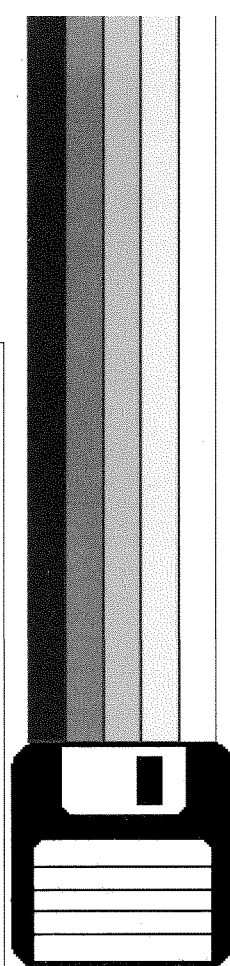
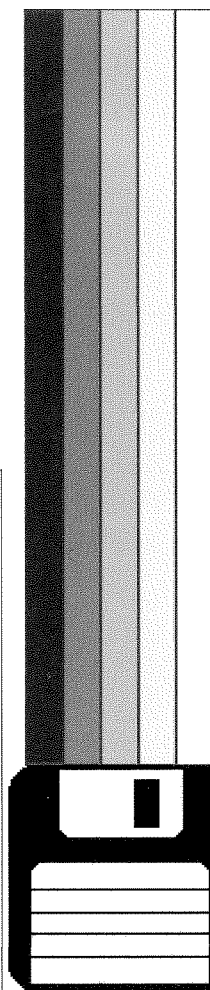
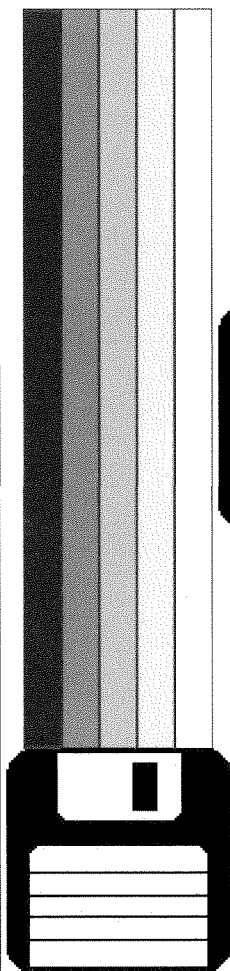
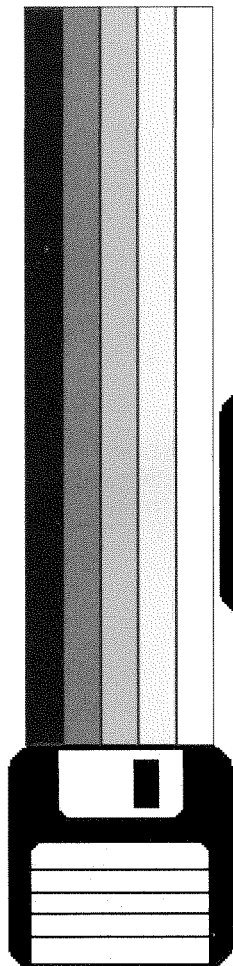


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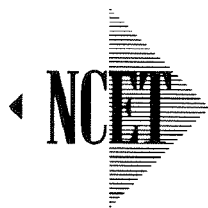


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SOFTWARE IN SCHOOLS

The provision, acquisition and use of computer
software in primary and secondary schools

Sue Harris
and
Christina Preston



nfer

Published in December 1993
by the National Foundation for Educational Research,
The Mere, Upton Park, Slough, Berkshire SL1 2DQ

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ISBN 0 7005 1344 2

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EXECUTIVE SUMMARY

Research into the provision, acquisition and use of computer software in primary and secondary schools was carried out between March 1993 and August 1993 by the National Foundation for Educational Research under contract to the National Council for Educational Technology. The project included:

- ◆ questionnaire surveys of a random sample of primary and secondary schools
- ◆ telephone interviews with IT co-ordinators in a sub-sample of primary and secondary schools
- ◆ visits to LEA computer centres
- ◆ interviews with IT co-ordinators in a number of 'focus' schools outside the random sample, which explored issues concerning IT in more depth
- ◆ a questionnaire survey of educational software publishers.

MAIN FINDINGS

LEA software developments were frequently initiated in response to specific demands from teachers, such as Bengali and Punjabi fonts for word processors.

Software bundled together with hardware purchases was a significant source of new programs for many schools.

IT co-ordinators were the main source of recommendations for schools' software purchases in both primary and secondary schools, although a number of teachers acknowledged advice from LEA IT advisory staff.

The two main priorities for both primary and secondary schools when choosing new software were curriculum needs/relevance and cost or value for money.

Teachers valued the support offered by LEA IT advisory teams and computer centres, in terms of

- ◆ information/advice about software
- ◆ workshops to examine software
- ◆ INSET.

Several teachers expressed concern over the potential demise of LEA IT support services.

For primary schools, the two sources most frequently used to obtain software were the LEA computer centre and commercial educational software catalogues. Secondary

schools obtained programs from commercial educational software catalogues more frequently than any other source; LEA computer centres and commercial software suppliers such as Microsoft and Lotus were the next most frequently used.

Roughly six out of ten primary schools and four out of ten secondary schools had purchased either software or software-related resource packs as a result of attending INSET courses.

For the financial year 1992-93, the median expenditure on software was £150 for primary schools and £500 for secondary schools.

Within secondary schools, Design Technology departments consistently spent more on software than other departments (excluding IT departments).

Many primary schools reported purchases of cross-curricular and subject-specific software without favouring one type significantly more than the other. Over 60 per cent of secondary schools' IT departments reported that most of their software purchases had been cross-curricular or generic. The quantities of software bought by other departments for their own use varied considerably, with some departments (notably Design Technology) investing very large sums in software and others spending very little, and possibly relying more on the software purchased by the IT department.

Within primary schools, nine out of ten respondents reported that computers for pupils' use were most frequently located in classrooms/teaching areas. In secondary schools, computers were predominantly used within classrooms and in specific computer rooms. However, many respondents indicated that very little time was available for their department to use networks, which were a shared facility.

The most widely used type of software across all ages in primary schools was word processors. Information-handling programs and adventures/simulations were also widely used.

Within secondary schools' Mathematics, English and Science departments, there was some evidence of increasing use of certain applications of IT during Years 7-9, followed by a reduction in use in Key Stage 4. In Design Technology departments some applications were used more extensively during Key Stage 4 than in Key Stage 3.

Primary schools reported that roughly a third of the software available within the school was used extensively. Across secondary schools' departments, the proportion of software available which was widely used varied from 10 per cent to 36 per cent.

Mice and printers were so widely used both in primary and secondary schools as to be regarded as virtually essential parts of the computer system. About one in five primary schools stated overlay keyboards were very widely used, and in secondary schools a similar proportion said CD-ROM players were very widely used.

Both primary and secondary IT co-ordinators expressed a preference for graphical interfaces such as Microsoft Windows, Acorn RISC-OS and the Apple Macintosh

desktop. There were also some suggestions that these interfaces facilitated pupil progression and attainment, especially when used at both primary and secondary level.

At the primary level over half the respondents indicated that software was perceived as a very useful resource for English. Mathematics and special educational needs were other areas where software was felt to be particularly useful.

Within secondary schools, software was perceived as very useful by three out of five respondents from Special Educational Needs and Design Technology departments. Slightly fewer Music departments felt software was a very useful resource.

There was evidence of a different focus for IT INSET in primary schools as compared with secondary schools. Responses from both sectors suggested that the majority of teachers had received INSET in initial awareness, but after this, there were different priorities in each sector. For primary schools the emphasis was on integrating IT across the curriculum and INSET concerning cross-curricular/generic software. Within secondary schools, the priority for INSET after initial awareness was training in subject-specific software.

LEAs visited were operating on, or moving towards, a cost recovery situation, with schools paying for the services they required, such as

- ◆ advisory teacher support within the school
- ◆ attendance at INSET sessions
- ◆ hardware maintenance/repair.

One in two rural primary schools reported difficulty in reaching their LEA computer centre, which may suggest a need for greater use of alternatives to centre-based support.

Teachers valued the support materials provided by educational software publishers. Primary teachers found that teachers' guides, suggestions for activities and pupils' worksheets were most useful. Within secondary schools, some departments (especially Mathematics, History, Geography and Special Educational Needs) found these types of materials very useful, whereas others either did not use them or found them of limited use.

Teachers in both primary and secondary schools felt software publishers could improve their support to schools by providing

- ◆ less complex manuals together with simple 'start-you-off' guides that were easier to understand
- ◆ short self-help cards summarising main points for teacher/pupil use
- ◆ more opportunities to examine software before purchase (either through 'on approval' arrangements or software demonstrations)
- ◆ more software related to specific subject curricula at Key Stage 3 and especially at Key Stage 4.

Many 'focus' schools had established links with a range of organisations which provided additional perspectives, expertise and funding.

There was enthusiasm for classroom use of laptops, especially with pupils with special educational needs, although teachers would have liked more laptops for these pupils in the £400-£600 price range.

Software developers identified a future of opportunities and pressures; there was the potential of increased sales to overseas markets, but, at the same time, the increasing proliferation of mixed machine platforms in schools, together with constant technological innovation, meant that new software development would continue to require considerable investment for an uncertain return.

LEA advisory staff predicted further expansion in the use of CD-ROMs and laptops in the future, although they also expressed concern about the security of their own financial future. Teachers were keen to have continued support from LEA advisory teams, referring specifically to INSET provision and the availability of classroom support. However, they also emphasised the need for time and money to allow these to take place.

In terms of software support for the future, many teachers referred specifically to INSET requirements in information handling, modelling (especially spreadsheets) and measurement and control, clearly indicating that these are areas with which many teachers are not yet at ease.

1. INTRODUCTION

Information technology is one of the attainment targets detailed in Technology in the National Curriculum (Department of Education and Science and Welsh Office, 1990). It contains statements of attainment which describe the capabilities which pupils may develop in relation to information technology (IT); as with other National Curriculum subjects, there are ten levels of attainment. The programmes of study for each of the four key stages provide guidance for teachers on what pupils should be taught. To supplement the information contained in the programmes of study and statements of attainment, the National Curriculum Council (NCC) produced non-statutory guidance on IT. As part of its guidance on incorporating the programmes of study into schemes of work, it divides IT capability into five strands:

- ◆ communicating information
- ◆ handling information
- ◆ modelling
- ◆ measurement and control
- ◆ applications and effects.

The first four of these strands are concerned with types of software, whereas the fifth is concerned with the use of IT in a wide range of situations inside and outside the classroom.

Information technology is also one of the six cross-curricular skills identified by the National Curriculum Council and, as such, aspects of IT work can be integrated across the curriculum. Various sources provide information on the provision of hardware in schools, such as the Surveys of Information Technology in Schools carried out by the Department for Education (DFE) and published as reports in 1986, 1989, 1991 and 1993. However, rather less information is available about the range of software in use in schools and its impact on the curriculum. In addition, continual technological innovation is increasing the availability of more powerful hardware which in turn allows the development of software which is increasingly sophisticated, yet at the same time is easier to use.

NCET has therefore funded this research to investigate the current use of educational software in schools, in terms of what is being used, how it is being used and which aspects of the curriculum are being supported.

AIMS

The main aim of the project was to collect information on the range of software in use in primary and secondary schools in England and Wales. More specifically, the aims were as follows:

1. to investigate the range of software available to primary and secondary schools, including a range available from LEA computer centres
2. to ascertain how schools obtain software
3. to collect information about the software purchased by schools
4. to investigate the ways in which schools use software
5. to determine the strategies and systems available to support teachers in their use of software
6. to investigate the views of developers and publishers concerning educational software
7. to identify the main messages for the future in terms of the development, availability of and support provided for the use of software in schools.

Related issues were investigated where relevant, such as the hardware available within schools, funding available for IT equipment and purchases related to in-service training courses (INSET).

METHODOLOGY

The main elements in the research methodology were:

- ◆ questionnaire surveys of a random sample of primary and secondary schools
- ◆ telephone interviews with IT co-ordinators in a sub-sample of primary and secondary schools selected from the respondents to the survey
- ◆ visits to LEA computer centres
- ◆ interviews with IT co-ordinators in a number of 'focus' schools outside the random sample, which explored issues covered in the questionnaire in more depth
- ◆ a questionnaire survey of educational software publishers.

Surveys of primary and secondary schools

Random samples of 400 primary schools and 600 secondary schools were drawn. The samples were stratified to provide a representative cross-section of schools, with factors

such as size, age range, geographical region and metropolitan/non-metropolitan area being taken into account. The primary sample included infant, junior, first, mixed infant and junior, and middle schools deemed primary due to their age range. The secondary sample included schools both with and without a sixth form, sixth form colleges, and middle schools deemed secondary due to the age range. In each case, some independent and grant maintained schools were included in the sample.

The primary questionnaire was designed for completion by the school IT co-ordinator (or a senior member of staff if the school had no IT co-ordinator).

The questionnaires for secondary schools comprised a core questionnaire for completion by the IT co-ordinator and a number of inserts directed to the heads of other departments. A total of twelve different inserts was produced, covering the core and foundation subjects together with religious education and special educational needs. In order to gain information from a wide range of curriculum departments without imposing excessive demands on schools, each school received only four inserts for specified departments, with the balance between core and foundation subjects as follows:

English, Science, History and Physical Education	150 schools
English, Science, Art and Modern Foreign Languages	150 schools
Mathematics, Design Technology, Geography and Special Educational Needs	150 schools
Mathematics, Design Technology, Music and Religious Education	150 schools
Total	600 schools

The questionnaires were sent to schools at the end of April 1993. A total of 196 primary questionnaires was returned completed, representing 49 per cent of the sample, and 292 secondary core questionnaires were returned, also giving a response rate of 49 per cent. The subject inserts which had accompanied the core questionnaires were not all returned: details of the number sent and returned are given in Appendix 1.

Telephone interviews

In order to pursue some issues covered in the questionnaires in more depth, such as details of software purchases and strategies for IT support within the school, telephone interviews were carried out with 25 primary and 25 secondary schools from the random sample. In most cases the interviewee was the person with responsibility for IT throughout the school (although especially in small primary schools this was frequently only one of several areas of curriculum responsibility), but in a few cases (notably secondary schools) the interviewee had an administrative role within the school.

Schools selected for telephone interviews were chosen to represent users of different machine bases and a cross-section of schools from different geographical areas,

including rural and urban locations, some small schools and some with a large number of pupils. All had indicated on their questionnaire that they were willing to take part in a telephone interview.

'Focus' schools

In addition to the random sample of schools, a further 25 schools were contacted in order to explore aspects of their IT work in depth. Because of the changes that have been taking place in the status of schools and the new relationship between the independent and the state system, recommendations for these 'focus schools' were not restricted to the opinions of LEA advisers. Requests for information were made to a range of organisations that support projects in schools either through LEAs or independently. Responses were received from:

- LEA advisers
- professional bodies
- charitable trusts
- international industries
- software and hardware companies
- university education departments.

About 50 replies were received each citing up to three primary and up to three secondary schools that were considered to demonstrate interesting IT practice across the curriculum. Some schools were cited by more than one organisation. The schools selected comprise twelve primary schools, twelve secondary schools and one special school. They represent eighteen different LEAs. In addition, one school has grant maintained status and another is a City Technology College.

These schools were sent the same questionnaires as the main sample (primary or secondary as appropriate), to enable some comparison to be made between the focus schools and the main random sample of schools. In addition, teachers in focus schools were interviewed in more depth about their IT work, either through a visit to the school or a telephone interview.

Survey of educational software publishers

In order to obtain information on the views and experiences of software publishers, a questionnaire was developed and sent to fifty different organisations. About one fifth of these are members of the Educational Software Publishers' Association (ESPA). A similar number are members of the Educational Publishers' Council (EPC) who publish software in addition to their book lists. Other publishers include a number of software developers who are neither members of ESPA nor EPC. Some of these are non-profit making organisations, others serve the educational software market on a commercial

basis and some sell predominantly to business/industrial markets with educational sales forming a relatively small proportion of their turnover. Twenty-seven software publishers completed and returned questionnaires, representing 54 per cent of the sample.

Visits to LEAs

Information concerning the range of support services offered to schools by LEAs has been obtained through visits to interview relevant personnel in five different LEAs. The LEAs selected represent areas where traditionally there have been different machine bases in schools (predominantly Research Machines or BBC/Acorn Archimedes), although in recent years schools have been purchasing a wider range of computers.

One computer centre visited covered a large metropolitan area, whereas other LEAs encompassed both rural and urban areas: different geographical areas were therefore represented. Two centres had well established backgrounds in software development, whereas for others this was a negligible or even non-existent part of their activities. Hence the sample of LEAs visited had different interests, although they should not be regarded as being statistically representative of all LEAs.

REPORT STRUCTURE

This report is structured so as to present the data collected as it relates to the aims of the project. For this reason, information from different sources is integrated throughout the different chapters as appropriate. For example **Chapter 5: Systems and Strategies to Support School Use of Software** includes relevant information from:

- ◆ responses to questionnaires sent to the random sample of primary and secondary schools
- ◆ telephone interviews with IT co-ordinators in some of the random sample of schools
- ◆ LEA IT advisory services.

Specific chapters are devoted to reports concerning the focus schools and the perspectives of educational software publishers, since these are quite distinct areas.

2. HOW SCHOOLS OBTAIN SOFTWARE

SOFTWARE DISTRIBUTED BY LEAs

LEA software catalogues

Each of the five centres visited produced a catalogue listing software which could be purchased from the IT centre. The lists of software available from centres included programs for the most widely used machine bases: Acorn Archimedes, BBC B/BBC Master and RM Nimbus, with larger numbers of programs for the hardware used most extensively in the LEA. In all cases the software available represented the programs which the IT advisory teams felt they could recommend, although there were some suggestions that the market economy was steering IT centres towards supplying the software for which there was particular demand.

The range of software supplied by LEA computer centres visited varied considerably, with approximately 50-600 different programs available to schools, in some cases including software developed within the county/computer centre. Only one LEA supplied CD-ROM disks, offering a selection of ten. Each computer centre produced a software catalogue listing the programs available for purchase which was updated periodically - usually annually. The catalogues listed programs variously by subject (e.g. Language, Music, Cross-curricular) and/or by application (e.g. spreadsheets, desk-top publishing - DTP) and/or by strand of IT capability (e.g. handling information, modelling).

Advisory teams' recommendations and guidance

In some cases, the list of software available for purchase was supplemented by suggestions for suitable programs for different strands or applications (e.g. word processing, information handling, concept keyboard overlay designers and software to access Campus 2000). These were subdivided to list programs for Nimbus, Acorn Archimedes and BBC machines, and in one case gave a short description of the programs' features and listed the suppliers, cost and suggested age range.

All computer centres would offer guidance concerning appropriate software for particular applications/age groups if requested. This advice was frequently provided by advisory teachers, although in one LEA both the IT adviser and teachers within the authority commended the knowledge and expertise of the administrative staff working at the computer centre. Guidance usually took the form of information about the options that could be considered, rather than advocating a particular program.

LEAs' purchasing strategies

With regard to purchasing software for distribution to schools, computer centres used a combination of bulk purchase and licensing agreements with publishers. Some LEAs indicated that they were taking out fewer new licences with publishers to permit them

to duplicate software, and the majority of programs were obtained as bulk purchases. One LEA IT adviser commented that this strategy allowed them

'to buy in small batches and gauge the take-up of specific programs rather than pay for a county licence and hope there will be sufficient sales to cover costs.'

In terms of selling software, LEA computer centres reported that they were happy to sell to schools outside the county (or to schools who did not subscribe to the LEA support services where a charge/subscription was in operation) although the range of software available excluded programs which were licensed for use only within the LEA. IT centres reported operating different pricing arrangements for purchasers within the authority (or subscribers to their support service) as opposed to purchasers outside the LEA (or non-subscribers to their support service), with the latter paying higher prices.

One LEA with an active software development programme and a list of approximately 40 titles developed 'in-house' reported that currently about a third of their software sales were to schools outside the authority and a higher percentage was predicted. This was partly attributed to the authority's reputation for producing good quality software by teachers for teachers.

One benefit for schools purchasing software from LEA computer centres was the discounted prices as compared with those charged by software publishers selling directly to schools. These were possible since the computer centres negotiated discount on bulk purchase of software from publishers, ranging from five per cent to 40 per cent depending on the publisher and the quantity of programs bought. The discount was passed on to schools, with typical software 10 per cent to 25 per cent cheaper than manufacturer's price. However, the director of one computer centre commented that

'Schools value the convenience of obtaining software from one place, rather than being over-concerned with discount.'

Information from schools seems to confirm this view, since the LEA was a major source of software for significant numbers of both primary and secondary schools. (See section in this chapter on **Sources Used to Obtain Software**)

Software development

Some centres were involved in software development projects: projects were frequently initiated in response to specific demands from teachers, such as:

- ◆ Bengali and Punjabi fonts for word processors
- ◆ adaptations to popular programs to make them more accessible to pupils with special educational needs
- ◆ versions of popular programs for new hardware bases.

Suggestions for new software development projects were gained through contact with schools at advisory teacher level.

Bundling

Until recently LEAs have been able to promote certain programs to schools by bundling them together with hardware purchases: several of the teachers spoken to during telephone interviews with schools from the random sample indicated that this had been a significant source of software.

However, in some cases this is now a smaller part of LEA activities. One exception to this was the LEA which supplied Control Technology packs and Datacapture kits each with interface, input/output devices or sensors as appropriate together with the relevant software.

In addition, the same LEA had put together a pack of 12 different programs for Acorn Archimedes machines for primary schools covering the first three strands of IT capability (communicating information, handling information and modelling) together with printer drivers, a concept keyboard overlay designer, examples of multi-media files and guides produced by advisory teachers. This pack was in use in most of the county's primary schools and was also available to schools outside the LEA for less than £800, with all programs site licensed.

To summarise, the benefits to schools of obtaining their software from a local computer centre were:

- ◆ discount prices
- ◆ programs had been 'quality screened' by advisory staff
- ◆ the convenience of obtaining different publishers' software from one source.

DECISION MAKERS, INFLUENCES AND PRIORITIES

Decision makers

Within the random sample of schools surveyed, virtually all schools (both primary and secondary) had an IT co-ordinator (91 per cent of primary schools and 96 per cent of secondary schools). These members of staff may be expected to influence the choice of programs within the school. Schools were therefore asked who recommends which programs to purchase, and were able to indicate as many as were appropriate. Not surprisingly, of the staff listed for both sectors, the IT co-ordinators were main sources of recommendations for software purchases.

Amongst the primary respondents, the sources of recommendation most frequently cited were the IT co-ordinator and the IT co-ordinator in consultation with colleagues. Headteachers of primary schools were a source of recommendation more frequently cited than their counterparts in secondary schools, probably because where the school that did not have an IT co-ordinator, the questionnaire was completed by the headteacher who indicated that he/she covered this area of curriculum responsibility.

Within the range of 'other' sources named as providing software recommendations, the one source most frequently named was the LEA IT advisory team.

As in the primary schools, responses from secondary schools showed that the IT co-ordinator, either singly or in consultation with colleagues, was the most frequently named source of recommendations for programs. However, respondents also indicated that the specific needs of individual departments/subjects were considered: heads of faculties/departments and individual teachers within departments were also frequently cited.

Secondary school respondents who listed 'other' sources of recommendations for software also named the LEA advisory team and, additionally, specific subject specialists within the school, SEN staff and in one case 'IT link teachers' (presumably nominated teachers within specific departments with IT expertise who were expected to liaise with the IT department staff).

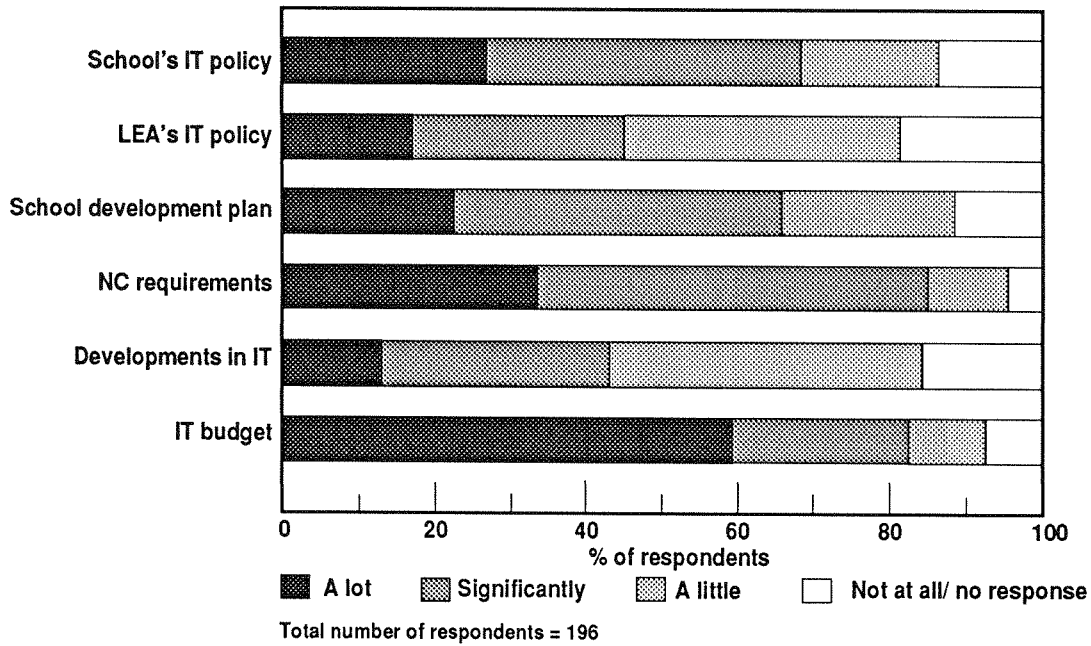
Influences

Schools were asked to what extent the following factors influenced their choice of software for the school:

- the school's IT policy
 - LEA IT policy/guidelines
 - the school development plan
 - National Curriculum requirements for core and foundation subjects
 - developments in hardware/software
 - IT budget.
-

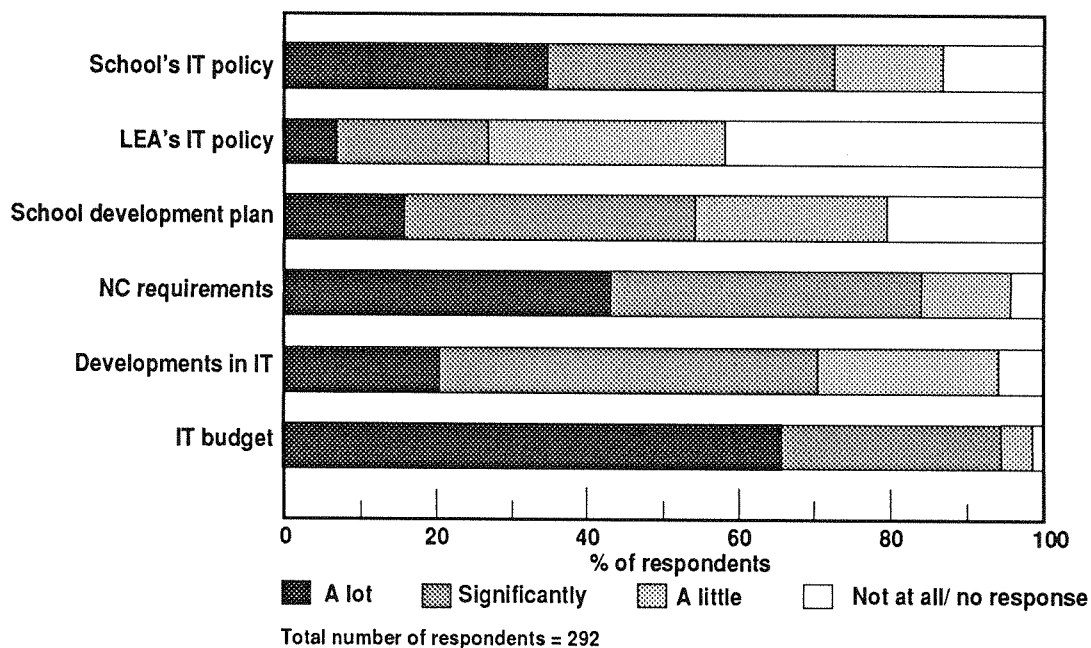
Figures 2.1 and 2.2 show the relative influences of different factors on primary and secondary schools respectively.

Figure 2.1 Primary Survey: Factors influencing choice of software



Using a four point scale to indicate a lot of influence to none at all, the factor most frequently cited by both primary and secondary schools as having a lot of influence was the IT budget. There was consensus between primary and secondary schools in indicating that National Curriculum requirements and the schools' IT policy were also very influential in deciding on software purchases.

Figure 2.2 Secondary Survey: Factors influencing choice of software

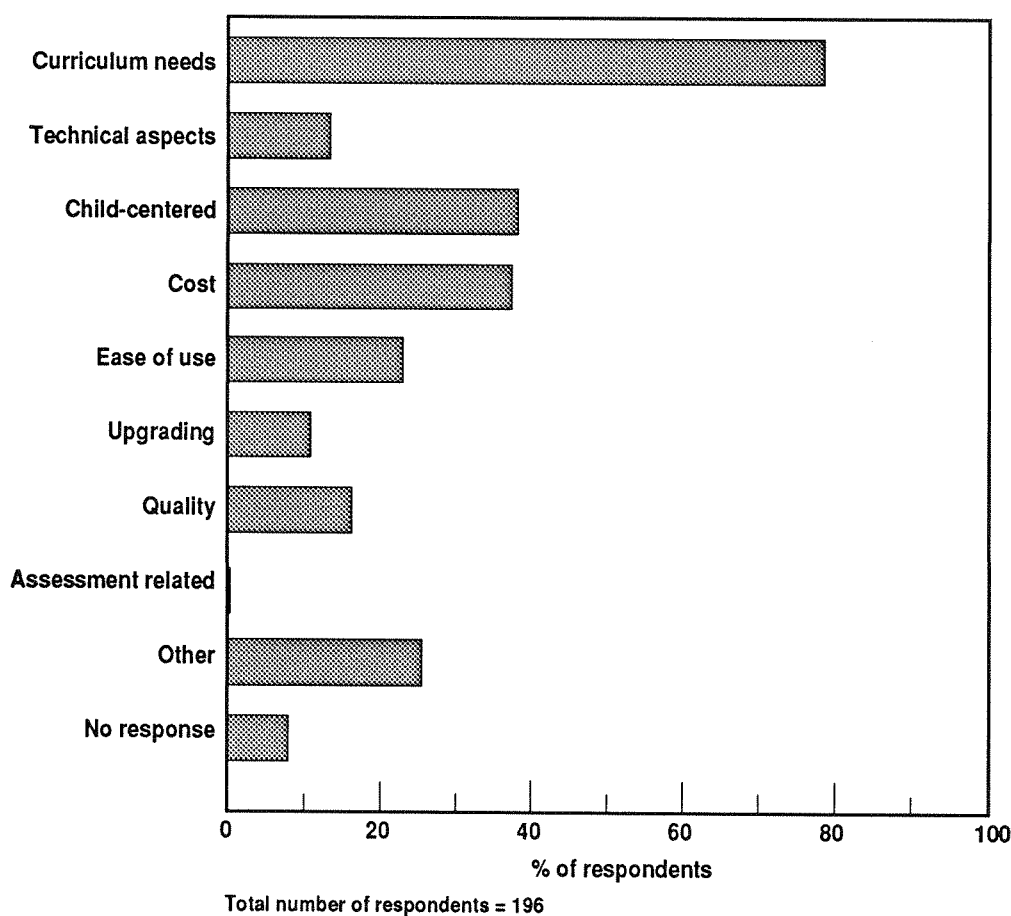


Given that a number of respondents had indicated that recommendations from IT advisers/inspectors/advisory teachers were used to help decide on software purchases, it is worth noting that LEA IT policies/guidelines were not considered a significant influence by the majority of schools: indeed 35 per cent of secondary schools reported that they **did not influence at all** the schools' choice of software.

Purchasing priorities

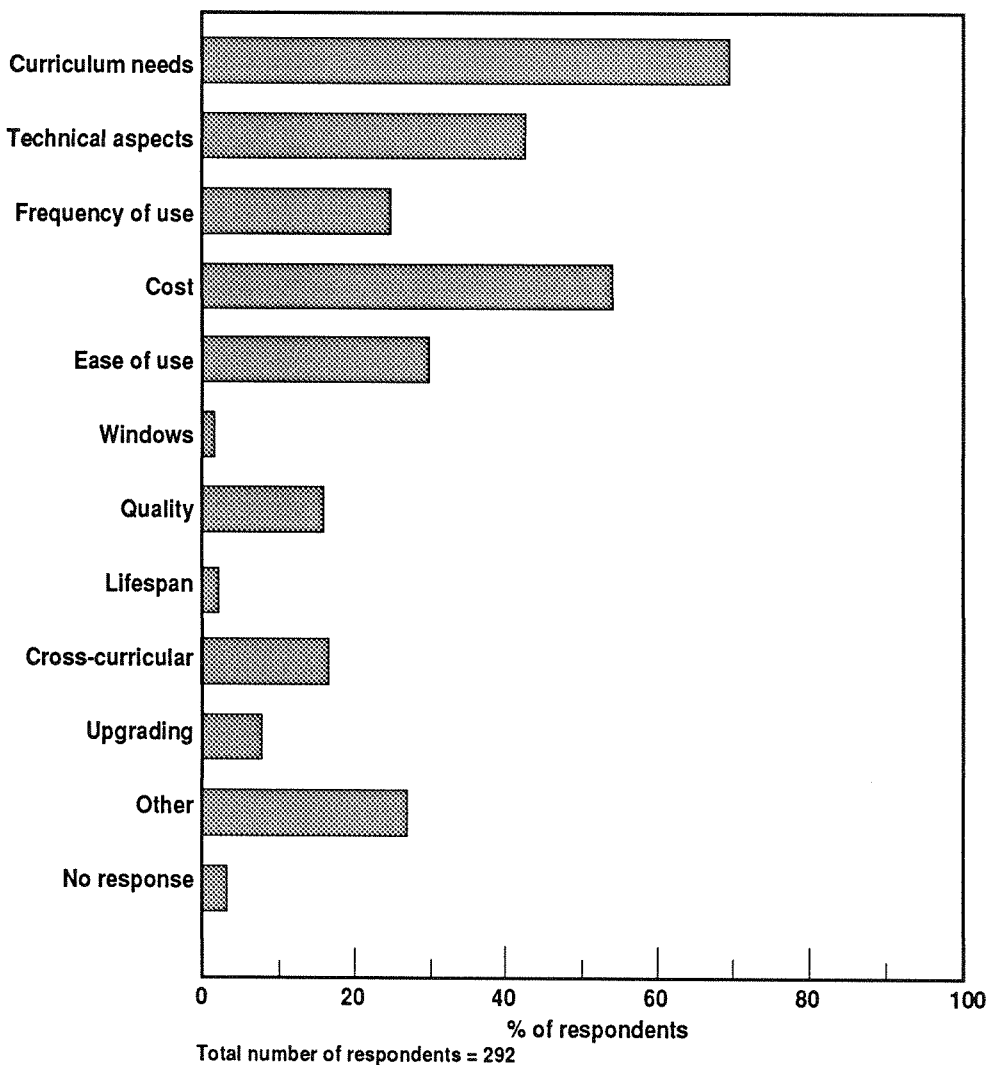
In order to clarify schools' priorities in deciding how to spend funds available for the purchase of software, they were asked to list up to five main priorities. As shown in Figures 2.3 and 2.4, curriculum needs or relevance was the one priority named by more respondents than any other.

Figure 2.3 Primary Survey: Main priorities in buying software



Child-centred factors such as suitability for age range, the development of skills and relevance to pupils with special educational needs were significant considerations for nearly 40 per cent of the primary respondents. A similar proportion cited cost as a consideration, in terms of value for money, the cost of a site licence and the limited funding available forcing schools to prioritise. Slightly fewer respondents reported ease of use (for staff and/or children) as a main priority in choosing software.

Figure 2.4 Secondary Survey: Main priorities in buying software



After relevance to the curriculum, the next most frequently cited consideration for secondary schools was cost/value for money, which was reported by more than half the respondents. Interestingly, about three times as many secondary respondents as compared with primary respondents named technical considerations as a priority in selecting software (four per cent and 14 per cent respectively). Typical responses within this category included hardware requirements, compatibility, fully RISC-OS compliant, simplicity of installation and industry standard.

Ease of use/user friendliness was valued by about a third of secondary respondents. Other priorities were each reported by fewer respondents, including

- ◆ frequency of use/relevance to a wide age range
- ◆ quality of the software in terms of open-endedness, flexibility and ability to show progression
- ◆ cross-curricular use.

FUNDING

Annual budget

Schools were asked to indicate the sums which had been/would be available from the school budget for the purchase of IT equipment for the financial years 1991-92; 1992-93; 1993-94. For this question there was no attempt to separate sums allocated for hardware and software purchases, since teachers have frequently commented that it is difficult to quantify each: funds available are spent on what is required. A significant proportion of questionnaires returned did not have this section completed: in some cases comments indicated that this information was not conveniently to hand or would be too time-consuming to obtain. The information presented is therefore based on the responses from varying numbers of schools: some comments showed that the funds available for IT purchases for 1993-94 had not been decided.

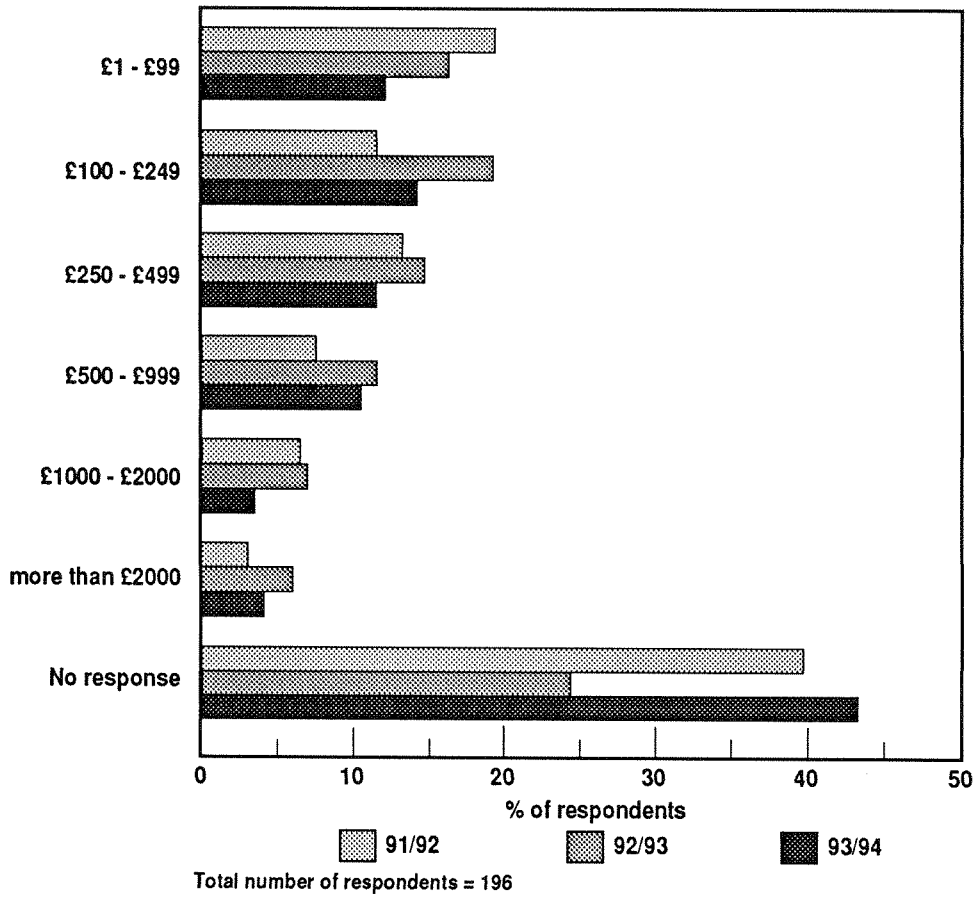
Table 2.1 shows the minimum and maximum sums specified by both primary and secondary respondents, together with the median value (i.e. the sum at which half the respondents received less, and half received more than the specified sum). (The median is given in preference to the mean (or average) since this could be distorted by having a single particularly high sum quoted, which would therefore raise the mean value despite the majority of sums being within a relatively close range.)

TABLE 2.1: Sums available from the school budget for the purchase of IT equipment

	1991-1992			1992-1993			1993-1994		
	Min	Max	Median	Min	Max	Median	Min	Max	Median
	£			£			£		
Pri	20	12,000	300	20	10,000	300	20	30,000	350
Sec	1	80,000	2,500	40	90,000	3,000	1	80,000	3,500

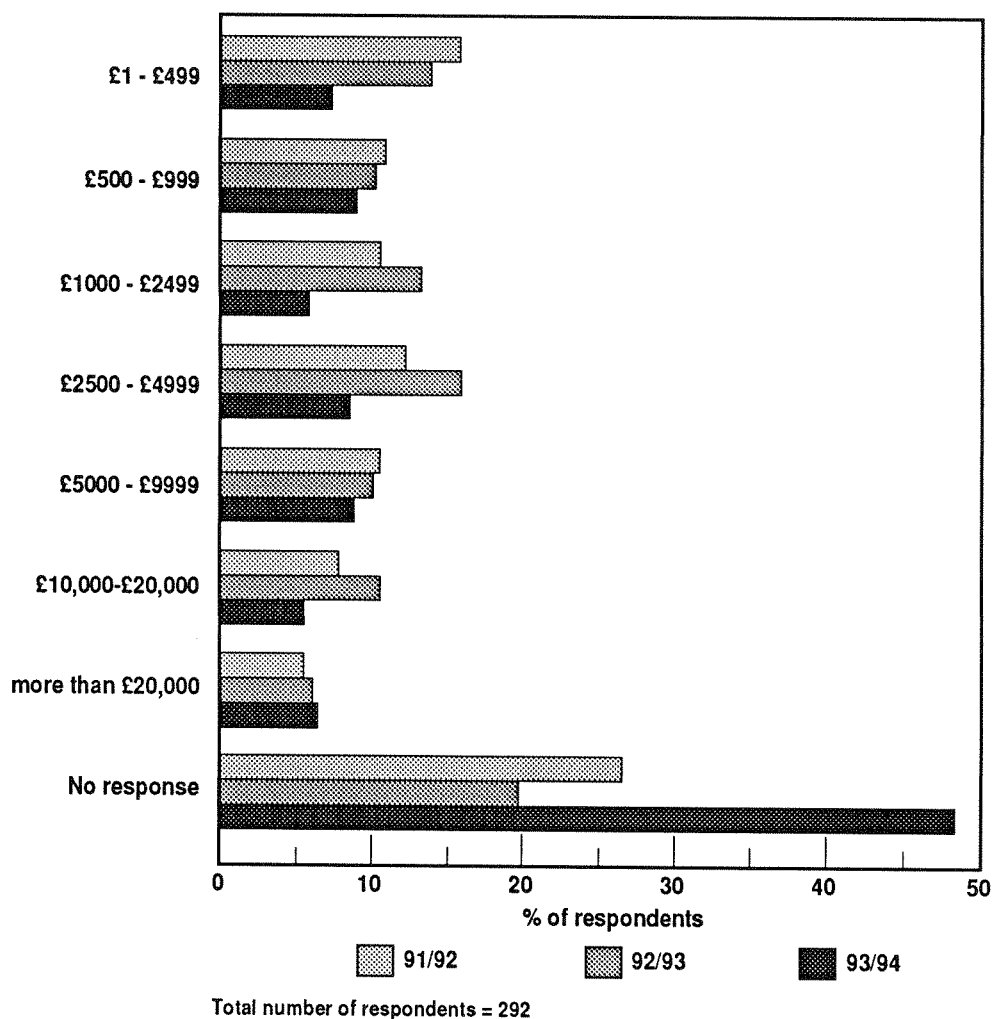
The number of respondents indicating the value of their IT budget has been grouped into the ranges shown in Figures 2.5 and 2.6 overleaf.

Figure 2.5 Primary Survey: School budget money for IT equipment



In the case of both the primary and secondary respondents, the budgets quoted in excess of £2,000 and £20,000 respectively emphasises that the large sums reported by some IT co-ordinators were atypical since they were found in a very small number of schools. In some instances comments written by respondents indicated that the school had received an unusually large sum for a specific reason such as an insurance claim following a fire.

Figure 2.6 Secondary Survey: School budget money for IT equipment



Additional funding

Schools were also asked about any additional sources of funding received during the financial year 1992-3 for IT purchases. Of respondents who had answered this question, 55 per cent of primary schools had received additional funding as compared with 68 per cent of secondary schools. Tables 2.2 and 2.3 show the most frequently cited sources of additional funds.

TABLE 2.2: Sources of additional funding for IT purchases for primary schools during 1992-93

	Percentage of schools
PTA/PA/School Association	27%
GEST	26%
LEA	21%
Additional sums from School budget	11%
Other	31%

Based on 100 responses from 89 primary schools.

Respondents could list as many sources as appropriate, so total does not sum to 100%.

Within primary schools, income from Parent/Teacher Associations was named as frequently as GEST funding as a source of finance for IT purchases. LEA grants were also frequently reported.

TABLE 2.3: Sources of additional funding for IT purchases for secondary schools during 1992-93

	Percentage of schools
TVEI	40%
GEST	18%
PTA/PA	12%
Additional sums from School budget	11%
LEA	10%
Other	41%

Based on 234 responses from 168 secondary schools.

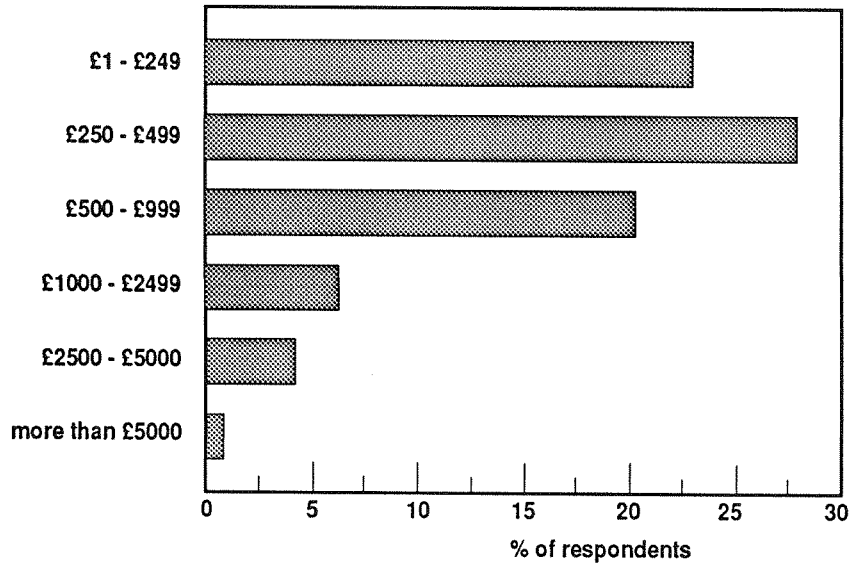
Respondents could list as many sources as appropriate, so total does not sum to 100%.

Clearly the most frequently cited source of additional funding for secondary schools was TVEI extension funding, which was reported by four out of ten schools who had received additional funds. Other sources, which were each named by fewer than 10 per cent of respondents, included:

- the Careers Service
- Tesco coupons
- GMS start-up funds
- the NCET/government CD-ROM pilot scheme
- school governors' funds.

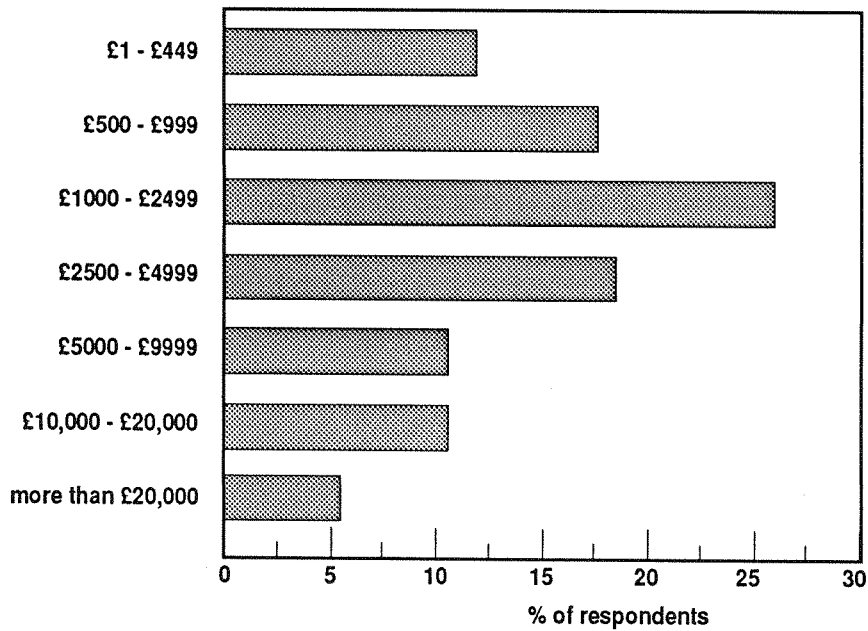
Not surprisingly primary schools attracted smaller sums than secondary schools (see Figures 2.7 and 2.8) with the median sums received in additional funding amounting to £425 and £2000 respectively.

Figure 2.7 Primary Survey: Average amount of additional funding



93 respondents stated they received additional funding for IT purchases

Figure 2.8 Secondary Survey: Average amount of additional funding



177 respondents stated they received additional funding for IT purchases

SOURCES OF INFORMATION

Commercial software catalogues

Telephone interviews with IT co-ordinators indicated that teachers used a variety of sources in addition to their LEA IT support services to gather information about software. Software catalogues from publishers such as Sherston, Resource and SPA were frequently named, with some teachers commenting on the value of having a general catalogue from software suppliers such as AVP and Reckitts. Secondary teachers used a wider range of information sources which reflected their more disparate hardware platforms. Their more sophisticated curriculum needs were indicated by greater use of industrial standard software suppliers. In addition to the primary list, software catalogues named were:

- Capedia
- Longman Logotron
- Macline
- NCET
- TAG.

A few schools found Whitaker's Educational Software (1992) useful for indicating the range of subject-specific programs.

Magazines

Several primary teachers referred to articles in general publications such as Child Education, Junior Education and the Times Educational Supplement and some also named specialist magazines. Secondary teachers also listed a range of publications which they found helpful. The ones most frequently named by primary and/or secondary teachers were:

- Acorn User
- Acorn Archimedes World
- Educational Computing and Technology
- Archive
- Equipment Today
- MacUser
- MacWorld
- PC Today
- What PC?

With regard to articles in national publications, one teacher commented that the most useful type of software review compared different programs, describing the strengths and weaknesses of each one.

Local sources of information

At a local level, teachers frequently commented on the value of the LEA IT computer centre and advisory staff. These centres provided information about software in several ways:

- ◆ software catalogues listing programs available
- ◆ periodical newsletters with articles about new programs
- ◆ regular open workshops/'drop in' sessions for teachers to examine software at the IT centre
- ◆ IT INSET courses offered by the LEA provided teachers with opportunities to use a variety of programs
- ◆ software help lines
- ◆ part-time IT advisory teacher secondment.

Several of the teachers interviewed commented on the value of LEAs as a source of trusted information about software, and expressed concern over the potential demise of LEA support services.

A number of teachers referred to local IT support groups, or informal links with IT coordinators in local schools. These links enabled teachers to share views on specific programs; one commented on the value of '*personal recommendations from other teachers - first hand advice is better than magazines.*' Another teacher valued the opportunity to examine software at the LEA IT centre and stated

'I wouldn't buy software without having seen it or having [had] a recommendation from someone I trust.'

Independent schools had their own formal and informal information networks; some reported that they were using LEA services where they survived.

Organisations and exhibitions

Some primary teachers found that membership of MAPE (Micros and Primary Education) was beneficial in that they received newsletters and free software. The National Association of Coordinators and Teachers of Information Technology (ACITT) seemed to be providing a national focus for secondary teachers with an annual conference and an informative quarterly newsletter.

Several teachers commented that attending conferences and exhibitions was a useful source of information, referring specifically to:

- ◆ the British Education and Training Technology (BETT) exhibition in London
- ◆ the annual conference and exhibition staged by Resource at Doncaster
- ◆ the Education Show at the National Exhibition Centre in Birmingham
- ◆ local Acorn roadshows.

SOURCES USED TO OBTAIN SOFTWARE

Range of sources used

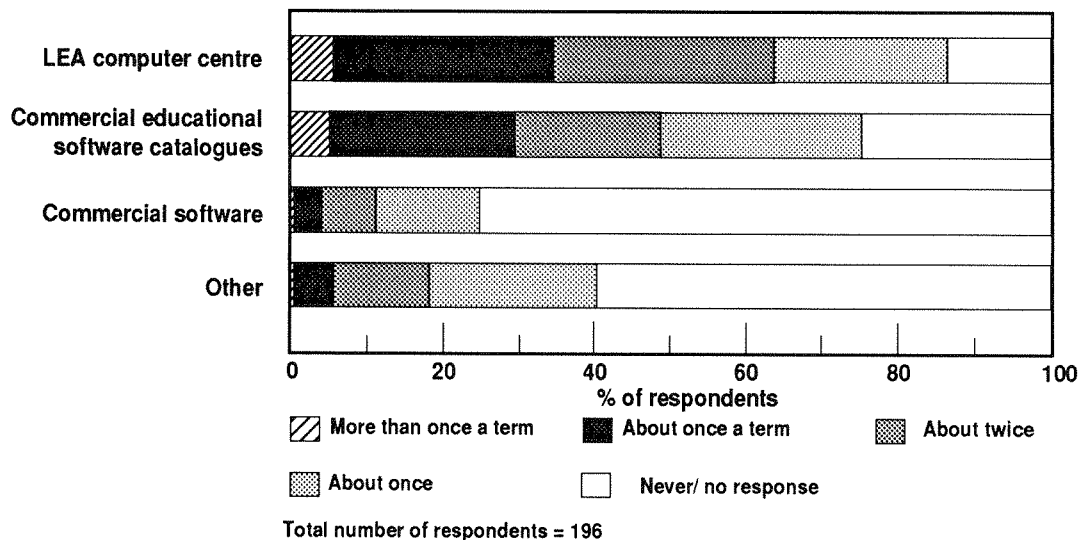
The questionnaires sent to both primary and secondary schools asked how frequently a number of different sources had been used to obtain software since April 1992. Sources listed on the questionnaire were:

- ◆ LEA computer centre
- ◆ commercial educational software catalogues (e.g. 4mation, Sherston etc.)
- ◆ commercial software (e.g. Microsoft, Lotus)
- ◆ direct from NCET
- ◆ school or personal membership of a relevant specialist organisation (such as MAPE or Microcomputer Users in Education - MUSE).

Respondents were also given the opportunity to list any other sources they had used.

For primary schools, the two sources most frequently used to obtain software were the LEA computer centre and commercial educational software catalogues (see Figure 2.9). In each case, roughly a third of respondents indicated that the source was used at least once a term, and about a third more stated that they had obtained software from the LEA computer centre about twice in the last year. Other sources were used less frequently, with roughly 20 per cent of respondents indicating that software was obtained about once from commercial software suppliers, NCET and MAPE. (These less-frequently used sources have been grouped together in Figure 2.9).

Figure 2.9 Primary Survey: Frequency of obtaining software from sources

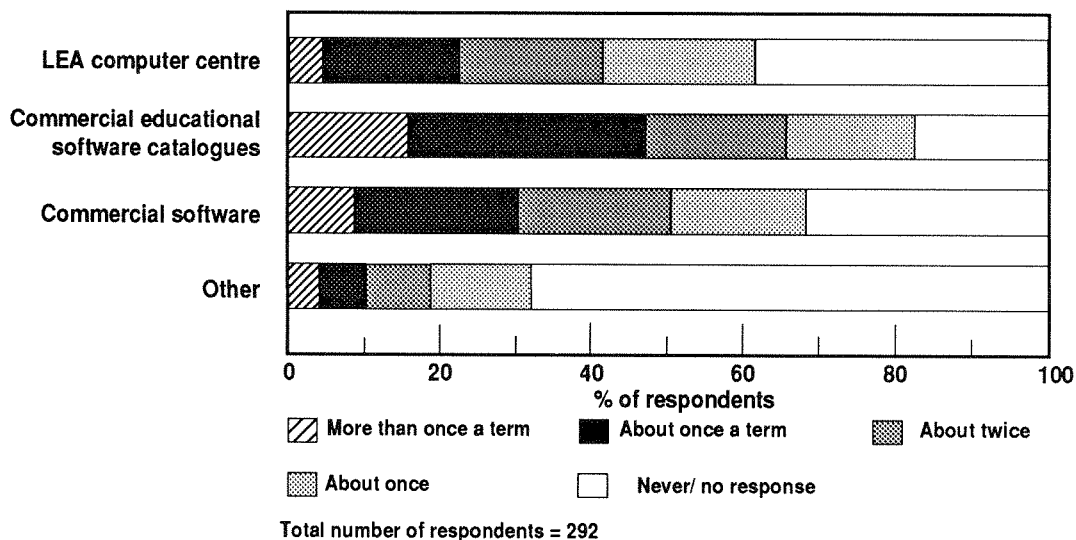


Only 13 responses indicated sources other than those named as having been used, typically software bundled with new hardware, an annual software pack distributed by the LEA, and, in one case, Blue File software (programs originally intended for children with special educational needs but with potential relevance throughout the primary

phase; although originally distributed by regional Special Education Micro-Electronics Resources Centres - SEMERCs - these programs can usually be obtained from LEA computer centres at nominal cost).

The pattern of secondary schools' purchases was rather different, with commercial educational software* purchases being reported more frequently than any other source. Fifty-two per cent of respondents stated that this source had been used at least once a term since April 1992, with 17 per cent indicating that purchases from this source were made more than once a term. Other sources extensively used by secondary schools were commercial software** suppliers and LEA computer centres. Ten per cent of respondents indicated that they had bought commercial software more than once a term, twice as many as had bought from the LEA computer centre with the same level of frequency. Similar numbers of schools had used these two sources both termly and twice a year (see Figure 2.10).

Figure 2.10 Secondary Survey: Frequency of obtaining software from sources



As with the primary respondents, other sources (including MUSE membership and NCET) had not been used by significant numbers of schools. Sixty-three respondents cited other sources: hardware manufacturers (Acorn, Apple, ICL but predominantly Research Machines) were frequently named, together with more general references to software bundled with hardware.

Purchases related to INSET

Schools were asked whether or not software (or software-related resource packs) had been purchased as a result of staff attending out of school IT-related INSET courses since April 1992. Primary schools were much more likely to make purchases than secondary teachers: roughly six out of ten primary schools had made purchases as compared with about four out of ten secondary schools.

* Commercial educational software was exemplified on the questionnaires by listing companies such as 4mation and Sherston.
 ** Commercial software was exemplified on the questionnaires by listing companies such as Microsoft and Lotus.

HOW SCHOOLS OBTAIN SOFTWARE

Of the primary schools who stated they had made purchases as a result of INSET, Table 2.4 shows the numbers of purchases. The median number of programs purchased after INSET was three, although the number of purchases ranged from 0 to 20.

TABLE 2.4: Number of programs and software-related resource packs purchased by primary schools as a result of attending out of school IT-related INSET courses

Number of items purchased	Percentage of primary schools who had purchased:	
	Programs	Software-related resource packs
0	13%	58%
1	17%	13%
2	20%	17%
3	16%	4%
4	15%	3%
5	6%	3%
6-10	10%	1%
11-20	3%	1%

Based on responses from 111 schools.

The pattern of secondary schools' purchases following INSET is shown in Table 2.5.

Table 2.5: Number of programs and software-related resource packs purchased by secondary schools as a result of attending out of school IT-related INSET courses

Number of items purchased	Percentage of secondary schools who had purchased:	
	Programs	Software-related resource packs
0	17%	53%
1	28%	27%
2	22%	12%
3	16%	3%
4	6%	-
5	3%	1%
6-10	6%	2%
11-20	2%	2%

Based on responses from 123 schools.

As in the case of primary schools, over 80 per cent of respondents had purchased programs, although fewer than half the respondents had purchased software-related resource packs; the median number of programs purchased was two programs, with the total number of programs bought ranging from 0 to 20.

Since the majority of both primary and secondary schools reported that the INSET courses had been provided by the LEA (more than 95 per cent in each case), this is further evidence of the influence of LEAs in terms of the software purchased by schools.

3. SCHOOLS' SOFTWARE PURCHASES

INSTALLED HARDWARE BASE

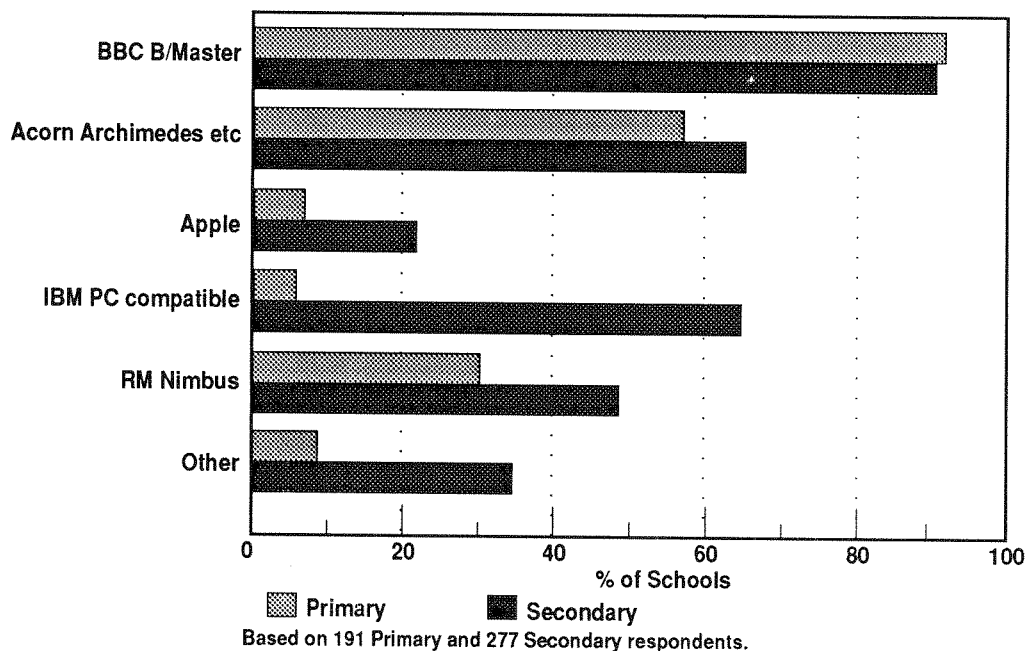
Although primarily concerned with the range of software in use in schools, the project investigated hardware provision since despite the fact that many programs are available for different types of computer, some software is only available for limited types of hardware. Consequently the types of hardware available in schools will affect their use of software. This becomes an increasingly important issue for schools where different hardware bases are in use, either with certain types of hardware concentrated within age ranges, or where different machines are used (perhaps for different applications) throughout the school.

The two most widely available hardware bases in primary schools were BBC B/BBC Master and Acorn Archimedes, present in over 90 per cent and nearly 60 per cent of schools respectively. Schools reported having 1-21 BBC machines with a mean of five per school, and 1-11 Acorn Archimedes systems with a mean of two per school. In many schools both BBC and Archimedes machines were in use. Less common were RM Nimbus computers, present in about a third of schools, who reported having 1-25 machines, with a mean of one per school.

Very few schools reported having Apples or IBM PC compatibles: those that did had few available. A small number cited other computers including RM 480Z, BBC Master Compact and laptops such as the Acorn Pocket Book and Amstrad Notebook. Figure 3.1 shows the types of machines available in the primary and secondary schools that responded to this survey.

Across all primary respondents, the mean number of computers available for children's use was eight per school.

Figure 3.1 *Primary and Secondary Surveys: Types of hardware available in schools*

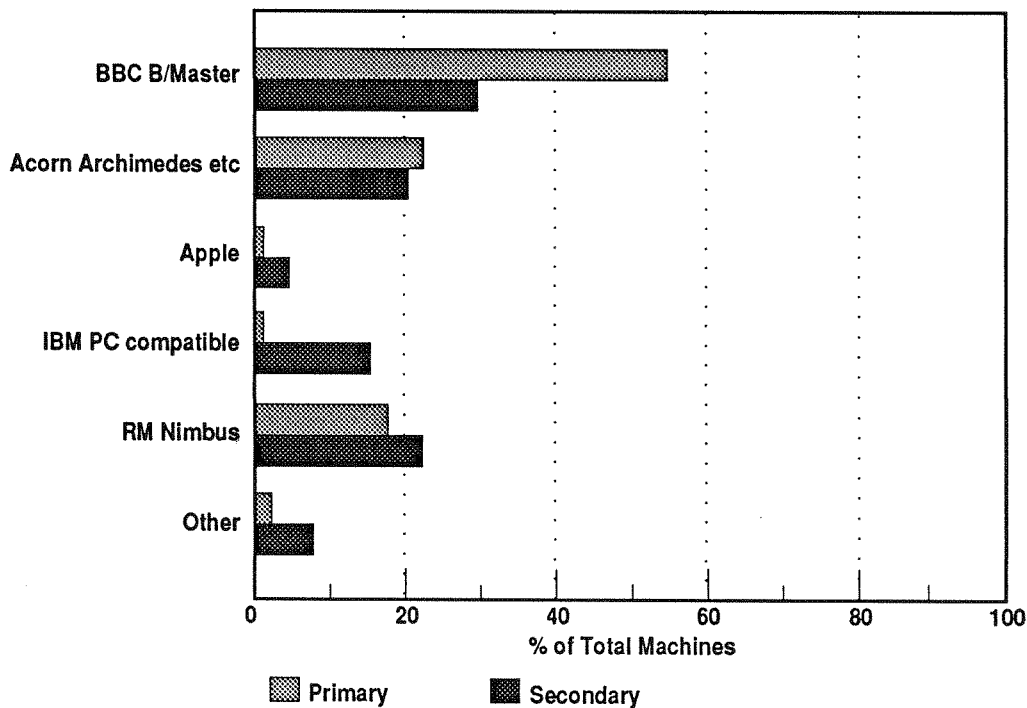


Secondary schools reported a wider range of hardware available for pupils' use, with schools frequently citing three or more hardware bases in use. The most widely used hardware bases were BBC B/BBC Master (90 per cent), Acorn Archimedes and IBM PC compatible (both about 65 per cent) and RM Nimbus (about half of secondary respondents). Apple machines were reported in just over a fifth of schools. Secondary respondents reported a wider range of other machines in use, of which the most frequently cited were Amstrad, Amiga, Atari and laptops such as the Nimbus Notebook and Cambridge Z88.

In terms of the total number of computers available in secondary schools, this ranged from a minimum of four to a maximum of 202, with a mean number of 58 machines per school.

Taking into account the numbers of different types of machine available in schools, Figure 3.2 shows what percentages of the total number of machines available in primary and secondary schools respectively are of each of the types listed. Generally, the profile of hardware available in schools that responded to this survey is similar to that reported in the most recent Survey of Information Technology in Schools (DFE, 1993), see Appendix 3.

Figure 3.2 Primary and Secondary Surveys: Different types of hardware available as a percentage of all hardware available

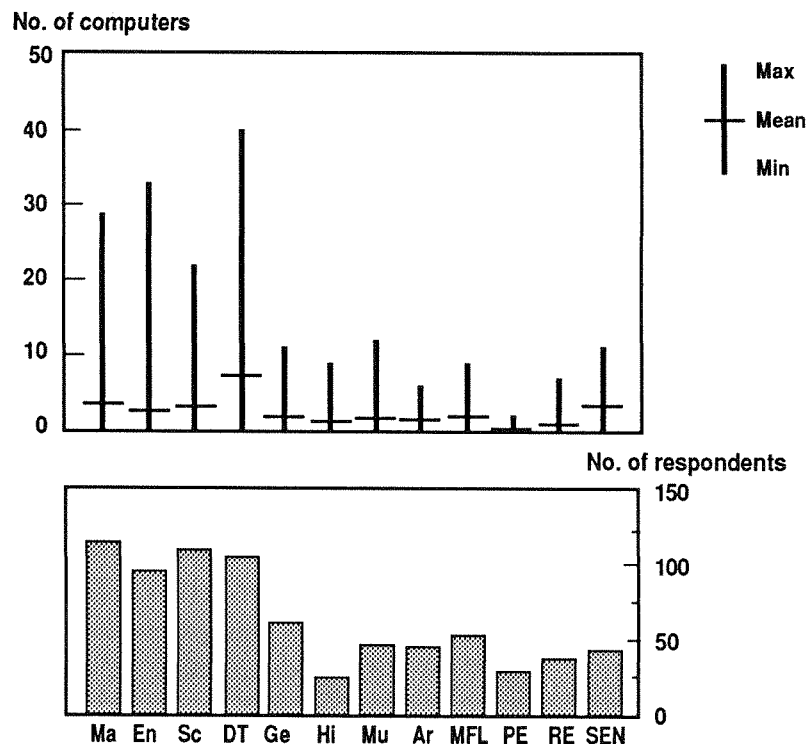


Based on 191 Primary and 277 Secondary respondents.

In order to clarify the IT resources available to specific departments within secondary schools, the subject inserts for completion by heads of department asked about the number of computers available for pupils' use exclusively in their department. Figure 3.3 shows the number of computers available for use in specific departments.

Although the number of respondents for some departments was fairly low, it is likely that this information is representative of typical departments or even some better-equipped departments, since arguably those who make little use of IT were less likely to complete and return the questionnaire. Responses shown in Figure 3.3 suggest that the departments which had the best provision, in terms of numbers of machines available for use solely within the department, were Mathematics, English, Science and Design Technology.

Figure 3.3 *Subject Inserts: Numbers of computers in own department*



EXPENDITURE

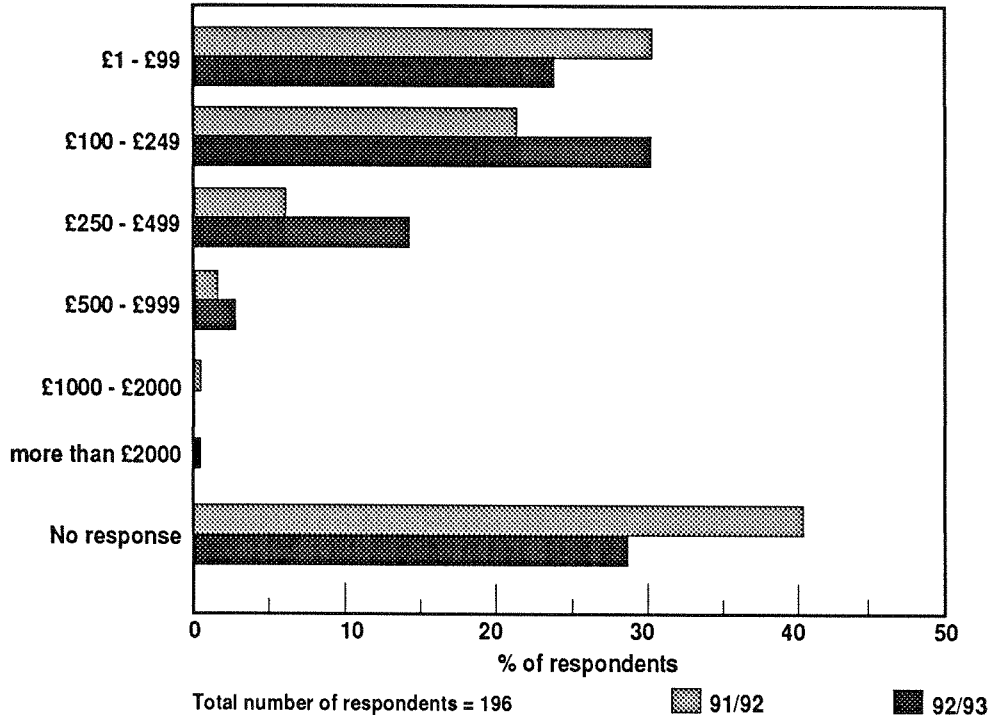
Primary schools

Primary and secondary schools were asked to give their expenditure on software for the financial years 1991-92 and 1992-93. In secondary schools the core questionnaire asked for expenditure by the IT department and the subject inserts requested the expenditure for the specific departments.

For primary schools, expenditure on software for 1991-92 ranged from £10-£1,600 and for 1992-93 from £15-£4,200. The sums spent by schools have been grouped in Figure 3.4 and show general patterns of expenditure. The median expenditure on software was £100 for 1991-92 and £150 for 1992-93, representing a pattern of increased spending, although 26 per cent of primary schools spent less on software in 1992-93 than they had done in the previous year.

Figure 3.4 Primary Survey: Actual expenditure on software

Expenditure for the financial year

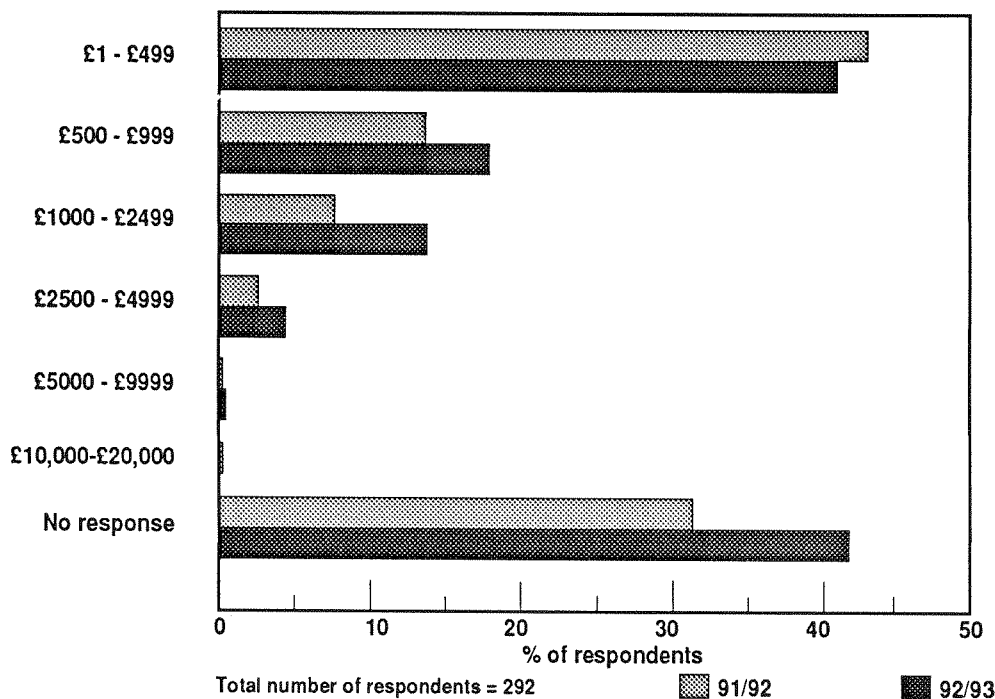


Secondary schools

Responses from secondary schools showed that expenditure on software ranged from £20-£19,000 for 1991-92 and from £5-£7,650 for 1992-93. As with primary schools, there was a general trend towards increased spending on software for 1992-93, which can be identified from the increase in median expenditure from £400 (1991-92) to £500 (1992-93). Figure 3.5 shows secondary schools' expenditure on software for the two years.

Figure 3.5 Secondary Survey: Actual expenditure on software

Expenditure for the financial year



Spending on software within secondary subject departments varied considerably, with some purchasing no software from departmental budgets, and others spending considerable sums. Design Technology departments were consistently spending more on software than other departments, with one school reporting expenditure amounting to £15,000 in 1991-92, having purchased site licences for several state-of-the-art design packages. Expenditure on software by different departments is shown in Figures 3.6 and 3.7. These figures are logarithmically scaled in order to show the whole range of sums cited by respondents. The mean values of departments' expenditure are represented by horizontal lines, where the vertical line for each subject illustrates the maximum sums spent; minimum sums quoted by each department for each year were £0 although these have not been shown on the scale.

Mean values of departmental expenditure on software have been given instead of median values, since across subject departments, many respondents reported no expenditure at all on software for either one or both of the years in question. This would result in a median expenditure of nothing in some subjects where fewer than half the respondents reported having purchased software from their departmental budgets.

Figure 3.6 *Subject Inserts: Expenditure on software by subjects 91/92*

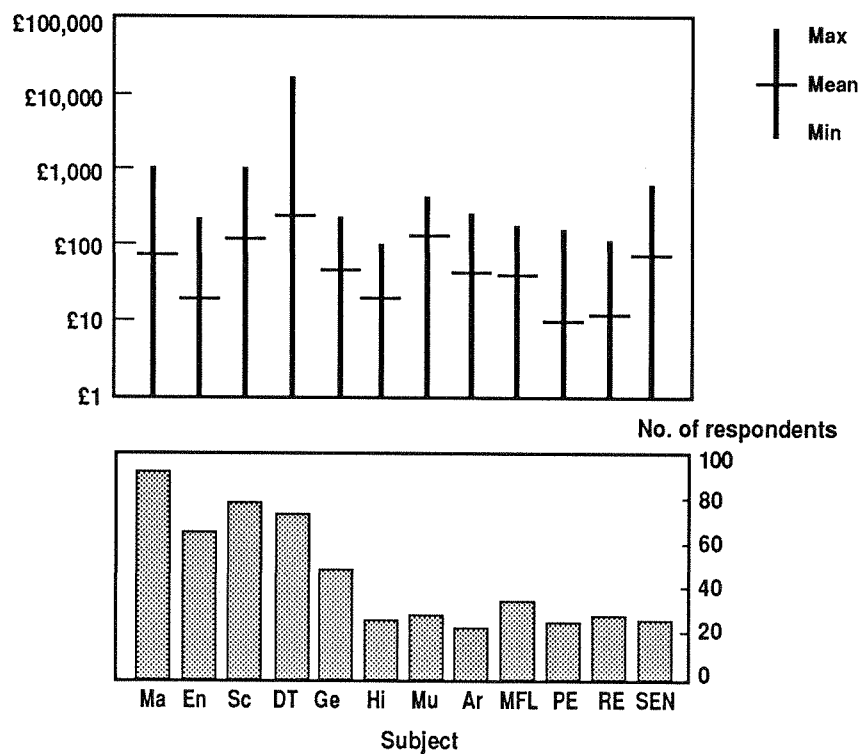
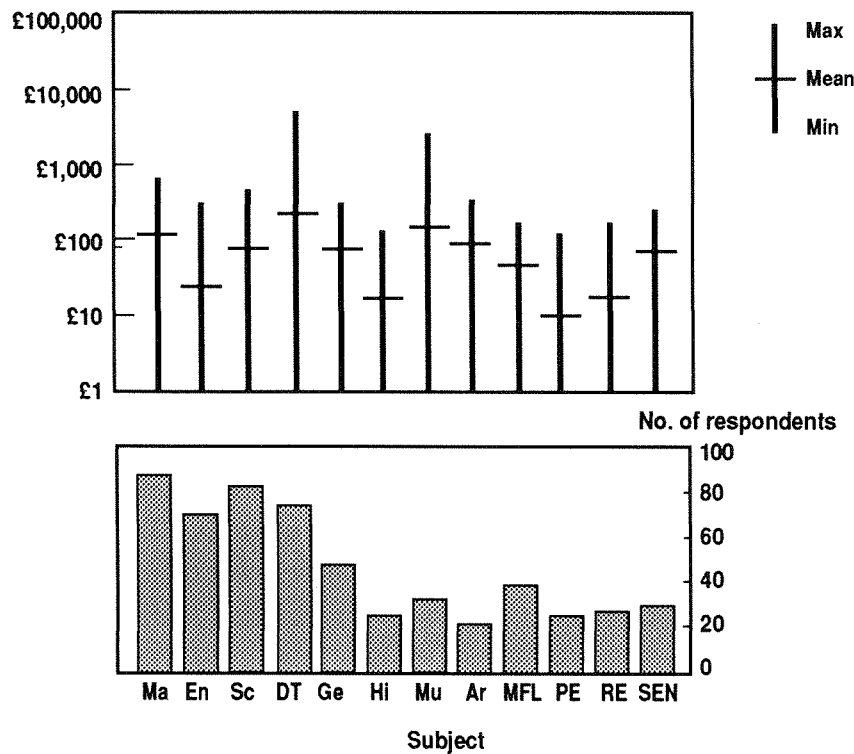


Figure 3.7 Subject Inserts: Expenditure on software by subjects 92/93



Software costs

IT co-ordinators in both primary and secondary schools were asked to indicate the cost of their cheapest, dearest and typical software purchases for single units and/or multiple units/networks as appropriate. The mean values for each category are shown in Table 3.1.

Table 3.1: Mean cost of a single software purchase for the financial year 1992-93

	Single Units			Multiple Units/Network		
	Cheapest	Dearest	Typical	Cheapest	Dearest	Typical
Pri	£12	£51	£25	£25	£83	£44
Sec	£23	£154	£55	£60	£425	£193

In comparing the sums quoted in Table 3.1 it should be borne in mind that these are mean sums, and there was a range of sums quoted. The largest ranges were quoted by secondary respondents in connection with the cost of the dearest site licence for multiple units/networks (£5-£2,000) and the cost of a typical site licence (£5-£1,380).

When asked to express their views on the pricing of software with reference to a five point scale, ranging from **very expensive** to **very cheap**, there was a consensus between primary and secondary respondents. In each case the majority of respondents indicated that in their view software was **quite expensive**, as shown in Table 3.2.

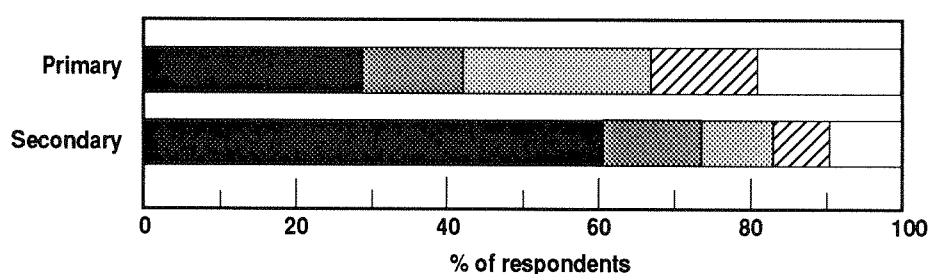
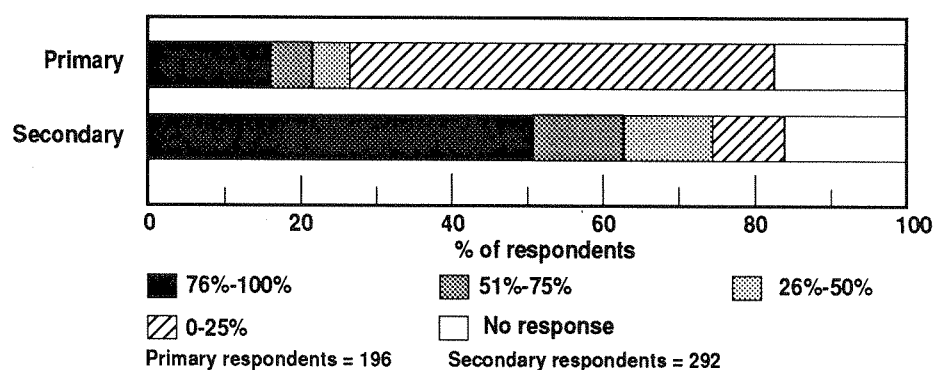
Table 3.2: IT Co-ordinators' views on software prices

	Percentage of respondents	
	Primary	Secondary
Very cheap	-	-
Quite cheap	-	-
Reasonably priced	29%	29%
Quite expensive	55%	53%
Very expensive	16%	18%

Based on: 181 responses from primary schools;
279 responses from secondary schools.

PROGRAMS PURCHASED

Schools were asked to indicate the percentage of software purchased since April 1992 which was cross-curricular or generic as compared with programs bought to support specific areas of the curriculum. They were also asked to indicate the percentage of purchases which were for stand-alone computers as compared with multiple units/networks (i.e. a single copy of a program needed rather than a site licence). Each question required teachers to state the balance between the specified areas in the form of a percentage, where the categories were mutually exclusive. This means that if, for example, a respondent stated that 60 per cent of purchases had been for cross-curricular software, the remaining 40 per cent would have been for subject-specific software. For this reason, only one of the areas for each question is represented on Figure 3.8, which shows cross-curricular purchases, and on Figure 3.9 which shows multiple unit purchases.

Figure 3.8 Primary and Secondary Surveys: Cross-curricular software**Figure 3.9 Primary and Secondary Surveys: Multiple unit software**

Primary schools' purchases

Responses from primary schools indicated that about 30 per cent of schools reported that 76-100 per cent of their purchases since April 1992 had been cross-curricular software. About another 15 per cent of schools stated that 51-75 per cent of their software purchases were of this type. Overall, this suggests that a considerable number of primary schools purchased both cross-curricular and subject-specific software without favouring one type significantly more than the other.

Secondary schools' purchases by IT departments

Interestingly, over 60 per cent of secondary schools reported that most of their software purchases had been cross-curricular or generic. This may be indicative of policy decisions to buy site licences for generic software which could be used by pupils in different subjects. Responses from secondary schools also showed that about half the schools purchased the majority of their software for multiple units/networks, clearly showing that purchases for stand-alone machines were a small proportion of their overall purchases. Conversely, primary schools' responses showed more purchases for stand-alone machines, with nearly six out of ten schools reporting that most software purchases were programs for single units.

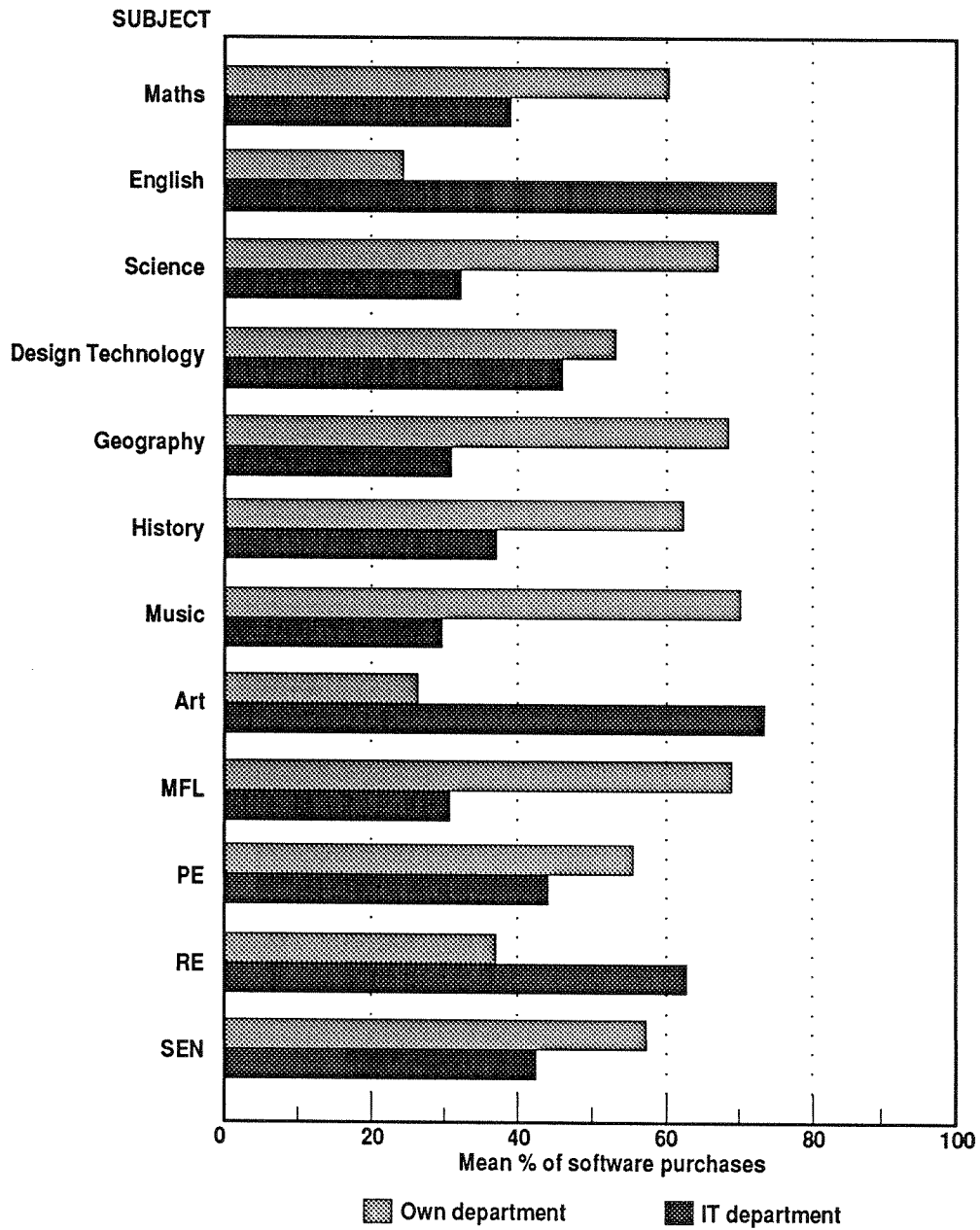
Secondary schools' purchases by other departments

The questionnaires for heads of department in secondary schools asked what percentage of programs available within the department had been purchased through their department as compared with purchases made through the IT department. The extent to which different departments purchased software for their own use varied considerably, with some respondents for each subject reporting that none, or, at the other extreme, 100 per cent of their available software had been purchased by their own department. The mean values of software purchases for each department are shown in Figure 3.10.

It is interesting to note that English and Art departments frequently reported that a large proportion of the software they used had been purchased through the IT department. In the case of English departments, this may be a case where generic software such as word processors and desk top publishing (DTP) packages were centrally purchased since they could be used by many departments. With regard to Art departments' purchases, the same may apply, since some graphics software can be used for posters etc. and therefore again be cross-curricular. Another possible explanation is that Art departments were spending the bulk of their budget on specific art equipment, especially consumables, and had to rely on the general IT budget to provide software for their use. A further option is that some Art departments are not yet making extensive use of IT as a medium for creative expression.

In addition to the information gathered from questionnaires, the telephone interviews provided an opportunity to investigate schools' recent software purchases. These interviews were conducted with 25 primary and 25 secondary school IT co-ordinators from the random sample of schools. Details of the types of program purchased by schools since April 1992 are included in Appendix 2.

Figure 3.10 Subject Inserts: Purchase of software



See Appendix 1 for details of respondents

4. SOFTWARE IN USE IN SCHOOLS

LOCATION OF COMPUTERS

Computers for pupils' use may be located in a number of places, depending on such factors as the number of machines available, the geography of teaching areas and other activities going on in the classroom. IT co-ordinators were therefore asked about the location of computers when pupils were using them, in terms of which positions were **mostly** used and which were used **occasionally** or involved only **a few** machines. The following locations were specified on the questionnaire:

- ◆ within classroom/teaching area
- ◆ near to classroom/teaching area (e.g. a quiet corridor)
- ◆ in an open resource room (e.g. library area)
- ◆ in a specific computer room.

In addition, respondents were given the opportunity to list other places where computers were **mostly** or **occasionally** used.

Location of computers in primary schools

Within primary schools, computers were **mostly** used within classroom/teaching areas, with nine out of ten respondents indicating this location was common practice. Some use was made of locations near to the teaching area, with about one in five teachers stating that computers were **mostly** used there and one in four reporting that they were **occasionally** used there. Locations other than those listed were not widely used.

Location of computers in secondary schools

The picture was rather different within secondary subject departments, with the two most widely used locations being within classrooms and in a specific computer room. For some departments the majority of computer-based activities were carried out in computer rooms: this was reported by significant numbers of Mathematics, English and RE departments. Other departments which reported mostly classroom-based computer work were

- ◆ Science
- ◆ Design Technology
- ◆ Music
- ◆ Art
- ◆ Special Educational Needs.

Responses from other departments suggested that computers were used in several locations.

Usage of stand-alones, multiple units and networks

Further details of the type of computer usage typical of different secondary school departments were provided by responses concerning the balance of pupils' work done on stand-alone units, multiple units and networks. Table 4.1 shows the mean percentage of work done using different systems.

Table 4.1: Mean percentage of work done by pupils in different departments using different computer facilities

	Single computer	Multiple units	Networks	Number of respondents to this question
Mathematics	36%	21%	43%	122
English	36%	22%	42%	93
Science	59%	21%	20%	102
Design Technology	59%	19%	22%	110
Geography	52%	16%	32%	63
History	43%	10%	47%	40
Music	87%	8%	5%	41
Art	70%	17%	13%	42
Modern Foreign Languages	43%	23%	34%	51
PE	33%	11%	56%	9
RE	49%	12%	39%	33
SEN	62%	18%	20%	43

In some cases, comments by respondents indicated that very little time was available to their department to use networks which were a shared facility. This may be one reason for the fact that many departments carried out the majority of computer-based work using stand-alones within the department.

RANGE AND INTENSITY OF SOFTWARE USE

A wide range of software is available for use within schools, and different subjects within the National Curriculum may draw upon some types of program more widely than others. Whilst acknowledging that software usage can vary considerably over a period of time, as different programs complement different aspects of learning, for example, an attempt was made to investigate the types of software in use and the extent to which they are used.

Questionnaires sent to primary and secondary schools therefore asked about the types of software which had been used by each year group within the school in the previous week. In the case of secondary schools, this question formed part of the inserts sent to specific departments. To put this information in the wider context of general usage of different types of software, schools were also asked to indicate how widely different types of programs were used within the school/department. Finally, general questions were asked about the age of software available and its use within the school/department.

Software used in primary schools

Within primary schools, certain types of software were widely used throughout all year groups. Word processing, information handling programs and adventures/simulations had all been used by roughly half or more of the schools that responded. Slightly less widely used programs included:

- ◆ creative software for art and/or music
- ◆ programs related to specific subjects within the National Curriculum
- ◆ floor turtle and/or Logo-type language
- ◆ practice exercises and puzzles.

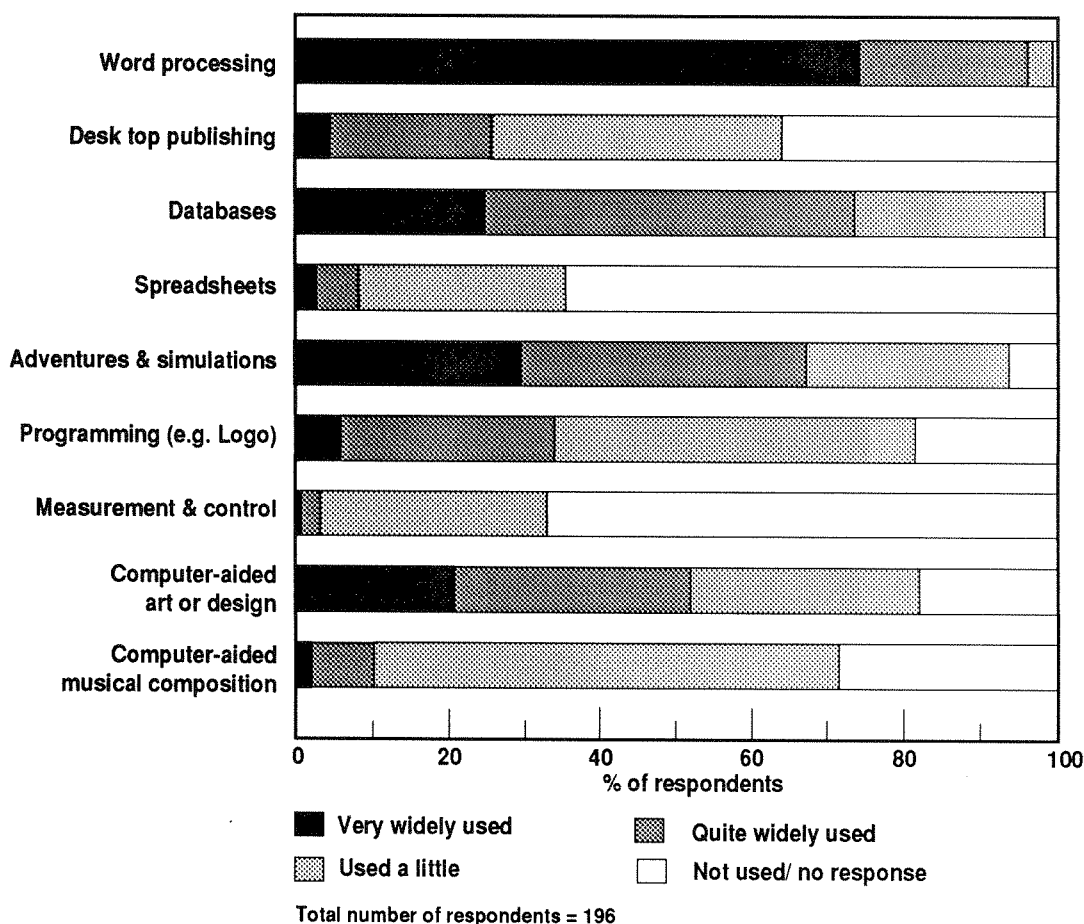
Desk top publishing, and to a lesser extent, work using spreadsheets and control technology, was more widespread in Years 5-7.

Table 4.2 shows the use of different programs across year groups. Other types of software listed by respondents were each used by fewer than 10 per cent of schools.

Table 4.2: Percentage of primary schools which indicated different types of program that were used in the week prior to completing the questionnaire

	Year Groups as defined for the National Curriculum							
	R	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Word processing	43	65	81	81	82	85	84	75
Desk top publishing	1	2	7	14	18	32	38	57
Databases and/or information handling	15	30	49	51	55	59	62	67
Spreadsheets	1	2	3	2	5	10	18	29
Adventures and simulations	36	48	49	51	49	46	53	47
Floor turtle and/or Logo type language	13	18	30	28	29	31	38	47
Creative software: art and/or music	23	25	29	30	39	37	38	36
Control technology	2	5	10	7	8	14	17	27
Software related to specific subjects under the National Curriculum	34	39	39	38	41	42	44	65
Practice exercises and puzzles	41	39	37	34	32	34	29	37
CD-ROM	1	1	1	1	2	1	3	7
Multimedia and hypertext	-	-	-	-	1	1	3	7
Electronic communications (e.g. E-mail)	-	-	-	-	-	-	3	7
No. of schools with pupils in specified year	R	Y1	Y2	Y3	Y4	Y5	Y6	Y7
	163	165	164	162	158	146	147	16

This reported range of software agrees with information provided by primary schools about the extent to which different programs are used, with word processing, information handling and adventures/simulations being widely used in at least two thirds of schools. It is possible that these types of program are widely used because they can generate or support thematic or topic work involving different areas of the curriculum. This is also true of computer-aided art or design, which was very widely used in one in five schools, and quite widely used in one in three schools. Other types of software were reported as being less widely used, as shown in Figure 4.1.

Figure 4.1 Primary Survey: Use of different types of software

Software used in secondary schools' departments

Responses from different secondary school departments showed, not surprisingly, that the programs most widely used were those which were particularly relevant to the curriculum, although word processors were also very widely used. Within Mathematics departments, the programs reported by the highest numbers of schools were:

- ◆ databases
- ◆ spreadsheets
- ◆ Logo-type work
- ◆ practice exercises/puzzles.

English departments were making extensive use of word processing and desk top publishing and Art and Music departments were making significant use of computer-aided art/design or musical composition programs as appropriate.

Software usage was more extensive in some departments than others: within Geography, RE and Modern Foreign Language departments, responses indicated that fewer than a quarter of schools had used any one type of software in the previous week, no PE respondents reported any use of software at all. Figures 4.2 to 4.6 show the types of program relatively widely used in Mathematics, English, Science, Design Technology and SEN departments.

Figure 4.2 Secondary Mathematics: Use of different software by age groups

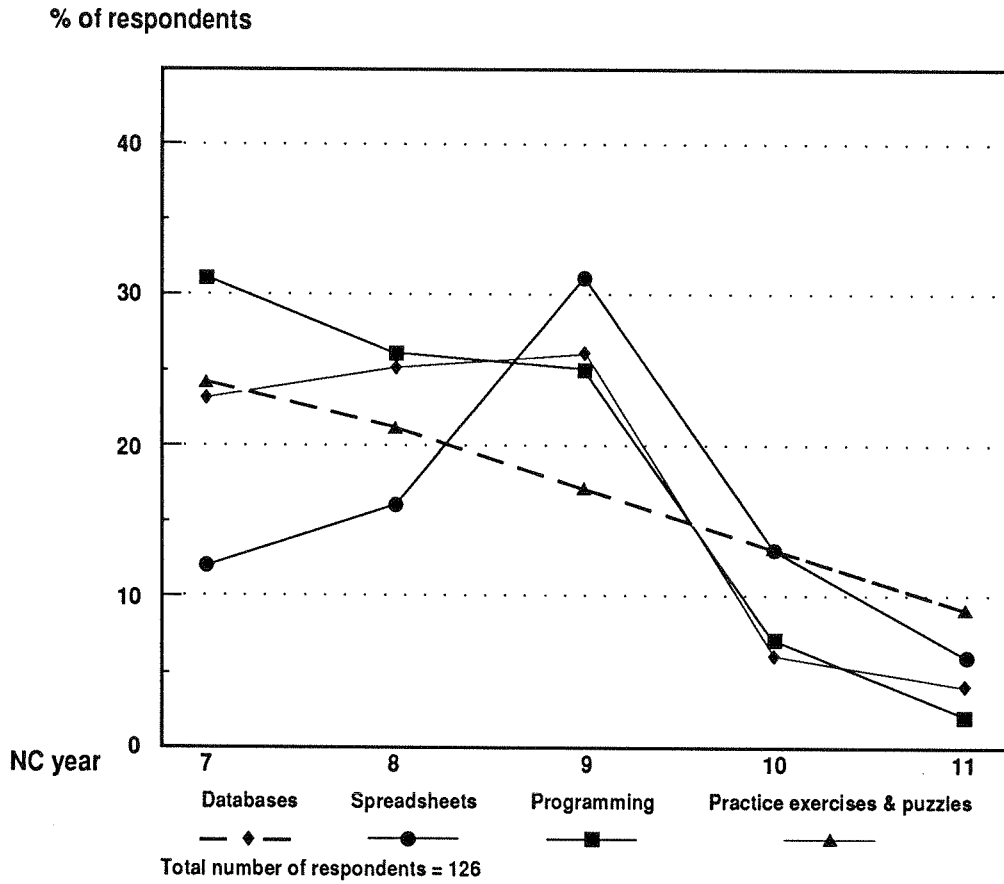


Figure 4.3 Secondary English: Use of different software by age groups

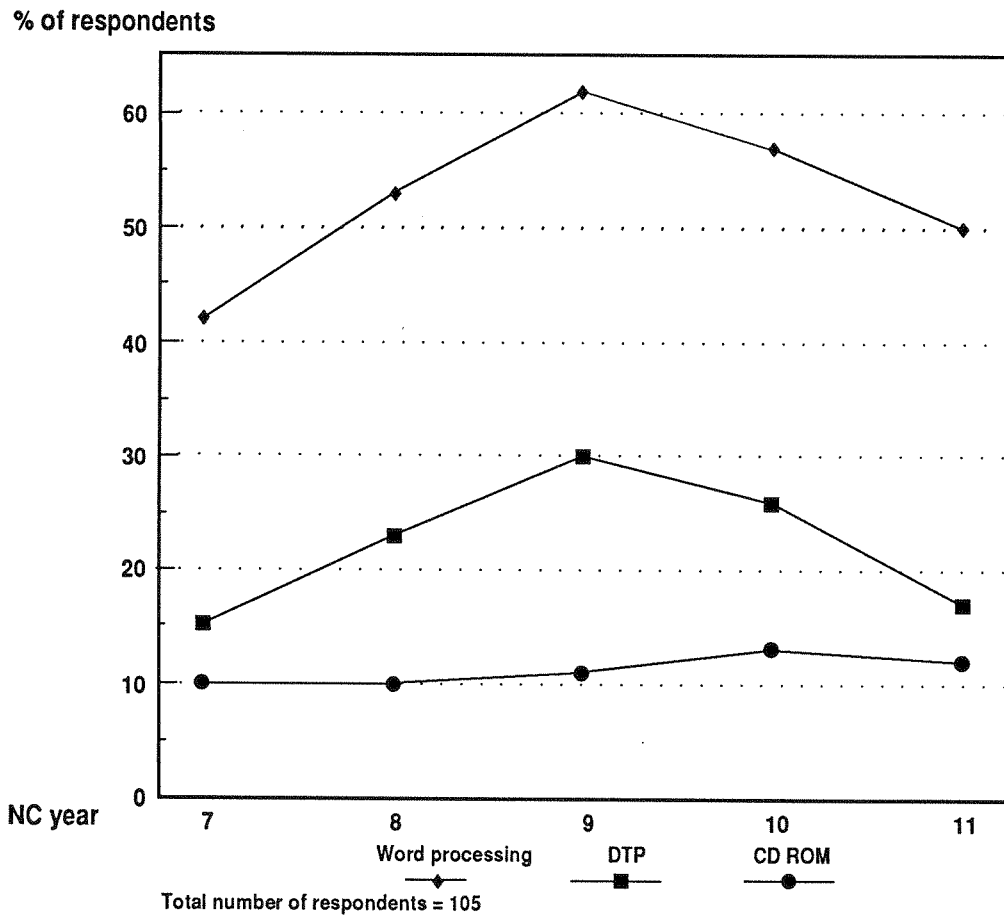


Figure 4.4 Secondary Science: Use of different software by age groups

% of respondents

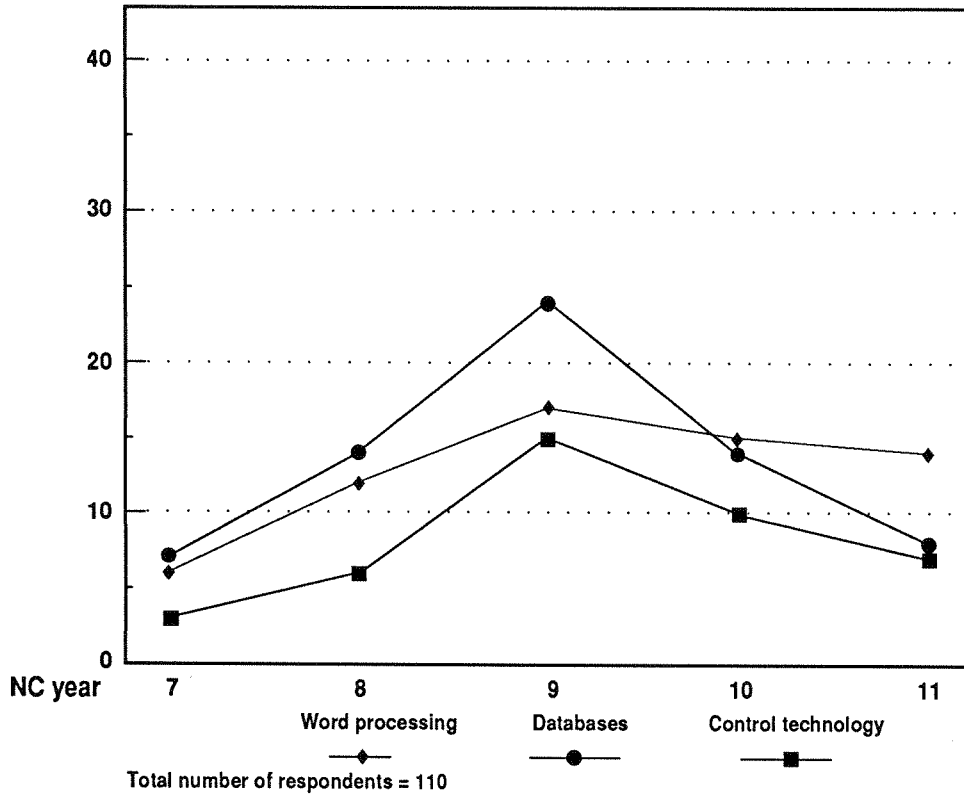


Figure 4.5 Secondary Design Technology: Use of different software by age groups

% of respondents

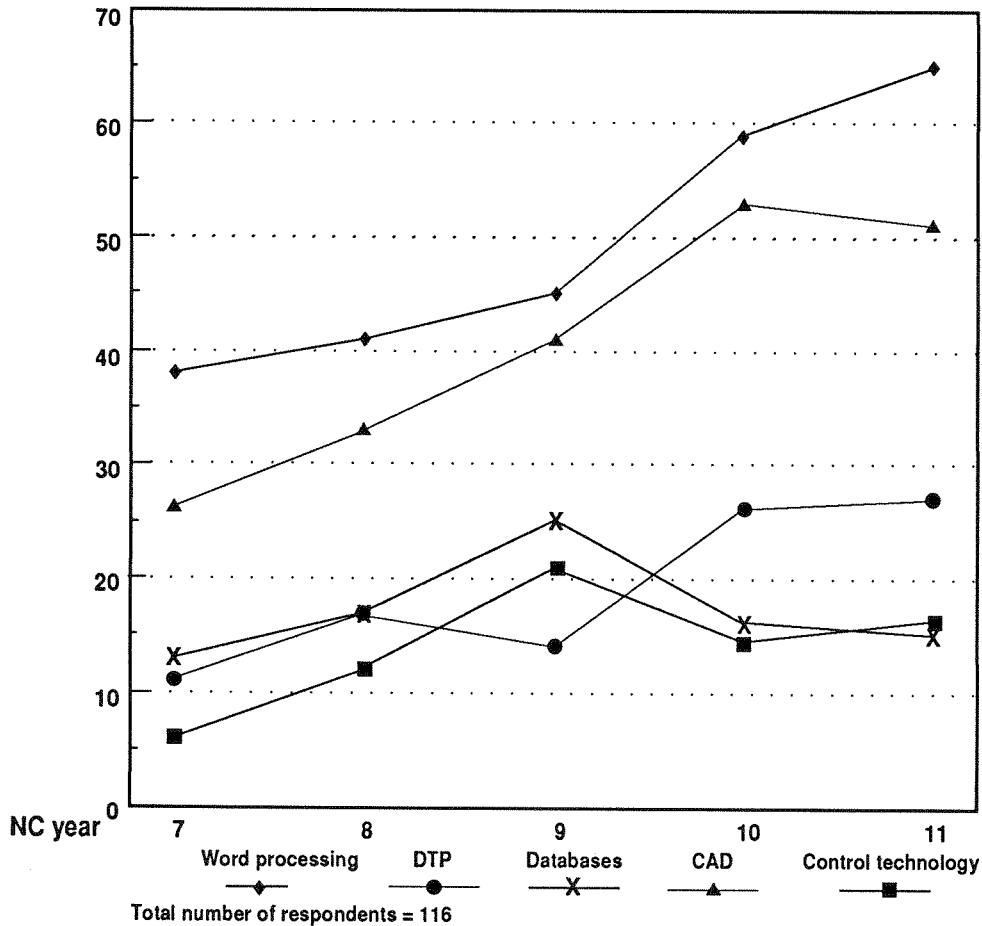
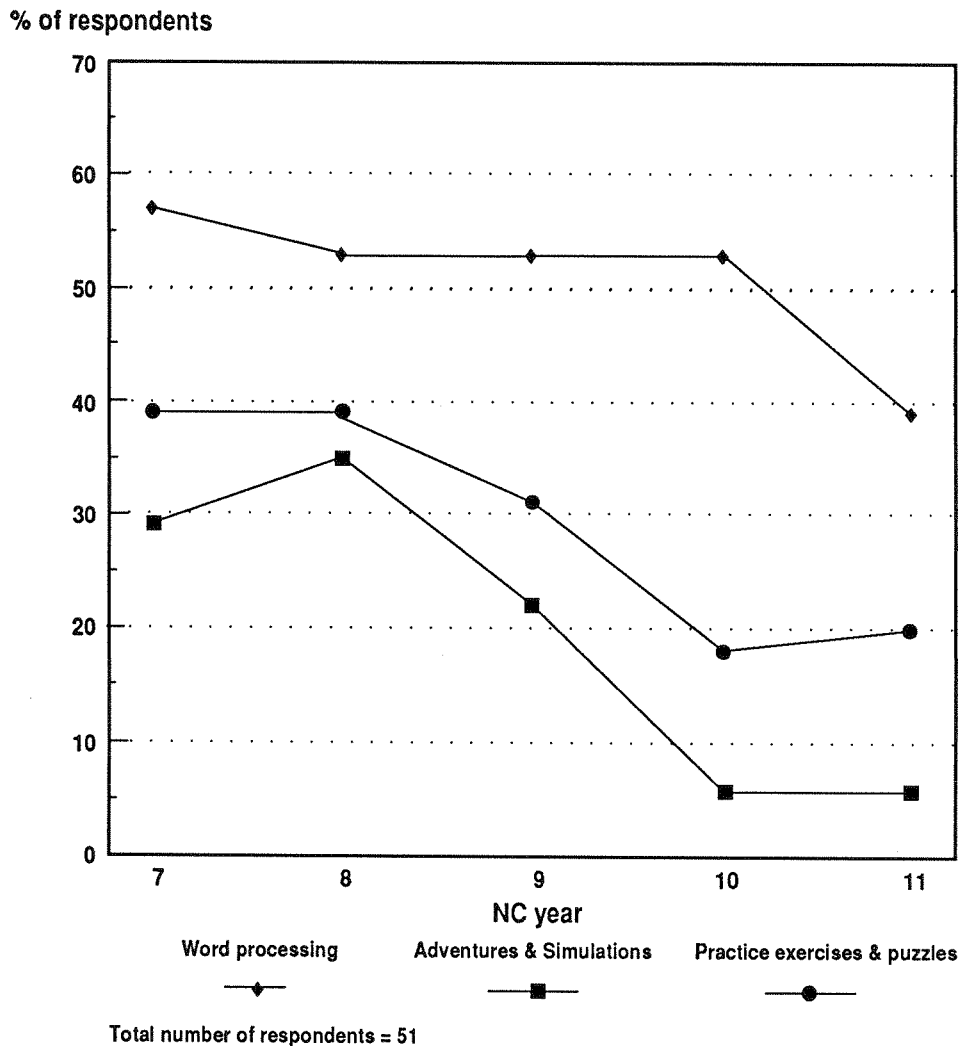


Figure 4.6 Secondary SEN: Use of different software by age groups

Patterns of software use in KS3 and KS4

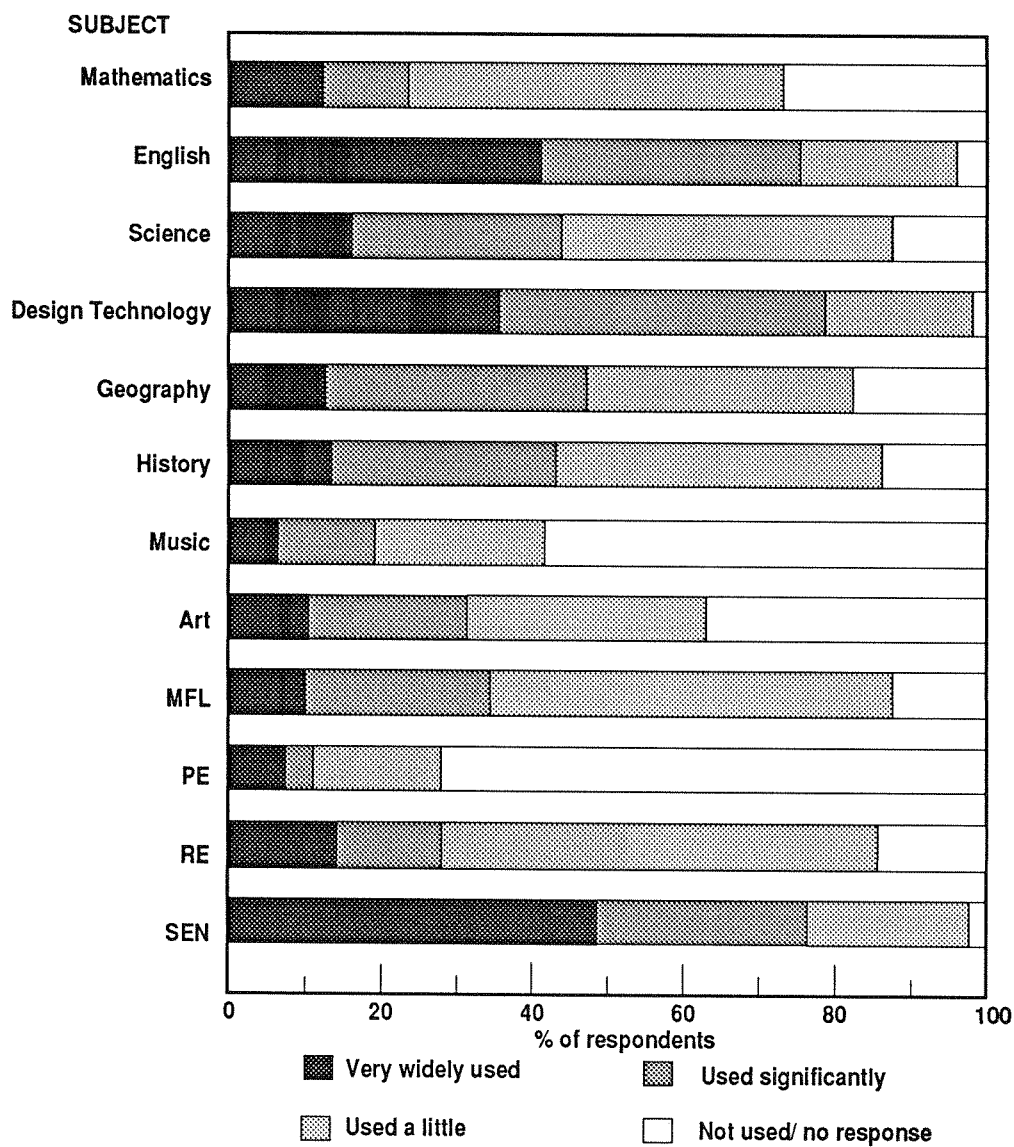
A trend which can be seen quite clearly in the use of software within Mathematics, English and Science departments is for the use of software to gradually increase from year 7 to year 9 and then decrease in years 10 and 11. This may be related to GCSE syllabi and the provision (or lack) of programs specifically related to the KS4 curriculum. However, it is interesting to note that within Design Technology the emphasis placed on some aspects of IT within the curriculum continues to increase during Years 10 and 11.

Widely-used software in secondary schools

Responses by different departments to the question concerning how widely used each type of software was confirmed trends identified in the previous question. Word processing was relatively widely used across departments; databases were also quite widely used, especially within science-based and humanities departments. Spreadsheets were most widely used in mathematics although adventures/simulations seemed to be used to some extent in most departments, especially SEN and humanities. Information concerning responses from different departments concerning their use of software is

shown in Figures 4.7 to 4.11 covering word processing, DTP, databases, spreadsheets and adventures/simulations. Other applications were more noticeably used only within appropriate departments (e.g. measurement or control of physical processes was quite widely used by a third of Science departments with only limited use in a few other departments).

Figure 4.7 Secondary Survey: Use of word processing software by department



See Appendix 1 for details of respondents.

Figure 4.8 Secondary Survey: Use of DTP software by department

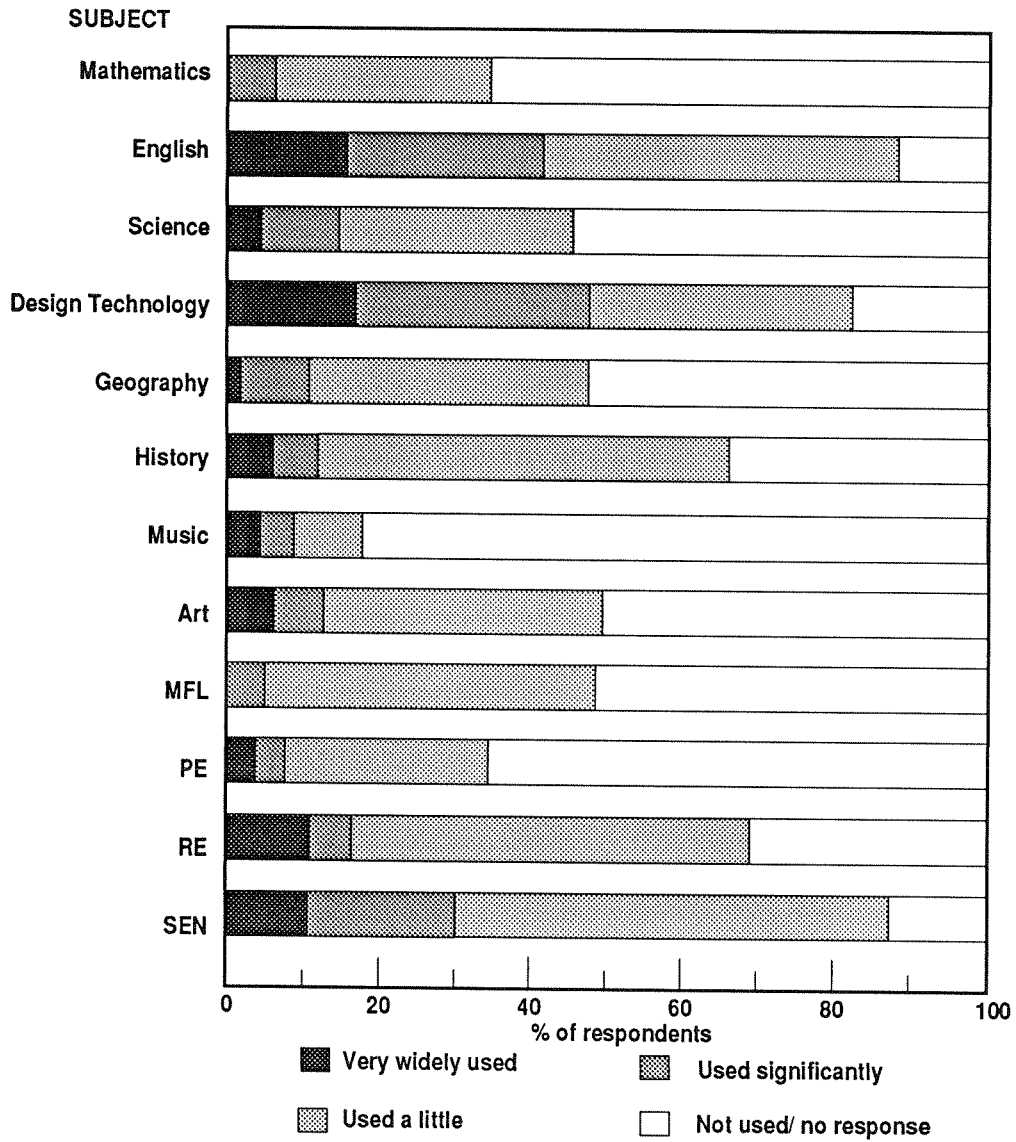
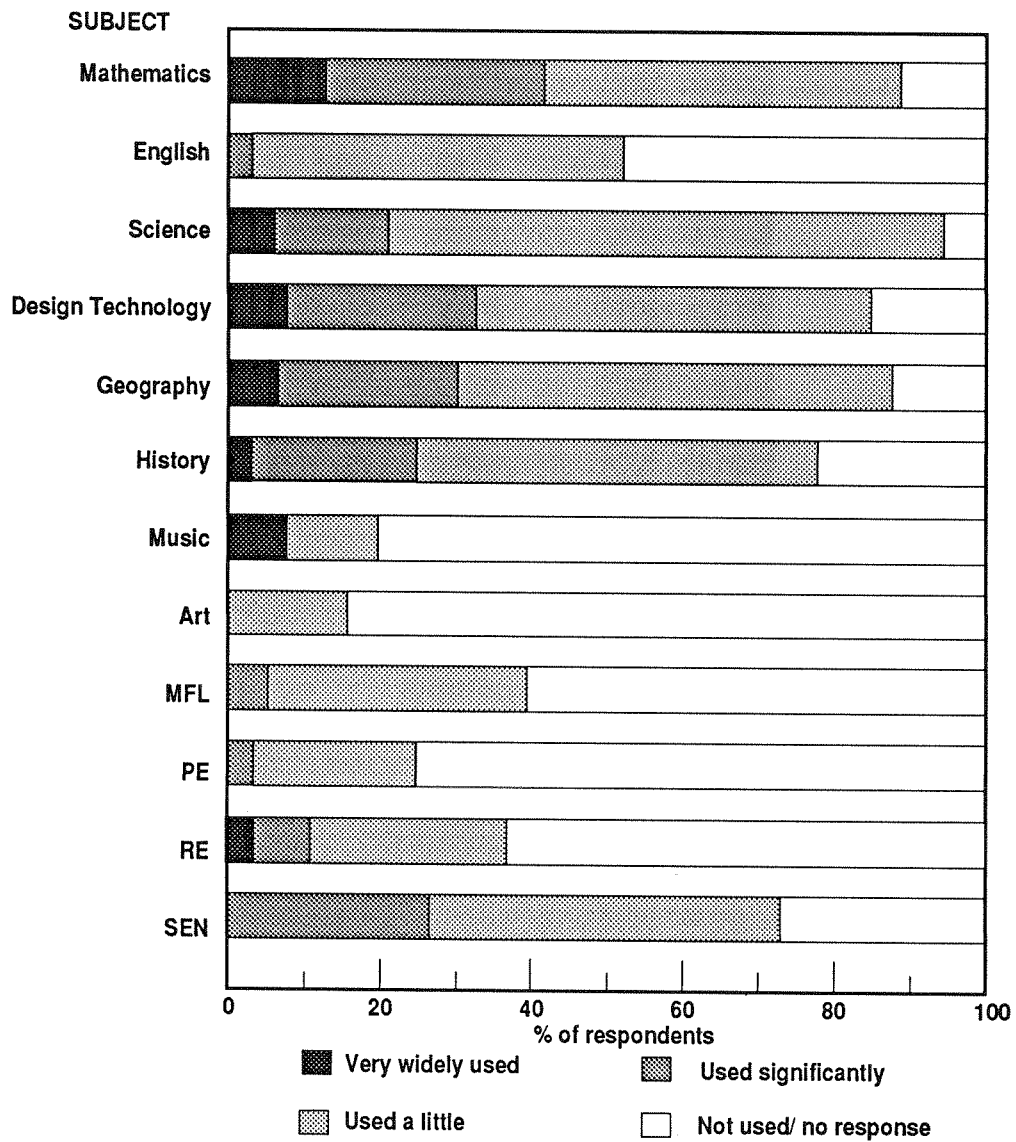
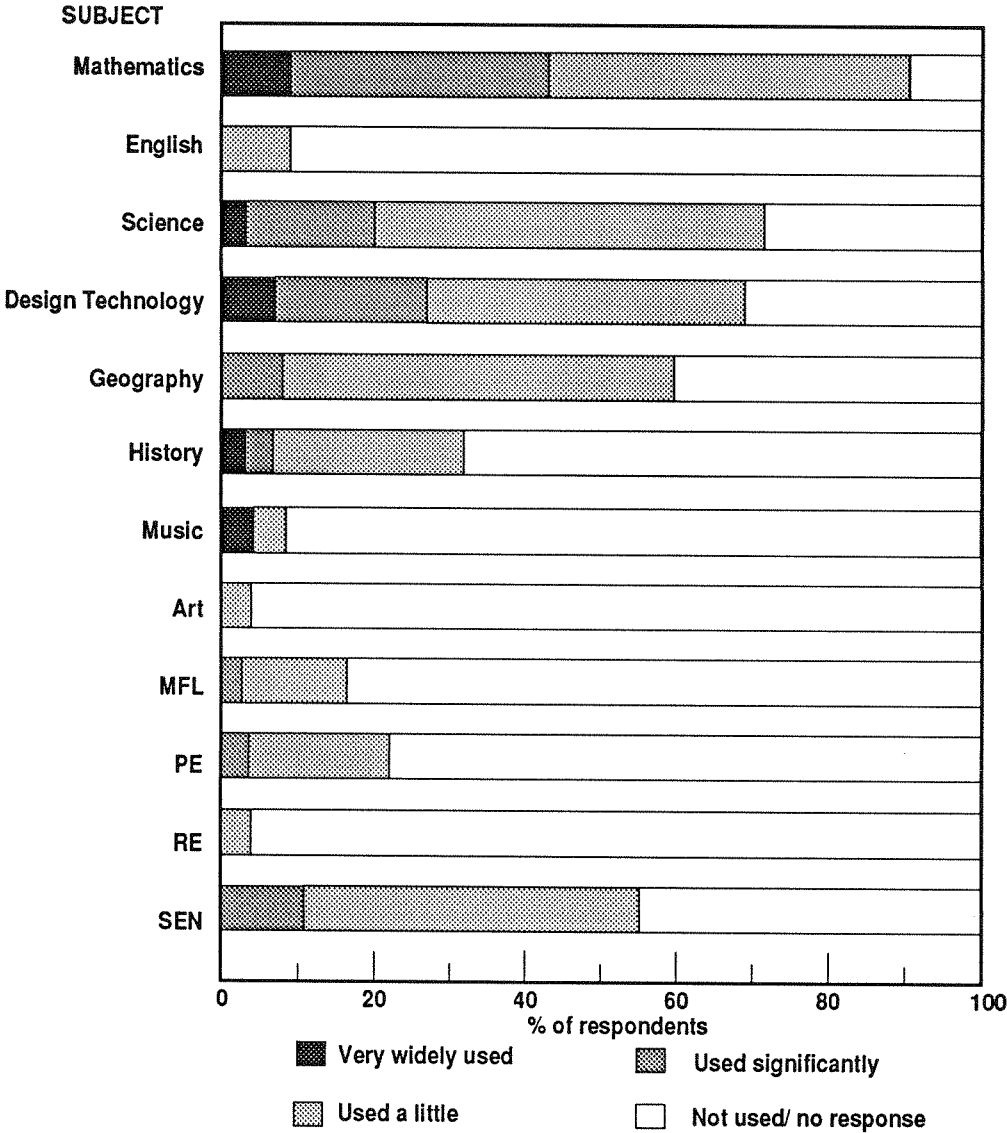


Figure 4.9 Secondary Survey: Use of database software by department



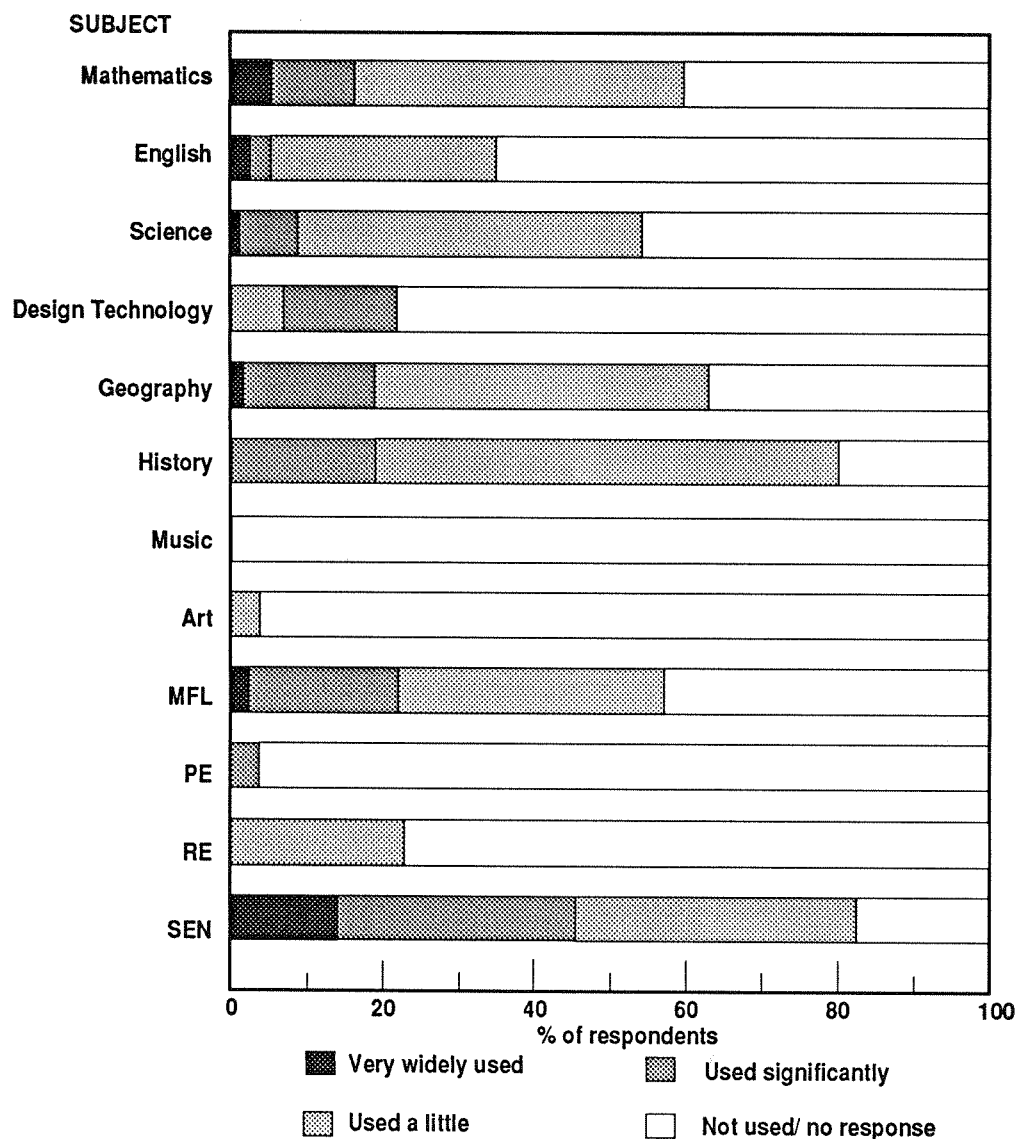
See Appendix 1 for details of respondents.

Figure 4.10 Secondary Survey: Use of spreadsheet software by department



See Appendix 1 for details of respondents.

Figure 4.11 Secondary Survey: Use of adventure/simulation software by department



See Appendix 1 for details of respondents.

Other software used in secondary schools

Significantly, more secondary than primary respondents took the opportunity to list other types of software which were used - in all cases this was closely linked to the subject curriculum. Examples of additional software cited by respondents are listed below; each was named by 10 per cent or fewer of respondents:

- ◆ Mathematics - graph plotters/analysers; SMILE programs
- ◆ Science - datalogging
- ◆ Geography - weather data; satellite imagery
- ◆ Modern Foreign Languages - text manipulation
- ◆ Music - rhythm/pitch trainers.

Age of software available and intensity of use

Information was sought concerning the age of software available within primary schools as a whole and within each secondary department. Respondents indicated the percentage of software which had been available for up to two years, for three to five years and for more than five years. The details returned showed that within each group, at least some respondents indicated one extreme of the range i.e. some schools had had 100 per cent of their software available only within the last two years, others had had none bought during this time; the same was true of software available for 3-5 years and more than five years. Table 4.3 shows the mean percentage of software available in primary schools for different periods of time.

Table 4.3: *Mean percentage of software available in primary schools for different periods of time*

Time Available	Percentage
up to 2 years	36%
3-5 years	38%
more than 5 years	26%

Based on 186 responses.

A similar pattern emerged concerning the spread of intensity of use: again within each category the range of responses was very great (ranging from 0 to 100 per cent). Table 4.4 shows the mean percentage of titles used to different extents.

Table 4.4: *Mean percentage of software titles available in primary schools which are used to different extents*

Extent of Use	Percentage
Used extensively	35%
Used quite widely	28%
Used a little	21%
Never used	16%

Based on 183 responses.

Responses from secondary departments suggested that again, the software available varied between some programs bought more than five years ago, through some acquired 3-5 years ago to software purchased within the last two years. Similarly, there was a balance between the percentage of programs which were used extensively and those which were never used. Table 4.5 shows the age of software available within departments and Table 4.6 shows the extent to which software is used.

Table 4.5: Mean percentages of software available for different periods of time within different departments in secondary schools

	Up to 2 years	3-5 years	Over 5 years	Number of respondents to this question
Mathematics	41%	38%	21%	121
English	49%	42%	9%	85
Science	40%	41%	19%	103
Design Technology	46%	44%	10%	106
Geography	36%	47%	17%	61
History	46%	44%	10%	35
Music	57%	39%	4%	42
Art	55%	40%	5%	38
Modern Foreign Languages	59%	37%	4%	49
PE	52%	48%	-	13
RE	49%	36%	15%	22
SEN	40%	46%	14%	43

Table 4.6: Mean percentages of software titles available in secondary departments which are used to different extents

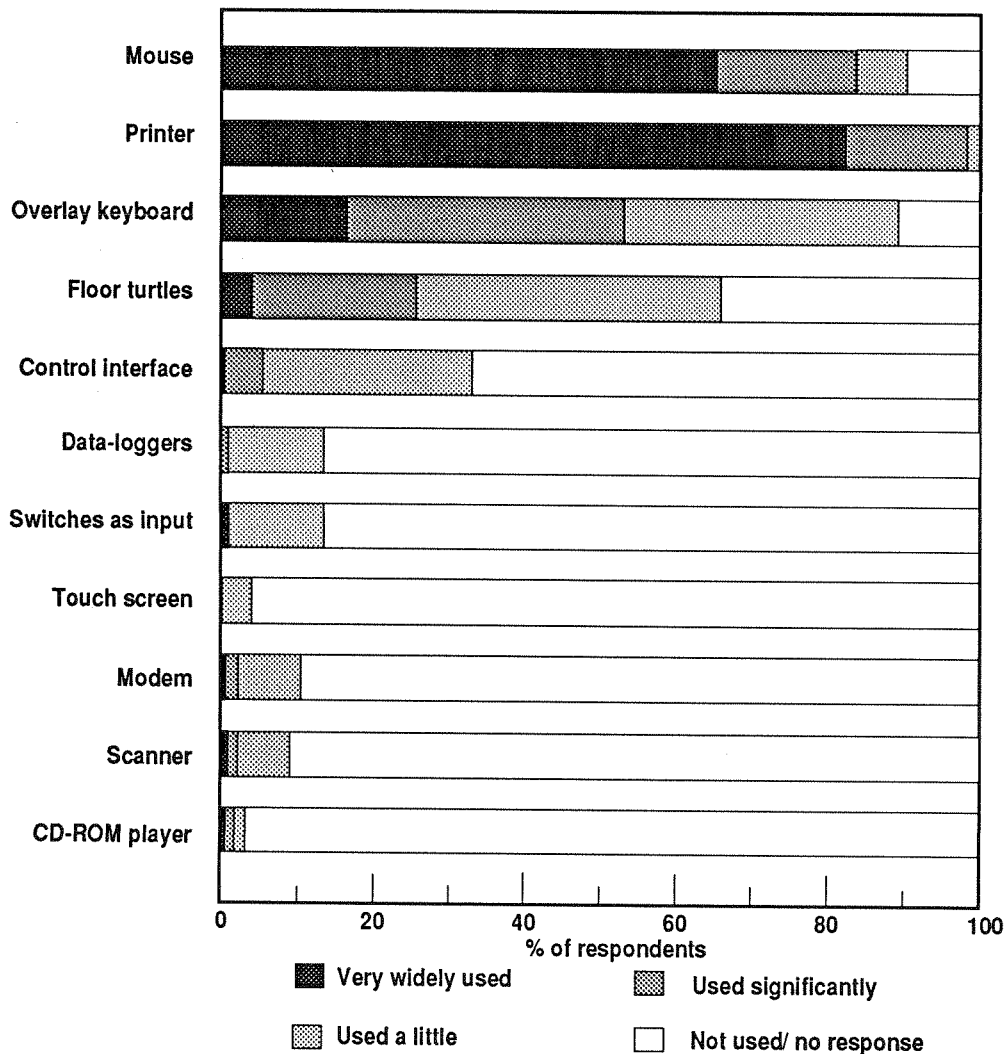
	Extent of Use				No. of respondents to this question
	Used extensively	Used quite widely	Used a little	Never used	
Mathematics	20%	27%	40%	13%	118
English	28%	26%	34%	12%	84
Science	13%	21%	47%	19%	102
Design Technology	36%	32%	24%	8%	105
Geography	14%	17%	52%	17%	59
History	8%	18%	55%	19%	35
Music	36%	16%	41%	7%	41
Art	30%	28%	35%	7%	38
Modern Foreign Languages	16%	20%	54%	10%	49
PE	4%	7%	58%	31%	15
RE	11%	28%	42%	19%	24
SEN	36%	25%	23%	16%	42

USE OF PERIPHERALS

In addition to the basic computer system and appropriate software, a range of additional pieces of equipment, or peripherals, may be used in conjunction with computers. In some cases these peripherals represent an alternative means of the user entering information, such as an overlay keyboard, whereas others are used with software for particular applications, such as control interfaces for the control of physical systems. Peripherals such as the mouse and printer are so widely used that they may almost be regarded as essential parts of the computer system.

In order to assess the extent to which a range of different peripherals were used in schools, IT co-ordinators were asked to indicate whether each one was used **a little, significantly, a lot** or **not at all**. The information from primary school respondents is shown in Figure 4.12.

Figure 4.12 Primary Survey: Use of different hardware items



Total number of respondents = 196

Peripherals used within primary schools

Within primary schools printers and mice were identified as being very widely used (cited as being used a lot by 83 per cent and 67 per cent of respondents respectively),

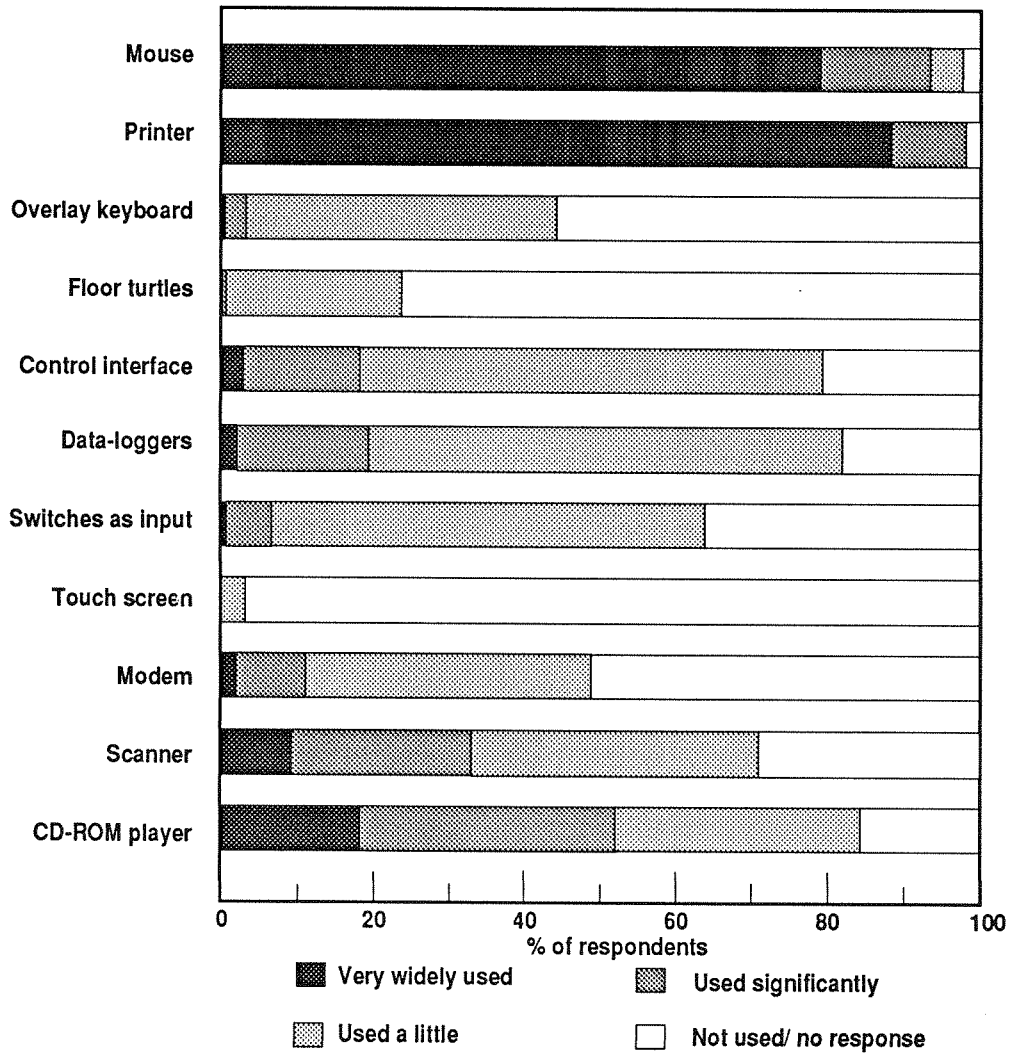
although some teachers commented that mice, were used **a lot** with some machines (such as Acorn Archimedes) and **not at all** with others (such as BBC systems). Overlay keyboards were relatively well-used, with 17 per cent of schools using them **a lot**, and a further 37 per cent using them **significantly**.

Several teachers who indicated that specific peripherals were not used at all reported that these were unavailable within the school, in the words of one teacher, '*You can't use what you haven't got!*' Some mentioned cost as a reason for the lack of some of the peripherals listed. Although respondents were given the opportunity to list other peripherals used, very few did so. Those that did mentioned a midi interface, touch pen, Ion camera and Oak recorder.

Peripherals used within secondary schools

Secondary schools' responses showed they were also using printers and mice **a lot** (89 per cent and 81 per cent respectively). Of the peripherals listed, the next most widely

Figure 4.13 Secondary Survey: Use of different hardware items



Total number of respondents = 292

used was the CD-ROM player, with 19 per cent of schools stating they were used a lot and a further 35 per cent making **significant** use of them. Figure 4.13 shows the extent to which different peripherals were used in secondary schools.

Additional pieces of equipment were listed by about sixty secondary schools, with plotters, sound or video digitisers and midi interfaces being most frequently cited. Other peripherals listed by fewer respondents included robot arms and Ion cameras.

SOFTWARE USER INTERFACES

Interface preferences

Software user interfaces were explored in more depth in the telephone interviews. All the IT co-ordinators in the random sample expressed a preference for graphical interfaces like Microsoft Windows, Acorn RISC-OS and the Apple Macintosh desktop. Few problems were reported of students getting lost on these systems. School IT co-ordinators generally liked menu systems which were set up to prevent access to sensitive areas of stand-alone hard disks and network servers - a few thought this unnecessary for stand-alones. Some IT co-ordinators had reluctantly removed Windows from older networks because of slowness.

More than half the schools had a mixed machine platform and a range of software user interfaces to contend with. Students had no trouble switching from old operating systems to new ones and back again, whereas some teachers found this more difficult. The increasing similarity of graphical environments was seen to be an advantage: mixed machine platforms were more viable since the software interface was much the same. Schools were beginning to standardise on the same software title where it was available across the different platforms. A preference for industry-standard programs for curriculum use was marked. One advantage in secondary schools was considered to be the students' opportunity to list specific program skills in job applications. The reliability of this software was another factor.

PC compatible computers were widely in use for administrative work by teachers though they did not all run 'Windows'. IT co-ordinators who were trying to improve the skills of their colleagues by making staff machines easily available in or near the staff room found that user-friendliness was very important. Teachers preferred to use windowing interfaces for this reason.

Pupil progression and attainment

Progression was assisted where primary and secondary schools both used an interface such as Microsoft Windows, Acorn RISC-OS or the Apple Macintosh desktop. Within LEAs and independent school systems IT co-ordinators reported that the transition from

primary to secondary school was easier when younger children had already established competences in using graphical interfaces. Teachers emphasised the range and complexity of applications that these primary children could handle. For example, in four primary schools dropping illustrations into text presented no problems. Moving blocks of texts, editing and changing fonts and letter sizes was also part of everyday word processing in primary schools where the newer interfaces and powerful machines facilitated these approaches to communication skills. These two examples illustrate work being done in primary schools which relate to statements of attainment in the IT attainment target at level 6(a) '*use information technology to combine and organise different forms of information for presentation to an audience*', and level 7(a) '*select software and use it to produce reports which combine different forms of information to fulfil specific purposes for a variety of audiences*' (DES, 1990).

Telephone interviews with secondary school IT co-ordinators revealed that recent purchases of IBM PC compatible, Apple Macintosh and Acorn Archimedes machines had been influenced by their ability to run graphical user interfaces. It is likely that access to this type of interface would enhance pupils' opportunities to achieve some of the higher level statements of attainment, such as those cited above.

THE VALUE OF SOFTWARE TO THE CURRICULUM

Software is available to support different subjects within the National Curriculum and other aspect of the wider curriculum, such as religious educational and special educational needs. Software purchases, described in more detail in **Chapter 3**, include both subject-specific software and programs which are generic or cross-curricular in application, such as word processing.

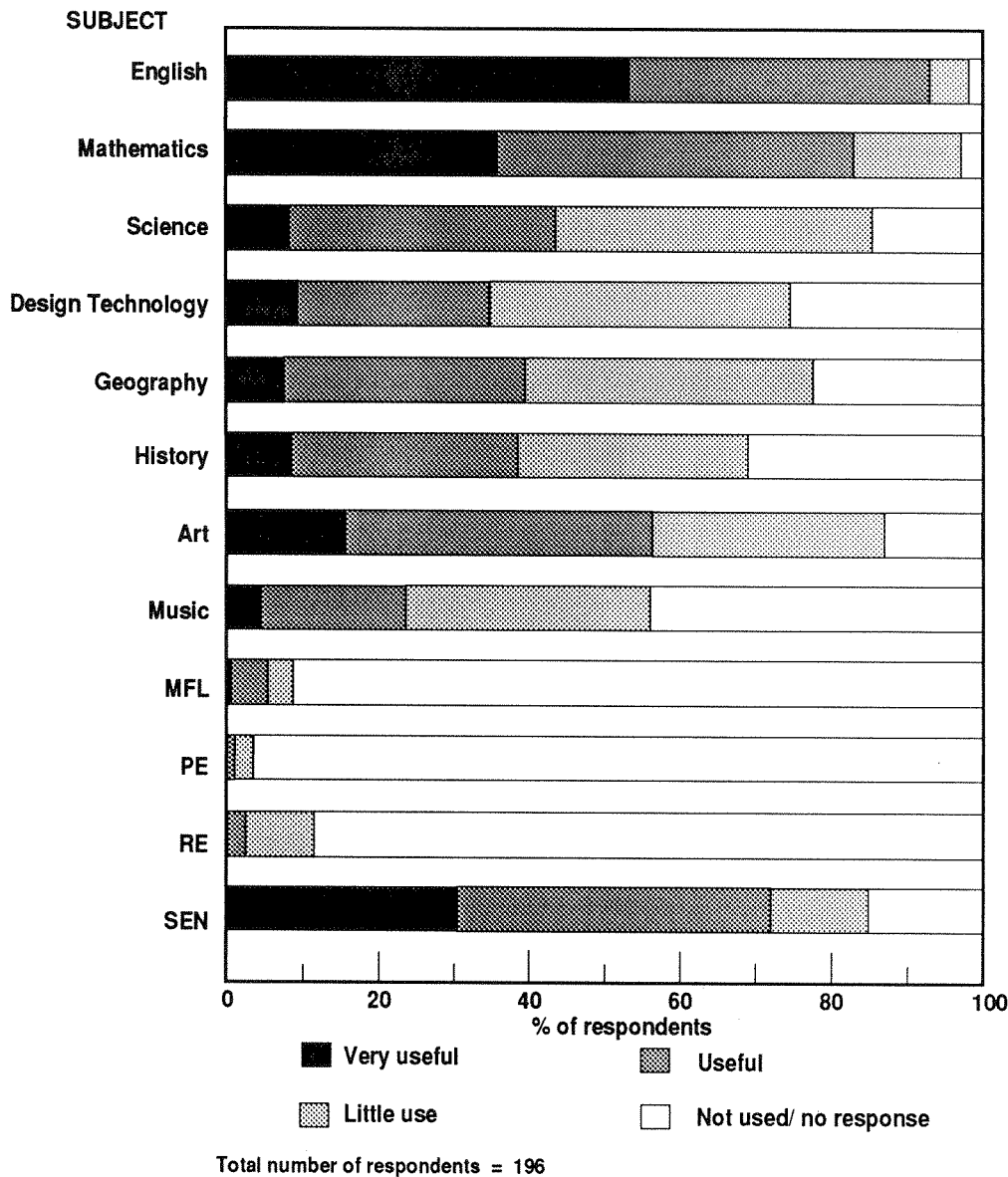
In order to assess the impact on both primary and secondary schools of software as a resource for the curriculum, schools were asked to indicate their views using a four point scale, from **not used** to **very useful**.

Since the primary schools' questionnaires were completed by the IT co-ordinators, they were asked to indicate their perception of their colleagues' opinions on the usefulness of software as a resource for different areas of the curriculum. Responses are shown in Figure 4.14.

The primary curriculum

The areas where software was perceived to be **very useful** were English, mathematics and special educational needs. Significant numbers of respondents reported software was regarded as **useful** for other subjects, especially

- ◆ science
 - ◆ design technology
 - ◆ geography
 - ◆ history
 - ◆ art.
-

Figure 4.14 Primary Survey: Usefulness of software for curriculum

Fewer than a quarter of respondents indicated that software was **useful** for other areas.

The secondary curriculum

Within the secondary sample, information concerning the value of software to the curriculum was provided by respondents who completed the subject inserts. It is interesting to note that the overall level of response was more positive from secondary schools than primary schools: for every subject (apart from PE and RE) more than two thirds of respondents felt software was **useful** or **very useful** as a resource for the curriculum.

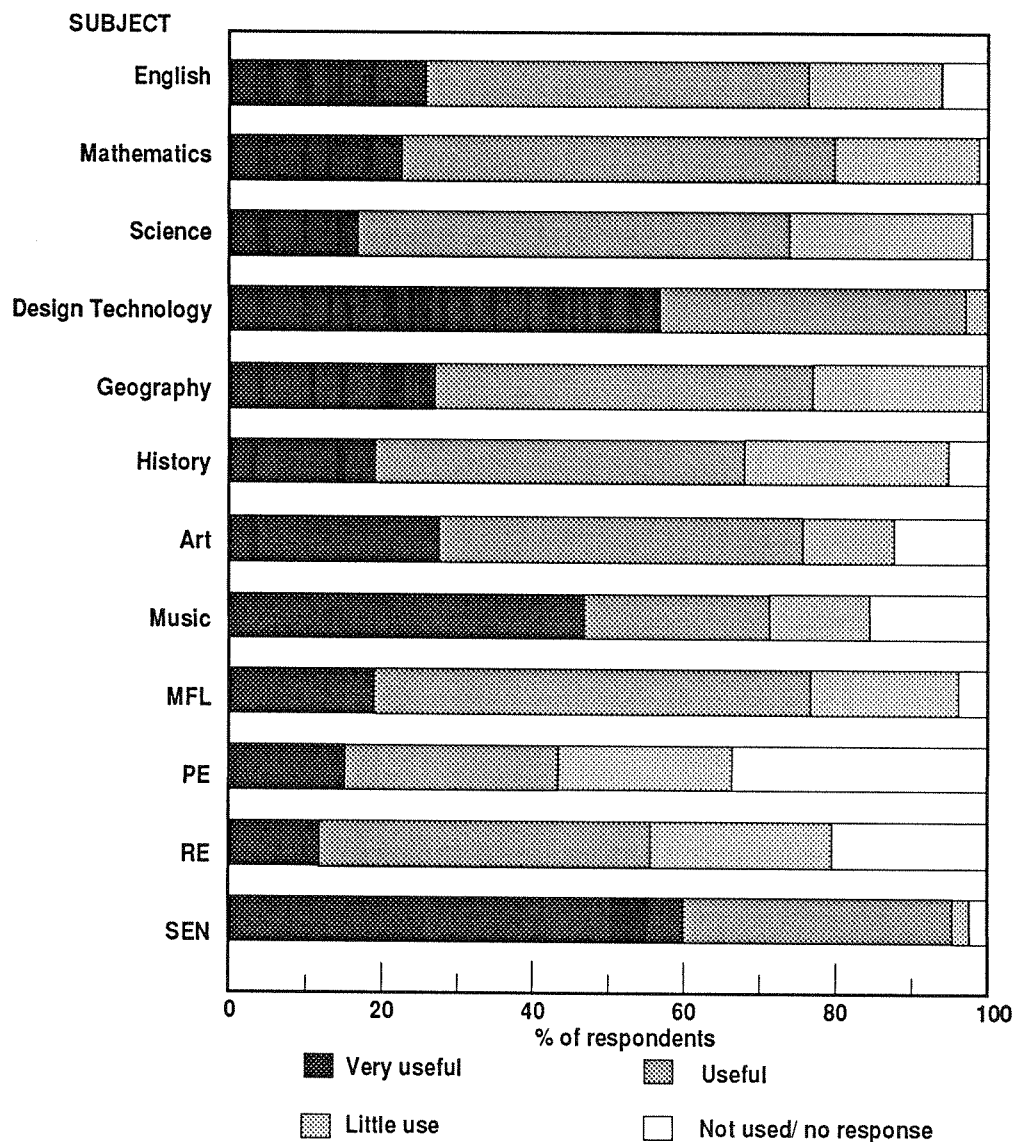
There are a number of possible explanations for this:

- ◆ primary IT co-ordinators may have been unduly pessimistic in their estimates of colleagues' views on software;

- ◆ some secondary respondents may have indicated a ‘theoretical’ value of software to the curriculum which was more favourable than the extent to which it was being utilised at the time of the survey;
- ◆ the types of software being used at secondary level by different departments may be more directly relevant to specific subjects: as stated in **Chapter 3**, a large percentage of programs available within departments had been purchased from departmental budgets, and therefore would be expected to be perceived as valuable;
- ◆ primary schools may be concentrating their software purchases on some main applications (such as strands of IT capability) with the relatively small budgets available to them.

Secondary respondents’ views are shown in Figure 4.15.

Figure 4.15 Secondary Survey: Usefulness of software for curriculum



See Appendix 1 for details of respondents.

NETWORKS

Benefits

Issues concerning networks were explored during telephone interviews with IT co-ordinators. Most information was collected from secondary interviewees, since very few primary schools in the survey had networks. IT co-ordinators who had new networks thought that the technology had improved. Many schools reported a growing tendency to mix networks and stand-alone machines as well as hardware platforms.

A range of advantages for networks was mentioned. A shared bank of software was convenient. Some co-ordinators also thought this to be more economical and efficient than loading software on stand-alone hard disks. Sharing resources like laser printers, scanners and CD-ROMs raised the standard and quality of every-day work and increased pride in achievement.

Upgrading and backing-up were thought to be quicker on a network. On-line housekeeping and updating by the hardware manufacturer was highly commended by one convert.

Problems and disadvantages

Problems of crashing were reported on most types of networks found in schools. Insufficient memory on old network servers and terminals was causing serious problems. Large 'Windows' style applications were running too slowly to be viable. Some IT co-ordinators reluctantly removed 'Windows' in these circumstances.

The expense of cabling was preventing extension of networks where it would have been useful. Maintenance of the server hard disk was considered to be time consuming particularly when space was at a premium.

IT co-ordinators who have eschewed networks explained that they thought reliance on specialists increased the mystification associated with computers. Staff lost a sense of ownership if they had to wait for an IT expert to do some of the computer tasks. It was thought that hard disk machines with tape streamers made networks less necessary.

Software installation

There was praise for recently designed software. Most problems seemed to have been eliminated and, where possible, installation was a technician's job.

User access and storage

A variety of methods was used to give access to students and teachers. Students were reported to be generally responsible because they valued being allowed to use the computer. Students' curiosity and simple error could cause problems on the network and passwords were sometimes forgotten.

Some students were issued with their own disks for storage of their materials though most were kept by the co-ordinator between lessons.

Different types of hardware base

As might be expected the hardware base used by the schools affected the IT coordinator's view of networks. Research Machines users tended to think in network terms, whereas those who had Acorn Archimedes and IBM compatible machines with hard disks were divided between preferences for networks and stand-alones.

Networks in primary schools

There were few networks in primary schools in this survey. Those that existed were there as the result of an industry/education partnership. These schools had enjoyed enormous support and a full range of software in the past. Most of them were struggling to move on as their funding came to an end. This was coinciding with the demise of some of the most well funded and organised LEAs who had orchestrated the high levels of support, training, maintenance and resourcing.

5. SYSTEMS AND STRATEGIES TO SUPPORT SCHOOL USE OF SOFTWARE

SUPPORT WITHIN THE SCHOOL

One of the most common ways of supporting IT work in general throughout a school is to have a specific member of staff designated as IT co-ordinator. The person appointed would have particular expertise in this area and be able to assist colleagues within the school. Ninety-one per cent of the primary schools surveyed and 96 per cent of the secondary schools stated they had an IT co-ordinator. In some cases respondents indicated that they held responsibility for one or more other areas too. Within primary schools, additional responsibilities were usually other subjects within the National Curriculum, such as mathematics or science, although in some schools the headteacher acted as IT co-ordinator. Secondary schools that did not have a designated IT co-ordinator usually had someone with recognisable IT skills, such as a network manager or head of computer studies who could provide guidance to colleagues.

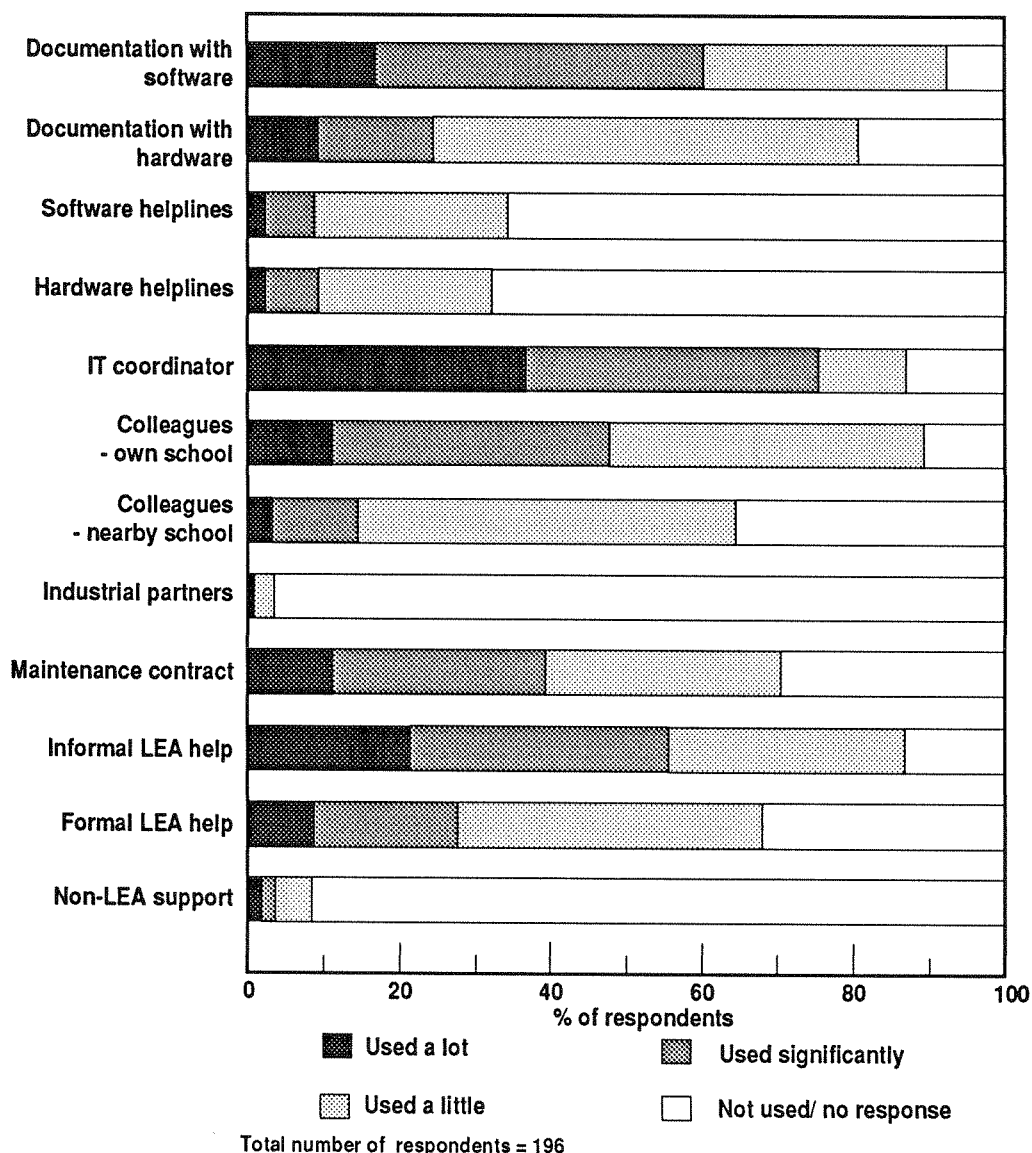
The questionnaire sent to primary and secondary schools asked which of a number of possible sources of support were/were not used within the school to provide on-going IT support for teachers. For all the sources that applied, respondents were asked how extensively they were used. Figure 5.1 shows responses from primary schools.

Support within primary schools

Within primary schools the IT co-ordinator was the single most widely used means of providing support for IT within the school, with 40 per cent of schools indicating that they were used **a lot** to support colleagues, and a further 41 per cent reporting that they made a **significant** contribution in terms of IT support. The next most widely used strategy for providing support was the use of informal support from the LEA IT advisory service. This was typically in the form of advice/information when needed, either through a member of staff visiting the LEA IT centre, or via the telephone. More formal support from LEA advisory services, such as an advisory teacher leading INSET sessions based at the school, or providing class-based support, working with particular teachers and pupils within the school, were less frequently used. This may be due to the fact that numerous demands on (the relatively few) advisory teachers mean that they are able to provide school-based support to only a small number of schools. In addition, since many LEAs are now charging for this type of service, schools may be less inclined to spend funds on this. Interestingly, roughly half the primary schools indicated that other colleagues within the school (apart from the IT co-ordinator) were a significant source of support, suggesting that there is a move towards more staff within a school sharing their confidence and expertise in the use of IT. Very little use was made of telephone helplines provided by software and hardware companies, although six out of

ten teachers reported that the documentation provided with software was a significant source of support. Fewer than 10 per cent of schools reported using non-LEA support services.

Figure 5.1 Primary Survey: Sources for teachers' IT support



Telephone interviews with primary IT co-ordinators revealed a number of strategies that were used to support colleagues within the school. These included:

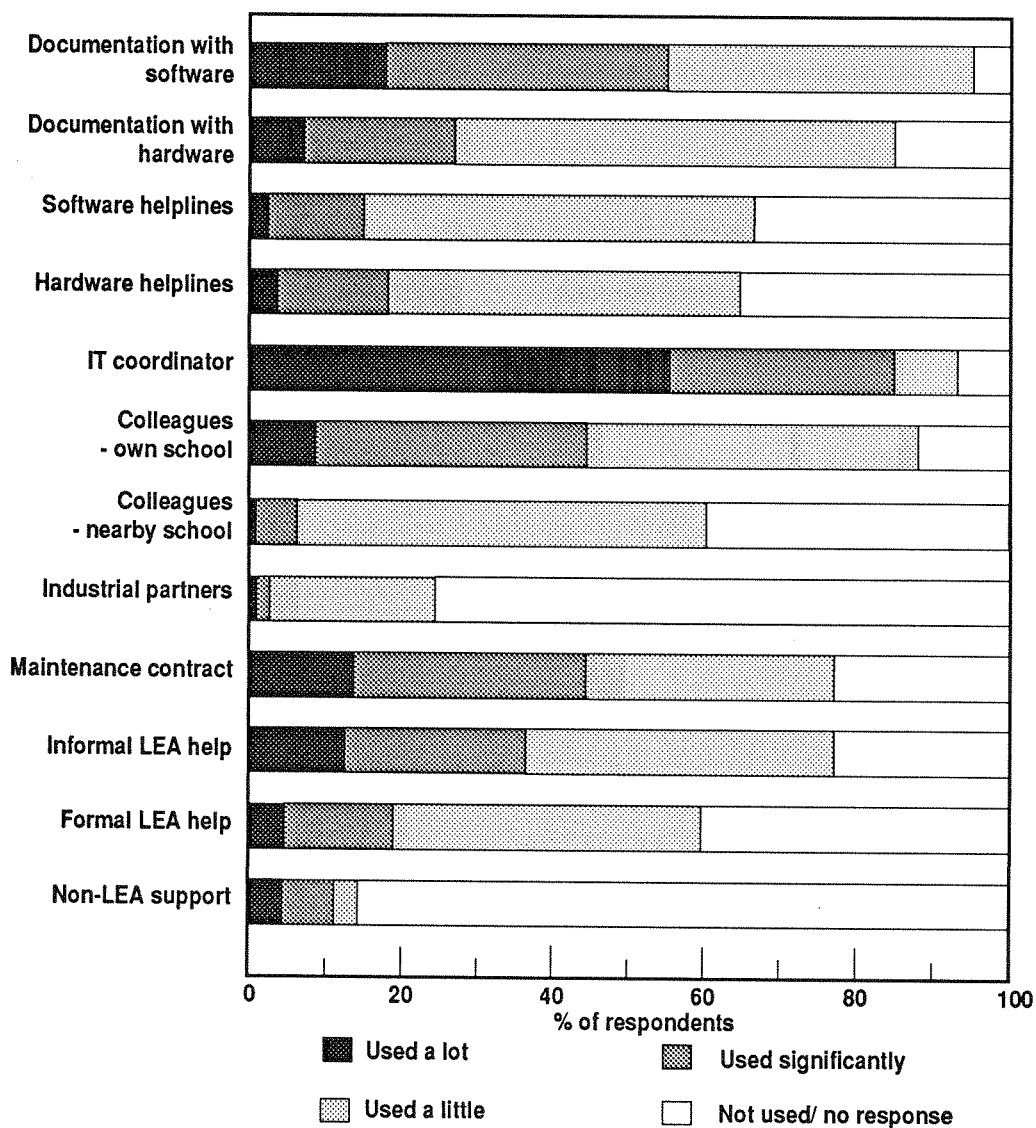
- ◆ providing information about software which would support different aspects of the curriculum
- ◆ leading staff INSET and workshop sessions to introduce new software
- ◆ working with colleagues within classrooms (due to the problems/cost in providing cover for the IT co-ordinator's class this was relatively infrequent, say once a term, and only used in a small number of schools)
- ◆ impromptu assistance with problems with hardware or software, often carried out during lunchtimes or breaktimes (for many teachers this was the aspect of support which took most time, simply because of the frequency of requests for help).

Support within secondary schools

Responses from secondary school IT co-ordinators indicated that they, like their primary school counterparts, were a major source of IT support for their colleagues: more than half the respondents reported that a lot of use was made of their expertise. No other source of support was used as extensively as the IT co-ordinator, with responses suggesting that a wide range of sources was each used relatively infrequently. Sources that secondary schools drew on for support more extensively than primary schools were:

- ◆ telephone helplines operated by hardware and software companies (both used by roughly twice as many secondary schools as primary schools)
- ◆ industrial partnerships (used to a limited extent by four per cent of primary schools and 26 per cent of secondary schools).

Figure 5.2 Secondary Survey: Sources for teachers' IT support



Total number of respondents = 292

Non-LEA support services were used slightly more by secondary schools than primary, but still remained the least significant of all sources used. Within the secondary schools who had used non-LEA support, the sources cited included:

- ◆ clustering arrangements with other schools nearby
- ◆ support provided by hardware manufacturers, with Research Machines being the company most frequently named.

Figure 5.2 shows the sources used by secondary schools to provide IT support to colleagues.

Establishing and maintaining links with IT co-ordinators in other schools nearby was a strategy for support used by more secondary than primary IT co-ordinators (77 per cent as compared with 56 per cent).

It is perhaps worth adding a word of caution in considering the use of different sources for providing IT support within schools. Both primary and secondary responses to this question were given by the IT co-ordinator, their perceptions of the extent to which different sources of support were used are not therefore objective. This is not to underestimate the contribution made by IT co-ordinators within their schools, but merely to identify a potential area of bias.

Telephone interviews with secondary IT co-ordinators identified further strategies used to provide support within the school, including:

- ◆ whole staff training programmes
- ◆ software training on demand
- ◆ cascade training through the faculties
- ◆ after-school surgeries for staff
- ◆ timetabled classroom support
- ◆ open resource areas staffed by a technician
- ◆ software training by technicians and librarians.

Although there was little resort to outside training agencies, a few schools had supplemented their INSET programme with university courses, and one school had employed an independent IT consultant. However, it would be premature to identify these strategies as a trend for the future.

IT INSET within primary schools

Primary schools were asked to indicate what proportion of staff had received IT INSET in the following areas:

- ◆ initial awareness
- ◆ integrating IT across the curriculum
- ◆ INSET concerning hardware
- ◆ INSET concerning cross-curricular/generic software.
- ◆ INSET concerning subject-specific software.

In each case, respondents indicated the proportion of staff who had received INSET using a five point scale ranging from **most** to **none**. Table 5.1 shows the responses from primary schools.

Table 5.1: Percentage of primary schools who indicated different proportions of teaching staff that had received different types of INSET

	Most	More than half	About half	Less than half	None
Initial awareness	66%	15%	5%	12%	2%
Integrating IT across the curriculum	33%	13%	18%	32%	4%
INSET re. hardware	25%	11%	16%	40%	8%
INSET re. cross-curricular/generic software	26%	19%	24%	26%	5%
INSET re. subject-specific software	19%	13%	21%	32%	15%

Based on 188 responses.

Once teachers had received initial awareness training, the responses from primary schools suggest that INSET was focused on two main aspects: integrating IT across the curriculum and training concerning cross-curricular or generic software, with roughly two thirds of schools reporting that half or more teachers had undergone INSET in these areas. Obviously these two areas complement each other and reflect the primary ethos of cross-curricular topic work.

IT INSET within secondary schools

Within secondary schools information was requested from specific departments, so that some comparison between departments is possible. Again there was an encouraging picture of the majority of the teaching staff in most departments having received INSET in initial awareness: the only departments where this was not the case were PE departments, as shown in Table 5.2.

Table 5.2: Percentage of schools that indicated specific proportions of departmental staff had received INSET in initial awareness

	Most	More than half	About half	Less than half	None	No. of respondents to this question
Mathematics	75%	6%	6%	6%	7%	123
English	64%	12%	8%	11%	5%	102
Science	59%	9%	11%	14%	7%	104
Design Technology	63%	9%	10%	11%	7%	113
Geography	59%	9%	12%	11%	9%	65
History	58%	7%	15%	15%	5%	40
Music	59%	8%	8%	4%	21%	48
Art	45%	8%	2%	14%	21%	49
Modern Foreign Languages	53%	12%	16%	10%	9%	58
PE	29%	10%	16%	24%	21%	38
RE	53%	7%	6%	11%	23%	53
SEN	62%	5%	16%	13%	4%	45

Generally, responses from different departments indicated that INSET regarding hardware, the use of IT across the curriculum and cross-curricular/generic software had not been a priority (the latter two areas in contrast to the INSET activities within primary schools). However, training with a focus on subject-specific software (undoubtedly geared towards the needs of specific departments) seemed to be relatively widespread with the majority of respondents stating that a total of half or more of departmental staff had received this type of INSET (see Table 5.3).

Table 5.3: Percentage of schools that indicated specific proportions of departmental staff had received INSET in subject-specific software

	Most	More than half	About half	Less than half	None	No. of respondents to this question
Mathematics	55%	9%	12%	5%	9%	124
English	32%	7%	16%	20%	25%	95
Science	32%	14%	21%	19%	14%	103
Design Technology	34%	18%	20%	18%	10%	108
Geography	28%	14%	26%	14%	18%	65
History	30%	13%	12%	25%	20%	40
Music	51%	4%	6%	11%	28%	47
Art	29%	10%	21%	15%	25%	48
Modern Foreign Languages	32%	9%	16%	25%	18%	56
PE	-	3%	11%	23%	63%	35
RE	8%	-	8%	4%	80%	49
SEN	32%	7%	25%	20%	6%	44

LEA SUPPORT

LEA IT advisory teams and IT centres offer a range of services to schools in terms of supporting class use of educational software. Interviews were carried out with advisory staff in five different LEAs to investigate the services offered and, where appropriate, the costs involved.

Where all GEST funding for IT had been devolved to schools, the advisory services were operating on, or moving towards, a cost recovery situation, with schools paying for advisory teacher support within the school and attendance at INSET courses. One LEA had retained funding to pay for the salaries of the IT advisory teachers, however, which had two main consequences:

- ◆ schools were not charged for the time spent by advisory teachers working in schools

- ◆ since charges for IT INSET did not have to include a levy to contribute towards advisory teachers' salaries, this meant INSET charges to school were less in respect of IT courses than other subject courses.

The main elements of the support services offered to schools were:

- ◆ the provision of IT INSET courses
- ◆ the availability of IT advisory teachers for school-based support
- ◆ options for hardware maintenance/repair agreements
- ◆ software sales and development.

INSET provision

Details of the INSET courses offered by IT centres were sent to schools indicating the programme of courses available within an academic year. In some cases reminders were sent during the year to promote that term's INSET programme. Generally, IT INSET emphasised applications to the National Curriculum, often with reference to specific key stages. In some cases courses were targeted at specific areas of the curriculum, such as Geography at KS1 and KS2, whereas in others the focus was on applications of one of the strands of IT capability (as defined by the National Curriculum Council) across the curriculum, such as aspects of measurement and control at KS3.

At a more general level, some courses were concerned with using the **Microsoft Windows** interface, network management and operating systems such as **Microsoft MS-DOS** and **Acorn RISC-OS**. In addition some centres offered courses exploring specific software in detail such as **Software Solutions' Genesis**, **Longman Logotron's Revelation** or **Aldus Pagemaker**.

Two of the five centres contacted already provided award bearing INSET courses, specifically RSA Certificate and Diploma courses and a third indicated that these would be available from September 1993. Views on this type of INSET were mixed, with some interviewees reporting little interest in this aspect of training while there was extensive interest in one LEA, to the extent that one headteacher had arranged that all teachers in the school would be allocated funding to attend training sessions to attain the RSA Certificate as a minimum level of IT training.

IT curriculum support

In some areas schools were able to opt for IT curriculum support by paying an annual subscription with different rates applying to primary and secondary schools. Electing for this support option entitled schools to some INSET sessions and/or school-based support from advisory teachers free of charge. Additionally subscribers could negotiate further INSET and/or advisory teacher support at discounted rates as compared with non-subscribers, with typical charges for subscribers of £50-£65 for one day's INSET and £208-£290 for one day of advisory teacher support in school, as compared with charges for non-subscribers of approximately £80 and £260-£315 respectively.

In other areas, there was currently no charge for advisory teacher support in schools, although one LEA indicated that charges would be introduced in the near future, and schools paid for all INSET when booking places on courses.

Hardware maintenance/repair

Arrangements for hardware maintenance/repair varied considerably between the five LEAs visited. Two areas offered comprehensive repair services for an annual subscription. Of these, one charged a subscription according to school size (£80-£400) and levied a call out charge plus an hourly rate for repair work. The other operated a charging system in relation to specific pieces of equipment, so that different charges applied to different systems, such as Nimbus 186 (£44) and Acorn A3000 (£62).

Another LEA offered network maintenance for £550 p.a., with an additional charge of £100 for a second server. Other services, such as hardware and software installation and repairs incurred charges for the work done with no subscription option.

The remaining two LEAs were not directly involved in hardware repairs: one referred schools to local repair firms, Acorn main dealers etc. and the other had established a system of inviting tenders for maintenance/ repair for county schools' hardware. The contractor's services were currently free to primary schools and secondary schools paid a fee for each item they wanted covered; charges for primary schools were planned from April 1994.

The information from LEAs shows that they are attempting to meet the needs of schools by offering support for IT in different ways. In some areas schools can buy in all services they require, in terms of INSET, advisory teacher support and hardware maintenance. In certain LEAs (and for some sectors of education) some of these services are 'free', although charges may be introduced in the near future. Where certain services are not offered by an LEA IT centre, schools have the option of buying in these services, either from neighbouring LEAs, or non-LEA sources. It is clear that the annual cost of these services, in addition to expenditure on software and hardware, could constitute a significant part of the school's budget.

Expenditure on IT support

The questionnaires sent to primary and secondary schools therefore asked about the cost of providing the following types of support for the financial year 1992-93:

- ◆ software-related INSET
- ◆ hardware-related INSET
- ◆ hardware maintenance/repairs.

Expenditure on these types of support varied considerably, even within primary and secondary phases, ranging from less than £100 to four figure sums.

Of particular interest is the different emphasis placed on INSET: within primary schools the median expenditure on hardware INSET was greater than on software INSET, whereas in secondary schools the opposite was true. In addition, secondary schools were spending much more on the maintenance of hardware. Table 5.4 shows the median costs of the types of support listed.

Table 5.4: Median expenditure by primary and secondary schools on support services

	Software-related INSET	Hardware-related INSET	Maintenance/repairs
Primary	£200	£250	£200
Secondary	£400	£300	£500

*Based on responses from: 80 primary schools;
147 secondary schools.*

LEA IT centres

Given the importance of IT support to schools, the location of the school with regard to the LEA IT centre could influence the extent to which staff attend INSET or take advantage of after-school workshop sessions. Across both primary and secondary schools, half the respondents reported that the IT centre was **reasonably convenient**, with the remainder roughly evenly split between those who felt it was **very easy** or **difficult** to reach. There was a slightly greater number of primary respondents who indicated that it was **difficult** to get to the LEA IT centre, so further analysis was carried out to establish whether or not this was related to the school location, in terms of rural as opposed to urban environments. A large number of primary respondents indicated that it was **difficult** from their rural school to reach the IT centre: this was a greater number than would have been expected by chance and was therefore statistically significant. Details of this analysis are shown in Table 5.5.

Table 5.5: Area in which primary school is located by ease of access to LEA IT centre

	Very easy	Reasonable	Difficult
Rural	6%	44%	50%
Semi-rural	17%	63%	20%
Urban	30%	48%	22%
Inner-city	25%	50%	25%

Based on responses from 186 primary schools.

There was no evidence to support the idea that secondary teachers in rural (or indeed any other locations) found it particularly difficult to reach IT centres. However, in view of the fact that one in two primary schools in rural areas reported difficulties, it may be

worth considering alternative strategies for providing support to this type of school. Possible options could include:

- ◆ greater use of clustering arrangements between schools in the same area to provide mutual support
- ◆ the potential use of distance learning materials as an alternative to centre-based INSET.

SUPPORT FROM EDUCATIONAL SOFTWARE PUBLISHERS

Schools' IT co-ordinators were asked about their views on the usefulness of the materials software publishers often provide to support their programs. Teachers were asked to rate the value of each of the following:

- teachers' guides
- suggestions for activities
- pupil worksheets
- overlays for concept keyboard
- sample files.

Teachers rated the value of each type of support materials using a three-point scale (**very useful to a little use**) with an additional option to indicate materials **not used**.

Primary teachers' views

Primary teachers' views on these support materials are shown in Table 5.6.

Table 5.6: Primary teachers' views on the usefulness of support materials provided by software publishers

	Very useful	Useful	A little use	Not used
Teachers' guides	36%	52%	10%	2%
Suggestions for activities	20%	56%	23%	1%
Pupil worksheets	21%	40%	28%	11%
Overlays for concept keyboards	35%	37%	17%	11%
Sample files	19%	35%	33%	13%

Based on 190 responses.

Only two teachers listed other materials provided by software publishers and indicated the value of them.

Forty-six primary respondents used the opportunity offered to comment on additional forms of support they would welcome from software publishers. The most numerous responses focused on three main types of support, as follows:

- ◆ very simple ‘start-you-off’ guides, for teachers and/or pupils
- ◆ better support when things go wrong, such as step-by-step ‘troubleshooting’ guides and telephone help lines
- ◆ improved access to software before purchase to facilitate evaluation, such as allowing software on approval or having demonstrations of software, possibly through software representatives rather like book company representatives.

Other forms of support requested by fewer respondents included information on the relevance of programs to National Curriculum attainment targets, improved pupils’ materials and cheaper software.

Secondary teachers’ views

Each of the subject inserts for different secondary school departments collected information in the same format as primary schools (i.e. different support materials were rated according to their usefulness). In order to avoid a large number of tables to present the responses from secondary school departments, the percentages shown in Table 5.7 represent the total percentage of respondents of each department that indicated the specified support material were **useful** or **very useful**. In each case, the remaining percentage of respondents reported that the materials were **a little use** or **not used**.

Table 5.7: Percentage of secondary school heads of departments who perceived specific support materials as being useful

	Teachers' guides	Suggestions for activities	Pupil worksheets	Overlays for overlay keyboards	Sample files
Mathematics	60%	53%	50%	7%	33%
English	39%	32%	28%	14%	15%
Science	48%	43%	37%	6%	25%
Design Technology	64%	45%	36%	11%	39%
Geography	66%	61%	53%	13%	34%
History	64%	63%	62%	16%	26%
Music	46%	29%	31%	7%	31%
Art	34%	27%	13%	3%	22%
Modern Foreign Languages	53%	51%	41%	10%	29%
PE	11%	4%	4%	-	-
RE	31%	34%	28%	9%	13%
SEN	73%	71%	61%	51%	58%

See Appendix 1 for details of respondents

Clearly, some departments' responses indicated they were making extensive use of the support materials provided with software, whereas others (notably English, Art, PE and RE departments) were either not using the materials provided or found them of limited use. Generally, responses showed that teachers found the most useful support materials were:

- ◆ teachers' guides
- ◆ suggestions for activities
- ◆ pupils' worksheets.

Special educational needs departments were alone in finding sample files and overlays for overlay keyboards especially useful.

In terms of additional support that departments would welcome from software publishers, a significant number of respondents mentioned a need for very simple manuals or step-by-step guides describing how to use programs. This was a main need identified by about a quarter or more of respondents from English, Design Technology, Geography, Art, Music and SEN departments. There was no consensus regarding other types of support that would be welcomed, although different respondents listed the following as priorities:

- ◆ pupils' materials, which were intellectually demanding and in line with subject syllabi
- ◆ opportunities to examine software before purchase (either through 'on approval' or demonstration facilities)
- ◆ software related to specific subjects at KS3 and KS4
- ◆ support and advice, for example through telephone help lines
- ◆ sample files with ideas as 'thought provokers', including examples of work related to National Curriculum levels and strands
- ◆ more detailed information in software catalogues and information about upgrades
- ◆ cheaper software.

6. 'FOCUS' SCHOOLS

In order to identify suitable focus schools a range of sources (including LEA IT advisers, university education departments and software and hardware companies) were asked to nominate up to three schools in both the primary and secondary sectors which had reached a particularly high standard of attainment in IT practice across the curriculum.

Respondents were asked to list other criteria which had affected their choice. The few who took this opportunity mentioned:

- ◆ a coherent IT policy
- ◆ a feasible development plan
- ◆ good classroom practice
- ◆ a committed staff with good IT skills
- ◆ promotional activity to raise the profile of information technology.

Several respondents emphasised that the schools they had suggested were not necessarily perfect. They were, however, well organised, had clear aims and objectives and were moving towards an attainable goal.

Twenty five schools were selected from the recommendations. These were chosen to reflect different hardware bases in schools and to represent rural and urban areas. The schools studied comprised twelve primary, twelve secondary and one special school: one school had grant maintained status, one was a city technology school and two were independent. The schools were pleased to have been selected, although some modestly felt that they did not qualify. One school, chosen by a hardware manufacturer, questioned its inclusion on the grounds of severely limited funds for IT plus a lack of formal professional qualifications on the part of the IT co-ordinator. Nevertheless, information collected from the school indicated a high level of consideration given to the integration of IT in the school, the planned use of scarce resources and determined fund raising.

These focus schools received the same primary or secondary questionnaire (as appropriate) as the random sample, with four curriculum inserts for the secondary sector. On the basis of the answers, a sub-sample of ten schools was selected for visits and telephone interviews. Software issues covered in further depth included:

- ◆ management style and software purchase
 - ◆ partnerships
 - ◆ IT INSET
 - ◆ software and the National Curriculum
 - ◆ priorities for software designers.
-

MANAGEMENT STYLE AND SOFTWARE PURCHASE

Software purchase was either in the hands of an individual or was agreed by a team. In some cases, both methods were used. The role of the IT co-ordinator varied greatly in the influence they had on purchasing budgets. In secondary schools, the IT co-ordinator was only occasionally a member of the senior management team, whereas in primary schools, the IT co-ordinator was sometimes the head. The focus schools reported good relationships with the senior management team together with a fair degree of autonomy in allocating the IT budget.

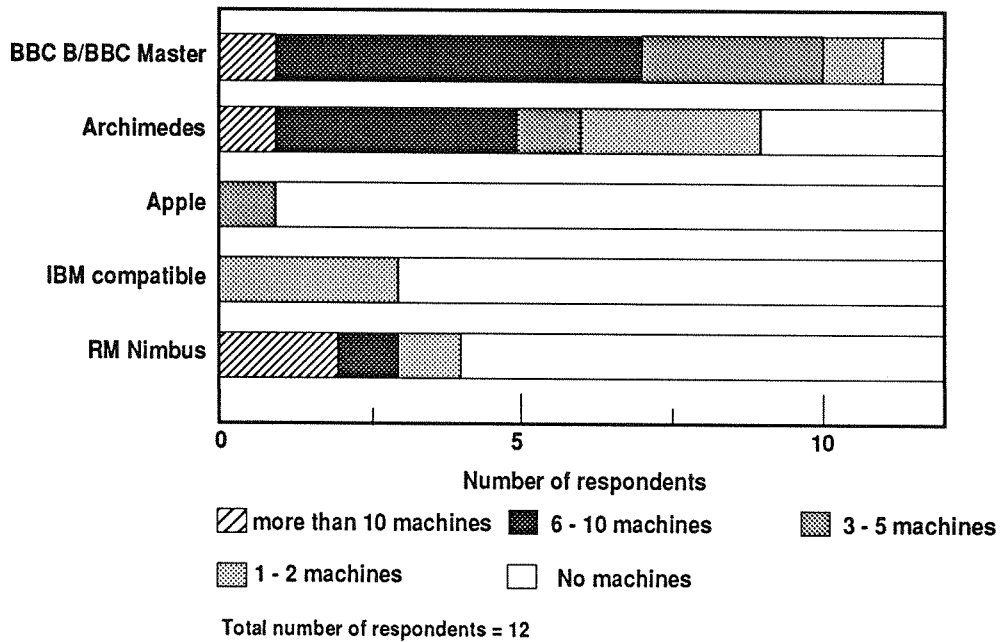
Although most schools had an IT co-ordinator, some effective practice was found in a primary school where they had made a conscious decision to have no IT co-ordinator. The staff had reasoned that an appointment of this kind would tend to channel all the experience and information to one teacher. This might create a situation where the staff relied too much on this 'expert' for curriculum and technical input. Consequently everyone on the staff had a specific IT curriculum responsibility and was charged to pass on this expertise to others, including the management of the network and the buying and training of software for specific areas.

IT co-ordinators were often the first port of call for help with software. Several had devised a chain of command that gave others in school the responsibility of sorting out minor problems with software. In addition, most of the secondary focus schools had some form of technician support, ranging from full time to a few hours a week. Several technicians installed software and took part in IT INSET in the school especially in software skills training; one technician ran most of the INSET programme.

Librarians, where they existed, were also contributing to the teachers' IT INSET programme. These specialists were often mentioned as a prime factor in the uptake of CD-ROM, an area which has enjoyed exponential growth in the last year. Librarians were also downloading on-line data and messages from electronic communications sources. Campus 2000 was used by a quarter of the focus secondary schools and Apple Global link was used by one. Schools with a tradition of electronic communications use reported increased interest by the Modern Foreign Languages and English departments.

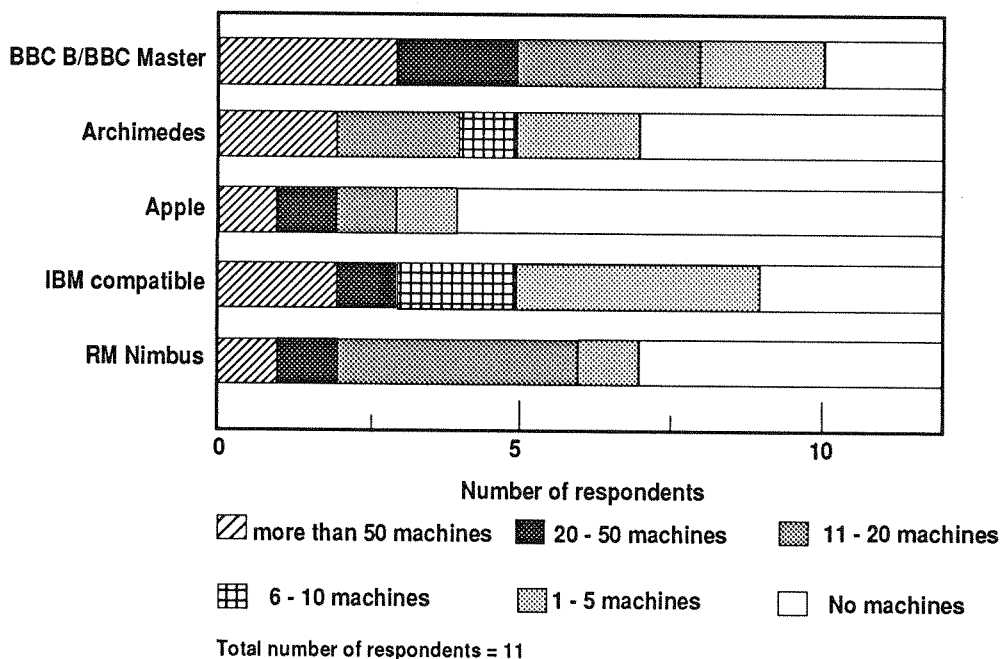
However inspired the management of computers, the numbers and types available must have an effect on the quality of the learning experience. The hardware available in primary focus schools is shown in Figure 6.1.

**Figure 6.1 Focus Primary Schools:
Different types of hardware available**



Generally information suggested that there are more mixed machine bases in the focus primary schools than in the random sample, but not as many as in the secondary system where this phenomenon appears to be increasing. This may indicate more confidence in handling different machine bases and improved user interfaces. However, this trend should be treated cautiously, since the number of focus schools was very small compared to the random sample. Figure 6.2 shows the hardware available within focus secondary schools.

**Figure 6.2 Focus Secondary Schools:
Different types of hardware available**



Secondary schools reported increasing problems with the networks of 186 computers but indicated that the machines were still in use for a range of tasks. BBC Bs/BBC Masters were available in all secondary focus schools: telephone interviews indicated that they were still good machines for datalogging and control because peripherals could easily be attached.

Focus schools were well stocked with new generation machines. Overall the mean number of computers available within the focus schools was roughly twice the number in the random sample, as shown in Table 6.1, although again this trend should be treated cautiously.

Table 6.1: *Mean number of computers available in focus schools as compared with random sample of schools*

	Focus Schools	Random Sample
Primary	15	8
Secondary	100	58

*Based on: 12 primary focus schools 191 random primary schools
11 secondary focus schools 276 random secondary schools*

A comparison of the IT budgets and actual expenditure on software between the random sample of schools and the focus schools suggested that the latter were allocating more funds to IT and spending more on software.

The range of choices and the range of prices made purchasing decisions for hardware and software difficult. The software budgets of focus schools reflected investment in resourcing a wider range of computers than ever before in education. They also suggested that there was more than a theoretical commitment to investing in technological changes that are taking place.

PARTNERSHIPS

Partnerships which focus schools established with outside agencies in order to promote IT development meant not just the external funding of initiatives but the sharing of aims and objectives. Additional resources the schools enjoyed included donations of software and hardware, consultancy and classroom support. Some schools had also been involved in teacher placement.

The range of partnerships mentioned by teachers in this small sample seemed high, probably due to the inclusion of recommendations from bodies other than the LEAs. They included:

National company initiatives

- BT Schoolink/Microcomputers in Curriculum English
- BT/NCET Gemini
- Newspapers in Education
- Understanding British Industry.

Company local involvement

- London Docklands Development Corporation
- BT regional offices
- Education Business Partnerships
- Eastern Daily Press
- Safeway
- Texaco
- Toyota
- Wellcome.

Education partnership initiatives included:

- TVEI
- Technology Schools Initiative: DFE
- LEA Open Learning
- NCET Interactive CD-ROM project
- Laptops NCET
- NCET PALM
- Maths and IT, Maths Association
- Maths Education and Industry (MEI)
- Warwick University sound simulation.

Funds had also been raised from organisations that did not enter into formal partnership:

- the Girls' Brigade
- Governors funds
- Parent Teachers Associations.

Generally speaking the focus schools appeared to have far more contact with outside agencies than the random sample and had been involved in a wide range of specific projects with a local and national focus. This suggests that the schools had developed effective relationships beyond their own gates.

The computer literacy and awareness of the head seemed to be an important factor in the focus schools. Staff had frequently been involved in LEA accreditation schemes and university and college courses on a range of curriculum uses. This IT competence in focus schools' staff may be an explanation of the additional funding that these schools enjoyed. Their staff would seem to be competent ambassadors and able to make their activities public. They were also taking advantage of IT training opportunities offered.

However, there was concern that so many of these education projects were now in the past, together with the fact that the recession had affected some companies' involvement.

IT INSET

Delivery of the IT attainment target and IT across the curriculum were well advanced, although not fully in place. Assessment was an area of anxiety. Concerns were voiced about the form assessment would finally take and the difficulties of addressing a moving target. Some IT co-ordinators in the secondary schools were waiting for more information before they invested in this area and started a full training programme. There was also concern in the same sector about resourcing KS4 and training in this area.

Although they were not yet satisfied with their colleagues' competence in all the five strands of IT capability, IT co-ordinators reported that they themselves had provided INSET in these strands given the strictures of time and money. Finally, some IT co-ordinators felt that the move of LEA advisers into inspectorate roles was a retrograde step in information technology training and practice.

SOFTWARE AND THE NATIONAL CURRICULUM

IT co-ordinators in the focus schools frequently cited integrated generic software as their main vehicle for National Curriculum delivery. There had been investment in hardware which came with bundled integrated packages. Subject-specific programs for the humanities were most often mentioned in the subject category.

The question about the way in which the schools managed progression revealed some interesting attitudes which correlated with the type of hardware and software available. Cross-phase progression was working well where the same computer systems were used both in the feeder primary schools and the secondary schools. In the state sector this had been due to an LEA decision. Cross-phase boarding schools and independent schools with preparatory schools attached had also benefited from the installation of a single new generation system throughout. A high number of teachers in these institutions were also computer literate, especially if the administrative system was also the same. Multimedia tools, CD-ROM and powerful integrated packages were used inventively at all levels. There were no correspondingly large numbers of PC compatibles at primary level in this survey, but 'Windows' environments on PCs were used in the secondary sector with an emphasis on integrated packages.

Special educational needs software issues

Despite the better ratio of computers to pupils in the focus schools, the National Curriculum, standards of entitlement and access were raised in the context of special educational needs (SEN). For example, one mainstream independent school and one inner city primary school were giving particular attention to expanding and funding this area of need. In some cases parents were buying appropriate computers which the schools could not provide.

Overall there was a range of evidence showing the support computers can give in the special needs area at all levels. Teachers mentioned:

- ◆ concentration on task
- ◆ improved quality and length of work
- ◆ accuracy supported by spelling checkers and calculators
- ◆ greater interest in words from the use of a thesaurus.

Most of the IT co-ordinators mentioned laptops in the SEN area. Many schools were buying more because the results had been so good even with quite cumbersome machines. Teachers would have liked more laptops designed for pupils with particular needs within a lower price range, roughly £400-600. Despite the enthusiasm for computer work in SEN, budgets were tight.

One teacher was particularly pleased with a newly published package that plugged a gap in her special needs programme. It was a program that read the words to the user. The use of sound released the teacher to attend to higher order learning problems and was, she felt, worth the cost. This teacher also used commercial adventures with text content to help with reading skills. She found this kind of software was effective and often more motivating than educational programs designed to teach reading. The use of sound in the reading context was greatly valued.

Teachers welcomed publishers' efforts to meet the need for special needs software, although some commented that too many programs did not fully use the capabilities of the newer, more powerful machines. In some cases content was a problem as programs tended to be a top-up for the average learner. A spelling program, for example, that was recently released 'got too difficult, too quickly'. The material failed to understand the problems of the slow learner:

'Going through a structured program is not enough. What they get right today they cannot get right tomorrow. Consolidation is vital.'

Mainstream teachers were particularly aware of the contribution computers could make to pupils' special needs with regard to basic numeracy and literacy training in the primary and secondary schools. However, there were not enough machines in the classrooms and booked time in the network room was limited for cross-curricular work. Software was not thought to be tackling these areas adequately. One teacher thought that teaching basic literacy and numeracy skills with computers should be part of general teacher training.

PRIORITIES FOR SOFTWARE DESIGNERS

There were some differences in emphasis in the priorities expressed by IT co-ordinators in the focus schools as compared with teachers in the random sample of schools which seemed to result from the greater opportunities they had had to maintain and develop their computer systems and to invest in software.

This group were unanimous in preferring software which offered graphical interfaces and 'point and click' operation. The cost of industrial-standard software was not an issue if it was robust, enjoyed many features and was well supported. On the other hand, two co-ordinators suggested that commercial companies, which sold predominantly to business/industrial markets, could help budgets if they viewed sales to schools as part of their marketing. The specialist educational software publishers were still seen to give excellent value and good authorship was valued.

These IT co-ordinators rarely felt the need to seek help outside the school for industrial standard software problems though telephone help services, on-screen and on-line help and on-line network maintenance were popular concepts.

The main complaint seemed to be that manuals were frequently too technical or too long. This was repeated by almost every IT co-ordinator. One quarter of the interviewees requested manuals that the pupils could read and use, with one teacher commenting:

'They're the ones with the time and the interest to solve the problems. Tell the software publishers to write the manuals for our pupils!'

Another request was for '*short idiot cards for the teachers with plastic backing to protect against constant use*'.

Secondary school IT co-ordinators emphasised a need for software relevant to key stage 4 requirements. Examples named by teachers were flexible and robust 'point and click' modelling programs and a range of appropriate files to customise existing spreadsheets, databases and computer-aided art/design packages. Another suggestion was for improved adventure generators which were currently thought to be inadequate and too clumsy for KS4 simulation and modelling purposes. Sophisticated applications were generally required, but with appropriate content to help the teacher in these new areas. In some cases the content existed in older programs.

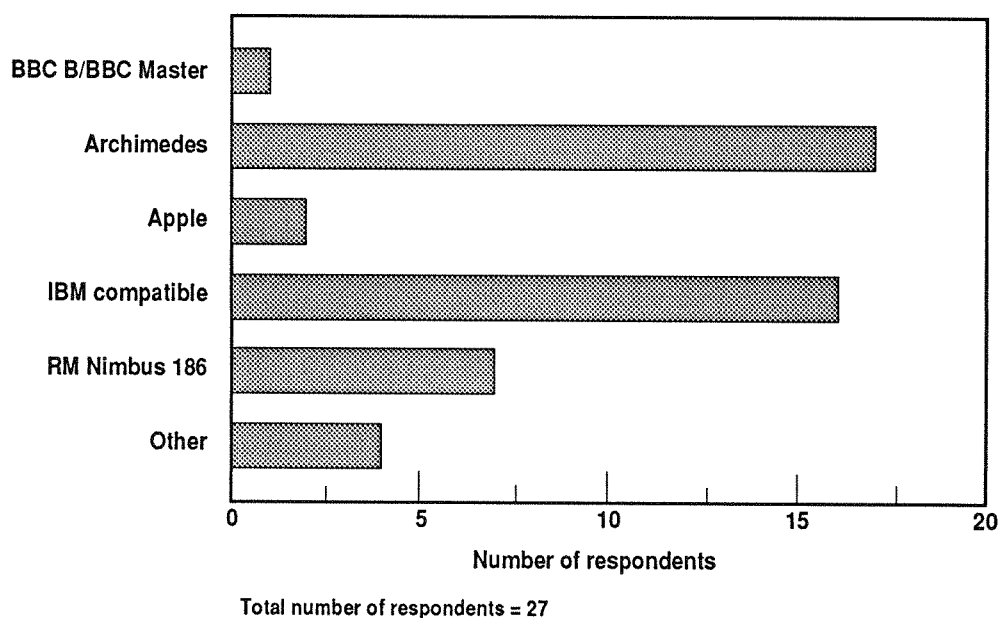
Printer drivers were too often incompatible with old machines and setting up printers to conform consumed too much time. Software for electronic messaging was considered to be poor though many schools had not updated since they bought the system. The electronic mail interfaces needed improvement and all the schools using E-mail requested a move to graphical interfaces.

7. DEVELOPMENT OF SOFTWARE – THE PUBLISHERS' PERSPECTIVE

SOFTWARE DEVELOPMENT

Publishers that responded to this survey are clearly focusing new software development projects on only two main formats: Acorn Archimedes and IBM compatible, with each being named by over half the respondents. In contrast, only one developer stated that programs were being developed for BBC B/BBC Master computers. Figure 7.1 shows the number of respondents who indicated the machines for which they were developing most new software.

Figure 7.1 Publishers' Survey: Hardware base for most new software



Considerations

A range of different factors are taken into consideration by publishers when developing new software. Publishers were asked to indicate whether the following factors were considered a lot, a little or not at all:

- ◆ user-friendly interface
- ◆ hardware capabilities
- ◆ cross-curricular or thematic applications
- ◆ National Curriculum subject requirements
- ◆ special educational needs
- ◆ projected cost to buyers.

The most important considerations from the developer's point of view were the interface, hardware capabilities and projected cost, each cited by at least two-thirds of respondents as receiving a **lot** of consideration. No other factor was considered a **lot** by more than a third of respondents. However, many teachers indicated that one of their main criteria in selecting software was whether or not it was relevant to or fulfilled National Curriculum requirements, and responses from subject specialists within secondary schools frequently emphasised a need for software related to specific subjects. It may therefore be appropriate for developers to give this factor more consideration.

Hardware bases

When deciding the hardware bases for which they would provide versions of new software, the response most frequently cited was concerned with the availability of different hardware bases within schools (both current and projected for the future). Another main consideration was the experience/expertise of programming staff within the company. Clearly the popularity of different machine bases within the target market is related to potential sales - a prime consideration for any business, whereas the expertise of programmers, the company's past strengths and the ease of development are more related to the feasibility of the project.

New program development

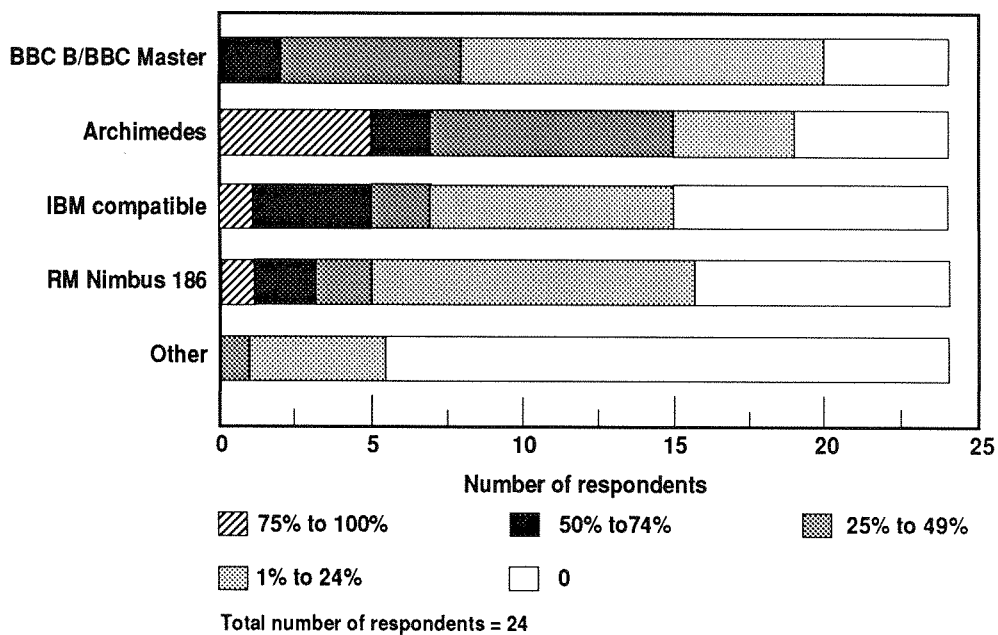
Although many factors can affect the overall development time and cost in producing a new piece of software, publishers were asked to indicate the **approximate** time and cost in producing a new program. Given the range of companies surveyed, the fact that some were small specialist educational software developers, others were publishers with extensive book lists as well as software lists and a small number was primarily concerned with business software markets, it is not surprising that responses varied considerably.

Development time ranged from 6-36 months, with the median time being 12 months. Development cost showed more variation, with some companies working with a budget of £5,000 or less, and, at the other extreme, development costs running to seven figures. Several companies reported typical development costs close to the median value of £25,000.

THE COMMERCIAL ENVIRONMENT

Sales

With regard to sales of software for the financial year 1992-93, publishers were asked to show the percentage of their sales in relation to different hardware bases. As shown in Figure 7.2, sales of software for Acorn Archimedes machines comprised over 75 per cent of their sales for about a fifth of the publishers. About the same number of developers achieved more than 50 per cent of their total sales with software for IBM PC compatibles. Sales for other machines formed a less significant proportion of total software sales.

Figure 7.2 Publishers' Survey: Percentages of sales for different hardware

This information confirms what many schools reported as their buying policy: although schools still have and use BBC B/BBC Master machines and there is a wide range of software published for them, many prefer to spend funding available for software purchases on programs for more powerful machines.

Consequences of improvements to hardware

Developments in IT have made available increasingly sophisticated computers which allow software developers to utilise their increased capabilities. On one hand this means publishers can develop more attractive and flexible software, on the other hand the pace of developments exerts a constant pressure on developers to keep up to date with the latest technology.

Software developers were asked to list up to five main effects on their company of continual improvements to hardware. There was little consensus in this, with a wide range of consequences being listed by respondents. Roughly half the developers made general comments on the greater opportunities offered by improvements in hardware, referring to greater sophistication in software, larger databases, more realistic simulations and the fact that *'faster processors make more things possible'*.

A quarter of respondents remarked on the associated costs in connection with keeping up to date, citing the cost of purchasing state-of-the-art hardware and *'the constant need to upgrade - which is expensive'*. Two developers emphasised the financial risks in beginning new software development projects:

'High risk investment with no firm long term commitments;'

and

'Need to begin development before market established'.

Closely linked to the financial cost of keeping up to date with hardware developments was the cost in terms of time: again one in four respondents mentioned this factor, referring to the fact that it is *'increasingly difficult to keep up'*.

In connection with the technical issues, several publishers reported experiencing problems, such as *'with RISC-OS 3 and existing programs'* and *'with incompatibilities of new micros supposed to be compatible with the old'*. As a result of changes to operating systems, developers found it necessary to test software on a wider range of machines.

A number of publishers commented that developments had allowed *'sophisticated presentation on screen'*, referring specifically to better screen colours, vastly improved graphics and sound.

Opinions were divided equally between those developers who felt hardware improvements led to *'easier programming'* and *'more rapid compilation'* and those who reported *'difficulty of programming on new interfaces'*, *'increased sophistication leads to longer software development time'* and *'more demanding programming (i.e. greater expertise required)'*.

In terms of the commercial market, several respondents identified new sales opportunities as being related to hardware improvements, including upgrade revenue. The corollary of this, however, was expressed by one publisher as the *'reduced life of existing product range'*. Having sold software, a significant number of publishers referred to the *'need to offer increasingly sophisticated technical support'* and the greater volume of requests for support from customers.

Threats

It is clear from publishers' comments that technological innovation brings both opportunities and headaches for software developers.

They were asked to list up to five technical and/or market-led threats and opportunities that their company had to take into consideration. The single threat named by more companies than any other factor (roughly half the publishers) was the range of different hardware platforms available, with respondents commenting on the *'rapidly changing machine base'*, *'too many platforms in UK schools'* and uncertainty regarding *'what hardware will be standard'*. A few publishers felt there were *'too many hardware companies to keep in close touch with'* and one complained about *'companies not revealing their future strategies,'* clearly a problem when some software development projects can take 12-24 months.

Slightly fewer companies were concerned about the lack of school money for buying software, some obviously having identified a reduction in spending by schools. One respondent commented *'LMS has caused problems due to extreme caution by budget holders'*. If this is indeed the case, once schools feel more at ease in controlling their devolved budgets, this situation could ease, although in the short term this does not help

developers with their own cash-flow problems. Another respondent identified one possible explanation for schools reducing their expenditure on software: *'educationalists buying hardware and not software'*.

The other main threat reported by a significant number of publishers was concerned with competitors within the software development sector and marketing strategies. Large companies, especially the international ones, were perceived as a major threat:

'Large companies with more resources leave few gaps in the market and often supply competing software on networks' ;

and

'Competition by worldwide companies who sell cheaply to education'.

This must raise the question of whether competitive prices of good quality educational software can only be achieved with large volume sales, with the result that small companies, some of which may specialise in certain sectors (such as programs to support special educational needs), may be perceived by schools to be marketing more expensive software. For small companies to reduce the cost of their programs would mean a reduction in their income, which in turn could reduce their scope for new software development projects.

A small number of publishers viewed as a threat the withering of LEA IT support services, with the consequential reduction in funds available to LEAs to purchase software. One commented on *'the difficulty of marketing to schools directly instead of via LEAs'*.

Publishers also recognised the influence of curriculum change, both in terms of developing new programs in line with the National Curriculum and because *'National Curriculum uncertainties makes many teachers hold back on planning'*, with the consequence that purchases may be deferred until curriculum revisions are finalised.

Opportunities

Developers listed a wide range of opportunities that they had to consider. The three main opportunities identified were:

- ◆ new hardware creates a demand for new software
- ◆ international markets
- ◆ CD-ROM.

In terms of export markets, some comments suggested interest in both European and US ventures:

'European schools have generally standardised on one or two platforms'

and

'Increased use of IBM and Apple in UK leading to USA market place'.

Another possible growth area was identified by fewer respondents: the home market, since there are now more home computers and '*PC software opens up the home market*'.

Updating existing software

In order to maintain sales within a market in which there are changes not only to the curriculum but also in the hardware available, software publishers have to consider the viability of updating existing versions of software. Developers were asked to list up to five main factors involved in producing updates. Four main areas were identified in the responses:

- ◆ comments/suggestions from customers
- ◆ the potential size of the market
- ◆ changes to curriculum content and requirements
- ◆ hardware developments.

Other factors cited by fewer respondents included finding and eliminating 'bugs', and cost, both in time and in financial terms. One developer emphasised the need to consider the user's point of view, citing as a factor for consideration '*will teachers feel comfortable with the software?*'

8. THE FUTURE

LEAs' VIEWS ON THE FUTURE

Some of the LEAs who were interviewed had been heavily involved in IT INSET and software development since the 1970s. They were now having to look towards a future that some were finding alien.

The 1993 Education Act had confirmed that the government was seeking to diminish the traditional role of LEAs. Their services, which had in the past been free, now had to recover their costs from the schools. This meant that advisory services had to be client-led rather than making the policy themselves and training the schools.

Relations with schools

Although many schools were continuing to pay for regular maintenance in this new situation, financial concerns meant that they were opting for curriculum IT support in one year and not in another. This was not a strong enough basis on which to maintain advisory teachers on the pay roll.

A small number of schools were turning to other sources for training. Competition in the INSET field was emerging from the publishers who in one adviser's view, gave skills training unrelated to the curriculum. Another threat came from courses run by further and higher education institutions which were often cheaper, though reported by one LEA to be poorly resourced and inadequate in content.

Skills were being lost to the service as advisory teachers returned to school. Other teachers were reluctant to join the service although one LEA was successfully creating new part-time posts for teachers who spent just one day a week touring the schools training and collecting information. In the main, however, it was acknowledged that inspection, assessment and review duties were now taking over from the training aspects of the adviser's job. A widely held view was that schools were not getting the training they had once had.

Collaboration and opportunities

One adviser expressed regret that LEAs were now competing against each other instead of working together. Several advisers referred to the need for mutual support between LEAs and referred to the growing difficulty of getting information about schools and about software and hardware advances. One adviser suggested that the advisory services would be greatly helped *'if the hardware companies would stand still for a while'*.

Of even greater concern to the LEAs than the present financial difficulties was their perception of the government's long term commitment to IT across the curriculum. It

was felt that funding over the last ten years had been reasonable. Left to market forces would the same levels of funding apply? One adviser saw the removal of IT from English in the National Curriculum (DFE and Welsh Office, 1993) as an ominous sign that more cuts might be coming. Another adviser thought that in about eighteen months time, when the older computer systems could no longer cope, IT in schools would be quietly dropped.

In order to respond to the new circumstances they found themselves in, LEAs were looking at a range of ways of financing themselves, including selling their services as a privatised agency and becoming a charity. The fact that the National Association of Advisers for Computer Education (NAACE) was now offering advice on business opportunities was considered helpful.

NAACE were also praised for welcoming the new NCET LINK-IT centre leaders. Core funding for established IT centres though the NCET LINK-IT centres was a popular idea, although one interviewee thought the number should be reduced.

One adviser hoped for a more international focus for LEAs with wider IT world links based on industry-compatible hardware and software, use of shareware and education links fostered by the growth of electronic services. This would link in with a growth in distance learning and flexible teaching methods to fit in with schools' needs. This thinking was reflected in the practice of the focus schools in this study.

The LEAs pinpointed opportunities for the future that they hoped to foster. CD-ROM was seen as a growth area which fitted in with the views of the schools in this survey. The lowering of prices for laptops was thought to be important especially in the area of SEN. Teachers' sentiments in this survey were echoed by a request for cheaper laptops for the visually impaired and laptops with smart cards to transfer data to the main computer.

In terms of vision for the future, LEAs urgently required clearer indications of the direction that the Department for Education and NCET expected them to take. Impetus at national level for IT development was a main request. One adviser thought that the LEAs still had a role to play in planning for the future because their ability to identify needs had not changed. A problem was that they did not have the venture capital to fulfil the needs they had identified.

SCHOOLS' NEEDS FOR THE FUTURE

Evidence of children learning through the use of computers, examples of imaginative efforts to promote IT across the curriculum and the effective integration of new technologies like multimedia bode well for the future of information technology in schools.

IT co-ordinators were asked to list up to five main types of software support they thought would be needed in the future. Across both primary and secondary schools, INSET needs were most frequently named with roughly a quarter of respondents listing specific INSET requirements.

INSET requirements

General requests for INSET were focused on the strands of information handling, modelling (especially spreadsheets) and measurement and control. Teachers were clearly indicating here that they have not yet mastered these areas of the National Curriculum and need support. Other areas in which both primary and secondary schools identified a need for INSET were introductions to software for new generation machines and the use within the curriculum of existing software.

After INSET primary teachers identified as a priority continued support from LEA IT advisory teams, referring specifically to:

- ◆ continued visits and classroom support
- ◆ technical and maintenance support services
- ◆ greater freedom of licensing for LEAs to distribute software.

Not surprisingly, secondary respondents listed a much wider range of INSET needs, which in some cases reflected their current level of development in IT. Areas identified included:

- ◆ subject-specific software
- ◆ guidance on IT assessment
- ◆ CD-ROM and interactive video
- ◆ multimedia applications
- ◆ IT confidence boosting sessions for non-specialists
- ◆ software relevant to KS4 curricula.

Another kind of longer-term INSET concerned curriculum development. One respondent suggested that there was scope for more teacher designed files for established generic programmes like integrated packages, spreadsheets, hypertext and multimedia applications.

Time and money

Time was a major issue for many respondents, with teachers wanting more timetabled periods for dealing with IT-related matters, familiarisation with new software and for supporting colleagues in the classroom. Several IT co-ordinators also wanted time for producing software documentation tailored to their school's requirements.

Money for IT equipment and INSET was listed as important in both the primary and the secondary sector, but not overwhelmingly so. Better educational discounts from industrially-compatible software companies were suggested. They thought these highly profitable companies selling mainly to industry should take account of the marketing aspects of software use in schools and adjust the price accordingly.

Subsidy was not considered to be the answer to prices in the specialist education developer market. In the interviews and visits the general view was that it was worth paying for quality and reliability in software. This should be some comfort to the small publishers whose only market is the schools.

Support from software developers

It is important to note that this project identified enthusiasm in schools for a range of educational software developed by some of the small specialist publishers, particularly titles produced since 1992 when the new generation machines appear to have made their impact on buying policy in schools. Most schools were aware of these general developments and were making budgetary efforts to keep up with best practice in quality software solutions. In fact, some IT co-ordinators were overwhelmed by the volume of publishers' literature coming into the school and were developing strategies to share this information amongst the staff.

Overall the responses encouraged the software publishers to continue to supply materials which were already proving useful in teaching and learning:

- ◆ ideas for using software
- ◆ curriculum materials such as pupils' worksheets
- ◆ sample files
- ◆ tutorials on disk.

A frequent complaint was the tendency for software and hardware manuals to be too lengthy and too technical: many teachers wanted simple instruction cards and instructions written in '*pupil-speak*'.

Teachers wanted more opportunities to trial packages before buying, especially given the high prices of new generation software. More publishers' demonstrations and demonstration disks were suggested.

A negative feature of the research findings was a growing sense of isolation and frustration at decreasing opportunities for obtaining trusted information, advice and training. Requests were repeated for sources of reliable advice on the best buys, specific strand and subject software reviews and technical information.

Telephone advice was one of the sources that was highly valued by those who used it, though large numbers of teachers from areas that had been supported by LEAs were not taking advantage of this route. The independent, grant maintained schools and city technology colleges have had a tradition of working with hardware dealers and software publishers directly and had used these services for some time. Nevertheless, across the range of schools surveyed there was evidence of constructive and mutually supportive relationships between schools and developers. This was particularly evident in the area of special needs where it was reported that publishers responded to a variety of suggestions for customising software and adding peripherals.

EDUCATIONAL SOFTWARE DEVELOPERS' VIEWS ON THE FUTURE

The educational software developers who responded to this survey ranged from small specialist companies to one large publishing house selling to industry and commerce. Groups sponsored by education and a multinational company that sponsors classroom IT resources also responded. The questionnaire invited views on future developments relevant to the software market.

The general message from the developers was that the educational software business had changed and adjustments were being made for future contingencies. Publishers saw teachers being particularly supported in the future by development in the administrative and management areas of education e.g. scoring of test results, recording children's progress and reporting to parents.

These suggestions about future developments in educational software were overshadowed by the feeling amongst several publishers that the number of software publishers would decrease. Major software houses were in the strongest position as they were geared up to coding for new generation machines. In addition, they often had a commercial market to support them.

Pressures

One small developer emphasised the financial problems the company faced:

'We are a very small group funded by our LEA having to face the harsher economic regimes imposed on LEAs now. Government rules on trading with grant maintained schools make life even harder! Try us this time next year and see if we are still around.'

There was regret that a common user interface had not yet been developed. Some developers felt that too much time, effort and money was wasted in servicing all the hardware possibilities in schools. Agreement on a common interface was essential if the best overseas practice was to be used and advantage taken of the export potential of internationally admired British software.

Another major problem was the increasing variety of machine platforms in schools, a trend which is clearly continuing according to the evidence in this report. Developers talked about the problems of trying to keep up with these technological advances in the hardware market:

'The ever-changing hardware scene is a continual cause for concern as the hardware manufacturers struggle against each other to bring out ever better machines for an under-trained and increasingly under-supported and under-funded teaching workforce.'

This concern about the IT training of teachers was emphasised by another developer:

'Schools make insufficient use of software because of the lack of training for teachers, the lack of time to get that training and the money to pay for it.'

These comments were echoed by the IT co-ordinators in this survey. INSET was their main priority if they were to progress in the use of IT across the curriculum. Time and money were also listed.

There was concern amongst developers that small software publishers would no longer be able to offer on-line technical support free. These services would be discontinued or become increasingly expensive. This would reduce further the channels available to teachers for immediate advice and training on software.

At the moment, however, potential support for sustaining appropriate software use in schools is peripheral to developers' needs for solvency. According to some publishers, the number of schools in Britain and the fragmentation of the education software industry make reasonable profits almost impossible. To take on IT INSET for teachers at the same time would be unrealistic.

There are clearly many pressures on software developers arising from sources over which they have no control. Changes in hardware and revisions to the National Curriculum mean reductions in the sales potential of some of their products and lead to a demand for new/updated programs. Development costs for new software represent a considerable investment, with an uncertain return. The future therefore presents a mixture of threats and opportunities, not only to developers but to the schools looking for software to resource the curriculum. The views of both sides were aptly expressed in this comment regarding the future from one publisher:

'Exciting possibilities, including explosion in hardware and availability in schools, but lack of funds and continuity for future development are very unsettling. Good software development is not cheap and many pieces of software are being launched with insufficient teacher participation in design/trials and by software writers who have no educational base or insight.schools, unlike businesses, cannot invest much in software - if they buy the wrong package, they have to live with it.'

A way forward?

Broad solutions are needed for the future. Overseas markets are an obvious target for improving sales and profits to invest in educational activity. Much British software was considered to be more appropriate to the style of teaching and the National Curriculum content than much of the industry-standard subject-specific software that was coming into the country from international English speaking sources. Government-led liaison with international software manufacturers could be one solution. This policy requires financial commitment from government sources to support the software developers in this initiative so that they can develop profits adequate to support themselves from a broader base. The reciprocal initiative set up with American publishers by NCET and the DFE could be a positive step in this direction. There was, nevertheless, some concern about the urgency of the situation.

9. REFERENCES

GREAT BRITAIN. DEPARTMENT OF EDUCATION AND SCIENCE (1986). *Results of the Survey of Microcomputers etc. in schools - Autumn 1985*. (Statistical Bulletin 18/86). London: DES.

GREAT BRITAIN. DEPARTMENT OF EDUCATION AND SCIENCE (1989). *Survey of Information Technology in Schools* (Statistical Bulletin 10/89). London: DES.

GREATBRITAIN. DEPARTMENT OF EDUCATION AND SCIENCE AND WELSH OFFICE (1990). *Technology in the National Curriculum*. London: HMSO.

GREAT BRITAIN. DEPARTMENT OF EDUCATION AND SCIENCE (1991). *Survey of Information Technology in Schools* (Statistical Bulletin 11/91). London: DES.

GREATBRITAIN. DEPARTMENT FOR EDUCATION (1993). *Survey of Information Technology in Schools* (Statistical Bulletin 6/93). London: DFE.

GREAT BRITAIN. DEPARTMENT FOR EDUCATION AND WELSH OFFICE (1993). English for ages 5 to 16 (1993): *Proposals of the Secretary of State for Education and the Secretary of State for Wales*. York: NCC

NATIONAL COUNCIL FOR EDUCATIONAL TECHNOLOGY (1992). *Educational Software: A Directory of Currently Available Software for Schools and Colleges*. London: J. Whitaker and Sons Limited.

NATIONAL CURRICULUM COUNCIL (1990). *Information Technology: Non-Statutory Guidance*. York: NCC.

NATIONAL CURRICULUM COUNCIL (1990). *The Whole Curriculum* (Curriculum Guidance 3). York: NCC.

APPENDIX 1

Secondary subject inserts sent and returned

	Number sent	Number returned completed
English	300	210
Mathematics	300	126
Science	300	110
Design Technology	300	116
Geography	150	69
History	150	42
Art	150	55
Music	150	57
Modern Foreign Languages	150	59
Physical Education	150	41
Special Educational Needs	150	51
Religious Education	150	53

Where possible the number of responses to specific questions accompanies the tables and figures in this report.

APPENDIX 2

Schools' software purchases since April 1992

Telephone interviews were carried out with IT co-ordinators in 25 primary and 25 secondary schools from the random sample during June 1993. The schools were chosen to include schools of different sizes, age groups, locations and using different machine bases, although it should not be regarded as a statistically representative sample. During the interview, IT co-ordinators were asked for details of software purchases made between April 1992 and June 1993: the programs named have been collated into the categories shown below.

Software purchases made by schools between April 1992 and June 1993.

Software type	Primary schools' purchases	Secondary schools' purchases
Art and design	8	19
Control	1	2
Data handling	17	21
Desk top publishing	3	18
E-mail	1	1
Hypermedia/multimedia	3	0
Integrated packages	4	2
Measurement	0	1
Music	2	0
Programming (inc. Logo type)	2	2
Simulation/modelling	13	1
Topic specific (e.g. history)	39	18
Utilities/administration	5	4
Word processing	15	15

Based on 25 primary schools and 25 secondary schools.

APPENDIX 3

Average numbers of computers available in schools: this survey compared with Survey of Information Technology Schools (DFE, 1993).

	Primary This survey DFE		Secondary This survey DFE	
BBC B/BBC Master	4.6	3.6(1)	17.3	19.6(1)
Acorn Archimedes/A3000	1.9	1.3(2)	11.7	10.3(2)
Apple	0.1	0.0	2.7	1.2
IBM compatible	0.1	0.2(3)	8.9	6.9(3)
RM Nimbus	1.5	1.3	13.0	14.0

Based on

191 primary schools' responses to this survey

277 secondary schools' responses to this survey

682 primary schools' responses to the DFE survey

432 secondary schools' responses to the DFE survey

Data taken from DFE survey in which

(1) is the sum of Acorn Master and BBC Acorn B

(2) is the sum of Acorn Archimedes and Acorn A3000

(3) is the sum of Amstrad, IBM PC clone and IBM compatible.

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SOFTWARE IN SCHOOLS

Commissioned by the National Council for Educational Technology, this report gives an overview of the current use of educational software in primary and secondary schools in England and Wales, indicating what is being used, how it is being used and which aspects of the curriculum are being supported.

The report provides information on the range of software available, including programs obtainable from LEA computer centres, the kinds of software purchased by schools, the strategies and systems deployed to support teachers in their use of software, the views of software developers and publishers concerning educational packages, and likely developments in the future. Other issues covered include the hardware already installed in schools, funding for IT equipment, and purchases related to in-service training courses.

Based on a sample of 400 primary and 600 secondary schools, including independent and grant-maintained schools and schools of all sizes, age ranges and geographical regions, this report is of value to school IT co-ordinators and everyone interested in the most up-to-date picture of the use of software in the state school system.

ISBN 0 7005 1344 2

£7.50