around a digital

resource need. For example, ICT co-ordinators in primary schools approached LEA ICT advisers and, to a lesser extent, LEA cluster groups for advice. In secondary schools, visits to the BETT exhibition were made in order to find resources that would meet identified needs. More usually, though, recommendations were taken opportunistically. This way of identifying potentially useful digital content resources was often preferred to any other.

Example 2: Case study – Choosing digital content resources with the assistance of the LEA

This primary school was a relatively small school in a deprived urban area. The school’s performance measures were good and the school scored particularly well on the improvement measure. Although hardware provision was outdated the school’s relationship with the LEA around ICT was close. The school was waiting for the installation of a network and broadband internet connection but worried that the school buildings themselves were old and would present problems in installation. Also, there was no space within the school to set up an ICT suite. The school was hoping to relocate to newer buildings in time.

In spending eLCs the school had a centralised purchasing structure with the ICT co-ordinator assuming primary responsibility for decisions. However, these decisions were made in close liaison with the local LEA. The LEA provides the school with information and advice about recommended programs or suppliers. At the beginning of the academic year the LEA had invited 15 different providers that they had screened to come and present to the ICT co-ordinator’s cluster meetings. It was as a result of this presentation that the ICT co-ordinator had decided to purchase a suite of electronic resources with eLCs. The relationship with the LEA ICT adviser assigned to the school was also close. The ICT co-ordinator described this adviser as excellent and relied on him to support her in her role within the school and in evaluating digital content resources.

¹² BETT is an annual exhibition showcasing developments in educational ICT hardware and software, and its uses in teaching, learning and school management.

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4.4.3 Other internet sites

The internet was often used where other sources of information had failed to identify an appropriate digital resource.

"I'd probably look in a magazine or catalogue, [laughter] and then if I couldn't find anything, it would be the internet... I don't suppose I'm that comfortable with it. I ordered something actually from a website the other day and I had to get the catalogue out to look at it. It was all on screen! I couldn't do it. I had to get the catalogue and do it from there! Strange, I know... I don't know if I trust what's written on paper more than on the internet, or if it's just that... I can focus better on it, I think, on paper... I don't know..."

(Teacher and science co-ordinator, primary school)

In some cases, though, the internet was the 'first port of call'. Teachers who used the internet as a first port of call discussed the following sites:

- DfES main website
- TeacherNet
- NGfL
- BBC
- Channel 4
- small sites created by other teachers or schools in other parts of the country and abroad.

Teachers using the internet as a later source of information where others had failed discussed using general searches such as Google and Yahoo.

Using the internet to locate digital content resources was used more proactively than with many of the other sources of information discussed in this chapter, with staff actively looking for a resource to meet their specific needs. However, teachers and ICT co-ordinators might also choose digital materials reactively if, while searching the internet, they came across a resource which did not meet the specific needs for which they had logged on but which they thought looked useful.

4.5 Explaining preferences for particular sources of information

Staff gave reasons for preferring sources of information about digital content resources. These were that the

source included trustworthy evaluations, was easier to access, was administratively easier, or simply that it was more familiar.

4.5.1 Evaluation

Teachers discussed how searching for digital content resources, researching the alternatives and evaluating their potential all took a good deal of time. For teachers, searching for digital content resources was considered to be a lower priority than lesson planning, marking, fulfilling pastoral duties or performing other head of department or subject co-ordinator roles in non-contact time. For this reason the time available to teachers for the selection of digital content resources was often limited. Many ICT co-ordinators, especially those in primary schools, also struggled to find time to evaluate digital content resources, reflecting the fact that their role was usually one of many non-teaching roles with no dedicated time given to the role and limited strategic and technical support. ICT co-ordinators who had dedicated time for their ICT role were somewhat less likely to discuss the pressures of finding time to search for and evaluate different digital content resources. As well as having dedicated time available, they were often supported by network managers and IT technicians. These staff sometimes took lists of requests and researched these products further, looking at network compatibility but also sometimes researching alternative products that fulfil a similar function.

Example 3: Case study – Secondary school evaluation and purchase of digital content resources

In one of the secondary schools the ICT co-ordinator passed subject-specific information on software to departments on a monthly basis. This information might be an article from a newspaper or software magazine, or could be marketing materials sent to the ICT co-ordinator. Before sending them to each department the ICT co-ordinator would consider which were most appropriate or relevant to each department, as well as how easy different resources would be to embed in teaching practice. He also arranged for six staff to attend the annual BETT exhibition in London to learn about digital content resources available.

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Teachers and, in particular, subject heads were then expected to approach the ICT co-ordinator when they came across a digital resource they felt would be useful in their department. The ICT co-ordinator would then discuss this request with them, checking how often they thought they would use it, how easy it would be to get to grips with and embed in teaching practice, and how it could enhance teaching a specific area. When satisfied with a request he and the school network manager would ensure that any digital resource is compatible with the school network. The network manager would then check if a resource was eLC-accredited. The ICT co-ordinator estimated that about 10% of requests were for non-eLC-accredited materials. In these cases the ICT co-ordinator or network manager would seek similar eLC-approved resources or try to locate alternative funding. Although eLC funding was not explicitly divided between school departments, the ICT co-ordinator also monitored the spending across departments.

Personal recommendations, in particular, eased difficulties of finding time to evaluate potential purchases since someone else known to the respondent had found the resource useful. In other cases both primary and secondary teachers would obtain digital content resources (usually via catalogues) that offered a trial period of around 28 days. Teachers would usually then find non-teaching time, often outside their usual working hours, to experiment with a resource in order to evaluate it.

4.5.2 Ease of access

Given that time was a significant barrier to finding and evaluating digital products, ease of access to sources of information on digital products was particularly important. Catalogues were seen as particularly convenient in this regard. They were often sent to schools and could be easily distributed to appropriate members of staff through pigeon holes. Hence, they often arrived without teachers needing to seek them out for themselves. Paper-based sources of information were also easily carried around, for example between classes and staff rooms, and could be browsed whenever a member of staff found a convenient time. In addition, internet access in schools is heavily filtered with protective measures installed to allow pupils safe access. This can mean that

sometimes innocuous websites or word searches can be blocked in schools. Consequently, those staff who did use the internet as a preferred source of information often searched for digital content resources from home.

4.5.3 Administrative ease

The ability to transfer information about digital content resources between staff members was also an important factor, especially in those purchasing structures where requests for software were passed through various people, typically from subject co-ordinators or department heads to the ICT co-ordinator or head and sometimes to a third person (such as a bursar or technical support staff). ICT co-ordinators or, in secondary schools, IT support staff would sometimes need to check the compatibility of choices with the hardware or networks. This meant they needed information on chosen products to perform checks. Passing a catalogue with the relevant pages marked was an easy and convenient way to transfer this information.

4.5.4 Custom or habit

Some teachers said that they preferred paper-based sources because this was their habitual way of seeking and absorbing information. Some staff struggled to explain their preference for paper-based sources, giving reasons such as *"I just do, I don't know why... I just prefer it on paper"* (ICT co-ordinator, primary school). Other staff preferred to use catalogues from suppliers they had used before. It seemed for these staff that custom or habit was a strong guiding factor in how they preferred to obtain information on digital content resources.

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5 Use of ICT across the curriculum

Curriculum Online aims to support schools in expanding the use of ICT and digital content resources in teaching across the whole school curriculum. This chapter looks at:

- how far the schools in this study are achieving cross-curricular use of ICT
- the factors that are inhibiting or facilitating progress
- the contribution that Curriculum Online is making
- the impact on teacher workload
- the impact on pupil motivation, engagement and attainment.

5.1 Cross-curricular use of ICT

Primary schools

In primary schools, teaching using digital content resources was generally firmly established for numeracy and literacy. However, the degree to which ICT was used in teaching in other parts of the curriculum varied from teacher to teacher depending on levels of skill and confidence with ICT. Differences between schools, and between subject areas within schools, were less pronounced than they were in secondary schools. The fact that there was more variation among secondary schools in how far ICT was used in teaching across the whole curriculum seemed to reflect the fact that ICT development in primary schools was at an earlier and more uniform stage. Similarly, the fact that there was less variation between subject areas within primary schools reflects the fact that there is less subject-based development than there is in secondary schools and that, while primary schools may have subject co-ordinators, individual class teachers plan and deliver lessons for their class across the whole curriculum.

Secondary schools

Secondary schools varied considerably in how far ICT was used to support teaching across the curriculum. Some schools were significantly ahead in using ICT to support teaching across the whole range of subject areas. In other schools ICT was used primarily in the context of delivering discrete ICT or other computer-

dependent lessons. In one or two cases, schools that were using ICT primarily in ICT lessons talked about plans to extend ICT use to a wider range of subject areas.

Within secondary schools, respondents reported differences in the use of digital materials between subject departments. This reflected the fact that the development of digital content resources in teaching was most often led at departmental level. However, across the whole sample, there appeared to be no systematic differences between different subject areas. And within departments there were teachers who used, and helped to develop, departmental resources and approaches depending either more or less on their enthusiasm and their skill and confidence with ICT.

Example 4: Profiles of five schools and their use of ICT across the curriculum

A) Secondary school

Use of ICT in teaching varies across departments. High level of ICT use in maths including an electronic library of resources, spreadsheets, a graph drawing package, a geometry package, games and activities, etc.

Use of ICT in languages is more limited, with occasional use of CD-ROMs and online resource bank. ICT not considered important in teaching languages.

B) Secondary school

Some differences between departments, although high overall use. High level of computers, interactive whiteboards and other hardware. Many departments have computer rooms and range of specialist software. Beginning to think through best practice issues in using ICT in specific topic areas.

C) Secondary school

ICT use is concentrated on teaching ICT. Limited use across rest of curriculum although isolated examples of teachers using ICT – for example, one geography teacher uses interactive whiteboard with CD-ROMs and DVDs as well as a digital video recorder. The other geography teacher in the department, however, is not confident in using ICT and prefers to teach using textbooks.

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D) Primary school

Class teachers vary in how far they use ICT in teaching. School has three computers in each classroom and no computer suite. Children have to work with limited adult support while teachers manage the rest of the class in other activities. Most ICT use is in literacy and numeracy.

E) Primary school

Using ICT in numeracy and literacy although respondents believed that they were not using it as imaginatively as they could do. Increased use of ICT in lessons since having whiteboard. Bought a library of cross-curricular resources stored on network server with eLCs.

5.2 Factors inhibiting or facilitating progress

There appeared to be a number of factors that acted as barriers to, or facilitators of, using ICT and digital content resources across the curriculum. These were:

- type and location of hardware
- reliability of hardware and technical support
- skills and confidence of individual teachers
- the need to embed the use of ICT and digital content resources in teaching
- the strategic leadership for ICT development.

All of these factors could act as either barriers (or, if schools were well placed with regard to these factors, facilitators) to using ICT across the curriculum. However, these factors were all inter-dependent and schools needed all these elements to come together for the use of digital content resources in the classroom to become well established and effective.

In some schools, therefore, progress was slowed since one or several of these factors were underdeveloped. In primary schools this was often about poorly developed (or developing) hardware and connectivity, poor technical support, and lack of skills and confidence among teachers. In secondary schools there were sometimes issues around hardware and technical support, although this was not as marked as in primary schools. The ICT skills and confidence of teachers were also factors, although secondary schools had more teachers who

were highly skilled and experienced in using ICT. The degree of strategic development and management of ICT varied more across secondary schools than in primary schools. In schools where it was weak, it inhibited the development of ICT use across the curriculum. In the following sections, the various inhibiting (or facilitating) factors are discussed in greater detail.

5.2.1 Type and location of hardware

The type and location of hardware was the most often cited barrier to the wider use of digital content resources in teaching. The issues were slightly different in primary and secondary schools.

Primary schools

Primary schools tended to have computers based in classrooms or, in some cases, in small suites containing fewer than 15 computers. Several teachers described how having a small number of computers based in the classroom meant that they had to rotate the children on the computers while managing the rest of the class in another activity. Dividing themselves between supporting children on the computers and the rest of the class was demanding on teachers and they often struggled to get all the children through, even relatively short, computer-based tasks.

"We've got to the end of the week and you've still got like five children that haven't actually done it. Like on Monday... quick... get them all on!"

(NQT, primary school)

This was especially difficult if the task set was a slightly longer one or if children needed a lot of explanation and support to get on with the tasks. Because of how computers were located within primary schools and the lack of connection to school networks, the digital content resources purchased were usually single use rather than having either multiple licences or a site licence.

"I try and have people on [numeracy package] or [literacy package] every day. But they are single use only, when you buy them, even though they cost goodness knows how much. So they're on the one computer in my class and you can only have... I put them both on the same computer, because I put them on the new computer. It's no use putting them on the old one. The old one takes 10 minutes just to get up and ready."

(Teacher, primary school)

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These pressures meant that teachers sometimes only felt able to use digital content resources for the priority areas of numeracy and literacy rather than using ICT-based teaching resources more broadly across the whole range of subject areas. However, a number of the primary schools either had, or were in the process of, establishing (albeit small) computer suites. Alongside this, primary schools were often in the process of installing or developing their networks and several had used their eLCs to purchase site licences for whole-school, cross-curricular digital content resources.

Having a computer suite, however, was not a panacea. Teachers working in those primary schools that already had computer suites reported finding it difficult to arrange their ICT-based activities to fit around the times that they were allocated or able to book the room. It meant that lessons were often unnaturally structured, with ICT-based activities crowded into a single lesson. Teachers felt that often lessons were decontextualised and fragmented with trips down to the computer room for an ICT-based activity and then back to the classroom to complete the lesson with non ICT-based activities.

"You've got to wait for your ICT time or find if the ICT room is free and dash the whole class in there to show them a picture of something, and dash them all back out to carry on your lessons."

(Teacher, primary school)

"What is really good is the fact that because the computers are in the classroom, you can use them during numeracy and literacy hours. You can use them throughout the day, whereas if you only walked out in 20 minutes per week, down to the ICT room, children don't really see it in the context of other things. They only see it as 'we walk down, we do our work and then we walk back'."

(Teacher, primary school)

Also, where teachers wanted to take half the class to the computer suite at a time, so that the children would not need to share a computer, they were dependent on a classroom or teaching assistant to oversee the remainder of the class. This meant that if assistants were absent or off sick, lesson plans would need to be altered at short notice.

Teachers particularly valued interactive whiteboards and data projectors. These allowed teachers to use digital content resources with the whole class. They could also

demonstrate and explain a computer-based task to the whole class before asking them to carry out tasks in computer suites or on classroom-based computers. Otherwise they either had to gather children around a single computer or teachers had to give children individual explanation.

Interactive whiteboards and projectors that were permanently set up in a classroom were considered the most useful. Where they were shared between classes, there were the additional barriers of having to book them out, sometimes weeks in advance, or the time and problems involved in setting them up, which teachers in primary schools usually had to do themselves. Having these set up permanently in classrooms made it more likely that teachers would use digital content resources across a wider range of subjects and allow them to better integrate ICT-based activities with other learning activities.

Example 5: Case study – Use of interactive whiteboard based permanently in the classroom

One teacher explained how she was able to use ICT more frequently to support teaching across the whole curriculum now that she had an interactive whiteboard based permanently in her classroom. This meant that she could use digital content resources more naturally alongside other teaching methods to consolidate learning. For example, she described how, in the context of a biology lesson, they could put an insect under the microscope and look at it live on screen. This allowed children to share and discuss their ideas whereas otherwise they would have had to look at the insect under the microscope individually.

Secondary schools

Secondary schools had more, and larger, computer suites and computers in the school were generally well networked. In secondary schools the most usual access problems for subject teachers, therefore, related to booking out computer suites. In many cases computer suites were dominated by subjects requiring a high ICT input such as ICT courses and BTEC and other vocational courses in subjects such as art, media and business studies. The amount of time available for other subjects to use computer suites varied. In one school, the history department aimed to get students into a

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computer suite three times a year but was not meeting this target because the suite was generally overbooked. In another school, a humanities teacher was able to work with a class in a computer suite about twice a month. In yet another school, a language teacher worked with pupils in a computer suite every two weeks and a language teacher in another school worked with pupils in a computer suite every three weeks. A number of respondents wanted to have additional computer rooms that were not time-tabled for ICT-dependent classes and were instead available to be booked by the full range of different subject teachers.

"Personally I have been saying for quite a number of years that we should have a computer room that is never actually timetabled for lessons, so that everybody would be able to book in at some time during the year, but that's money, and the answer has always been we can't afford to have that."

(Teacher, secondary school)

Even in one of the better equipped secondary schools, teachers experienced problems accessing hardware as readily as they wanted.

"But my classroom over there doesn't have computers, so I'd have to book a room full of computers. That's usually quite easy to do, though they do tend to be booked solid. So if I know three weeks in advance that I want a room I can usually get what I want, but if I'm less organised and suddenly think the day before, oh, I really need to use the computer room, they've usually been booked by then. So whilst the facilities here are excellent, we always need more."

(Teacher, secondary school)

Again, hardware that allowed teachers to integrate ICT-based activities with other classroom-based learning activities were greatly valued. For example, a science department in one of the schools had a trolley with about 20 laptops on it that could be wheeled into any room as needed. We did not have the opportunity to talk with any teacher using this system but the respondent, a teacher from another department in the school, thought this was a good way of organising computer access. In another school, hardware was organised departmentally with subjects such as art and music having their own computer suites with specialist hardware and software.

As with primary school teachers, secondary school teachers spoke highly of interactive whiteboards and projectors.

"I was thinking of applying for a job recently somewhere else but... they didn't have an [interactive] whiteboard and I was thinking 'I can't work anywhere without one now'."

(Geography teacher, secondary school)

Secondary schools tended to have more interactive whiteboards and projectors than primary schools but, in many cases, secondary school teachers did not have them in their classrooms and were reliant on portable interactive whiteboards and projectors. As in primary schools, teachers preferred to have interactive whiteboards and projectors located permanently in classrooms so as to facilitate more frequent and integrated use and because of difficulties of booking them out and setting them up.

"Yes, connect it up to the projector... it's a moveable whiteboard. So it can take anything up to 20 minutes to set it up. If you want to do it for each lesson, you can't."

(Teacher, secondary school)

Secondary schools tended to have more established computer networks than primary schools and teachers often utilised technicians to put software and digital materials on the school network so that pupils could access these, not only in the classroom, but in open access areas or libraries available for pupils to do homework and research.

5.2.2 Reliability of hardware and technical support

Primary schools tended to be at a less developed stage in the process of establishing and expanding their ICT provision compared to secondary schools. Primary schools were less likely to have networked computers than secondary schools and they tended to have more old computers and computers of differing specifications. Technical support in primary schools was more often outsourced and teachers reported that this was frequently slow and difficult to access. Secondary schools, in contrast, frequently had on-site technicians to manage networks and to provide technical support to teachers. Where hardware was unreliable and technical support limited, this also had an impact on how willing teachers were to use ICT and digital content resources in the classroom.

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"I think the teachers would be... more willing, but like with this [interactive white] board, you see, when we got these new [interactive white] boards, I was like: that's it, get it out, used it once, fine – no problem. Used it twice, no problem. [I] taught the person next door how to do it; she used it a couple of times and I go to use it again and it doesn't work! There's a dodgy connection! So then you just think oooh!! And you haven't got time to fiddle around, you know... We haven't got time, you know... And there's no one here other than me who's supposed to be able to fix anything."

(ICT co-ordinator, primary school)

A number of teachers in both primary and secondary schools also talked about needing to have back-up lesson plans in case hardware failed, although more experienced teachers felt that they could teach the class without ICT and without written lesson plans if the need arose. Some teachers felt, consequently, that it was best that they were not over-reliant on ICT and digital content resources in their teaching, or that if they invested too much time in developing lessons using ICT, it could be wasted.

"I do like ICT and the children love it and the staff are fine with it, generally, when they have had the right training and everything works. It's just depressing doing your planning, having a brilliant plan and you can't do it. Because it's not your fault, that's the problem. It's not all [name of LEA] fault that so and so breaks down, but there's nobody here that can fix it there and then and that is our problem."

(ICT co-ordinator, primary school)

Some teachers also spoke of the time and difficulty of setting up portable hardware resources such as interactive whiteboards, laptops and projectors or, in the case of one teacher who was very uncomfortable using ICT, even a DVD player without technical support. In these cases, teachers, especially those who were less confident with ICT, tended to use ICT equipment less.

5.2.3 Skills and confidence of individual teachers

The skills and confidence of individual teachers made a difference to how far digital materials were used in teaching. In primary schools, there was not the same degree of departmental or subject-based development of

digital content resources as there was in secondary schools. Also, the development of ICT provision was at a relatively early stage when compared to secondary schools. In this context, the varying skills of teachers made a significant difference to how far they chose to use ICT in their classes, although the use of numeracy and literacy packages was generally well established.

In secondary schools, the levels of skill and confidence teachers had in using ICT also varied although, unlike in primary schools, some secondary school teachers had very high levels of skill and confidence. These teachers tended to drive forward the development of ICT and digital teaching materials in their departments. And because of the departmental lead taken in developing subject-based digital content resources, less skilled colleagues were often brought along, at least to some degree, on the tide of departmental developments.

Teachers who were less confident with ICT were sometimes put off using it more because of the fear of looking inept in front of the pupils. One teacher described having been shown how to use a new software package but when she was in the classroom she could not remember how to do it and had to be helped by the pupils which she found humiliating and difficult. Other teachers who were not confident with ICT said that they could not manage using unfamiliar ICT and managing a class at the same time, emphasising how less confident teachers felt they needed to gain confidence in using new hardware or software packages before using them in the classroom.

"You have like a few at the front that are interested and then the rest are not. But with the [interactive] whiteboard, I haven't had an awful lot of success delivering lessons with it. I think I've not practised enough... You just can't get the whole class... well, I can't get the whole class really that interested. Certainly not for a long time, no more than about five minutes."

(Science teacher, secondary school)

On the other hand, teachers who had developed confidence in using ICT in the classroom found that it made classroom management easier.

"It's much easier to teach a lesson when you've got good resources. Much easier to manage the class, to keep them interested."

(Languages teacher, secondary school)

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Providing classroom cover was a significant obstacle to teachers having formal training. Consequently, training was sometimes voluntary and carried out in teachers' own time which may have limited the degree to which teachers attended. And where teachers had received training, they often reported finding it either too basic or too advanced for their needs.

"...CDs that you had to work through and I think it wasn't really friendly to those people who had no ICT skills, you know. I mean, some of them wouldn't have been able to log on or even know how to log on or what to do with CDs. And there wasn't that basic sort of hands-on stuff. You know, you were pretty much given a CD... 'go home and do it or do it in your free lesson'. I mean, for me it was fine, you know, I could take the work away with me. But for a large number of teachers, they find it quite difficult initially."

(Teacher, secondary school)

There were, however, examples of teachers receiving training that they found valuable, especially in those schools that were further ahead in the development of ICT use across the curriculum. Also, a number of teachers interviewed saw some advantage in having the same basic training as colleagues as this gave them the same basic skills base and vocabulary. However, this was no guarantee that this would result in teachers having similar levels of skill and confidence. In one school the ICT co-ordinator explained how teachers who had received the same training needed significantly different levels of support from her.

"But some people I don't even have to speak to; they just go and do it. Or I'm helping with important pictures and things like that. Whereas other people are still, 'I've forgotten my log in number or I can't do this and I can't do that'."

(ICT co-ordinator, primary school)

Only rarely was training considered to be sufficient, on its own, to develop skills and confidence in using new ICT. It was clear that developing skills and confidence was largely about having the time and informal support necessary in order to experiment, familiarise oneself and practise with ICT equipment and digital materials.

"I think because [the interactive whiteboard] was put in my room, you know, I thought, well, I have to use it. Because if I don't use it, who will? And I

was quite nervous at first. But as I've got more confident and, you know, you just play around with things really. And the course I went on was absolutely fantastic, and he really showed us loads of examples as to how to use it. And I wrote down, like, word for word, pretty much, how to do it. And it's just practice, you know? At first it took me ages to do something, and now I can do something much quicker."

(Teacher, secondary school)

"I've had some specific training courses although I find they are only a starting point; the only way you really learn a package, and how to use it, is to play with it and see what happens. It's quite part of the fun of it."

(Teacher, secondary school)

Teachers who were less confident with ICT particularly valued having technical support staff or more experienced colleagues on hand to respond to questions or to help them when they were trying out new hardware or software.

There was also evidence that the skills and confidence of classroom and teaching assistants, in particular, made a significant difference to how effectively ICT was used in the classroom in primary schools. Generally, respondents referred to the very low levels of skill and confidence that assistants had. In these instances, it was difficult for teachers to flexibly enlist the support of assistants when some children were engaged on computer-based tasks while the remainder of the class were engaged in some other activity, since only they, the teacher, could support the children using the computer.

One primary school had employed an ICT support assistant who had been able to provide one-to-one support for children using computers while the teacher took the remainder of the class and this had worked very well. However, this staff member was, at the time of interviewing, on extended sick leave. The school also recruited student or parent helpers to provide this support where they could. This arrangement also worked well but was never permanent and these people would move on, leaving the school to try and find someone to replace them.

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5.2.4 The need to embed the use of ICT and digital content resources in teaching

A number of respondents argued that the effective use of ICT across the curriculum depended on these resources becoming 'embedded' in teaching. Teachers needed not just to have basic competence with ICT or specific digital packages, but to develop a more comprehensive understanding of how digital content resources can support learning objectives, generally and in specific subject and topic areas. Schools varied in how far along they were in thinking these issues through and in developing their own practices.

Respondents from schools with the most advanced ICT provision and the most developed strategic leadership for ICT were eloquent about how ICT and digital content resources needed to be used in a thought-out and judicious way. Using a variety of digital content resources alongside other teaching approaches was seen as important. There was a recognition in one school, for example, that the pupils were tiring of "yet another PowerPoint presentation" and respondents spoke of needing to avoid using ICT as a "treat" or "soft option". As one history teacher put it: "We only use ICT in the department where it will help kids to do history better."

Respondents from these schools were much clearer that the effective use of digital content resources required a period of familiarisation and development. This was discussed most usually in the context of teachers finding time to properly evaluate potential purchases to ensure they were the most appropriate materials for their specific aims and objectives, and in having the time to experiment with software in developing teaching materials and lesson plans.

"I am careful now because of this issue of the amount of time it takes to embed something into a scheme of work and for the staff to become familiar with it. They've got to invest the time. And buying the software is a small proportion of the cost. The Government's very keen on the total cost of ownership of equipment, but the total cost of ownership of software hasn't been talked about, because you've got to stop to think about the amount of time that has got to be invested in learning it and there is no funding directed at that."

(ICT co-ordinator, secondary school)

One head of maths described how they had employed an educational consultant to help 'short-cut' this process. He worked with their department over a couple of days to develop ideas around how they could develop their department's digital content resources and then use the software most effectively in teaching.

"He was very, very good. Came into the classroom with equipment and software, recommending it and we have all bought quite a bit of the software that he recommended with e Learning Credits... His remit was... six of us would have data projectors in their classrooms and an IT suite at the end of the corridor... come and tell us a good way of using it. Two of us had already had the kit in our rooms for one year and made lots of progress. The others hadn't been using it and we were all going to be thrown in at the deep end and we wanted to know how we could use it smart rather than laboriously and how we could use it... not creating an extra load of work for ourselves, but how we could use it, you know... teaching effectively."

(Head of maths, secondary school)

Other respondents felt that teachers could benefit from training in the specific skills involved in using ICT effectively in the classroom. Other schools had structures in place for sharing learning and examples of good practice of using ICT in the classroom. And others were either doing this more widely across schools or aware of the need to.

"That's something I noticed about [name of county] as a county, partly because of its size maybe. I was in [name of another county] before, which is kind of... very small... 10 secondary schools. And so there it was very easy to get the schools together and do something together. Here it doesn't happen, but it's certainly needs to... As a specialist school, we're supposed to be sharing."

(ICT co-ordinator, secondary school)

5.2.5 Strategic leadership for the development of ICT

The highest levels of cross-curricular use of digital content resources were evident in those schools with strong strategic management of ICT and a formalised and well-supported ICT co-ordinator role. These schools also had well-developed hardware and dedicated technical support and tended to have above average

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performance figures. The two strongest schools in this respect were schools with specialist status in computing and technology. It was beyond the scope of this study to examine in detail the relationships between these different elements although it seems likely that there was, in many cases, a 'virtuous circle' in operation where developments and capacity in one area impacted, and depended upon, developments in other areas.

Certainly, this study has highlighted a number of factors that appear to have influenced how far, and in what way, ICT and digital content resources have been used across the school curriculum. All of these factors are, to a greater or lesser extent, within the influence of schools themselves. They are also inter-related so that developments and capacity in one area influence, and depend upon, developments in another area. It is important, then, that schools move forward on these different fronts in an integrated way in order to establish widespread and effective cross-curricular use of digital content resources. Consequently, the strategic leadership for the development of ICT at the school level is likely to be important.

There was also some evidence that staff used ICT in teaching more consistently and successfully when the use of ICT and digital content resources was seen as an integral part of school policy and a central part of the expectations upon them. For example, teachers in primary schools reported broad general skills at using digital content resources to support teaching in the priority areas of numeracy and literacy. Primary schools also commonly had targets for how long pupils would spend using ICT and, even though hardware constraints meant that these targets were not always met, the policy encouraged a concerted effort to ensure all pupils spent their allotted time on a PC. Another school had all teachers contribute to the school website as a matter of school policy. In another school there was concern that classroom assistants were not skilled or confident at using ICT, despite receiving training, because using ICT was not viewed as an integral part of their role.

"Some of them aren't very good and some of them are good... we've got people that are like: 'Oh... I've got to turn the computer on!' Like all our classroom assistants... you wouldn't believe that they have been on some of the same training as us, because they're just like... we don't make them feel that it's part of their job at the moment."

(ICT co-ordinator, primary school)

It would be simplistic to suggest that policies in themselves can ensure greater use of ICT in teaching. This study, for example, was not able to determine what additional support was provided to support teachers in these priority areas. However, the findings do suggest the importance of clear strategic leadership for putting into place the policies and support necessary to establish widespread and effective use of ICT in teaching.

5.3 The contribution of Curriculum Online

The schools included in this study were at different stages of development with regard to using ICT in teaching across the curriculum. They were also differently positioned with regard to the factors that influence the use of ICT and digital content resources in teaching across the curriculum. For some schools, with effective strategic leadership for ICT development, a well-supported ICT co-ordinator role, well-developed ICT provision, ICT-confident staff and established practices for using digital content resources in teaching, there were few barriers to spending their entire allocation of eLCs.

"I could spend the e-credits over and over and over... we could always do with more in e-learning."

(ICT co-ordinator, secondary school)

Some schools, however, did experience barriers to spending their eLCs, to a lesser or greater degree. Among those schools with poorer ICT provision, the type, quality and reliability of hardware often constrained choices of software. Primary schools, in particular, felt that some digital content resources could not run on some of their computers because they were too old or because they had computers of varying specifications. And schools without dependable networks, again usually primary schools, felt that some resources were only likely to be useful if they could be networked across the school and did not feel confident that their network would support this. In these schools there was a view that more investment was needed in hardware before eLCs could be spent to their fullest benefit. Frustration was also felt in some schools that eLCs could not be used to buy or upgrade hardware that supports software bought with eLCs. For example, a secondary school ICT co-ordinator discussed having bought a particular software package for the performing arts department. This software can be used with both video cameras and computers and the teacher expressed frustration that she had been unable to update the video cameras, to use with this software, from the same funding pool.

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In other schools, including those with high levels of ICT provision, there were barriers around having adequate time to properly assess potential purchases. These barriers were experienced especially strongly where ICT co-ordinators did not have dedicated time for this role nor support from technical staff. But they were also mentioned in schools that did have ICT co-ordinators with dedicated time and support but where there was a strong emphasis on purchasing digital content resources in a strategic and thoughtful way. There were also related concerns, in these schools, particularly about having enough time following purchase for teachers to experiment and become familiar with resources and to 'embed' these materials in teaching. Teachers and ICT co-ordinators in these schools were often, therefore, cautious about spending their eLCs liberally on a wide range of new software that they may then not be able to use properly, and the 'use it or lose it' aspect of eLC funding raised concerns for some ICT co-ordinators who were struggling to find time to evaluate potential purchases. Some respondents said that they thought this provided an incentive to "spend it without thinking", although no respondent said that this had actually happened in practice.

However, in several schools, having adequate levels of software and digital content resources had been the 'missing piece of the jigsaw'. In these cases, having more money for digital content resources helped address a gap where other factors, such as appropriate and reliable hardware, had been addressed.

"Software – a lot was bought using e Learning Credits. I think that is what really helped, because the initial budgets set aside for ICT were most definitely always concentrated on the hardware. And the amount left over for departments to buy software was always inadequate for the size of the school, and the fact we're almost always committed to getting site licences..."

(Maths teacher, secondary school)

There was also evidence that, in many of the schools, eLCs were being used explicitly to develop the use of ICT and digital content resources within specific subject and topic areas that had been previously under-resourced, thus filling 'gaps' and extending the use of ICT and digital content resources across the curriculum. A number of respondents from secondary schools spoke about how eLCs were allowing them to build up their department's

stock of digital content resources, ensuring more effective coverage of all topic areas. And two primary schools purchased whole-school, cross-curricular digital content resources with their eLC allocation specifically to promote the use of digital content resources in subjects such as history, geography and science.

5.4 The impact on teacher workload

Respondents who were using ICT for administration, for example in recording grades, writing reports or drawing up written lesson plans, were clear that it saved them considerable time. For example, teachers spoke about how they would draw up lesson plans, save them and then update them for use in later years. Some teachers, however, were only just starting to use ICT for administration. Those who had gained some experience were unanimous in thinking that it was more efficient than doing these tasks by hand and felt that the quality of lesson plans, in particular, had improved as a result. Those who were less confident and only just experimenting with ICT for these tasks generally felt hopeful that once they had gained the basic skills, it would become more efficient in the long run.

In some schools, teachers had laptop computers. This tended to assist them in using ICT for administrative tasks and also in preparing lessons but some teachers felt that having the laptop tended to mean that they did more generally, and especially that they spent more time working on lesson content and planning.

Teachers felt that the process of developing ICT-based teaching took more time, at least in the beginning while teachers were developing lesson plans incorporating ICT and digital content resources for the first time or getting familiar with new software or programs.

"You've got to prepare the work, so sometimes it does have an impact there. And it may be an initial time that you need to spend, same as the interactive white boards, I mean the software. I know I'm gonna stay in school after school to get to know how to use it. Otherwise it can stay in your cupboard and not be used, and that's the danger really. I think that's been one of the major issues really with any of the new software, it's devoting the time to find out how it works properly."

(Teacher, primary school)

Teachers who had used digital content resources in teaching were quick to point out that, even if one was

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fairly confident with the basics of the package, there was still plenty to think through in order to integrate the digital content resources into a lesson in a way that included appropriate teacher support and met learning objectives. One ICT co-ordinator from a secondary school explained that some teachers thought that, when using subject-specific software, the program itself would be telling you what to do; they thought they could use the software instead of having to actively teach and, instead, just be there to help out. He felt that using digital content resources in this way was, in the main, likely to be an ineffective way of teaching.

There were also a range of more practical considerations that could take additional time. For example, one teacher said that one even needed to think about the layout of the room, thinking about how you would teach while pupils are sitting at the computer or how you can get all the pupils around a computer to see a demonstration. And teachers who had to book out equipment said that this took additional time in booking it out, setting it up and returning it.

"I would have had to book a laptop from the IT department, book a separate projector from the IT department, get either me to put it together or have somebody come and put it together, then realise it's not working, so call the technician to come down and find out why it's not working. Meanwhile you've got the kids in here, going why isn't this computer working, why? So the time and the stress and the hassle, then at the end of the lesson I've got to return it right down the bottom to the IT department, and you know, for a teaching thing that lasts a maximum of 10 minutes, it's just not time effective."

(Languages teacher, secondary school)

Other teachers described how a host of technical glitches or mishaps could detract from teaching time, for example one teacher described a situation where programs shut down if they forgot to disable the screen saver.

"If anything goes wrong, it's time taken away from a lesson including sorting it out if the child's pressed the wrong button, or has been 'click-happy' with the mouse. So yes, I can lose half an hour of a lesson sorting something out, if it's meant to be part of the lesson."

(Teacher, primary school)

Some teachers also felt they had to prepare back-up plans in case the ICT did not work, although more experienced teachers felt that they could improvise if ICT failed. This was more of a problem where there was little technical support and unreliable hardware. Primary school teachers, in particular, who had to split the class in order to rotate them around the available computers, talked about having to prepare two lots of work for the children, one ICT-based and one not ICT-based.

However, there was a view that, although preparation often took longer, the quality of lessons using ICT was likely to be higher. And where ICT was used to help children produce an output of some sort, this was of a much higher standard, which was also motivating for the children concerned. It was also recognised that once an initial investment was made in selecting and exploring digital content resources and developing and incorporating use of these in lesson plans, it would be less time-consuming in future.

"At the moment it's extra because it's early days. But we will see the benefit of teachers having prepared resources this year... that next year they are going to remodel slightly and re-use. So at the moment we are in an investment period. We have yet to reap any dividend from that. So at the moment it is extra, no question about it."

(ICT co-ordinator, secondary school)

Some respondents wanted to be able to use funding to support this bedding-in and development process. Others felt that one had to introduce new digital materials into a subject area in a staged way.

"I spoke to my head of faculty... when you sort the timetabling out for next year, I want to repeat that course with the class and I want to do this one new, so I can use some of what I did last year and spend a bit of time developing something else. I don't want to suddenly have classes, all my classes where there is stuff that I haven't prepared for. 'Cos, you know, it will benefit the faculty if I create the stuff anyway. So you want a bit of overlap, a bit of re-using it to make your life easy and one new thing, which you can spend time on."

(Maths teacher, secondary school)

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5.5 Pupil engagement, motivation and attainment

Some teachers were clear that using ICT and digital content resources had raised attainment. Teachers pointed to improving GCSE and A-level results and attributed that, in part, to greater use of ICT in the classroom. One teacher believed that extending use of ICT in the classroom had contributed to their school, which had just come out of special measures, increasing its performance three-fold against a national GCSE performance measure. A language teacher said that she gave her pupils ICT-based vocabulary exercises to do and found that pupils were more engaged and that their recall of what they had learnt was good. Another teacher, this time in a primary school, said that ICT helped children get more homework done. Yet another teacher, in a secondary school, said that she had used ICT with a group of young people who were in danger of exclusion and found that using ICT motivated them. However, other respondents thought it was too difficult to say whether using ICT actually increased attainment.

"It's made my job easier; I know the presentation is better. But whether it's actually improved results, I don't know."

(Religious studies teacher, secondary school)

Other respondents felt that ICT and digital materials could, and often did, raise pupils' engagement, motivation and attainment only where digital content resources were used effectively and appropriately and in conjunction with effective teacher input.

In particular, respondents discussed how ICT appealed to a wide range of learning styles, including primarily visual, aural and kinetic learners, since digital materials usually included a variety of interactive features, graphics, visual images and sounds.

"And because you are using these multiple channels, students can choose within a CD-ROM whether to see a movie or whether to read text about it or just hear something, then obviously you are going to hit more of the students with that one resource."

(ICT co-ordinator, secondary school)

Respondents also spoke of how digital materials freed up children to concentrate on understanding important concepts and ideas rather than spending their time working through the calculations or the "nitty-gritty" and believed that this had led to higher levels of attainment.

Respondents also spoke about how ICT could bring a subject alive for children. A history teacher explained how the use of ICT and digital content resources could enable his pupils to see places of historical importance that they were not able to visit in person, not just in the form of static pictures in a textbook, but in various, more animated ways. A religious studies teacher felt that children trusted material from the internet and could, by doing research on the internet, see that Vaisakhi (for example) was a real festival, celebrated by real people, which he felt contributed to their engagement and, thereby, their attainment.

Respondents recognised that digital content resources and the internet provided children with a larger amount of information than ever before and that this could support learning and increase interest. It was seen as helping children to develop the skills to go and find things out for themselves and, in history for example, it gave them experience of selecting and evaluating sources. However, some respondents pointed out that there could be too much information for children to use effectively and that pupils needed effective guidance from teachers if they were to understand how to most effectively access and use information.

Some teachers felt that the repetition on some programs was really useful for reinforcing learning. However, others felt that this reinforcement tended to help those children who were doing well to begin with. Some respondents pointed out that software programs could not understand why a child was failing to learn something.

"Students can work at their own pace through a programmed set up. And so the limitation – and there is a huge limitation – is that the software doesn't yet analyse the reasons why students might get something wrong, which a teacher can do. And so you just get: try again... or just: you got it wrong. I'll try another method of presenting this to you. But there's virtually no support that I know of that does that yet. But it could do it very crudely and just work through an exhaustive process of trying methods of presenting the same information and eventually one of them is going to work. Whereas as a teacher, you can get that feedback much more quickly."

(ICT co-ordinator, secondary school)

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This points to the irreplaceable role of the teacher in mediating between the software and the pupil. It may also relate to the importance that some respondents placed on ensuring that software was pitched at the right level for children of different abilities, and this ability to differentiate was mentioned as an important criteria in choosing digital materials. ICT-based learning activities allowed children to work at their own pace. They were considered to be especially appropriate for children of low ability or with special needs since they could work at their own pace and were able to achieve things academically and create high quality outputs without necessarily having to write. Other respondents talked about providing more stretching tasks for pupils who were of above-average ability.

Numerous teachers spoke of how using interactive whiteboards and projectors helped them to explain things better. One respondent, for example, described how much easier it was to explain map skills using interactive 3D software. He also stressed how valuable it was to be able to use interactive software with a whole class group since it allowed both interaction with software and interaction and exchange between pupils. He explained how he might even engage the children in leading parts of the lesson, giving them a greater feeling of ownership and involvement.

"Pupils now, I would feel quite comfortable with... almost let them teach a little bit at the end, using the whiteboard and coming up to the front and teaching it... Or getting... asking the kids questions on things through the [name of package], asking the class what I need to be doing now on there and then... really just the interest level from the pupils like that."

(Geography teacher, secondary school)

Teachers spoke of children's expectations around ICT, with even less confident teachers acknowledging that teaching without ICT would probably seem "old-fashioned". High levels of ICT use was seen to be normal for young people and teaching had to involve ICT and the internet if it was going to seem relevant to them. There was also a feeling that by using ICT in teaching, you were equipping young people with ICT skills that they would need when they went to secondary school, or in later life.

However, respondents also spoke of how some teachers used ICT and digital content resources as a "treat" or

"soft option". These respondents felt that this was an ineffective use of ICT and that there was the danger that "the novelty would wear off" and pupils could become disengaged as a result. One school said they had evidence that they were overusing electronic slide presentations, for example, and that pupils were losing interest as a result. A number of respondents spoke about the need for variety, the appropriate use of ICT to meet learning objectives and the need to combine ICT effectively with non-ICT teaching methods.

"I do think ICT does need to be used with care. I mean to be honest, our syllabus is so jam-packed, there's so much to do. And I think if you're going to use it just to say, oh look, I've used ICT, then it's pointless. But if you're going to use it for a real purpose and it can enhance the learning, then it's fantastic. And certainly some of the CD-ROMs that we've got are very, very good. And some of the internet sites that I'm familiar with, really, really motivate them, which is excellent. But, you know, you can have too much and it can be too overwhelming. But I think we've probably got the balance right here. And you don't feel pressurised that you've got to do these things. So you know, it's excellent really."

(Languages teacher, secondary school)

Other teachers stressed the need to ensure that the focus on developing emotional and social skills was not overlooked. Some felt that one had to be careful about just sitting pupils in front of a computer and assuming that this was good for their learning or development. One secondary school teacher explained how his pupils used digital camera and video equipment to develop a storyboard and video film about their local area. He felt that the use of ICT and digital content resources enhanced learning but, used in this way, it also helped to develop co-operation, social and communication skills. Another respondent pointed to the importance of social reinforcement in learning, again pointing to the importance of using ICT in conjunction with well-thought-out interaction between the pupil and teacher.

Other teachers also pointed to the need to balance the use of digital content resources with traditional book-based learning. One religious studies teacher wanted to ensure pupils were able to look something up in the contents page or an index of a book and develop the ability to skim read effectively.

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There was evidence that teachers were, to different degrees, thinking through where best to use ICT and how using ICT in teaching would support learning objectives. One secondary school teacher thought that a few years ago teachers in her school would have taken pupils to the computer room to type up what they had learnt rather than learning through using ICT and that this had changed. Many teachers said that it was the process of thinking through how to use digital content resources most effectively in meeting learning objectives that was the most demanding aspect of planning to use ICT in lessons. One respondent also pointed out that while it was important to engage children, it was equally important to ensure that the use of ICT and digital content resources supported learning objectives and, ultimately, the ability of children to perform well at their GCSE examinations.

This emphasis on the integrated and appropriate use of ICT was particularly apparent with respondents from the best performing secondary schools with the most developed ICT provision. The ICT co-ordinator from one of these secondary schools explained how gaining an understanding of what works in the classroom is an important area for further development, for their school and for the education field as a whole.

“What we’ve got to now start to work on is how to use it well in terms of improving learning and really there isn’t much expertise that we can draw on. It is a very open field at the moment and whilst the Government is saying: yes, it’s got to be embedded in teaching and learning and good practice and how do you use it to engage students? Well, they’re asking the questions but we could do with some answers and then some training with our staff. We can get staff to tell colleagues things that have worked well with their class, but in terms of how has that altered the way in which the student learns the subject, that’s a very complex question and not one that our staff, I don’t think, would be able to explain, though they would just intuitively know: I did this and this worked well.”

(ICT co-ordinator, secondary school)

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6 Conclusion

This chapter highlights some of the key findings from the study. It summarises how the five primary and five secondary schools included in this study have utilised their eLC allocation and, more generally how they have responded to the Curriculum Online programme. In particular, it highlights those factors that seem to have most influenced the way in which these schools have responded to the Curriculum Online programme and considers the impact of these factors on how far, and how effectively, digital content resources are being used across the school curriculum. This chapter also points to some of the possible implications of these findings, making broad recommendations to those involved in supporting the development of ICT in schools, and outlines areas for focus in the follow-up study planned for 2005.

6.1 Contextual factors affecting schools' responses to Curriculum Online

A key finding from this study was that schools were differently positioned to take advantage of the Curriculum Online programme and to extend the use of ICT and digital content resources in teaching across the school curriculum.

Compared to secondary schools, primary schools tended to be at an earlier and more uniform stage of development in their ICT provision. Secondary schools tended to have better ICT provision, although some were better resourced than others.

Secondary schools varied more widely than primary schools in how far they used ICT in teaching across the curriculum. Within secondary schools, compared to primary schools, there were greater differences between subjects in how far ICT was used in teaching. In primary schools, there was more difference between individual teachers than subjects.

The factors that were associated with widespread use of ICT across the curriculum included clear arrangements for the strategic leadership for the development of ICT, a well-supported ICT co-ordinator, high levels of good quality of ICT hardware, effective technical support and teachers with the skills and confidence to use ICT in the classroom. Extensive use of ICT across the curriculum was also linked to higher performance figures.

In primary schools, the further development of ICT in teaching may depend upon improvements in hardware

and technical support and the development of strategic leadership for ICT and the ICT co-ordinator role. Improvements in these areas would provide a supportive context for further skills development among primary school teachers and classroom assistants.

In secondary schools that are more advanced, the key elements of strategic leadership for ICT, a well-developed and supported ICT co-ordinator role, high levels of good quality hardware, effective technical support and a focus on skills development and sharing are all broadly in place. These schools would seem to be better positioned to extend and refine the use of ICT and digital content resources across the curriculum and to capitalise fully on the opportunities for development presented by the Curriculum Online programme.

Secondary schools that are lagging behind in extending the use of ICT and digital content resources across the curriculum may have a range of mutually reinforcing factors that are inhibiting more rapid development. The exact nature of these factors are likely to vary from school to school. In these cases, funding for digital content resources is likely to be one, albeit important, part of the jigsaw puzzle.

6.1.1 Strategic leadership for ICT and the role of the ICT co-ordinator

The role of ICT co-ordinator, and the strategic context within which they worked, influenced the way in which ICT provision was developed within the school and how eLCs were spent. Most of the ICT co-ordinators interviewed for this study had a role in the spending of eLCs. This study was not able to identify specific outcomes in terms of the appropriateness and effectiveness of software bought with eLCs. However, ICT co-ordinators varied in how effectively they felt they could support the effective spending of eLCs given the dedicated time they had for the role and the degree of strategic support and leadership.

Those involved in supporting the development of ICT in schools may wish to consider ways of helping schools to strengthen the ICT co-ordinator role and their strategic capacity to spend eLCs effectively and appropriately. For example, one suggestion made by respondents in this study was to allow part of the eLC funds to be spent on providing cover for ICT co-ordinators and others to spend time on the strategic evaluation of potential purchases.

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6.1.2 ICT hardware and technical support

The scope of Curriculum Online to impact on how ICT and digital materials are used across the curriculum was influenced by the quantity, quality, type and location of ICT hardware in schools. Interactive whiteboards, data projectors and other hardware installed permanently in classrooms and easily accessed ICT suites tended to lead to more frequent and effective use of digital materials in teaching. Technical support for setting up and troubleshooting ICT equipment also led to increased use of ICT in teaching. The ICT infrastructure varied from school to school, although it was generally improving in all of the schools visited.

The DfES, and other agencies supporting the development of ICT in schools, will want to ensure that the range of support they are offering schools for developing their ICT infrastructures is effective so that the greatest benefit possible is gained from digital content resources purchased with eLCs.

6.1.3 Training in ICT and the skills and confidence of staff

Skills and confidence in using ICT varied from teacher to teacher in secondary and primary schools, although highly skilled teachers were more likely to be found in secondary schools and among younger teachers. In secondary schools, departmental developments could help less skilled colleagues use ICT in teaching. In all schools, teachers described informal, responsive support from the ICT co-ordinator, technical staff or other colleagues and time to experiment and familiarise themselves with digital materials as extremely helpful in building skills and confidence. Some teachers also spoke about going beyond technical competencies to focus on developing the skills necessary to make the most effective use of ICT in teaching. These findings suggest that training alone is not necessarily effective in raising skill and confidence levels but that other support needs to be in place to consolidate benefits gained from training.

The DfES and partner agencies may want to give further consideration to how they can help schools provide other forms of more responsive support in order to consolidate skills gained through ICT training and to help teachers gain the necessary confidence to use ICT in the classroom. The DfES, and other agencies supporting the development of ICT in schools, may also want to consider how the sharing of effective practice in using ICT in teaching can best be facilitated and supported.

6.2 Impacts of using ICT and digital content resources in teaching across the curriculum

6.2.1 Teacher workload

Teachers reported the fact that it took longer to plan lessons involving digital materials although there was a view that this level of input would be reduced as teachers grew more familiar with the ICT, software and digital materials. Teachers tended to see it as an investment for the future and felt that the quality of their presentation and lessons were improved as a result.

The DfES, and other agencies supporting the development of ICT in schools, may want to consider what ways might be available to support teachers in developing lesson plans incorporating use of ICT.

6.2.2 Pupil engagement, motivation and attainment

Generally, teachers believed that effective use of ICT and digital content resources could improve pupil engagement, motivation and, most likely, attainment. ICT could, for example, support independent learning, allow pupils to work at their own pace, by appeal to different learning approaches, bring subjects alive and improve the presentation of lessons. Overall, the headteachers and ICT co-ordinators interviewed for this study were therefore very pleased with the fact that significant investment was being made in this area.

The evidence suggested, however, that there were various factors that could influence how effective the use of ICT and digital content resources in teaching was. These factors included practical and logistic factors such as having ready access to ICT equipment and effective technical support. They included having good quality digital content resources, to which Curriculum Online has made a significant contribution. They also included giving greater consideration to how digital content resources can be used in teaching to support learning objectives. Some schools had begun thinking about this issue and had sessions for teachers to share ideas and practice. The DfES and its partner agencies may have a role in supporting schools in developing and sharing ideas about using ICT and digital content resources most effectively in teaching. This will help to maximise the value of digital content resources bought with eLCs.

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6.3 e Learning Credits

6.3.1 Perceptions of e Learning Credits

ICT co-ordinators were aware of eLCs, understood what they could be spent on and were generally aware of the amount of funding their school had. Teachers who had been involved in selecting digital materials for purchase with eLCs were also aware of eLCs, referred to the eLCs logo and were aware of either the overall level of funding or the funding available for their department or year group. Staff that were not involved in purchasing were less likely to be aware of the level of eLCs funding.

All of the schools appreciated having additional funds for software and respondents spoke positively about the generous level of funding for an area that had previously been under-resourced. Some felt constrained in spending their eLCs by the nature and standard of their existing hardware and the time required to evaluate materials thoroughly and to embed them in teaching.

6.3.2 Evaluation of digital content resources

Respondents across all types of school frequently said that there was not enough time available for evaluation of digital materials and, for some, this was a barrier to spending their full allocation of eLCs. This study was not in a position to identify specific evidence of inappropriate purchases of digital materials. However, given the significant levels of funding provided by eLCs and the evidence of ICT co-ordinators having varying, though frequently limited, amounts of time available to inform strategic decision-making. The DfES and other agencies supporting the development of ICT in schools may wish to consider further how they can support schools in carrying out more thorough evaluation of potential purchases.

6.3.3 Arrangements for making purchasing decisions

Arrangements for spending eLCs varied along a continuum of centralised to devolved. Devolved or semi-devolved structures, in secondary schools, were associated with the highly developed ICT co-ordinator role, well-developed strategic leadership for ICT, higher levels of ICT provision and high levels of technical support. Highly centralised approaches could be resented by staff although there was some indication that the intention had been to focus spending upon previously under-resourced subject areas.

In primary schools, centralised decision-making generally reflected a desire to provide school wide cross curricular resources. The rationale for decisions taken appeared to be more transparent and were broadly supported by teaching staff. Where eLCs were devolved in primary schools, this was in order to increase teachers' feeling of ownership and engagement.

The evidence suggests that headteachers and ICT co-ordinators had well-founded reasons for both engaging teachers in purchasing decisions and for retaining strategic oversight. It may, therefore, be that the most successful models are semi-devolved models that incorporate both levels of input.

6.3.4 Types of digital content resources selected

Schools purchased a wide range of different types of digital content resources. These included CD-ROMs and DVDs, which were associated with highly devolved purchasing arrangements. They also purchased website subscriptions and electronic libraries of resources stored on a server on the school's own network. The latter were especially popular in primary schools.

Teachers often identified resources in response to a personal recommendation or after coming across a software program on a course. In other cases teachers pro-actively sought software by, for example, attending the BETT exhibition or by searching online. Criteria were often applied informally, rather than formally, especially in more devolved arrangements. The criteria that were most discussed were curriculum requirements and gap filling, hardware or network requirements, quality and usability and value for money.

6.4 Curriculum Online website

Regular use of the Curriculum Online website was restricted primarily to a small number of ICT co-ordinators. Many teachers were unaware of the website or confused about what it was. In other cases, opinions of the website sometimes seemed to be based on experience of a visit or visits to the website in earlier stages of development.

When non-users were asked about the features they wanted the Curriculum Online website to have, their preferences generally reflected features that were already in place such as improved search functions and written teacher evaluations. Teaching staff that were not involved in spending eLCs perceived little reason to use the

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website despite the fact that the website also houses free resources. Many teachers preferred to use catalogues and personal recommendations as their main source of information about digital content resources.

Other research carried out as part of the evaluation of Curriculum Online will be able to report in more detail on how users interact with the website and the features that they feel might be improved. Overall, however, evidence from this study suggests that a lack of awareness of the Curriculum Online website, and of its particular features and functions, could be restricting use.

The DfES may want to consider how it could increase awareness of the website among teachers. As part of this effort the DfES may want to consider how it might develop and promote Curriculum Online as a resource that can be used effectively in conjunction with other sources, especially catalogues and personal recommendations.

6.5 Further research

This study will be followed up in 2005. The research team will return to interview teachers in the same schools in order to look at developments and changes and to explore some of the issues arising from this study in greater detail. The study will also include interviews with small groups of school pupils in order to explore their perspectives on using ICT and digital content resources in the classroom.

In particular, the follow-up study will look at developments and changes in the contextual factors – strategic leadership for ICT; the nature of the ICT co-ordinator role; the level, quality and location of existing ICT hardware; technical support arrangements; the skills and confidence of teachers and the scope for sharing good practice – that are seen to influence both the use of ICT and digital content resources across the curriculum and how schools are able to respond to the Curriculum Online programme. And it will aim to draw out in greater detail the implications of schools being differently positioned with regard to these factors.

It will look, in more detail, at how ICT co-ordinators and teachers experienced different purchasing arrangements and how they feel that different arrangements have impacted on the effectiveness of spending decisions. It will also consider any changes in schools' arrangements for spending eLCs and the reasons for these changes and examine any changes or developments in the perceived barriers to spending eLCs effectively.

The next round of research will also focus on developments in the types of digital materials purchased and in how teachers identify digital materials and apply relevant criteria when selecting digital content resources. It will also consider in more depth the rationales for, and sustainability of, different types of purchase. And it will examine developments in the type of spending decisions made and the underlying rationales and decision-making processes behind these choices.

The follow-up research will also explore, in more detail, how teachers are using ICT in the classroom and how schools are developing and embedding ICT in teaching. And it will consider developments in teachers' perceptions of the time required for incorporating, using and embedding ICT and digital content resources in teaching. The research in 2005 will also look at developments in teachers and ICT co-ordinators' use and views of the Curriculum Online website.

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The ICT in Schools programme is central to the Government's ongoing programme of school reforms. *Fulfilling the Potential*, launched by the Secretary of State for Education and Skills in May 2003, outlines future directions for ICT as an enabler in whole school development and teaching and learning. Copies of *Fulfilling the Potential* are available on www.dfes.gov.uk/ictinschools. Research and evaluation is being undertaken using a variety of techniques, both qualitative and quantitative, and at both national and local level.

Below you can find a list of the reports published so far in the ICT in Schools Research and Evaluation series, produced by Becta for the Department for Education and Skills (DfES).

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