THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY INITIATIVES IN SCOTTISH SCHOOLS

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THE IMPACT OF ICT INITIATIVES IN SCOTTISH SCHOOLS

The Impact of ICT Initiatives study was established to provide information on the implementation of a series of government initiatives in Information and Communication Technology (ICT) in Scottish schools. The study was undertaken in two phases: the first was in 1998-99 at the start of the implementation; the second two years later in 2000-01 when, it was anticipated, some impact on learning and teaching might be evident. An Interim Report was published following the first phase (Stark *et al*, 1999; Interchange No. 63). This report presents the findings from the second phase, making comparisons with the first where appropriate.

The Interim Report presented evidence of the range of knowledge and skills which pupils possessed at that time. The picture was one of substantial variation, with some pupils demonstrating considerable expertise while others appeared inexperienced and untutored. In terms of the use of computers, word processing, graphics packages and information searching (through CD-ROMs and the Internet) were among the most frequent uses of ICT.

Teachers were similarly varied in their confidence and competence although the majority saw advantages in developing further their skills and understanding, and expressed support for the developments. Teachers saw the main benefits lying in the development of learning and teaching strategies but they also said that they needed more help in realising this.

In the second phase in 2000-01, the evidence was not greatly different although there were a number of positive moves in some areas, indicating that the initiatives were making some impact on teachers and pupils, although not perhaps as great as might have been hoped.

It should be noted that a two-year gap between surveys is a relatively short time scale given the rate at which educational initiatives tend to impact upon practice. It will be necessary to continue to monitor the impact for some years yet, perhaps through repeating some of the elements of this project.

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THE IMPACT OF ICT IN SCOTTISH SCHOOLS

EXECUTIVE SUMMARY 2001

The main aims of the government's national ICT Initiatives were:

A To increase the amount of, and access to, up to date ICT equipment in schools.

B To improve resources available, particularly online, to support classroom work.

C To enhance staff skills in the use of ICT to deliver the curriculum.

The indicators of the achievement of these aims included the following:

1. Enhanced learning experiences for pupils through the use of ICT.
2. Increased motivation for both learners and teachers.
3. Greater use of ICT in the classroom for both teachers and pupils.
4. Higher levels of pupil attainment as a consequence of increased motivation and enhanced learning experiences.
5. Emergence of online communities of both learners and teachers.
6. Greater access to external teaching resources.
7. Increase in network literacy for both teachers and pupils.
8. More use of basic network skills (e.g. more use of email, WWW, network search) in routine classroom learning work.
9. Greater use of ICT for learner, staff, and parent support.
10. Greater use of ICT in managing information and data relevant to assessment, recording, reporting, monitoring and evaluation.

The Impact of ICT Initiatives project was designed to determine the extent to which these were met within the first two years of their implementation, with particular focus on evidence of change in the indicators of achievement nos. 3, 4, 7, 8, 9 and 10. In addition, some aspects of the questionnaires provided evidence in relation to indicators 1, 2, 5 and 6.

In investigating the extent of the impact through these indicators, the project established the following key aims:

- to develop an assessment framework which provides a sound baseline measurement of the current knowledge, understanding, attitudes and skills associated with ICT use;
- to develop a set of assessment materials and tasks which assess the types of knowledge and skills required by pupils;
- to conduct two surveys in 1998-99 and 2000-01 with nationally representative pupils at P7 and S4;
- to analyse the results in order to provide information on:
  - i. attainment at each stage in a range of ICT knowledge and skills;
  - ii. changes in performance between 1999 and 2001;
  - iii. differences in performance between P7 and S4; and, where possible,

iv. differences in performance between selected sub groups within the national sample.

- to follow through the sample of P7 pupils in 1998-99 to S2 in 2000-01, seeking evidence of progression and development in this longitudinal sample; and
- to identify the levels of access to, provision of and use of ICT, by teachers and pupils both within schools and outwith, as well as their attitudes towards its use in education.

They are considered in turn, with summaries of the main findings under each heading.

The Assessment Framework

The framework used in the survey met the needs of data analysis and permitted the reporting of findings in readily recognisable categories. During the project, the ICT competences for Initial Teacher Education and the revised 5-14 Guidelines were published. The 5-14 guidelines were checked against the framework developed for use within the project (Appendix 8) and, while the names and strands/categories were different, the basic expectations were very similar. The main difference is that the expectations of the 5-14 document are set out in (st)age-related levels whereas the Impact of ICT Initiatives framework is not. At the beginning of the project, there was little to guide such a differentiation but any future assessment of ICT competence should take account of these. The data presented in this report do not clearly indicate stage-related performance levels although there are hints here and there of some underlying trends.

The Assessment Package

Due to the reluctance of schools to participate it was not possible to implement all aspects of the assessment package across all pupil samples, in either phase of the project. In addition, the numbers in some of the sub-samples were not sufficiently high to give confidence in their representativeness. In saying that, the majority of the tasks and procedures were sufficiently robust and, should provide the basis for any future re-run of the project, or similar exercise.

There are many robust computer/web-based assessment packages on the market and in development to allow more use of ICT to undertake such exercises in the future. One of the emerging concerns however is whether the impact of ICT is best determined through changes in the skills and knowledge of users and/or through the extent to which they become adept at using the technology in appropriate contexts and in knowing what these are.

Considerable effort went into attempting to recruit schools earlier in the second phase and to retain as many as possible of the 1998-99 sample of schools. This was relatively successful but due to the pressure on schools in terms of performance targets, etc., a number of schools were still reluctant to become involved and several dropped out even after they had indicated an initial willingness to become involved. Tracking pupils from primary to secondary was relatively successful but many went to non-associated secondary schools and the numbers in each were sometimes so small as to make involving them impracticable.

The Performance Data

a, Pencil and paper assessment

The data from the assessments undertaken in 1998-99 indicate that almost half of the pupils in P7 and S4 demonstrated knowledge and understanding of much of the ICT hardware and software included in the papers. Performance at S4 was, overall, higher than at P7 but on some individual tasks, the younger pupils demonstrated a superior performance. Knowledge and Understanding of Communications Networks and the Uses and Impact of ICT were less secure but still significant. This was again the broad pattern in 2001, although the superiority of S4 pupils was more marked. Performance at S2 was little differentiated from that at P7 although the smaller numbers in the former sample mean that these conclusions must be treated with some caution.

At all stages, knowledge and understanding of hardware and software was the most secure of the sub-categories assessed.

In both phases, the evidence from the other category assessed through the written papers, Personal Appropriation, also indicated that many pupils at both stages could identify ways of using their knowledge and understanding in specific contexts. The number of tasks in this category was relatively low.

b. Practical assessment

The materials and procedures used in Phase 2 practical assessment component were more effective than in Phase 1. Unfortunately, schools were reluctant to become involved and the numbers of pupils assessed were smaller than desired. However, the numbers were sufficient to provide some evidence on patterns of performance within and across the stages assessed to allow some tentative inferences to be drawn.

Performance levels at S4 were higher than at P7. Both groups were more successful on the word processing and, to a lesser extent, the spreadsheet programs. The findings for CD-ROMs and electronic communication (email and internet) were somewhat confounded by the various difficulties faced in attempting to assess what pupils knew and could do in a practical context.

The Perceptions, Experiences and Skills of School Staff and Pupils

a. The ICT Co-ordinators

The ICT co-ordinators are at the interface of the external world, locally and nationally, and the internal practices and culture of the school. With no additional remuneration, and in the case of most primary co-ordinators, no additional time allocation, they undertake a range of duties which is rapidly extending. For the secondary co-ordinators, work associated with Networks and staff development were identified as the main escalating duties; for their primary colleagues, the management of resources, including hardware, and the demands of the ICT curriculum were the next most frequently mentioned concerns. When identifying their **time commitments**, dealing with technical problems was identified by the largest proportion as highest on the list of time consuming activities, although clearly, in some authorities, the additional technical support arrangements for co-ordinators were working and had improved matters since the last survey.

The data indicate, as before, that the most valued sources of information used by co-ordinators are mainly within the mainstream educational system - their own schools, the Authority, and for primary co-ordinators, Learning and Teaching Scotland. Staff development was the main priority identified in both sectors. The next most frequently mentioned by primary staff were: setting up a computer suite, and attending to the ICT curriculum; in secondaries it was aspects of network development and securing staff access to hardware.

The areas of improvement included: the technical support (to secondary co-ordinators in particular), improvements in resource provision; the network arrangements (particularly in secondary schools). Infrastructure, computer numbers, access, and availability of peripherals were also viewed more favourably than in the previous survey.

Nevertheless, for schools in both sectors, a number of key aspirations clearly remain as developments on the horizon for the overwhelming majority, e.g. having a number of modern computers in every classroom; having most staff trained in a range of classroom ICT uses; seeing positive effects of ICT on pupil attainment in curricular areas; having developed a common vision of the use of computers in their school; and having regular ICT communications with a proportion of their parents.

b. The Classroom Teachers

In our random sample of **primary teachers**, 81% had home computers and three quarters of these were linked to the Internet. They indicated confidence in the procedures of word processing, use of CD-ROM, emailing for personal purposes and using the Internet.

Although the proportion of **primary teachers** indicating that their pupils are using the Web to search for information has increased to 27%, there has generally been little increase in other pupil activities which teachers describe as being 'well established', although around 60% indicate their pupils are using a CD-ROM and word processing in their classrooms. The main changes in the teachers' own use of ICT appeared to be the increased proportion that created curriculum materials, or downloaded materials from the Web. For the greatest proportion of respondents, colleagues in their own school and Local Authority staff remained the main sources of information about the range of resources available. To this, for about a third of teachers, has now been added the WWW.

Forty one percent are using ICT for the production of some pupil records for parents, 20% or less for other assessment data management. The primary teachers' views on the impact of ICT on the pupils, the staff and the schools remained substantially the same as they had been two years previously. With respect to the pupils, the most positive indicators were the proportions of teachers indicating their belief that their pupils showed a higher level of independence than usual from the teacher when working on the computer (63%), and those who now indicated that they had evidence that pupil attainment had improved (45%). There was a 12% increase in the proportion that agreed that ICT would make significant changes to teacher/pupil relationships (43%).

Although the change in proportions was not huge, there were indications that more primary teachers were becoming aware of the potential impact that ICT might have in schools and classrooms. Over 80% continued to agree that ICT opened up

interesting prospects for their future professional development, and their experiences were positively viewed by a greater proportion - half of the respondents indicating their development needs had been well met.

In our random sample of **secondary teachers,** evenly drawn from across ten subject areas, 88% had home computers and three quarters of these were linked to the Internet. They indicated confidence in the procedures of word processing, use of CD-ROM, emailing for personal purposes and using the Internet.

Although the proportion of secondary teachers indicating that their pupils are using the Web and CD-ROM to search for information has increased to around 25%, there has generally been little increase in other pupil activities which teachers describe as being 'well established', all remaining below 10%. However, an increased proportion of teachers created curriculum materials, or downloaded materials from the Web. Colleagues in their own school and local authority staff remained the main sources of information about the range of resources available. To this, for about a third of teachers, has now been added the WWW. Comments on specific uses within different subjects and some possible benefits to pupils were offered in open responses by around 80%. Around 30% are using ICT for the recording and analysis of test and exam results, and the production of some pupil records for parents.

The **secondary teachers'** views on the impact of ICT on the pupils, the staff and the schools remained substantially the same as they had been two years previously. The most positive indicators with respect to pupils were the high proportions indicating their belief that ICT had already contributed in positive ways to the learning of their pupils (84%); that their pupils showed a higher level of independence than usual when working on the computer (66%), and those who indicated that they had evidence that pupil attainment had improved (41%). Rather fewer felt disturbed by the comparatively high degree of competence of the pupils (31%). There was a 10% increase in the proportion that agreed that ICT would make significant changes to teacher/pupil relationships (52%).

Although 89% continued to agree that ICT opened up interesting prospects for their future professional development, few had at the time of the survey undertaken NOF training, and a majority indicated that their training needs had not been well met so far.

c. The Pupils

The pupils' attitudes and level of computer use, including Nintendo or Playstations, had changed little over the two year interval and were remarkably similar across the age groups. Almost all pupils regard learning to use computers as very or quite important. They view computers as a useful tool for learning, and computer knowledge and qualifications as being essential for future employment. With respect to confidence, the majority of pupils judge they know enough about computers to 'get by', and the younger they are, the more likely they are to have learned about computers at home.

Pupils' frustrations in using computers at school remained the same: the limited time for using them, boring work, out of date or slow machines, and the mode of teaching and learning. That the work given on computers was too easy was once again a perception of considerably more pupils than that the work was too hard. The predominant use of ICT in classrooms and at home consisted of word

processing, drawing and using CD ROMs. However over the two year period the use of the Internet doubled at home and school, with email usage also doubling at home, but with little increased use at school.

Around 80% had access to computers outside of school and for the majority of these pupils there was a computer in their home, with around one third of this home users group having a computer in their own room linked to the Internet (around 25% of the total pupil sample). Although the patterns of use at home and school are fairly similar, two particular features of the home use – plenty of time and the opportunity for trial and error learning are conducive to the development of fluency of use and general expertise, and these were very constrained in schools. This highlights the disadvantages experienced by that proportion of pupils who do not have computers at home. It is also perhaps this time to 'play' with the different uses and programs that may be responsible for the 'skills gap' which several teachers have perceived exists between themselves and some pupils whose skills are more advanced than most of their teachers.

1. INFORMATION AND COMMUNICATION TECHNOLOGY INITIATIVES

1.1 THE NATIONAL CONTEXT

The past twenty years have seen a period of significant change in the education system in Scottish schools. Changes in curricula and assessment have affected nursery, primary and secondary sectors, driven by a policy of improving the effectiveness of learning and teaching and the performance levels of pupils. In the midst of this change, the traditional model of the classroom and the working relationship between the teacher and pupil has remained fundamentally the same. In the wider society, in the home and in commercial and industrial organisations, the workplace for many adults has been transformed by the introduction of information technology. Employers increasingly expect school leavers to be familiar with, and to be skilled in, the use of a range of Information and Communications Technology (ICT). However, ICT in schools should mean more than just the acquisition and development of ICT skills; nor should ICT be regarded simply as yet another subject on the curriculum. The growing capabilities of modern computers to run sophisticated software, to be networked for instant communication and to store and share information, offer schools and teachers opportunities for the development of novel and powerful pedagogical strategies, professional development opportunities and management practices.

In order to prepare schools to take advantage of the opportunities offered by ICT, the government set up a number of key initiatives relating to the development of the National Grid for Learning (NGfL) in Scotland. These are directed towards the provision of a range of facilities necessary for the effective installation and use of ICT, including capital works, the provision of hard- and software and a national programme of staff development. It is the impact of these initiatives in primary and secondary classrooms that forms the focus of this project. The key aspects of these initiatives are outlined below.

1.2 THE NATIONAL ICT INITIATIVES

Overall, the aims of the initiatives were as follows:

A To increase the amount of, and access to, up-to-date ICT equipment in schools.

B To improve resources available, particularly online, to support classroom work.

C To enhance staff skills in the use of ICT to deliver the curriculum.

The indicators of the achievement of these aims include the following:

1. Enhanced learning experiences for pupils through the use of ICT.
2. Increased motivation for both learners and teachers.
3. Greater use of ICT in the classroom for both teachers and pupils.
4. Higher levels of pupil attainment as a consequence of increased motivation and enhanced learning experiences.
5. Emergence of online communities of both learners and teachers.

6. Greater access to external teaching resources.
7. Increase in network literacy for both teachers and pupils.
8. More use of basic network skills (e.g. more use of email, WWW, network search) in routine classroom learning work.
9. Greater use of ICT for learner, staff, and parent support.
10. Greater use of ICT in managing information and data relevant to assessment, recording, reporting, monitoring and evaluation.

1.3 INITIATIVES RELATING TO AIM A (DEVELOPING THE INFRASTRUCTURE):

A number of initiatives were funded to meet Aim A. Some of these are listed briefly here; further detail can be found in the Interim Report and on the Scottish Executive's website pages (www.scotland.gov.uk).

Funding for ICT and buildings (1997)

In July 1997, funding was announced for tackling the backlog of repairs to school buildings and to improve facilities for ICT in Scottish schools. Some of the specifically ICT-related improvements include: the refurbishment of rooms and their associated power sources; computer networking facilities; and purpose-designed furniture.

Comprehensive Spending Review (August 1998)

In the comprehensive spending review, various targets were set for the provision of modern desktop computer equipment and these were primarily intended to realise the following pupil to computer ratios:

- in secondary schools, 5:1;
- in primaries, 15:1.

This funding, announced in August 1998, was scheduled to be phased in during the period 1999-2002.

Capital Modernisation Fund (March 1999 budget announcement)

As part of the March 1999 budget funding was made available to support:

- the improvement of the provision of modern computers in primary schools and learning centres to 7.5 : 1;
- making it easier for teachers to own their own computers.

1.4 INITIATIVES RELATING TO AIM B (RESOURCES AND SCHOOL BASED SUPPORT):

Budget 1998 – Money for Schools (March 1998)

In the March 1998 budget £15 million was made available for a range of activities: support for standards; NGfL; and classroom assistants. Where this

money was used for ICT, authorities were encouraged to use it for NGfL pilot schools.

The Superhighways Task Force

Preceding the above ongoing initiatives, a considerable amount of work was undertaken by the Superhighways Task Force, which involved HMIE, three part-time National Development Officers and administrative support. The main work of the Task Force took place during the period from 1996-1999, resulting in the publication *ICT and Development Planning*. Additionally, the Scottish Council for Educational Technology (SCET) and the Scottish Consultative Council on the Curriculum (SCCC), since merged to form Learning and Teaching Scotland (LTS), established the Virtual Teachers' Centre, a Scottish version of the website set up by the British Educational Communication Technology Agency (BECTa). The Centre offers a range of curriculum resources and links to reputable, relevant, on-line resources and sites.

1.5 INITIATIVES RELATING TO AIM C (STAFF DEVELOPMENT):

New Opportunities Funding (April 1999)

A budget of £23m provided from the National Lottery funds has been made available for authorities on a per capita basis until 2002, primarily for staff development in ICT. It is intended that schools and authorities will be able to choose from a range of validated training providers. The training is focus on the use of ICT to deliver existing curriculum rather than on training teachers about ICT.

2. THE IMPACT OF ICT INITIATIVES PROJECT

2.1 The Aims

The general aims of the project were:

- to provide information on the impact of the initiatives on the learning experiences of pupils and on the classroom practices and technical skills of teachers, and the use of ICT by school staff in support of a range of professional activities; and
- to provide written and practical measures of pupils' attainments in ICT skills and knowledge early in 1999 just as the major ICT initiatives are being introduced (Phase 1) and two years later once implementation has been substantially completed (Phase 2).

In order to achieve this, the specific aims of the project were as follows:

- to develop an assessment framework which provides a sound baseline measurement of the current knowledge, understanding, attitudes and skills associated with ICT use by pupils at P7 and S4, taking account of the aims of the initiatives;
- to develop a set of assessment materials and tasks which assess the types of knowledge and skills required by pupils in order to take advantage of interactive computer based learning and communication;
- to conduct two surveys in 1998-99 and 2000-01 with nationally representative pupils at P7 and S4;
- to analyse the results in order to provide information on:
    - attainment at each stage in a range of ICT knowledge and skills in relation to the ICT initiatives;
    - changes in performance between 1999 and 2001;
    - differences in performance between P7 and S4; and
    - differences in performance between selected sub groups within the national sample, e.g. different gender groups; pupils with particular levels of support (e.g. having a computer at home; those taking a formal IT or computing studies course in secondary school).
- to follow through the sample of P7 pupils in 1998-99 to S2 in 2000-01, seeking evidence of progression and development in this longitudinal sample; and
- to identify the levels of access to, provision of and use of ICT, by teachers and pupils both within schools and outwith, as well as their attitudes towards its use in education.

2.2 The Project Design

In order to meet the aims of the project, two main forms of data gathering were established. Firstly, a package of assessment materials was developed to determine what pupils knew and could do at P7 and S4. This package contained

both written and practical components. Secondly, a series of questionnaires focusing on access to, provision of and familiarity with a range of ICT equipment and uses, was developed.

In both phases, nationally representative samples of pupils at P7 and S4 were identified to tackle the assessment materials. It was calculated that approximately 110 primary and secondary schools were required to provide such samples, with 20 pupils in each school (10 boys and 10 girls) selected at random from the appropriate stage roll. The sample was drawn from the Scottish Executive Education Department's database of Scottish schools, using a sampling frame stratified by local authority and size. The schools were identified using a software package, Samdem, developed as an Excel Macro by K Ross at the UNESCO International Institute for Educational Planning (IIEP) and used to support IEA surveys (e.g. TIMSS). The original sample, it was calculated, would give a confidence interval of ± 5% for the assessment data. Each school so identified was invited to participate in the project, initially for the written assessment and questionnaire elements. Those schools that accepted the invitation were later invited to participate in the practical assessment component.

Table 2.1: Initial numbers of schools agreeing to participate

	Primary schools (P7 pupils)	**Secondary schools (pupils)**
1998-99	90 (1800)	75 (1500)
2000-01	100 (2000)	S4: 85 (1700)

Table 2.2: Actual numbers participating in each phase

	Primary schools (pupils)	**Secondary schools (pupils)**
1998-99	85 (1595)	S4: 53 (1009)
2000-01	72 (1332)	S2: 49 (691) S4:

Those who declined the invitation cited a variety of reasons including: lack of equipment; staffing difficulties; building work; other initiatives; HMI inspections; time constraints. Not all of the schools that initially agreed to participate remained with the project throughout. The numbers of schools, and in turn, pupils involved in the project fell below what had been hoped for, particularly in the first phase. As a result the confidence intervals are greater, closer to ±7.5% in the written component. This should be borne in mind in interpreting the findings. The practical assessment involved even fewer numbers and, as a result, the data is less robust.

The written assessment materials and the questionnaires were sent to schools for administration by school staff. The practical assessment was undertaken by trained field assessors, following the return of the written materials. The questionnaires were sent to the pupils who tackled the assessment materials as well as the ICT Co-ordinator within each survey school, the P7 teachers in each of

the primary schools and 8 subject specialists (increased to 10 in Phase 2), with responsibility for S4, in each of the secondary schools.

In the second phase of the study (2000-01), the participation rate was higher than in the first. In 1998-99, some schools expressed a reluctance to participate because they felt they had not or were only just beginning to implement a policy for ICT. This was less in evidence in 2000-01. Indeed the incidental evidence from phone calls and other contacts indicates that interest in schools was generally greater during the second phase.

2.3 From Phase 1 to Phase 2

The Interim Report set out the aims and procedures of the first phase of the study in some detail, so only a summary is presented here.

Specific Aim 1: To develop an assessment framework

The assessment framework was essentially a grid of the knowledge, skills and attitudes that could be expected of pupils within four ICT categories: hardware, software, communications Networks and the Uses and Impact of ICT (Appendix 1). In preparing for 2000-01, it was necessary to take account of the recently published revised guidelines for Information and Communication Technology in schools. A Mapping exercise was undertaken and the Project Team and Advisory Group were satisfied that the statements from the guidelines could be readily accommodated within the Assessment Framework. The main difference was the distribution across Levels in the guidelines which was an aspect not tackled in the Project Framework.

Specific Aim 2: To develop and apply written assessment tasks that provide information on the types of knowledge and skills acquired by pupils in the use and application of ICT.

The assessment booklets used in 1998-99 formed the basis of the second phase survey, with some minor modifications and substitutions. Some tasks had become outdated (e.g. the 'millennium bug') and so were removed. In addition, one or two had not provided data of the quality desired, either because of the nature of the tasks themselves or their marking schemes. Tasks in this latter category were improved where possible and rejected if fundamentally flawed. In total only 4 new tasks were required in the written papers.

Specific Aim 3: To develop and apply practical assessment tasks to provide information on the proficiency of P7 and S4 pupils on a range of key practical ICT operations.

Practical tasks were developed to cover four areas of ICT: word processing; databases and spreadsheets; using CDROM; using the WWW and email. In 2000-01 some minor changes were made to the procedures used in this aspect of the study and the format of the pupil materials was modified although the content remained virtually unchanged.

Specific Aim 4: To ascertain the perceptions, experiences and skills of school staff and pupils with respect to key aspects of the initiatives and their intended outcomes.

The questionnaires used in the first phase formed the core of the second phase questionnaires, with some items removed and others added. These changes reflected some changes in priorities over the period and the fact that it was not necessary to collect some of the phase one data again. The themes remained as before:

Primary and secondary classroom teachers

Information on: their attitudes, preferred and actual uses of ICT; their expectancies and aspirations for the future; current levels of skills, access and level of use of ICT; their staff development experiences (including NOF training) and future needs.

ICT co-ordinators/School managers (Primary & Secondary)

Information on: their awareness of and involvement in the initiatives; the existence of a school policy on ICT; their perceived priorities in relation to ICT with respect to resource allocation, development planning, staff development (including their role in NOF training including responsibility for training or liasing with trainers); their intentions and aspirations for the future.

P7 and S4 pupils

Information on: their attitudes; their ICT educational experiences; self-assessment of competence and confidence in ICT; access to a range of ICT facilities and resources (both at home and in school); their interests, attitudes, hopes and expectancies for the future.

2.4 Phase 2

The second phase of the project was essentially very similar to the first phase. A few modifications were necessary for a number of reasons. Firstly, an evaluation of the first phase indicated that some aspects of communications with schools and administration of the materials (practical assessment particularly) could be improved. Some tasks and questions, despite pilot trials, could have been phrased and presented more effectively. A small number were therefore modified slightly. Some other tasks had become redundant e.g. 'millennium bug' which was no longer relevant, and so were replaced with other, more relevant, items. The set of items used in each of the written papers, with their categories is included as Appendix 2. Changed/new items are indicated.

2.5 The Report

The following three chapters, 3 to 5, focus on the findings from the assessment materials while the subsequent three, 6 to 8, present the findings from the questionnaires. Together, they present a comprehensive picture of the impact of ICT at the time of the survey.

3. THE WRITTEN ASSESSMENT COMPONENT

Summary of findings

- Primary 7 pupils achieved between 50% - 70% success on the different sub-categories within Knowledge and Understanding, with particular strengths in 'Software' (70%).
- Secondary 2 pupils gained over 50% of the marks available within Knowledge and Understanding, with the 'Software' showing the greatest success (67%).
- Secondary 4 pupils gained between 60% - 70% of the marks available on Knowledge and Understanding, with both 'Hardware' and 'Software' showing success rates of 71% and 72% respectively.
- Success rates were lower on tasks within the 'Personal Appropriation' category, at all three stages.
- In comparing across age groups, S4 pupils showed the greatest knowledge and understanding of all aspects of ICT assessed.
- Differences in performance between P7 and S2 were less clear cut, with P7 showing superior knowledge and understanding of the aspects of 'Software' assessed.
- Across the two surveys, 1999 and 2001, there was no pattern of change evident in the P7 performance data.
- In comparing the S4 performance data across the surveys, there appears to be some evidence of an improved performance in 2001, primarily due to greater understanding of ICT Software.
- Within the longitudinal element, P7 to S2, there was no discernible pattern of change over the years.
- In relation to the comparisons across surveys, it should be noted that a two year gap is a relatively short time period in the implementation of educational initiatives.

3.1 Samples and Papers

In 2000-01, a total of 1332 P7 pupils in 72 primary schools, 691 S2 pupils in 49 secondary schools and 1409 S4 pupils in 80 secondary schools were involved in the written component of the survey. The numbers at S2 were lower as this group consisted of those pupils successfully tracked from primary school in 1999 to secondary in 2001. A good number of pupils were not readily tracked. In addition, where only one or two pupils were identified within a particular secondary school, it was usually considered to be potentially disruptive to the school and unlikely to be cost effective to attempt to involve them in the survey.

As in Phase 1, there were two versions of each of the two written tests (to allow for order effects) and these were allocated to pupils such that written papers at P7, S2 and S4 would be balanced by gender and the version of the paper tackled. There was no attempt to give S2 pupils the same papers as they had tackled in P7; recruiting an adequate number of pupils was the priority.

In this section of the report, we present the findings from the three stages, P7, S2 and S4, in 2001 are presented separately. This is followed by comparisons across stages in 2001 and, finally, across the two phases of the project, including the longitudinal data.

3.2 The Tasks, 1999 and 2001

Each task was allocated a number of marks on the basis of the number of responses that the pupil had to make. Tasks were grouped into categories and the total marks possible for each category calculated. Pupil scores per category were calculated, based on the mean score on each task, and converted into percentages. There were three main categories of performance: Knowledge and Understanding (K), Practical Competences (PC) and Personal Appropriation (PA: the ability to identify and use appropriate strategies to complete a task) of which only Knowledge and Understanding and Personal Appropriation were assessed through the written tasks (the Practical Competences were assessed through the practical component). Each category contained four sub-categories: Hardware (H), Software (S), Communications Networks (C) and Uses and Impact of ICT (U). (Appendix 1 contains the framework while Appendix 2 lists the tasks in each paper as presented to pupils, with the specific sub-category.) Table 3.1 sets out the numbers of tasks in each category in the 2001 Written Papers.

Table 3.1: No. of tasks within each category in 2001 written papers

	Knowledge & Understanding			**Personal Appropriation**		
	P7	S2	S4	P7	S2	S4
Hardware	10	10	10	3	3	3
Software	16	24	24	1	3	3
Communications Networks	11	15	15	3	3	3
Uses and Impact of ICT	1	3	3	0	0	0

N.B. Practical competences were assessed through the Practical Component (Ch.4)

3.3 Performance data 2001: Primary 7

Performance data has been summarised by category: **Knowledge and Understanding** and **Personal Appropriation**. Detailed data of the performance levels on individual tasks are included as Appendix 3. The greatest number of tasks focused on Knowledge and Understanding. Table 3.2 breaks down the data for this category.

Table 3.2: Mean scores and percentages P7 - Knowledge and Understanding

Knowledge and Understanding	No. of tasks	Total mean scores 2001	Max score possible 2001	% of possible score
Hardware	10	21.41	34	63%
Software	16	74.25	106	70%
Communications	11	26.67	50	53%
Uses and Impact	1	2.81	4	70%

A total of 38 tasks were included in the Knowledge and Understanding category across the two booklets. (The common tasks have been treated as independent tasks for the purposes of this analysis; combined scores are used in section 3.5.) The mean scores indicate that P7 pupils gained between 50% and 70% of the marks available on each of the sub-categories. Knowledge and Understanding was particularly secure on the software tasks.

Table 3.3: Mean scores and percentages P7 – Personal Appropriation

Personal Appropriation	No. of tasks	Total mean score 2001	Max score Possible 2001	% of possible score
Hardware	3	8.87	18	49%
Software	1	1.33	4	33%
Communications	3	4.25	12	35%
Uses and Impact	0	-	-	-

Pupils gained approximately one third of the marks available on the tasks within Personal Appropriation. It should be noted that there were relatively small numbers of tasks within each of the sub-categories. In designing tasks, it was more difficult to construct ones for this category that met the requirements of a survey i.e. short, easily grasped and quickly completed by the pupil, than was the case for Knowledge and Understanding. Personal Appropriation tasks required that a context or scenario be developed and then a judgement made by the pupil. This kind of assessment would be easier to undertake within the context of ongoing classroom assessment where time is less of a constraint.

3.4 Performance data: Secondary 2

The original survey in 1999 did not involve S2 pupils. In the second survey, S2 became involved in order to provide a longitudinal comparison across the two surveys, i.e. the S2 pupils who tackled the written papers in Phase 2 comprised a sub-set of those P7 pupils who were involved in Phase 1. The findings from this longitudinal element are presented in section 3.7 of this chapter. In 2001, the S2 booklets were identical to those tackled by S4 pupils in that year. Table 3.4 shows the distribution of tasks within the S2/4 written booklets.

Table 3.4: No of tasks in each category and sub-category (S2/4)

	Knowledge & Understanding	Practical Competences	Personal Appropriation
Hardware	10	N/A	3
Software	24	N/A	3
Communications Networks	15	N/A	3
Uses and Impact of ICT	3	N/A	0

As at P7, the majority of the tasks were in the category Knowledge and Understanding, with an emphasis on Software. Similarly, Personal Appropriation was less well represented in the S2/4 written tests.

Table 3.5: Mean scores and percentages S2 - Knowledge and Understanding

Knowledge and Understanding	No. of tasks	Total mean score 2001	Max score possible 2001	% of possible score
Hardware	10	20.82	40	52%
Software	24	84.87	127	67%
Communications	15	31.69	60	53%
Uses and Impact	3	8.14	15	54%

The mean scores for the categories of assessment at S2 all exceeded 50% of the marks available for that category. Items assessing Knowledge and Understanding of software were the most successfully tackled, as at P7.

Table 3.6: Mean scores and percentages S2 – Personal Appropriation

Personal Appropriation	No. of tasks	Total mean score 2001	Max score possible 2001	% of possible score
Hardware	3	10.54	19	55%
Software	3	5.51	10	55%
Communications	3	4.72	12	39%
Uses and Impact	0	-	-	-

The number of tasks within Personal Appropriation was considerably less than for the Knowledge and Understanding category. For two of the sub-categories, the percentage score exceeded 50% - an improvement on the P7 findings.

3.5 Performance data 2001: Secondary 4

Tables 3.7 and 3.8 show the total mean score achieved across the tasks and the percentages of the maximum possible scores achieved by S4 pupils for each sub-category.

Table 3.7: Mean scores and percentages S4 - Knowledge and Understanding

Knowledge and Understanding	No. of tasks	Total mean score 2001	Max score possible 2001	% of possible score
Hardware	10	28.51	40	71%
Software	24	91.84	127	72%
Communications	15	36.43	60	61%
Uses and Impact	3	8.65	15	58%

The figures for Knowledge and Understanding at S4 indicate that, on average, pupils gained between 60% and 70% of the marks available within each of the sub-categories. 'Software' was again the most successfully completed, although the results for 'Hardware' also indicate a good level of understanding.

Table 3.8: Mean scores and percentages S4 – Personal Appropriation

Personal Appropriation	No. of tasks	Total mean score 2001	Max score possible 2001	% of possible score
Hardware	3	11.04	18	58%
Software	3	6.14	10	61%
Communications	3	5.43	12	45%
Uses and Impact	0	-	-	-

There were fewer tasks in the Personal Appropriation category and the scores achieved, overall, were lower than for Knowledge and Understanding.

3.6 Comparing Performance in 2001 at P7, S2 and S4

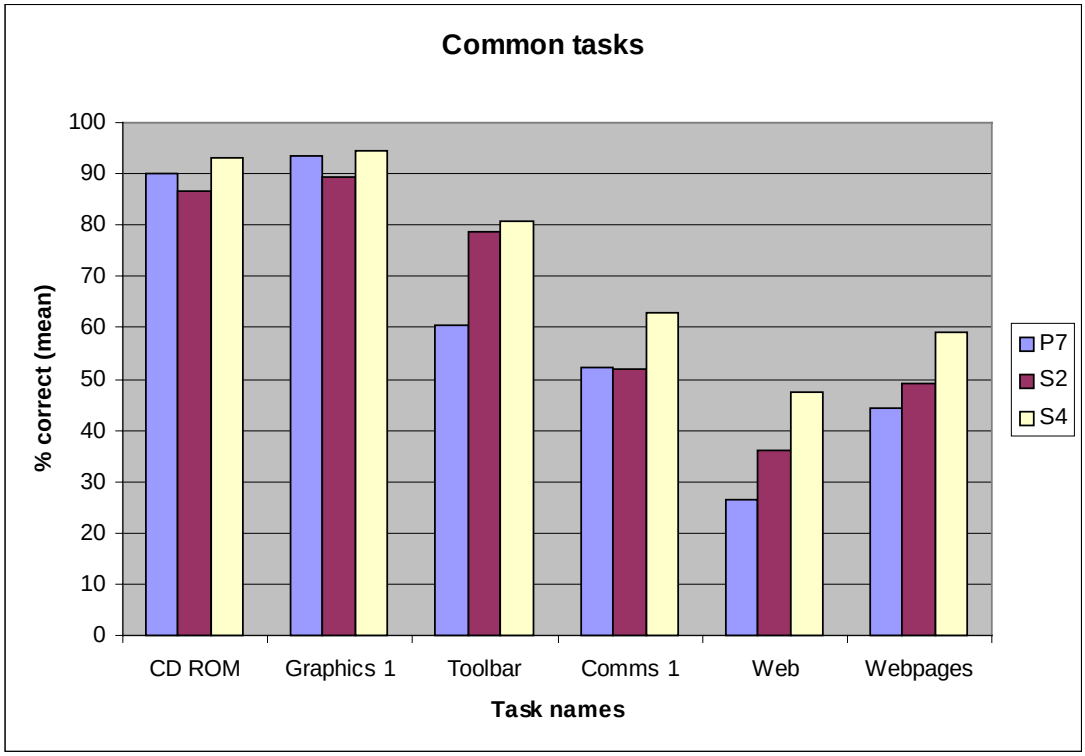
A number of tasks were common to P7, S2 and S4 to ensure a basis for reliable and valid comparison of performance across stages. Comparisons have been made between P7 and S2, P7 and S4 and S2 and S4 on these tasks. (Details of the actual scores achieved are included as Appendix 4). The number of pupils in the S2 sample was considerably smaller than in either of the other two samples. In addition, the sample is not as representative, by definition, as the other two. Therefore, in making comparisons, any involving S2 should be treated with caution due to the nature of the sample.

Six tasks were included in both versions of the booklets for all three stages. These provided a basis for comparison within and across the stages. Comparisons within stages indicated similar levels of performance, indicating that the two sub-samples at each stage performed at similar levels. With regard to comparisons across stages, the mean scores in 2001 are as in Table 3.9 and shown graphically in Figure 3.1.

Table 3.9: Common tasks: mean scores and percentages of marks available by stage

Cat.	Label	Possible score	P7 mean	% of total	S2 mean	% of total	S4 mean	% of total
S/K	CD ROM	4	3.6	90%	3.4	87%	3.7	93%
S/K	Graphics 1	7	6.5	94%	6.2	89%	6.6	94%
S/K	Toolbar	11	6.6	61%	8.6	79%	8.9	81%
C/K	Communications 1	5	2.6	52%	2.5	52%	3.1	63%
C/K	Web	5	1.3	26%	1.8	36%	2.3	47%
C/K	Web search	4	1.7	45%	1.9	49%	2.3	59%

Figure 3.1: Mean scores and percentages of marks achieved by stage (common tasks)



The six tasks are all from the Knowledge and Understanding category: the first three from Software and the other three from Communications. On all six, S4 pupils produced the superior performance. Performance levels on the first two, CD ROM and Graphics 1 are very similar across the stages and relatively high. Two of the three Communications tasks show a progression in achievement across the three stages, as does Toolbar (Software).

The remainder of the common tasks were included in only one paper at each stage. The following tables indicate the number of tasks common to each pair of stages and the number of tasks on which each stage achieved a superior performance. (P7 > S2, S2 > S4, etc.).

Comparing performance levels at P7 and S2

Table 3.10: Performance on K&U tasks common to P7 and S2

	No of tasks common	Superior performance (no. of items) P7 > S2	S2 > P7
Hardware	8	3	5
Software	13	12	1
Communications	7	3	4
Uses and Impact	1	0	1

In the majority of these tasks, the actual differences in scores were relatively small and should not be regarded as significant. The overall pattern of superiority indicates that the P7 pupils were more knowledgeable about different aspects of ICT software, with the other two sub-categories being more balanced.

Table 3.11: Performance on Personal Appropriation tasks common to P7 and S2

	No of tasks common	Superior performance (no. of items) P7 > S2	S2 > P7
Hardware	3	0	3
Software	1	0	1
Communications	3	1	2

The number of tasks here was relatively small but, on all but one, S2 pupils gave a superior performance. Again, the actual differences were small in the majority of instances.

Comparing Performance Levels at P7 and S4

Table 3.12: Performance on K&U tasks common to P7 and S4

	No of tasks common	Superior performance (no. of items) P7 > S4	S4 > P7
Hardware	8	1	7
Software	13	4	9
Communications	7	2	5
Uses and Impact	1	0	1

The pattern in Table 3.12 indicates a more regular pattern of superiority by the S4 pupils in this category than in comparison with S2 pupils. On a few tasks, P7 pupils turned in the superior performance.

Table 3.13: Performance on Personal Appropriation tasks common to P7, S4

	No of tasks common	Superior performance (no. of items)	
		P7 > S4	S4 > P7
Hardware	3	0	3
Software	1	0	1
Communications	3	1	2

In this comparison of performance between P7 and S4, S4 pupils were more successful.

Comparing Performance Levels at S2 and S4

Table 3.14: Performance on K&U tasks common to S2 and S4

	No of tasks common	Superior performance (no. of items)	
		S2 > S4	S4 > S2
Hardware	10	0	10
Software	21	1	20
Communications	12	1	11
Uses and Impact	3	1	2

Again, S4 turned in a superior performance on the majority of the tasks.

Table 3.15: Performance on Personal Appropriation tasks common to S2, S4

	No of tasks common	Superior performance (no. of items)	
		S2 > S4	S4 > S2
Hardware	3	1	2
Software	3	0	3
Communications	3	2	1

As with Knowledge and Understanding, S4 pupils demonstrated a more secure grasp of the content of the tasks.

At all three stages, the summary figures presented in these tables mask considerable variation in success rates on individual tasks and groups of tasks within the categories and sub-categories listed.

3.7 Comparisons across Surveys: 1999 and 2001

In order to provide a basis for comparison across surveys, the majority of the tasks used in 1999 were again used in 2001. This section provides, firstly, information on the performance levels of each of the two main groups of pupils in each survey (P7 and S4) followed by the data from the longitudinal element of the survey.

Details of the performance data are included as Appendix 5, with summary tables presented in this section. The tables indicate the number of tasks common to the two phases and the year in which the superior performance was achieved. It should be noted, again, that many of the differences failed to reach statistical

significance. Taken together, however, the findings do indicate some patterns of performance that are worthy of further investigation.

Primary 7, 1999 and 2001

A total of 34 tasks were common to the P7 papers in 1999 and 2001. The summary findings are presented in Table 3.16. Overall performance levels on 17 were higher in 1999 while 16 showed a superior performance level in 2001. One task showed no difference. Within categories and sub-categories, these differences showed no real pattern of change in performance levels across the surveys, in either direction.

Table 3.16: Comparing Performance at P7, 1999 and 2001

Knowledge & Understanding	No of common tasks	Better performance 1999	Better performance 2001
Hardware	9*	4*	4*
Software	10	4	6
Communications	10	6	4
Uses and Impact	1	0	1
Totals	*30*	*14*	*15*
Personal Appropriation			
Hardware	2	2	0
Software	0	-	-
Communications	2	1	1
Uses and Impact	0	-	-
Totals	*4*	*3*	*1*

* 1 task showed no difference in performance levels across the surveys

Secondary 4, 1999 and 2001

A total of 48 written tasks were common across the two phases of the project at S4. Table 3.17 indicates the patterns of superior performance within the two categories assessed and the sub-categories within these. Overall, pupils achieved a higher mean score on 14 of the common tasks in 1999 while performance was better in 2001 on the remaining 34 tasks. Within the categories and sub-categories, it would appear that this is mainly due to a considerably improved performance on tasks assessing knowledge and understanding of software and its applications.

Table 3.17: Comparing Performance at S4, 1999 and 2001

Knowledge and Understanding	No of common tasks	Better performance 1999	Better performance 2001
Hardware	9	2	7
Software	18	2	16
Communications	12	7	5
Uses and Impact	3	2	1
Totals	*42*	*13*	*29*
Personal Appropriation			
Hardware	3	0	3
Software	1	0	1
Communications	2	1	1
Uses and Impact	0	-	-
Totals	*6*	*1*	*5*

Primary 7 (1999) to Secondary 2 (2001)

In 1999, 1595 P7 pupils completed the written booklets. Of these, 691 pupils were successfully tracked to secondary school and became involved in the second phase in 2001. The difference in numbers contributing to the data in each survey has implications for the conclusions that can be drawn. Table 3.18 sets out the main findings.

Table 3.18: Comparing Performance at P7 and S2, 1999 and 2001

Knowledge and Understanding	No of common tasks	Better performance at P7 (1999)	Better performance at S2 (2001)
Hardware	8	4	4
Software	11	8	3
Communications	7	3	4
Uses and Impact	1	0	1
Totals	*27*	*15*	*12*
Personal Appropriation			
Hardware	3	2	1
Software	0	-	-
Communications	2	1	1
Uses and Impact	0	-	-
Totals	*5*	*3*	*2*

A total of 32 tasks were common across the two phases of the project. There was little difference in the pattern of superior performance however, with approximately similar totals in each of the final columns.

4. PRACTICAL ASSESSMENT COMPONENT

Summary of 2001 Findings

- S4 pupils performed at a consistently higher level than P7 on virtually all of the practical tasks.
- Both groups performed best on word processing tasks.
- Performance levels on spreadsheets were lower, with the use of formulae not well understood by either group.
- P7 pupils appeared more familiar with CD-ROMs for reference work S4 could access and play video and sound files more successfully.
- Substantial proportions of both samples were able to compile and send emails; the absence of appropriate applications prevented an accurate measure of this however.
- Similarly, the use of the WWW as a reference source was well understood by pupils in both groups but, again, not all those assessed had access to the Internet within school.
- The absence of electronic communication facilities in a significant proportion of schools prevented a good number of pupils from demonstrating what they knew and could do in the email and WWW tasks.

4.1 Phase 1

Only primary schools were invited to participate in the Practical Assessment component during Phase 1. Fifty-three schools, representing 22 local authorities were involved in what was essentially a pilot of the procedures as much as the materials. In each school, where numbers allowed, eight children (4 boys and 4 girls) were selected at random from those who had participated in the written phase to undertake the practical tasks. While the original sample was designed to be representative, the sub-sample of schools and pupils tackling the practical component cannot be claimed as such.

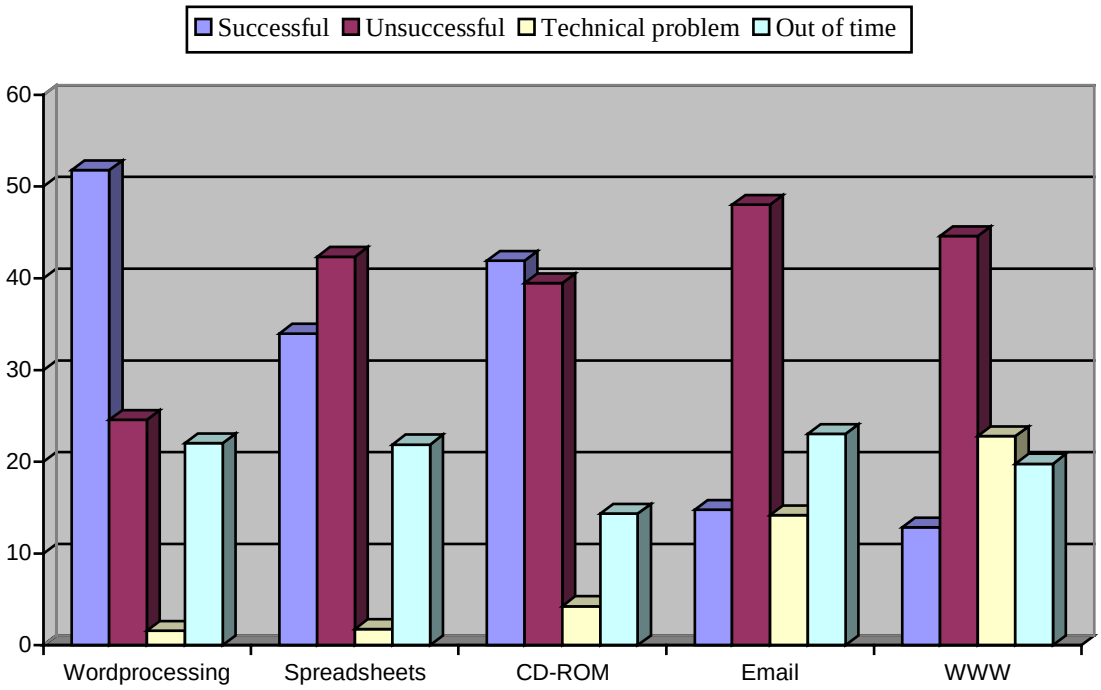
Four booklets were produced, one for each of the 4 categories of ICT knowledge/skills identified in the original framework: word-processing, spreadsheets, CD-ROM and electronic communication (Internet and email). Where possible, each pupil tackled all 4 booklets. In many schools this was not always possible, as many did not have email and/or Internet access. In addition, in some schools particular applications were incompatible e.g. for spreadsheets.

A total of 407 P7 pupils were involved in the practical phase and Figure 4.1 shows the summary (mean) performance data for pupils on each booklet (or part booklet in the case of email and WWW). Performance was best on the word processing tasks, with CD-ROM and spreadsheet success rates following. However, this is a somewhat simplistic interpretation, as many pupils did not have an opportunity to tackle each of the booklets/tasks for various reasons. Word-processing was the most commonly available application in the P7 classroom. Email and Internet access was the least frequently encountered form of ICT in primary schools. CD-ROM, while available in many schools, was still not found in approximately one

third of them. The figures for spreadsheet assessment are somewhat deceptive in that on several occasions the application available to the children was incompatible with the assessment tasks. In some other instances, the school informed the Assessor that the pupils 'did not do spreadsheets' and, as a result, they did not wish them to be assessed.

The two categories of analysis, 'out of time' and 'technical problems' have been considered in more detail. With regard to the former, pupils experienced difficulty in completing the tasks within the time limits set, with approximately one fifth of the tasks uncompleted. This appears fairly consistent across booklets, although slightly more of the CD-ROM tasks were completed. Examination of those tasks that posed 'technical problems' the majority were those concerned with using email and accessing sites on the World Wide Web. In addition, a note was made of those pupils who required help in completing the booklets. In general, less assistance was required for the first booklet (word processing) than the others, and it seems reasonable to infer that the tasks in the other booklets placed greater demands on the pupils and were, in turn, less familiar.

Figure 4.1: P7 performance data (%)



4.2 Phase 2

As a result of the lessons learned in Phase 1, a number of modifications were made to both the materials and the procedures used. Specifically, the assessment was undertaken on a one-to-one basis with pupils in the schools and the materials modified to reflect this and both primary and secondary schools were involved. One hundred and ninety-eight P7 pupils and 195 S4 pupils were assessed.

The Assessment Materials

Instead of 4 booklets, the Assessors were provided with scripts and recording sheets while pupils were given a single booklet, divided into 4 sections, to direct their work. Assessors presented the tasks orally. In working with the pupils, assessors were instructed to allow up to 15 minutes for each section of the booklet, where facilities were available. Some discretion was allowed, depending on the

specific circumstances of the school and/or pupil. The 'out of time' code was used for remaining tasks when pupils reached the end of the allotted period. A small number of pupils were relatively capable and managed to work their way through all the tasks in one or more sections within the time span.

Preparing the Assessors

As in the previous phase, some children appeared reluctant initially to try unfamiliar applications/tasks. Some of the data that assessors returned to the project office at the end of the first phase had been unclear and therefore not used. Generally this was because, in recording pupils' responses, they did not always note the precise reason for any difficulty experienced, e.g. whether it was the situation/application itself that they found daunting or the specific task. Additionally, the differences between 'technical problem' and 'unavailable' were not always clearly or consistently understood. These were clarified during assessor training days and, combined with the improved recording system; this problem was considerably reduced in Phase 2.

Coding the responses

As before, one or two of the tasks did not have codes for some of the things that pupils did with them. Assessors were asked to make notes of such events and these were taken into account in preparing assessors for the second phase and in developing the coding system they used.

Miscellaneous

A number of smaller, procedural issues arose. A few schools were unprepared for the assessors, despite all of the planning and communication. In the majority of cases however, this was due to a failure of communication between headteacher/co-ordinator and classroom teacher.

4.3 Phase 2 Practical Assessment Findings

In each practical session pupils were presented with 10 tasks covering aspects of word processing, spreadsheets, accessing CD-ROM reference material, using email packages and accessing the WWW, grouped into 4 sections. The tasks were identical for P7 and S4 pupils. (Full details are given in Appendix 6.)

Task	**Demand on pupil**	
Task 1	Wordprocessing – basic processes	(Section 1)
Task 2	Wordprocessing - with graphics	
Task 3	Spreadsheet – basic processes	(Section 2)
Task 4	Spreadsheet – using formulae	
Task 5	Spreadsheet – producing charts	
Task 6	CD-ROM – accessing text and pictures	(Section 3)
Task 7	CD-ROM – accessing video film	
Task 8	CD-ROM – accessing sound	
Task 9	Email – writing and sending an email	(Section 4)

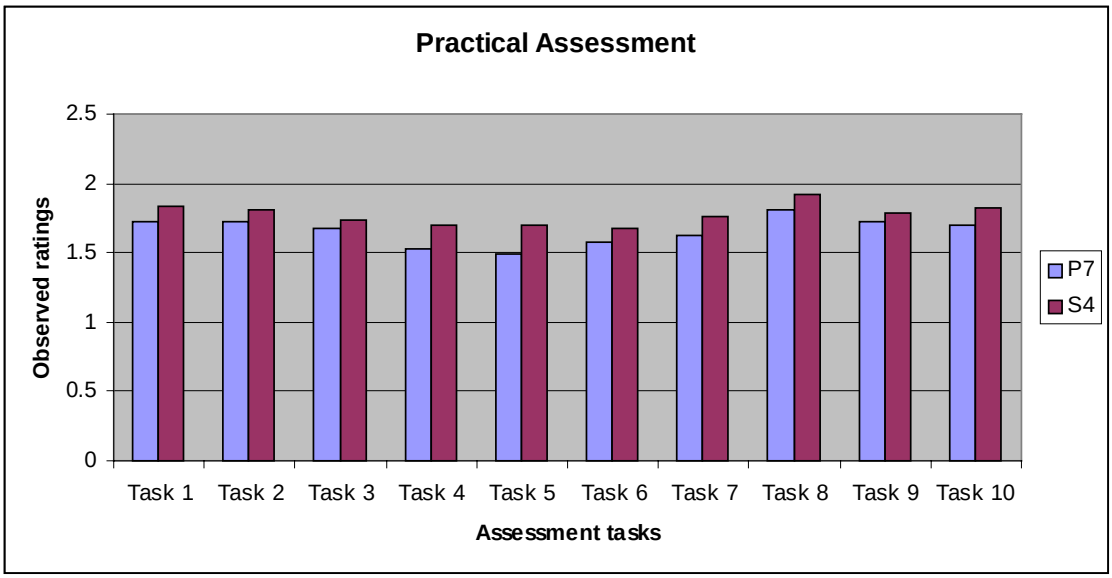
Task 10 WWW - accessing reference material on website

Each task involved a number of parts or actions e.g. changing the font or adding data to a spreadsheet. Performance on each of these parts was assessed on a simple scale of 1, 2 or 3 where: 1 = failed to achieve task, even with help; 2 = achieved task but required some help; and 3 = achieved task without help. These ratings were used to calculate a single mean score for each task. These mean scores are shown in Table 4.1 and graphically in Figure 4.2. (The higher the rating, the better the performance, with a maximum possible score of 3.)

Table 4.1 : P7 and S4 performance levels on practical tasks

	Primary 7	Secondary 4	difference
Task 1	1.72	1.83	0.11
Task 2	1.72	1.81	0.09
Task 3	1.67	1.74	0.07
Task 4	1.53	1.70	0.17
Task 5	1.49	1.70	0.21
Task 6	1.58	1.67	0.09
Task 7	1.63	1.76	0.13
Task 8	1.81	1.92	0.11
Task 9	1.73	1.78	0.05
Task 10	1.7	1.82	0.12

Figure 4.2: P7 and S4 performance levels on practical tasks



In all instances scores reached 1.5 or above, indicating that the majority of pupils achieved some degree of success on these tasks although many of them did require some assistance on various parts of each task. For all ten tasks, S4 pupils produced superior performances to those of the primary pupils but the differences were slight in the majority of cases.

The figures in Table 4.1 mask considerable variations both within and across the tasks. Ideally, the majority of pupils should be able to do the tasks without

assistance before they can be described as competent. In order to investigate these figures more closely, further calculations of the percentages of pupils managing the tasks 'without assistance' were made. For some tasks, the necessary applications were unavailable within individual schools or technical problems occurred, preventing pupils from completing the tasks (further details in section 4.4). Where this occurred, the observed performance levels should be regarded as somewhat less than the actual levels i.e. they slightly underestimate the pupils' abilities.

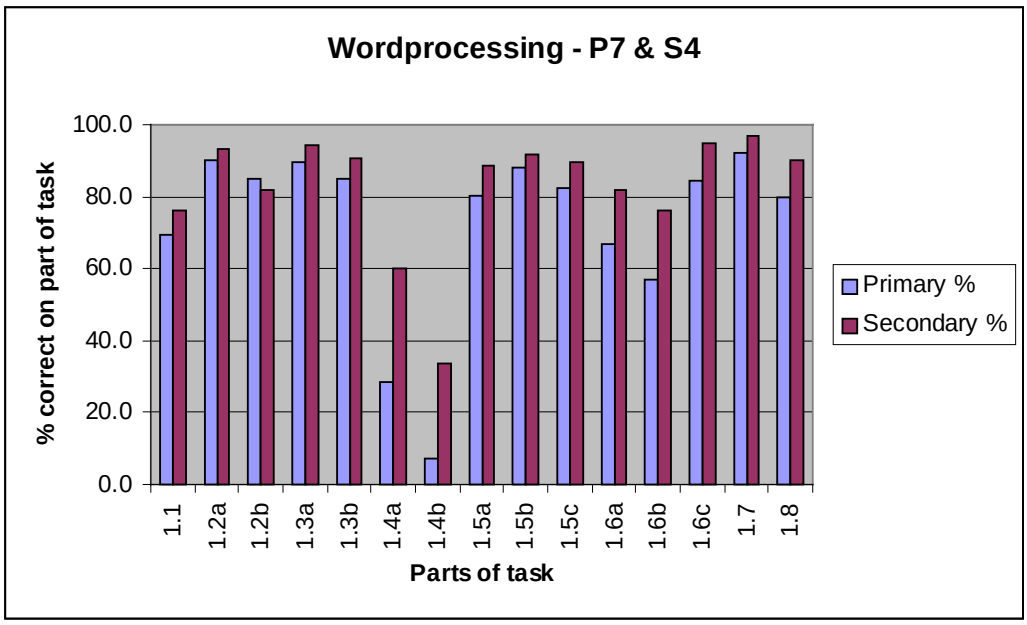
Task 1: Wordprocessing (1)

Basic wordprocessing facilities were available in all schools involved in the practical component of the survey. In the first task on word processing, pupils were assessed on several aspects of word processing procedures. These were:

1.1	create a new file
1.2a	type name and address
1.2b	put each part of address on new line
1.3a	delete name & insert Ms, Mr, etc
1.3b	type in Scotland to address
1.4a	copy and paste
1.4b	find and replace
1.5a	change font
1.5b	change font size
1.5c	bold and underline
1.6a	centre text
1.6b	spell check
1.6c	work saved correctly
1.7	use print option
1.8	close file

Figure 4.3 sets out the percentages of the P7 and S4 samples who completed each aspect of the task without assistance in 2001 (i.e. were rated '1' by the assessor).

Figure 4.3: Performance on Wordprocessing (1) in the practical phase (2001)



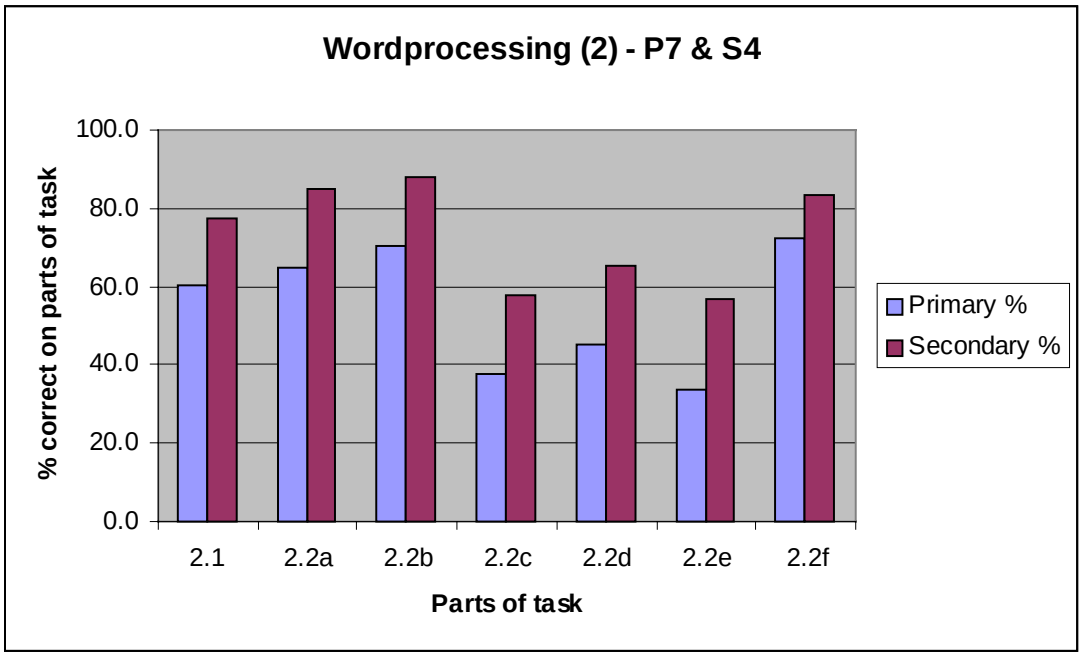
For all but one of the aspects, S4 pupils were more successful than those in P7. The majority of success rates exceeded 70% for both groups of pupils. The two sub-tasks with the lowest scores were: *copy and paste* (P7 – 28%; S4 – 60%) and *find and replace* (P7 – 7%; S4 – 34%).

Task 2: Wordprocessing (2)

The second task also involved wordprocessing but included the placement of graphics and some editing of associated text. A very small number of pupils in each group was unable to tackle this task as a result of technical problems or the unavailability of appropriate software. Figure 4.4 shows the percentages of each group who were successful on each part of the task 'without assistance'. The parts of the task were:

2.1	file opened
2.2a	headings centred
2.2b	headings bold/underlined
2.2c	pictures placed correctly
2.2d	pictures centred
2.2e	pictures labelled
2.2f	file closed/quit application

Figure 4.4: Performance on Wordprocessing (2) in the practical phase (2001)



S4 pupils were more successful on all aspects of the task than were the P7 pupils. The lowest performances, for both stages, were on the three sub-tasks associated with placing and labelling pictures in the document.

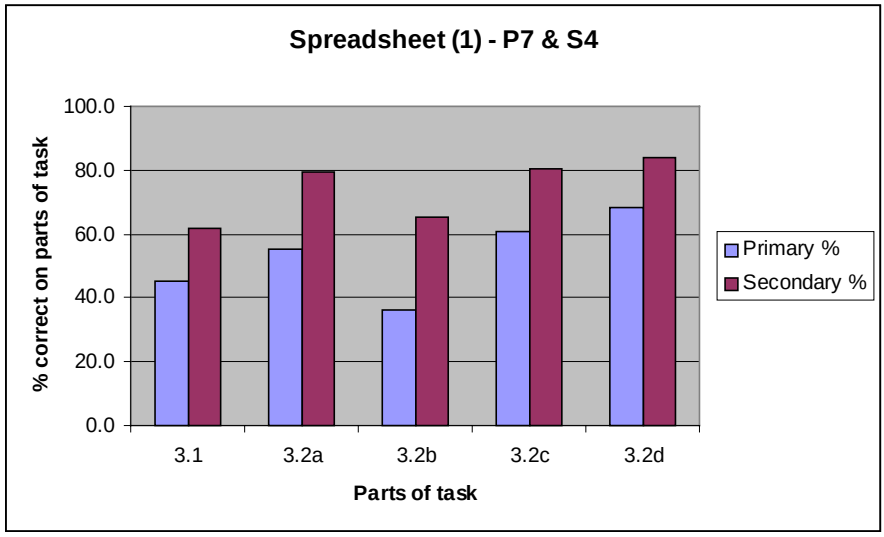
Task 3: Spreadsheets (1)

The third task presented pupils with a spreadsheet that required headings etc., to be modified. The aspects of the task which were assessed were:

3.1	start application/create file
3.2a	columns labelled
3.2b	headings centred

3.2c	headings bold
3.2d	information correct

Figure 4.5: Performance on Spreadsheet (1) in the practical phase (2001)



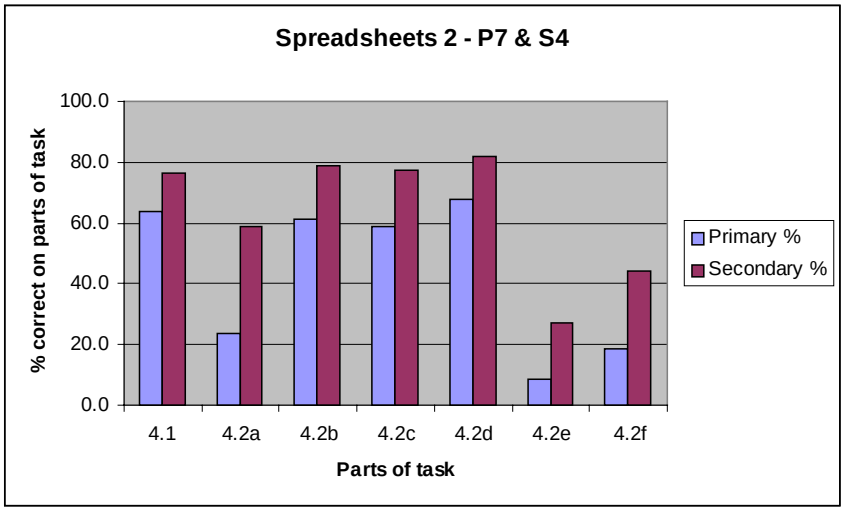
Again, S4 pupils performed at a superior level on all aspects of the task although overall success rates were lower than for the wordprocessing tasks.

Task 4: Spreadsheets (2)

The second spreadsheet task involved adding information and using formulae to give totals. The assessed aspects were:

4.1	opened file
4.2a	made column wider
4.2b	headings bold
4.2c	headings centred
4.2d	total in correct cell
4.2e	formula in correct cell
4/2f	formula replicated

Figure 4.6: Performance on Spreadsheets (2) in the practical phase (2001)



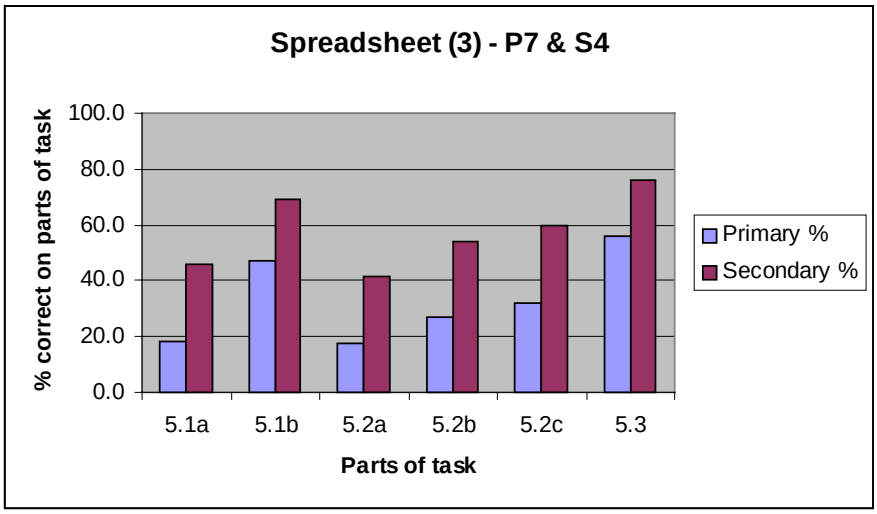
While the performance levels of S4 pupils remained higher than those of P7, neither group performed particularly well on those aspects of the task involving the use of formulae. A number of pupils ran out of time and did not complete the last two parts.

Task 5: Spreadsheets (3)

The third spreadsheets task involved the creation of a chart from given data. The task had six parts:

5.1a	chart created
5.1b	correct chart format
5.2a	x axis labelled
5.2b	y axis labelled
5.2c	chart title appropriate
5.3	file closed and quit

Figure 4.7: Performance on Spreadsheets (3) in the practical phase (2001)



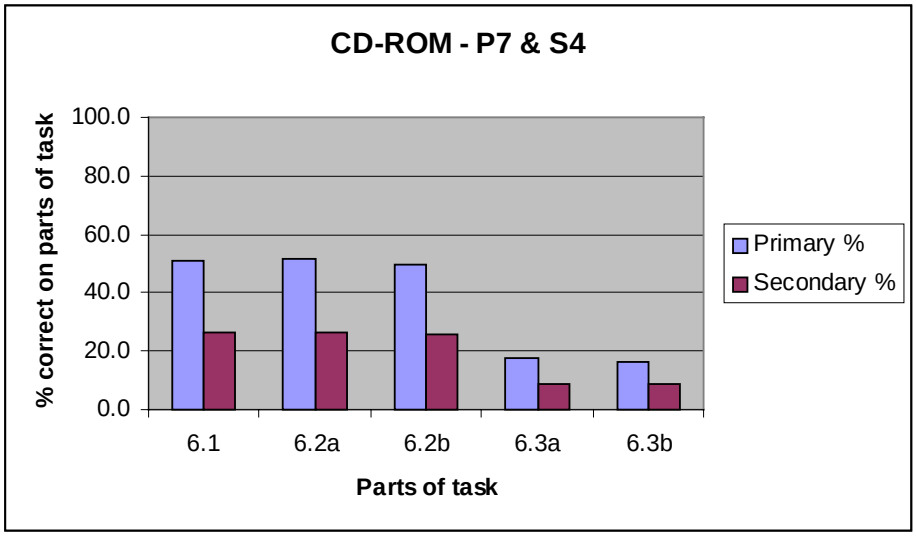
Performance on spreadsheets was lower than on wordprocessing, with Primary 7 pupils uncertain on a number of the more demanding aspects. They coped with putting data into cells and changing headings, etc. but the manipulation of data through formulae was unfamiliar to many of them. Performance at S4 was considerably higher on all aspects assessed.

Task 6: Using a CD-ROM (1)

Tasks 6, 7 and 8 required pupils to work with a CD reference disk (an appropriate and familiar encyclopaedia). Unfortunately this facility was unavailable to 5-7% of pupils at both stages. A further 10–15% experienced technical problems or ran out of time on one or more of the three CD-ROM tasks.

6.1	insert CD disk and start up
6.2a	find text
6.2b	find picture
6.3a	copy text to WP
6.3b	copy picture to WP

Figure 4.8: Performance on Using a CD-ROM (1) in the practical phase (2001)



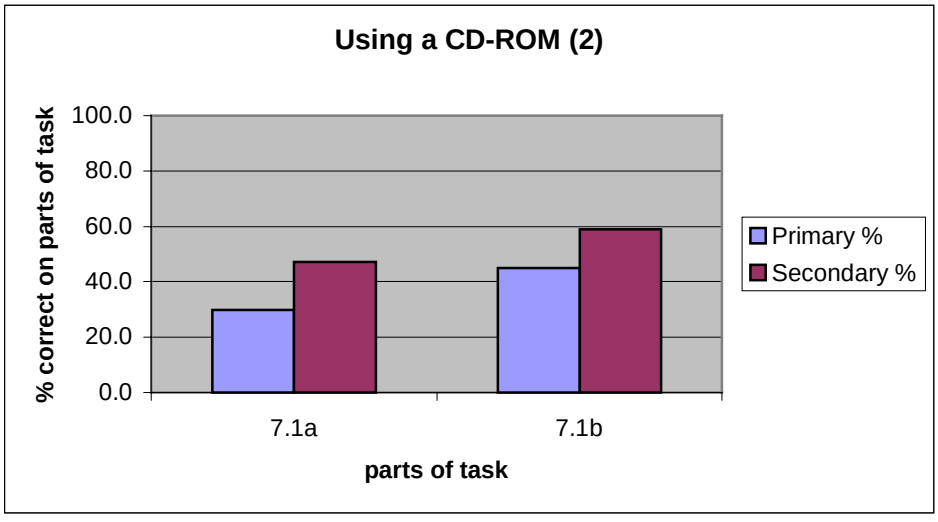
In this instance, the performance of the younger pupils exceeded that of the older ones. This appeared to be a common activity in primary schools, with children regularly using electronic reference sources, particularly encyclopaedia, to gather information for project work. However, for both stages, the more complicated elements of cutting and pasting into other documents were not familiar procedures.

Task 7: Using a CD-ROM (2)

Tasks 7 and 8 required pupils to find specific items within a CD-ROM and to activate them. Task 7 focused on video clips and required them to:

7.1a find a video film
7.1b play a video film

Figure 4.9: Performance on Using a CD-ROM (2) in the practical phase (2001)



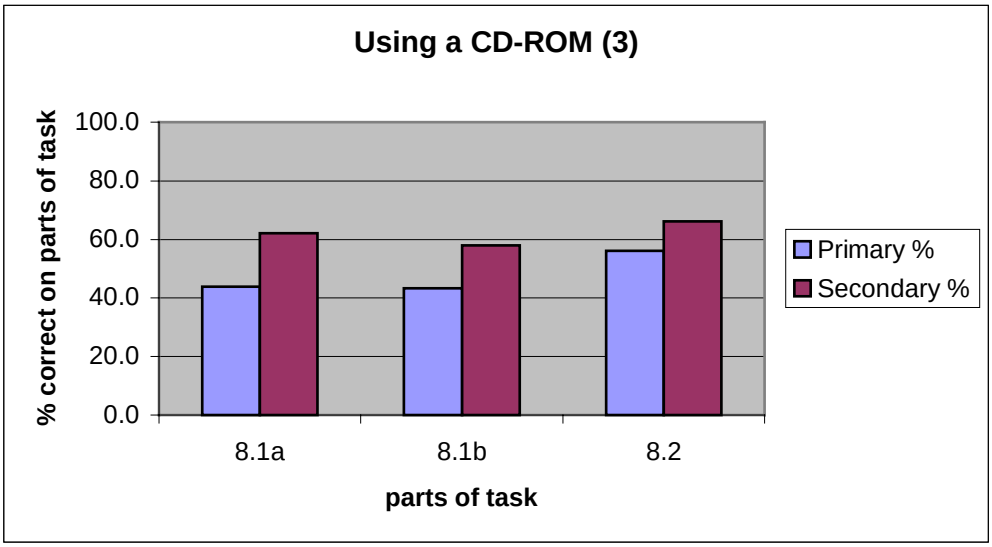
Primary 7 demonstrated some success on this task but again S4 pupils performed at a superior level.

Task 8: Using the CD-ROM (3)

As in Task 7, pupils were expected to identify a particular feature of the CD-ROM from a symbol and to activate the file. In Task 8, the parts were:

8.1a	find instrument
8.1b	play sound
8.2	close application

Figure 4.10: Performance on Using a CD-ROM (3) in the practical phase (2001)



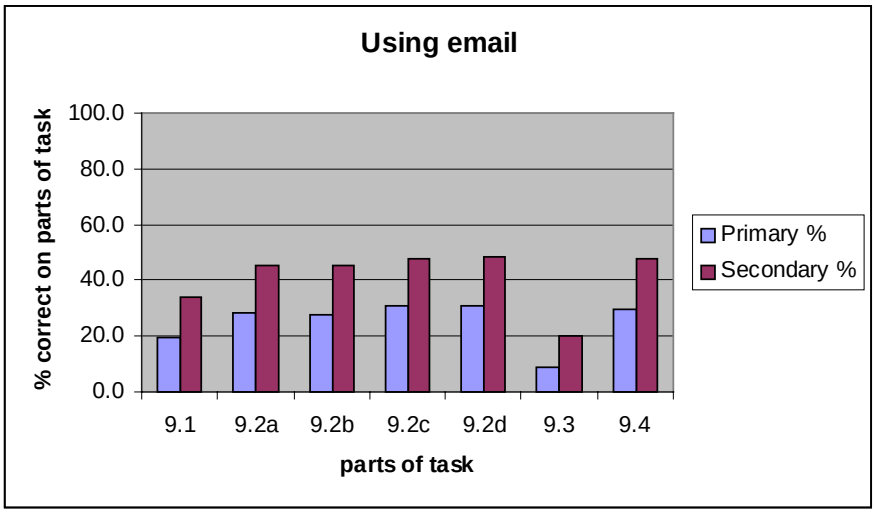
Approximately 45% of P7 pupils and 60% of S4 pupils were successful on this task. Although roughly similar number of pupils tackled both Tasks 7 and 8, more of them were successful on this one. It is possible that this was due to learning which occurred during the assessment process.

Task 9: Using email

The assessed elements of Using email were:

9.1	open email
9.2a	address correct
9.2b	subject correct
9.2c	message correct
9.2d	name and school added
9.3	file attached
9.4	message sent

Figure 4.11: Performance on Using email in the practical phase (2001)



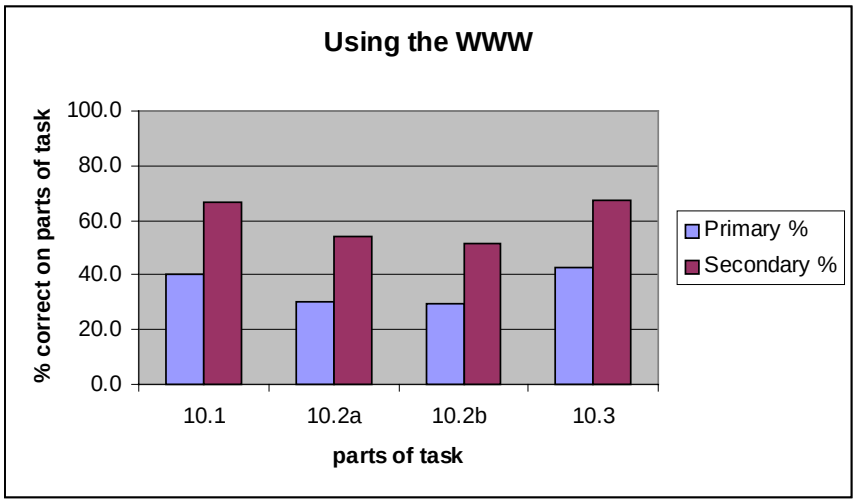
S4 pupils were more successful than the younger ones. This was one task where a significant number of pupils at both stages were unable to tackle it due to the unavailability of appropriate applications/software. The findings indicate that those pupils who began the task completed it successfully, apart from the requirement to attach a file – an activity that both groups found more difficult. Thirty-six percent of P7 pupils and 28% of S4 pupils did not attempt this task as a result of practical difficulties including lack of facilities, technical problems and lack of time (see Section 4.4).

Task 10: Using the WWW

The elements of using the WWW assessed within this task were:

10.1	WWW application opened
10.2a	Blue Peter site found
10.2b	Robots page found
10.3	Internet quit

Figure 4.12: Performance on Using the WWW in the practical phase (2001)

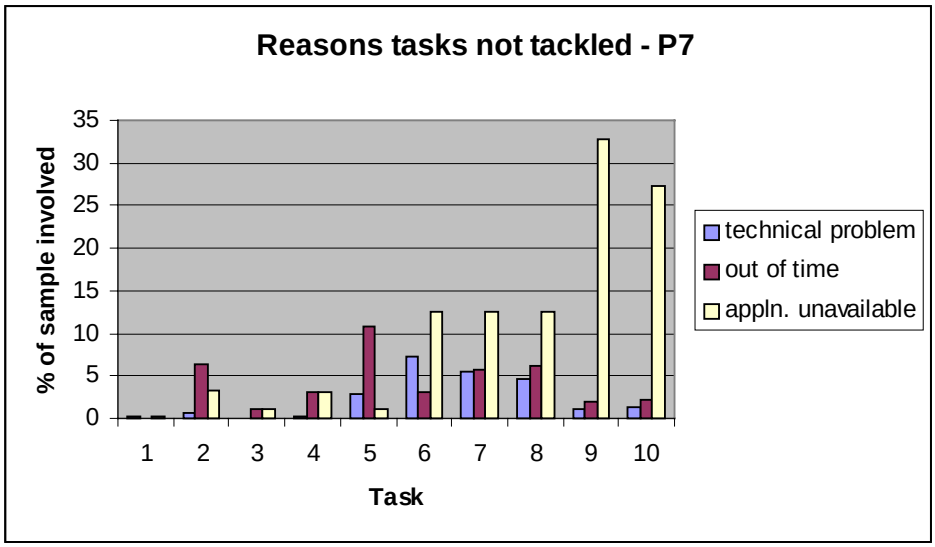


Approximately 30% of P7 pupils and 15% of S4 pupils were unable to tackle this task as an appropriate application was not available. Where it was available, the majority of pupils were successful on the parts of the task listed.

4.4 Practical Problems during Phase 2 Practical Assessment

As indicated, problems occasionally arose in preparing for or during a practical assessment session which affected pupil performance. Assessors noted such problems as they arose, particularly the three which had been most frequently experienced during the first phase, i.e. when a technical problem arose, if time ran out; or if an application was unavailable on the machine/within the school. The frequency with which each of these problems arose has been calculated for both groups of pupils and is shown Figures 4.13 and 4.14.

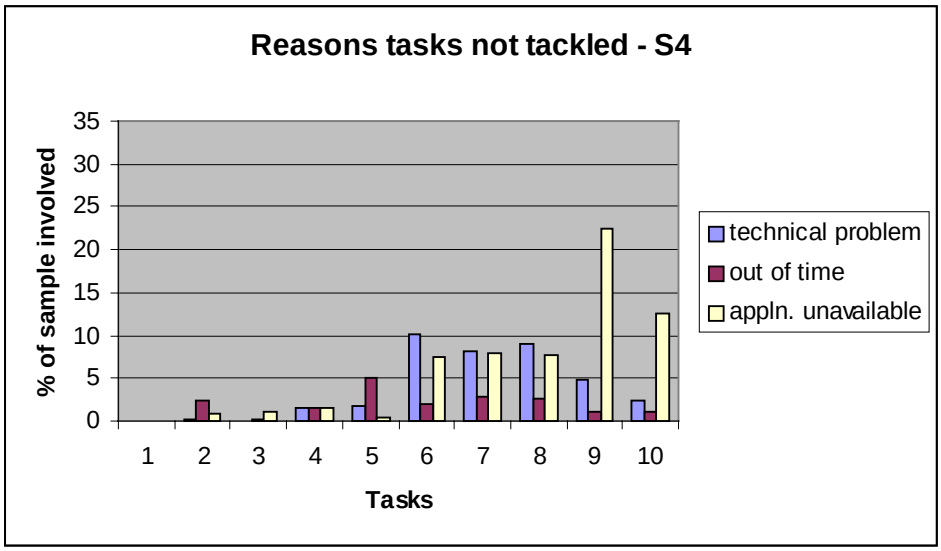
Figure 4.13: Problems arising during P7 practical assessment (Phase 2)



At P7, technical problems arose primarily with CD-ROMs, preventing approximately 5% of the sample from tackling the tasks. A small percentage of pupils exceeded the time allowed on each of the tasks, particularly on the spreadsheets. A significant percentage of pupils were unable to tackle the tasks involved due to a lack of access to appropriate applications. This happened most frequently in tasks involving the CD-ROM (6, 7 & 8), email (9) and the WWW (10).

As a consequence, the performance figures noted above for these tasks are probably an underestimate of the abilities of pupils at each of the stages assessed.

Figure 4.14: Problems arising during S4 practical assessment (Phase 2)



At S4, the percentages of pupils affected by the three main types of problem encountered were lower than at P7 but the pattern of difficulties was similar. Technical problems were encountered in working with CD-ROMs. Time ran out for small numbers of pupils on some aspects of most of the tasks but this was not a significant problem. Of greater concern is the frequency with which applications were unavailable for tasks involving CD-ROMs, email and the WWW.

Assessors reported that, although virtually all of the pupils at both stages involved reported that they had been assigned an email address by their school, very few of them used it regularly and a number had never used it at all. As shown in the questionnaires, a significant number had experience of using it at home.

5. COMPUTER BASED ASSESSMENT

In Phase 1, an attempt was made to undertake a brief pilot of the assessment of ICT skills and knowledge using a computer-based/mediated form of assessment. The tasks from the written booklets were modified to become multiple-choice questions and transferred onto disk using a software programme. Pupils were presented with the tasks on screen and responded by clicking the answer they considered to be the correct one.

It should be noted that, while the tasks used were derived from those in the written papers, they were not presented in an identical format in that the computer-based ones were in a multiple choice format. Not all the parts of each question in the written papers were amenable to such treatment; separate computer-based items were often produced for sub-parts of questions. While some conclusions can be, and were, drawn from the evidence, any interpretation of the evidence based on direct comparison with the written tasks would be unreliable.

The profile of success across the P7 sample reflected the pattern established in the written assessment tasks. Pupils demonstrated greatest knowledge and skill in those tasks that focused on software packages and the use of the computer as a word/graphics processor.

5.1 Looking to a next survey of ICT

In the time between the first and second phases, significant developments have been made by commercial ICT designers with regard to on-line and/or computer-based assessment and a considerable number, and variety, of packages have appeared on the market. An evaluation of these would be necessary if it was considered worthwhile to include such an element in any future survey of achievement in ICT. Subsequently, a CD-ROM based test package could be distributed to all schools involved and pupil responses recorded on the computer or sent down-line for analysis.

However, the limited experience of the project team would indicate that there are a number of practical difficulties inherent in taking computer-based assessment materials into schools at the present time. These include:

i. The different platforms that are currently in use and the age of some of these make it difficult to plan for all eventualities in schools;

ii. Access to computers, particularly to ones connected to the Internet, can be problematic in that it is frequently restricted; and,

iii. In many schools, computers are networked and do not have individual disk drives so that it is difficult to load material onto the hard drive for pupil use.

In addition, while the vast majority of pupils have email addresses, the evidence was that very few of them used them on a regular basis. (Most pupils interviewed during the practical phase could not remember their email address, because although they had received one, they rarely if ever used it.)

6 THE SCHOOL CONTEXT: PERCEPTIONS AND EXPERIENCES OF ICT CO-ORDINATORS

The project attempted to gather evidence by two main methods: assessing what pupils know and can do at key points in their school careers and asking pupils, teachers and ICT co-ordinators about their ICT experience and expertise both in and out of school. Chapters 3–5 presented the key findings from the first of these while Chapters 6–8 focus on the questionnaire data.

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c) What has been of most benefit to them in their role as co-ordinator?

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6.3.4 Q3. What have been their priorities and progress? 51

a) What had they identified as their priorities over the past two years?

b) What had been the main impediments to progress?

c) What stages of development have various initiatives reached?

i) Developments in learning and teaching

ii) Developments in staff support and school planning

iii) Developments in communications beyond the school

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6.1 Summary of Findings – ICT Co-ordinators

- All co-ordinators were experiencing increased scale and level of demands – network installation and staff development were identified as additional by secondary staff; management of all resources and the ICT curriculum arrangements by primary.
- 42% of primary and 72% of secondary co-ordinators respectively spent more than four hours per week on ICT duties; 17% of the latter committed more than twelve hours to their tasks.
- The sources of useful support most frequently indicated by secondary respondents were colleagues in their own school (59%) and local Authority staff, (59%). For primary staff it was local authority staff (68%) and colleagues in their own school (41%).
- Priorities in development identified by the primary co-ordinators were staff development, setting up a computer suite and attending to the ICT curriculum.
- Priorities in development identified by the secondary co-ordinators were staff development, network development and securing staff access to hardware.
- For both sectors the most frequently mentioned difficulties with respect to the implementation of the ICT guidelines were: lack of teacher confidence/expertise and staff training, time to teach, finance for hardware and other resources and monitoring of the programme.
- For the primary staff**,** the obstacles most frequently identified were: lack of time; problems with hardware (including access), lack of staff expertise, confidence and motivation. The impediments indicated most frequently by the secondary staff were: difficulties associated with the Authority; lack of staff development; Network difficulties; and cost/resources.
- Primary co-ordinators reported that the use of CD-ROM has been well established in 70% of classrooms. Other established uses had increased slightly since 1999: enhancing quality of pupil reports/profiles (48%); setting goals for pupils' ICT experiences (43%); and delivering in-service for staff (49%).
- Secondary co-ordinators reported that the use of CD-ROM has been well established in 71% of classrooms. Other established uses had increased slightly since 1999: enhancing quality of pupil reports/profiles (60%); giving assistance to pupils with learning difficulties (74%); securing pupil and teacher access to the WWW (74%) and delivering in-service for staff (61%).
- Communications with others outside the school - whether with parents, professional colleagues, pupil peer groups or the local community - remained the least well advanced in their development in both sectors.
- For both sectors, aspects of the management activities of teachers, increased pupil motivation, improved presentation and the improvement of the ICT skills of teachers and pupils were the benefits listed by the greatest numbers of respondents.

6.2 Introduction

> *There is just so much work required of the enthusiastic and committed ICT co-ordinators who believe that ICT is a key tool for learning in the future.*
>
> Primary ICT Co-ordinator

> *I am ICT coordinator, but without any formal ICT training and only very limited technical knowledge. I have managerial skills and I am enthusiastic. I feel a bit like the manager of Woolworth's being asked to successfully manage Glasgow Rangers Football club. I understand the broad management issues but find it very difficult to relate these to technical issues or constraints. It is not really very sensible, but I am considered the most appropriate candidate in our management team.*
>
> Secondary ICT Co-ordinator

The rate at which ICT is being introduced into schools and classrooms depends on a variety of factors. Outwith the school, the level of resources from central government and the policies of the Local Authority, particularly with respect to technical support, are key factors and are clearly making an impact. Within the classrooms it is largely the attitudes, skills and teaching styles of the individual teacher that determine how the technology interacts with the teaching and learning. At the interface of these two stands the schools' ICT co-ordinators.

6.3 The Findings: Primary and Secondary Co-ordinators Questionnaire

6.3.1 The Data Collection Procedures

Data from the previous 1999 survey are given in italics and underlined for comparison where appropriate. More detail is given in the tables in the appendix. Data from primary and secondary schools are presented where appropriate as follows: X% Prim; Y% Sec.

Questionnaires were sent out to **primary schools** to be completed by **ICT co-ordinators**, or by headteachers as appropriate, along with those to be distributed within each school to the **teachers of P7 classes**. Material was sent to 80 schools; responses were received from 69 *(77)* co-ordinators and from 116 *(132)* teachers. The questionnaires were completed in the early spring of 2001 (January – March). The data on the school size indicated that with respect to this, the sample was representative of Scottish primary schools.

Questionnaires were sent out to the **secondary school** sample to be completed by **school ICT co-ordinators**, or by headteachers as appropriate, along with those to be distributed within each school to **classroom teachers** across different subject groupings. Material was sent to 90 *(57)* schools; responses were received from 69 *(52)* Co-ordinators and from 573 *(397)* teachers. The data on the school size indicated that with respect to this, the sample was representative of Scottish secondary schools.

6.3.2 Question 1: What is the role and remit of the ICT co-ordinators?

a) Who are the ICT co-ordinators?

As expected, the majority of **primary school ICT co-ordinators** were female, although males constituted a slightly smaller proportion (17%) than previously:

(*25%*). Fifty one percent had responded to our previous questionnaire. As several pointed out to us, it is a remit which carries no additional remuneration or respite from full time teaching duties.

The same proportions as previously had a formal ICT qualification (17%), (the most frequently reported being a Post Graduate Certificate in Educational Computing), and had qualified as teachers 16 or more years previously (*73%*). Twenty percent (*22%*) of the schools had a working group or committee for ICT development.

> *As ICT coordinator I have had no formal IT training, only my own knowledge gained through using computers. I would find some training very useful.*
>
> *There has to be extra release time for us and an added incentive of extra salary as per teachers in England, if we are to fulfil our roles more seriously.*
>
> *I am a fully class committed Senior Teacher. ICT is only one of my areas of responsibility.*
>
> *Being an ICT coordinator is a full time job. It deserves to be a separate post.*

In the **secondary schools** 70% of the ICT coordinator respondents were male (*81%*). Seventy two percent (*70%*) were teachers of computing, technical subjects, business studies, mathematics and science (see appendix 7, table C0 1). The most frequently reported formal ICT qualifications of those 32% who had one (*21%*) were BSc, Diploma in Professional Studies (DIPSE, computing) and an Additional Teaching Qualification (computing).

Eighty six percent (*83%*) of the co-ordinators had qualified as teachers 16 or more years previously and, as before, three quarters of schools reported having a working group for ICT development. Thirty three percent had answered our previous questionnaire.

b) How has their role changed over the past two years?

Sixty percent of both primary and secondary respondents indicated that their role had changed over the past two years. For those in both sectors an increase in volume and scale was a frequently highlighted feature of the change, as was increased management responsibilities. For the secondary co-ordinators, work associated with Networks and staff development were also identified as additional; for their primary colleagues, the management of resources, including hardware, and the demands of the ICT curriculum were the next most frequently mentioned concerns. (see Table Co 2 in appendix for further details).

Primary Co-ordinators:

> *More hardware to monitor, more software to monitor, new 5/14 guidelines - Internet/e-mail access for staff and pupils.*
>
> *More machines and software to manage. Pupils/teachers are more increased in skills.*

More administration to enlist the help of parents to make good use of our ICT suite.

Increased number of new computers in past 2 years. More involvement in siting, arranging printers etc. Increased numbers equals increased problems, repairs to deal with.

More paperwork. As new guidelines have been introduced, more staff are asking us for help and training which we have no time to provide.

There are a lot more computers and there is more software to assess. In our school we have a new programme of study from P1 - P7 which needs constant monitoring.

Responsibility for more hardware, more software and staff support.

Chairing ICT working group within school. More meetings at Education Dept. level. Ordering hardware and software, organising cabling etc. Writing help sheets for Internet, e-mail, software etc.

Secondary Co-ordinators:

Becoming more onerous, more hardware and the network to manage - Internet implications. Co-ordination of NOF training.

Many more computers in school, with a LAN to manage, have increased the work considerably. Also, a more ICT aware staff is more demanding in support!

In addition to NGFL the role now includes NOF training and encouraging staff in using ICT for teaching and learning.

Staff development NOF/ICT training. Allocation of job remit 'time' totally dominated by ICT past year.

Introduction of an Internet network throughout the school has significantly increased the management issues.

School recently networked, with an authority central location in charge. Initially ironing out network problems for department. School has actively increased provision of ICT equipment.

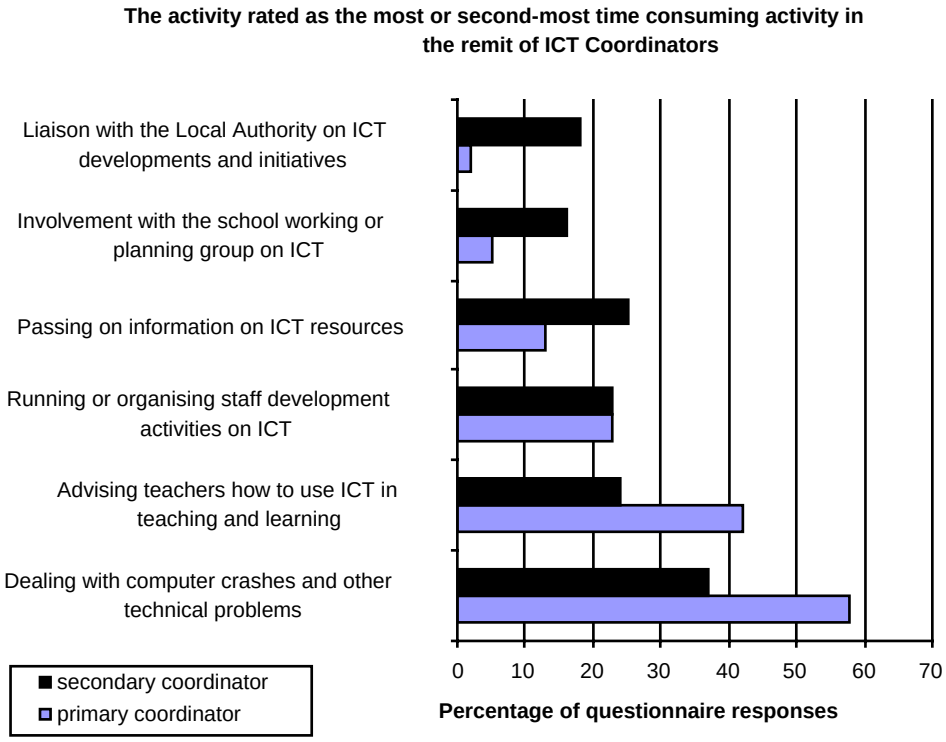
Installation of network, new skills to be learned, additional relationships to be built with colleagues.

c) How do they spend their time?

42% of primary and 72% of secondary co-ordinators respectively spent more than four hours per week on ICT duties; 17% of the latter committed more than twelve hours to their tasks. We asked them to rate activities with respect to the amount of time committed. The activities most frequently rated as highest or second highest in the amount of time committed are presented in detail in Fig 1 Co 3 below.

For co-ordinators in both sectors, dealing with technical problems was most frequently rated as the first or second most time consuming activity. A greater proportion of secondary co-ordinators rated the dissemination of information on ICT resources, involvement in an ICT planning group and liaison with the Authority as high on the time consuming list.

Fig. 1 Co 3 How Co-ordinators allocate their time



6.3.3. Question 2: What are their experiences of training and support?

a) Have they undertaken NOF training?

Their stages of engagement in NOF training at the time of the survey early in 2001 are set out in table C0 4 below. Although fewer secondary (6%) than primary (13%) had completed their training, the same proportions were at some active stage in the process, while around 30% in each sector had made no plans to undertake it. Of these 30%, almost half of the secondary co-ordinators already had ICT qualifications and expertise, whereas this is not the case for the primary co-ordinators – only two individuals who had no NOF training plans already had some form of ICT qualifications. (SEED indicate that these figures were considerably improved by 2002).

Table Co 4: The engagement of ICT co-ordinators with NOF training
(Percentage of questionnaire responses)

Stage of NOF training undertaken	Primary Co-ordinators	Secondary Co-ordinators
I have completed NOF training	13	**6**
I am currently undertaking NOF training	20	**20**
I have signed up for it, but have not yet started the training	19	**30**
NOF training is in my development plan	20	**9**
There are as yet no plans for me to undertake NOF training	28	**29**

Had NOF training met their needs?

Of these small proportions that had undertaken training, the majority in the primary sector (nine out of eleven respondents) indicated that the training had influenced their practice and had been appropriate to their training needs.

> *Planning more thoughtfully for incorporating ICT into teaching and learning*. (Primary Co-ordinator)
>
> *Enabled me to develop a much more focused approach to teaching ICT.* (Primary Co-ordinator)
>
> *Informed practice, able to train and help teachers more in information handling/text handling.* (Primary Co-ordinator)

Two respondents found the training not appropriate, one because there was not enough time available, and the other felt that there should have been more guidance in school rather than reliance on distance learning methods. Nine of the primary co-ordinators indicated that they would like further general training to keep up to date with new developments and also for specific uses, e.g. developing the school web page, PowerPoint.

Within the **secondary sector**, things had not gone quite so well. At this stage, we should caution that we are now dealing in such small numbers that reversion to absolute instances is perhaps advisable. Thirteen respondents had undertaken training among our secondary cohort. Only one indicated that the training had influenced his practice, by saying it encouraged wider use of ICT in the class, while six indicated that the training had been appropriate for their needs. However, four chose to indicate that it was not appropriate because they already had the expertise that the course covered:

> *Very little was new to me.*
>
> *As a computer teacher I had more expertise than the trainers.*

Six of this small secondary sample also indicated that they would like further training and individual responses included the use of digital camera, advanced training of multimedia, sound, movies and specific computing /information system areas that link across the curriculum.

b). What particular training needs do they identify?

In identifying their training needs within the main section of the questionnaire it is clear that the proportions of co-ordinators indicating a need for training in a wide range of applications of ICT have decreased. The majority still indicate a need for training in managing a school development policy on ICT, but even the proportions for this have dropped in the secondary, from *85*% to 68% over the period. For detailed information see table Co 5 below.

Table Co 5: Primary and Secondary Co-ordinators Training Needs
(Percentage of questionnaire responses) *(1999 data in italics)*

To help me fulfil my school-wide ICT remit I would like additional training/staff development in:	Primary 2001(99)	**Secondary 2001(99)**
Using the World Wide Web for educational purposes.	55 *(65)*	**33** ***(75)***
Managing a school development policy on ICT.	67 *(64)*	**68** ***(85)***
Using ICT as a general teaching tool with pupils.	55 *(61)*	**49** ***(58)***
Pupils using e-mail for educational purposes.	64 *(57)*	**29** ***(60)***
Pupils using video-conferencing for educational purposes.	45 *(55)*	**55** ***(56)***
Using ICT with: i) special needs pupils; ii) high achievers; iii) low achievers.	29 *(44)* 48 *(55)* 42 *(47)*	**25** ***(38)*** **38** ***(56)*** **30** ***(48)***
Setting up a school intranet.	52 *(37)*	**38** ***(54)***
Specialised learning systems e.g. Integrated Learning Systems (ILS) in mathematics and/or English.	23 *(31)*	**22** ***(38)***
The use of authoring software in teaching (e.g. HyperCard, HyperStudio).	35 *(25)*	**28** ***(35)***

c) What has been of most use or benefit to them in their role as coordinator?

In an open question we gave the respondents the opportunity to present their own views on those things which had assisted them over the recent past. The results are presented in detail below (table Co 6). For primary co-ordinators staff development had been of most benefit and for secondary it was support from colleagues. A greater proportion of primary indicated that Authority support had been of most use of benefit.

Table Co 6: (2001) Support for ICT Co-ordinators
(Percentage of questionnaire responses)

What has been of most use or benefit to you as ICT Co-ordinator?	Primary 2001 (N = 65)	**Secondary 2001 (N = 64)**
Time allocation	20	**16**
Staff development	34	**13**
Local Authority support	29	**17**
Resources for hard/software	25	**23**
Colleagues' support	12	**44**
Other, e.g. own knowledge and skills, network, in-school technician, home computer.	20	**26**

d) Where do co-ordinators seek out their information on ICT?

Given that the co-ordinators clearly play a key role in managing the introduction and use of ICT in schools and classrooms, where do they get their information from? The data indicated that, as in the previous survey, the **sources of useful input** most frequently indicated by secondary respondents were colleagues in their own school 59% (*60%*) followed by local Authority staff, 59% (*58%*). For primary staff once again it was local authority staff 68% (*64%*) followed by colleagues in their own school 41% (*44%*). SCET/SCCC (now L&T Scotland) was again identified by 41% (*46%*) in the primary sector as a source of support; while the proportion of secondary co-ordinators identifying it as a highly rated source of support fell to 19% (*40%*). Two years on, the Scottish Virtual Teachers' Centre still barely registers as a valued source of information (<6%), and primary or subject teachers' networks are clearly not thriving, the proportions having dropped even further to 12% primary; 6% secondary). The only notable increase has been the use of the WWW/Internet; up to 19% (*4%*) in primary and 20% (*10%*) in secondary. (For further details see table Co 7 in the appendix).

These data indicate a fairly 'closed' system of professional information flow, with many challenging and innovative ideas currently being reported in professional and research publications largely excluded. Perhaps this contributes to the additional finding that the expectation expressed by co-ordinators in the previous survey that **a whole school vision of ICT use** was likely to have been formulated within two years has not been fulfilled by more than a few.

e) What use was being made of policies and existing guidelines?

i) The 5-14 ICT Curriculum Guidelines

The co-ordinators were asked about the SEED documents "*Information and Communications Technology 5-14 Guidelines: Consultation Draft*" (November 1999) and "*Information and Communications Technology 5-14 National Guidelines*" (December 2000, the final document). Detailed results are presented in table Co 8a in the Appendix. The final document had only been published a few months before the survey and over three quarters (78%) of the secondary and almost half (48%) of the primary co-ordinators had seen it. However 58% of secondary and only 28% of primary co-ordinators claimed to have read it at the time of the survey.

A number of **anticipated difficulties in the implementation** of the document were raised by rather more secondary than primary staff (39% Prim : 62% Sec co-ordinators). For both sectors the most frequently mentioned difficulties were lack of teacher confidence/expertise and staff training, time to teach, finance for hardware and other resources and monitoring of the programme.

> *Staff do not have the experience or confidence to deliver the ICT curriculum using this model.* (Sec. Co.)
>
> *Assessment and monitoring of pupils on a cross curricular basis.* (Sec. Co.)
>
> *Pupils achieving Level F! – even students at higher in Business Management and/or Administration could not achieve level F unless they were working on their own (at home or with specialised equipment and software!)* (Sec. Co.)

Time taken to implement guidelines with only one member of staff on-site – need more expertise. (Prim. Co.)

Management of resources – balancing budget – do we spend on traditional materials or buy more software? (Prim. Co.)

Ratio of computers to children. Staff expertise to deliver range of activities/skills. Overcrowded curriculum. (Prim. Co.)

The unrealistically high level of demand set out for pupils at different stages was mentioned by several secondary, but no primary staff. It may be that since computers have been in the primary classroom for some time, primary teachers are more aware that some pupils at least have fairly sophisticated computing skills and indeed that many may outperform their teachers. In secondary classrooms and in computer suites within the computing department the use of the computer has been much more strictly controlled and teachers may be less aware of the variety and level of the skills of some of their pupils. This is not to say, of course, that all pupils can reach the high level currently reached by some pupils even without the benefit of an ICT curriculum and formal instruction. However, since the use of computers outside the school is now so widespread, it may be that the careful teaching by levels and monitoring which is applied in other areas of the curriculum is a somewhat inappropriate approach.

A majority in both sectors indicated their school had **a written ICT policy** with approximately half of those in the secondary sector taking guidance from the document "Using the Superhighways: ICT and Development Planning". However a much lower proportion in primary (19%) indicated this was the case. While three quarters were indicated to have **ICT committees or working groups**, only a quarter of the primaries had these.

At first sight the open data reported above appear to indicate that the concerns and remit of these groups are very much the same with respect to resources, training and planning. However, the primary staff undertake their activities within a curriculum that is common to all the teachers, and with classes that are handed on intact through the school. It is likely that the primary developments for ICT use will emerge with more whole school coherence than those within the secondary school, where there are strong forces which have the potential to act against co-operation and coherence in policy and practice, for example the subject barriers and management power of the Principal Teachers and the autonomy of individual teachers even within departments with respect to ICT use.

ii) The Authority ICT Policy

Regarding the co-ordinators' use of their Authority ICT policy, (for details see table Co 8b appendix), approximately one third of primary co-ordinators were not sure whether their local authority had an ICT policy. A majority in both sectors had a written school ICT policy, 62% Primary: 81% Sec., with approximately half of those in the secondary sector taking guidance from the document "*Using the Superhighways: ICT and Development Planning*" but a much lower proportion in primary (19%) indicated this was the case.

f) How is information disseminated throughout the school?

Communications within primary and secondary schools about ICT was clearly identified as an area of difficulty in our last survey, and all evidenced improvement in their perceived effectiveness (for details see tables Co 10a and 10b in the appendix), although only in-school staff development was thought to be effective by more than half the respondents. Contact between colleagues and in-service days were considered to be the next most effective ways of communicating information about ICT by almost half of the respondents. The use of email for this purpose had more than doubled in secondary, but was clearly less used in primaries.

6.3.4. Question 3 What have been their priorities and progress over the past two years?

a) What had they identified as their priorities over the past two years?

We asked in an open question, what had been the two main priorities in their development plan for ICT over the past year, and for an indication of how well they felt they had managed to achieve these.

As can be seen from table Co 9 below, for staff in both sectors engagement in staff development activities was the most frequently mentioned priority. The next most frequently mentioned as priorities by **primary staff** were: setting up a computer suite, and attending to the ICT curriculum:

> *The suite has been timetabled and staff have been issued with skills programmes to teach in all stages.*
>
> *Design and implement an appropriate programme of staff development.*
>
> *Setting up a computer suite with PCs.*
>
> *Developing ICT lessons to be taught.*
>
> *Looking at ways in which the training can be incorporated into curriculum use.*
>
> *Agree purchase of curriculum resources.*
>
> *Sharing information within the cluster.*
>
> *Deciding on staff development needs. Reviewing school policy on ICT to be PC compliant. Reviewing programme of work for staff to use.*

There are many strands of evidence that the arrival of the ICT guidelines have signalled to **primary ICT co-ordinators** that the time is over when the computer in the corner of the classroom can be somewhat casually or idiosyncratically used at the discretion of the individual teacher as a reward, time filler, CD ROM reader or simple word processor. ICT is now being seen by many as yet another curricular area to be covered, and one for which special whole class teaching arrangements have to be made. However, the use of the computer suite was commended by quite a few when indicating the benefits they had seen for pupils and teachers through the use of ICT:

Enthusiasm of children during lessons in computer suite.

Teachers able to access ICT suite making personal development easier.

Teachers and pupils have gained and increase knowledge dramatically – especially since suite was installed. Even technophobes have shown great enthusiasm. All staff have asked for more time in the suite.

Table Co 9: Coordinators priorities over the past two years
(percentage of respondents identifying priorities)

Priority	Primary (N = 57)	**Secondary (N = 64)**
Staff development	44	**50**
Establishing a computer suite	26	**0**
ICT curriculum	25	**8**
Purchase/installation of hardware	19	**34**
Installing a network	8	**47**
Internet access	19	**9**
Software provision/management	14	**0**
L& T/curriculum	12	**23**
e-mail	7	**6**
Policy development	4	**8**

For secondary staff the next most frequently mentioned priorities after staff development were aspects of Network development and access to hardware. While attending to the ICT curriculum guidelines were listed as a priority by 25% of the primary staff and only 8% of the secondary, attention to using ICT in learning and teaching in the curriculum was of concern to a greater proportion of secondary (23%) than primary (12%) co-ordinators, no doubt a reflection of their encouragement to subject colleagues to use ICT in their classrooms. Management/planning, National Grid for Learning (NGFL), and development of the school website were identified as priorities by 2% or less of the respondents. Secondary staff comments included:

Installation of Network.

All staff and classrooms connected to the Network.

Get the Intranet effective throughout the school.

Establishing the use of the school network as a major tool for teaching and learning and used by all staff and pupils.

Issuing of all pupils with passwords to allow access to the Authority Network.

Replacement of Apple Macs with PCs

Permeation of ICT skills in S1/2 curriculum.

Development of whole school ICT – allocating resources, staff training, future planning.

Deciding on deployment/purchase of resources, sharing knowledge/expertise.

Audit of curriculum; promotion of ICT across the curriculum.

b) What had been the main impediments to progress?

We asked for an indication of the **degree of success** they had had in attaining their priority aims. Of the 87% of secondary and 80% primary co-ordinators who indicated priorities, 38% primary: 42% secondary indicated that they had more or less achieved their main priority and 30% primary: 33% secondary that they had made fairly good inroads.

Approximately two thirds of the co-ordinators in both sectors, 68% primary, 65% secondary offered details of the impediments they had encountered in the pursuance of their priorities. For the **primary staff,** the difficulties most frequently identified were: lack of time; problems with hardware (including access), lack of staff expertise, confidence and motivation. The impediments indicated most frequently by the **secondary staff** were: difficulties associated with the Authority; lack of staff development; Network difficulties; and cost/resources. The Authorities were regarded as both a key source of assistance and support, but simultaneously as the instigator of many of their difficulties.

As a fully committed class teacher it is very difficult to find the time needed to deal with technical problems e.g. faulty monitors/hard disc crashes etc.

One computer per class is not enough, especially in a class of 30 plus. (Primary Coord)

Teachers' reluctance and lack of expertise. (Primary Coord)

Difficult to determine the most effective solutions to problems within the constraints imposed by the Authority. (Secondary Coord)

Prevarication at Authority level over NOF training. (Secondary Coord)

Email difficulties in configuring, Authority unable to support. (Secondary Coord)

IBM installed network – it 'crashes' when more than 20 people log onto the Internet! Occasionally not working – waiting for specialists to come and fix it! (Secondary Coord)

Major technical difficulties with Internet/school network – poor support and big bills from the Authority ICT Department. (Secondary Coord).

c) What stages of development have various initiatives reached?

What evidence was there of advancement in the use of ICT in key areas of practice in the schools and classrooms? Data on selected stages of development of a variety of ICT related activities related to learning and teaching; to staff support and school planning; and to communications beyond the school are presented below and in tables Co 11a and Co 11b in the appendix.

Developments in learning and teaching

Primary developments

Perhaps because considerable attention was being paid to the introduction and settling in of hardware and establishing Internet connectivity, some activities in learning and teaching in **primary schools** had progressed little from our last survey (see table Co 11a in the appendix for details of 1999/2001 comparisons). However, the only activity described as 'established' by more than 50% of primary schools was in the access to CD ROM. Progress in key areas since 1999 has been slow: giving assistance to pupils with learning difficulties, 39% *(33%)*, and extending opportunities for high attaining pupils 9% *(11%)*; securing opportunities for WWW access 20% *(10%).* On the administrative front, enhancing the quality of reports 48% (*39%)*, centralising assessment and testing records, 25% *(26%)* showed no great change from the picture given two years previously.

Secondary developments

The indications were that the establishment of a range of activities associated with learning and teaching had been taken forward in **secondary schools** (see table Co 11b in the appendix for details of 1999/2001 comparisons)**.** For example, securing pupil and teacher access to CD-ROMS, 71% (*58%*); giving assistance to pupils with learning difficulties, 74% (*56%*), and securing opportunities for WWW access 74% (*29%*) had clearly progressed in some schools.

On the administrative front, enhancing the quality of reports 60% (*48*%), and centralising assessment and testing records, 30% (*8*%) had been developed by an increased proportion. However, there was little advance in the establishment of the extension of learning activities for high attaining pupils, 24% (*21%*), and curiously, an apparent setback in the setting of goals for ICT experiences 17% (*59*%). We can only speculate that this was the result of the arrival of the 5-14 ICT guidelines in which a range of ICT experiences and achievements associated with stages had been set out. Other investigations indicate that in secondary schools the consideration and implementation of these is not very advanced and may largely be tackled by a rewriting of workbooks within computing departments.

ii) Developments in staff support and school planning

In **primary schools** there had been an increase of around 10% in the proportions indicating the establishment of ICT uses with respect to the delivery of inservice ICT courses for staff, 49% (*37%)* and in the recording of test and exam results for monitoring and review, 32% (*19%*). However, putting teachers in contact with other teachers locally 10% (*19%*) appeared to have decreased.

In **secondary schools** there was similarly an increase of around 10% in the proportions indicating the establishment of ICT uses with respect to the delivery of inservice ICT courses for staff, 61% (*52%),* the recording of test and exam results for monitoring and review, 42% (*29%*) and putting teachers in contact with other teachers locally 33% (*17%*).

iii) Developments in Communications beyond the School

Notwithstanding the final claim above, and vastly improved electronic links with the wider community, communications with others outside both the primary and secondary school - whether with parents, professional colleagues, pupil peer groups or the local community - remained the least well advanced in their development. Forty six percent of secondary schools indicated they had a website, but apart from the development of these as a window display, few external communication avenues were developed by many, although the proportions had increased a little; e.g. in secondaries; collaborative projects with other schools 13% (*6%*); local community access to computing facilities 21% (*15%*); giving pupils access to subject specialists outside the school 10% (*6%*). See tables Co11a and b in the appendix for further details.

6.3.5. Question 4: What benefits had the co-ordinators already seen for teachers and pupils as a result of the introduction of ICT?

The responses to this open question were coded and collated and are presented in the table Co 12 below.

For both sectors, aspects of the management activities of teachers, increased pupil motivation, improved presentation and the improvement of the ICT skills of teachers and pupils were the benefits listed by the greatest numbers of respondents. Contributions to teaching and learning were also mentioned by a greater proportion of secondary than primary co-ordinators.

Table Co 12: The perceived benefits for pupils and teachers from the introduction of ICT (percentage of open questionnaire responses)

What benefits have you already seen for pupils and teachers from the introduction of ICT?	Primary (N = 60)	**Secondary (N = 63)**
Teacher management	55	**60**
Increased pupil motivation	66	**43**
Improved presentation	50	**56**
Improved pupil skills	46	**48**
Improved teacher skills	46	**43**
Contributions to Teaching & Learning	20	**52**
Contributions to the curriculum	33	**22**
Improved access to information	25	**30**
Improved communication	5	**27**
Support for learning difficulties	10	**9**
Pupil research/independence	12	**8**
Improved quality of work / attainment	0	**13**

Perceived benefits from the primary co-ordinators' perspective:

Teachers' ability to produce learning resources, lesson plans, letters to parents.

Pupils are producing work of a high standard in topic work using word processing and desktop publishing as well as downloading images from Internet.

Improved quality of presentation of pupils' good work for display.

WWW as information resource has increased teachers' and pupils' scope for project and curricular research.

And perceived benefits from the secondary co-ordinators' perspective:

Publishing information and images on the web to raise pupils' self esteem.

Pupils able to use ICT skills across the curriculum – benefits many areas of different subjects.

Better staff relations – helping each other if a problem arises. 'We're in it together' feeling.

Stimulation for staff and pupils through access to the Internet and a wider source of material.

6.3.6. Question 5 What were their aspirations for the future?

The **time scale for the implementation** of key aspects of the initiatives indicated by respondents to the questionnaire in 1999 suggested that significant advances would be evidenced in this year's data. With the exception of electronic communications with a proportion of parents, most of the aspirations for their schools had been identified as likely to be acted on over the next two years. The indications are, however, that significant advances have been made in only a limited number of areas (see tables Co 13a and b in appendix). In primary schools, a greater proportion had a number of modern computers in their classrooms 29% (*18*%); and in both sectors, advances have been made in the areas of e-mail provision. Providing teachers with their own e-mail address is claimed to be established by 17% (*1*%) of primary and 44% (*6%*) of secondary co-ordinators; providing pupils with the same has also significantly increased in secondaries, 33% (*4%*).

However, in the secondary schools the following are barely established, and are clearly developments still on the horizon for the overwhelming majority, a similar picture being evident in the primary schools.

- having a number of modern computers in every classroom, 19% (*8%*)
- having most staff trained in a range of classroom ICT uses 6% (*4%*);
- seeing positive effects of ICT on pupil attainment in curricular areas, 6%, (*6%*)
- having developed a common vision on the use of ICT in their school 10% (*4%);*
- having regular ICT communications with a proportion of our parents 0% (*0%)*

With respect to their aspirations for the pupils (see table Co 13b in appendix), in secondaries the regular use of e-mail 26% (*0%*) and the WWW 35% (*2%*) had clearly advanced, and their pupils' experience of multi media showed a small increase, 23% (*15%*), with rather smaller increases on the part of primaries. However, having experience of working on projects with a strong ICT base 10% S; 6% P or accessing information from specialists outside the school 3% S; 1% P are clearly still developments for the future.

6.3.7 Question 6 What were the main obstacles in the way of their progress in the initiatives?

There had been little change in the main obstacles perceived by the overwhelming majority of co-ordinators – too many competing priorities (99% P; 97% S); not all having a home computer on which they could develop their skills (96% P; 98% S) or other means to progress them, (82% P; 71% S); too little time to preview software (94% P; 91% S).

However, there were areas of improvement: the technical support to secondary co-ordinators appeared to have improved for 20% of staff, although for only 12% of their primary counterparts, and resources were perceived as insufficient by over 20% less this time around. The network arrangements had also vastly improved – for 48% of secondary, but only 13% of primary respondents. Infrastructure, computer numbers, access, and availability of peripherals also had around 10-20% more favourable responses. The development of ICT as not being seen as a priority was still indicated as an obstacle to progress by half the primary and one quarter of the secondary respondents. The unavailability of suitable resources was still identified by over 70% secondary and half of the primary co-ordinators. For further details, see Table Co 14 in the appendix.

7 THE SCHOOL CONTEXT: PERCEPTIONS AND EXPERIENCES OF PRIMARY & SECONDARY TEACHERS

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7.1 Summary of Findings – Primary Teachers

- 81% of teachers have a computer at home and 77% of these are linked to the Internet.
- The most frequently identified uses of these is word processing for school (78%) and personal use (76%), Internet searches (65%), using e-mailing for personal (64%) and professional (37%) purposes, and CD-ROM (62%).
- 93% of primary teachers indicated that they had at least one computer in their classroom regularly in use by pupils and 54% that they also used a school ICT base, suite or lab or other shared computer facilities.
- The proportion indicating that their pupils are using the Web to search for information has increased from 3% to 27%. There has been generally little change in other pupil uses since 1999.
- The main changes in the teachers' use of ICT was the increased proportion that created curriculum materials (43%), or downloaded materials from the Web (26%).
- There was little change in the proportions of teachers indicating that procedures are established for the use of ICT to assist high attaining pupils (40%) and for providing differentiated activities (40%); the proportion giving specialist assistance to pupils with learning disabilities has increased from 34 to 47%.
- Key information on ICT was derived from very immediate and local sources within the profession - colleagues in their own school (79%) and Local Authority staff (39%). 33% now indicated the WWW as a key source of information.
- 41% are using ICT for the production of some pupil records for parents, 17% or less for other types of assessment data management.
- 22% of respondents indicated that producing records for parents; making profiles of pupil progress (29%); recording and analysing test results (46%) and setting up systems that would allow pupils to use ICT to record and monitor their own attainments (54%) are unlikely to be developed in the foreseeable future.
- 63% indicated that their pupils showed a higher level of independence than usual from the teacher when working on the computer.
- 45% now indicated that they had evidence that pupil attainment had improved and that ICT had contributed in significant ways to the learning of their pupils (94%).
- 55% now had a vision of the classroom of the future which was very different from the classroom as they experienced it at present; 40% agreed that the importance of ICT had been greatly exaggerated.

7.2 The Full Report of the Findings – Primary Teachers

7.2.1 Data Collection Procedures

Primary schools in the sample (80 schools) were sent a questionnaire with the request that it be completed by a P7 teacher. Since these were largely the same schools as had been involved in the 1999 survey, the questionnaire would very frequently have had to be given to the same teacher as previously. Responses were received from 116 *(132)* teachers, 68% of whom had previously answered our questionnaire. The questionnaires were completed in the early spring of 2001 (January – March). The data on the school size indicated that with respect to this, the sample was representative of Scottish primary schools.

(Where appropriate, equivalent data from the previous survey in 1999 are presented in italics and underlined)

7.2.2 Question 1: What Were the Key Characteristics of the Respondents?

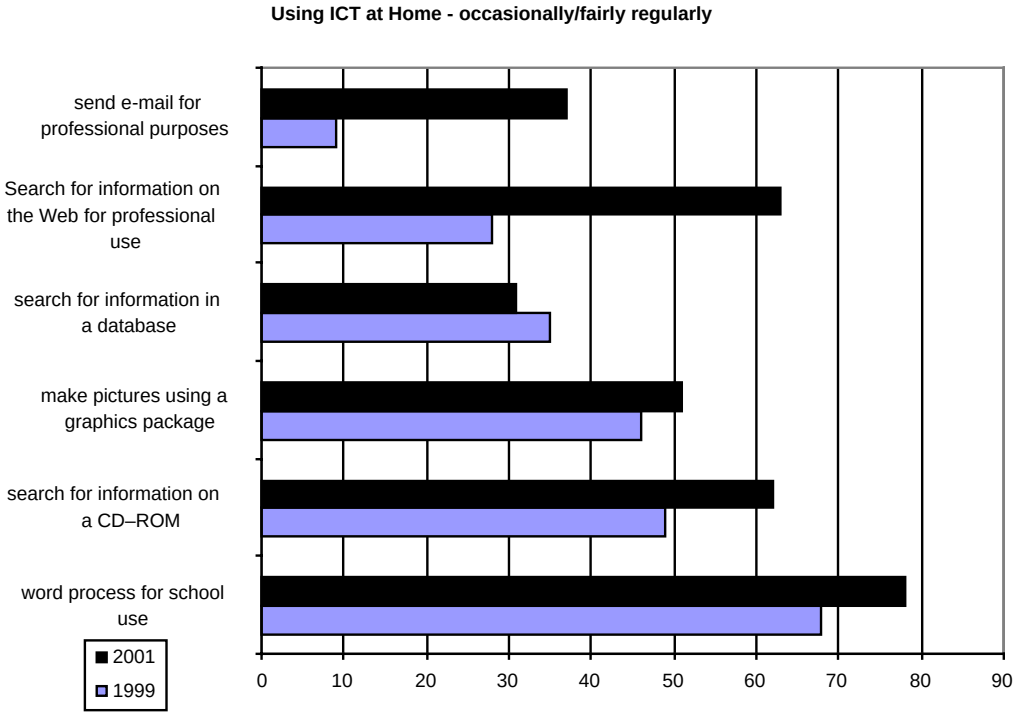
Of the 116 P7 classroom teachers who responded to our questionnaire in 2001, 88% (*93%*) were female, and the majority, 61%; (*64%*) had been teaching for 16 years or more. 8% were in addition, promoted staff – HT, DHT or AHT; 25% were Senior Teachers; 14% had a formal responsibility for ICT in their school. Around half taught in schools with rolls of 300 or more (54%; *56%*) and very few in schools of 150 or less (6%; *8%*).

7.2.3 Question 2: What Were Their Home Experiences and Skills in ICT Use?

The proportion indicating **the use of a computer at home** had increased to 81% (*67%*) and of these, 77% indicate they have links to the Internet. Word processing for the purposes of school work was the most frequently identified use, by 97% **of this home user group –** occasionally (22%), or fairly regularly (75%); with the use of CD-ROM (79%), Internet searches for personal and professional use (80%) and e-mailing friends and family (80%) used by almost all the group either occasionally or frequently. Sixty-five percent indicated they used graphics packages, 19% on a frequent basis. Eleven percent indicated they frequently e-mailed for professional purposes, 36% did this occasionally.

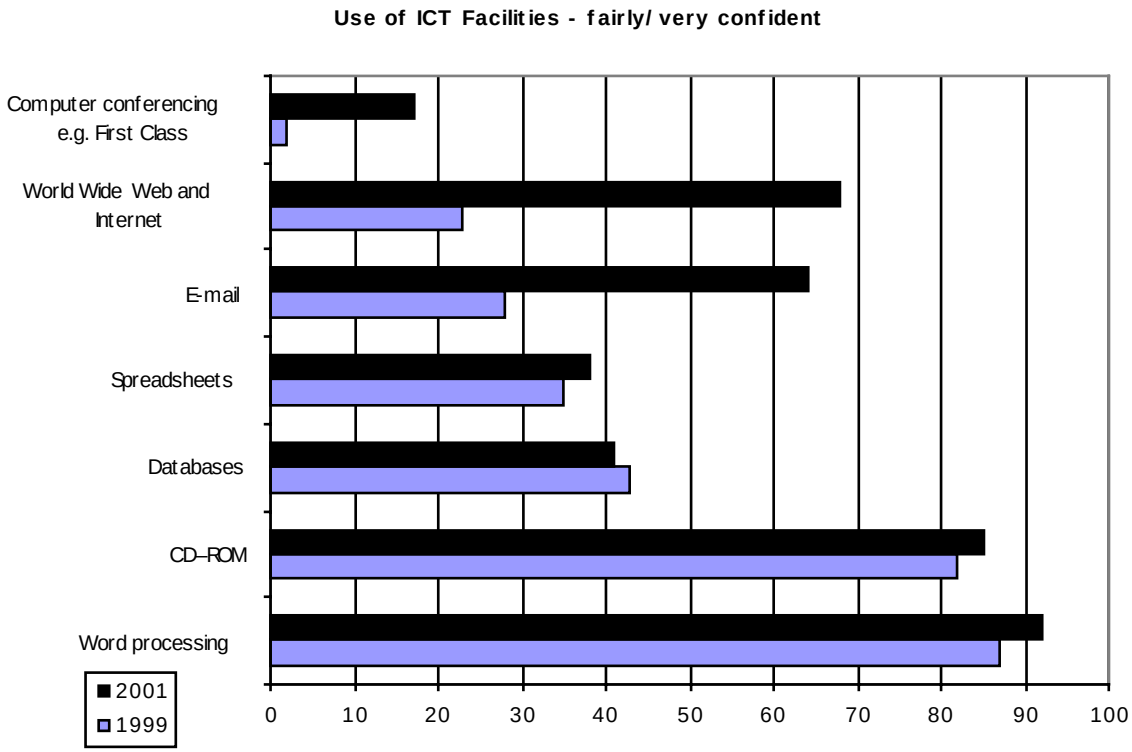
Dealing with changes in the overall patterns and **level of home use in the population of Scottish primary teachers as a whole**, it can be said that our data indicate that over the past two years the largest increase has been in the use at home of e-mail to friends and family 64% (*27%*), searching for information on the WWW for personal, 65% (*24%)* and for professional use 63% (*28%)*. Displaying or sending digital photos has increased to 23% (*7%*). See Figure PT 1 below and table PT 1 in the appendix).

Figure PT 1 Primary Teachers' Use of ICT at Home



Other activities which are possible through using computer at home had increased, though to a lesser degree: word-processing for school use 78% (*68%*); searching for information on CD ROM 62% (*49%);* and some activities remained at substantially the same level of frequency, for example, using spreadsheets 37% (*33%*) and databases 38% (*32%*). See table PT 1 in the appendix.

Figure PT 2 Primary Teachers' Level of Confidence in Use of ICT Facilities



The majority indicated **some degree of confidence** (fairly or very confident) in the use of word processing (92%; *87%*) CD-ROM (85%; *82%*) and the Internet (68%; *23%);* only 14% *(49%)* claimed never to have used the WWW and only 19% *(52%)* had not used e-mail. Confidence in the use of computer conferencing had increased to 17% *(2%)* although 67% *(93%)* indicated that they had never used it (see Figure PT 2 above and table PT 2 in the appendix).

7.2.4 Question 3: How is ICT Used in Teaching and Learning?

a) What computers are available?

93% of primary teachers indicated that they had at least one computer in their classroom regularly in use by pupils. Around 60% indicated that none of the computers used by pupils in their classroom were linked to the Internet. Fifty four percent indicated that they also used a school ICT base, suite or lab or other shared computer facilities. For details see table PT 3 in the appendix.

b) What are their pupils' uses of ICT?

Figure PT 3 Primary Pupils' Use of ICT in the Classroom

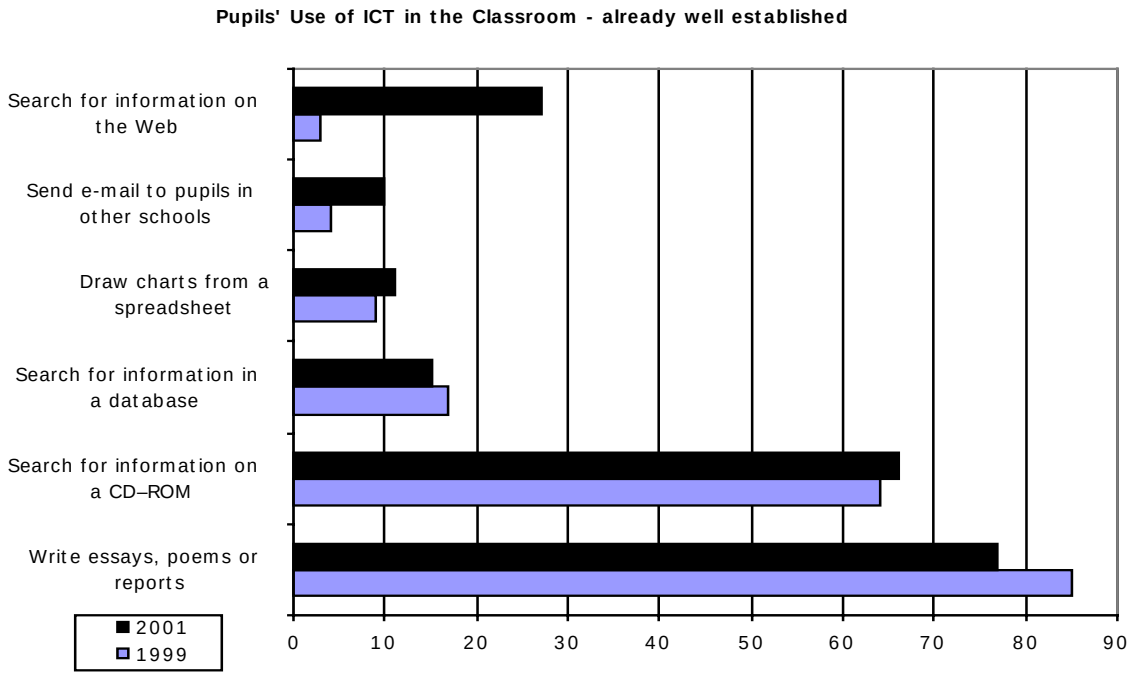


Figure PT 3 above (see also table PT 4a) gives a picture of some of the uses to which pupils put ICT in the classrooms of our sample. Although the proportion using the Web to search for information has increased from *3%* to 27%, there has generally been **little increase in the pupils' ICT activities** which are described as being 'well established'.

Rather fewer teachers now felt that developments in the use of e-mail were not likely in the future, 22% (*41%*) and searching for information on the Web 9%, (36%) (see table PT 4a). But there was little change in the proportions of respondents indicating that the pupils' use of some technologies in their class was not on their development agenda, (e.g. playing simulations, 57%; making newsletter pages, 14%; drawing charts from a spreadsheet, 14%. Also not yet into the foreseeable development plan of the majority of teachers was the use in classrooms of the more complex and innovative technologies such as videoconferencing, multi-media, or authoring software such as hyperstudio (see table PT4b in the appendix).

c) How is ICT used for teaching and learning purposes?

Figure PT 4 Primary Teachers' Use of ICT in Teaching and Learning

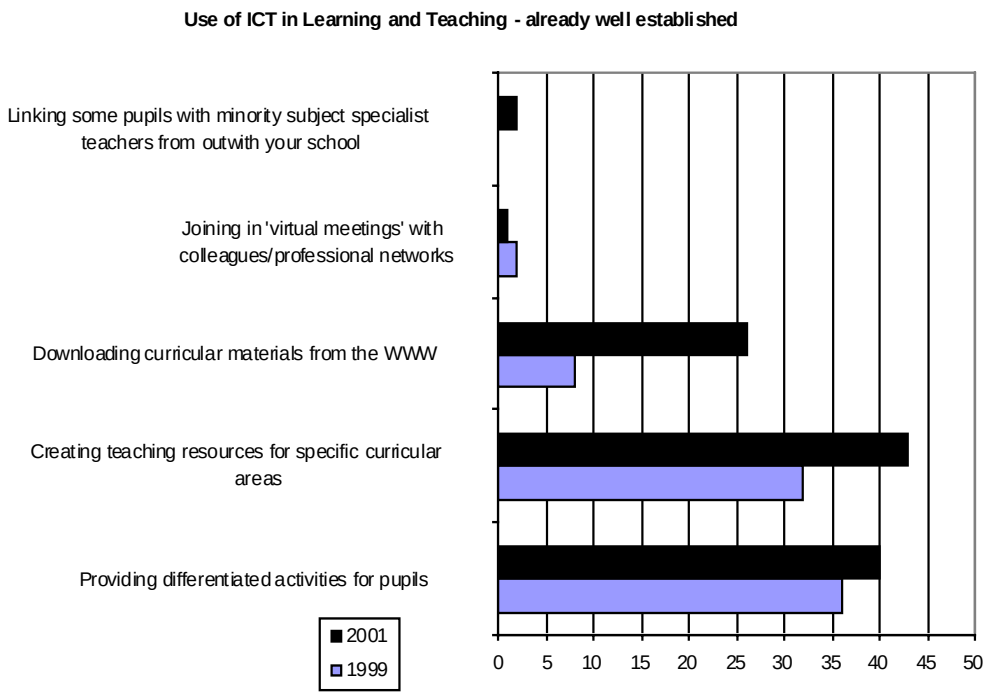


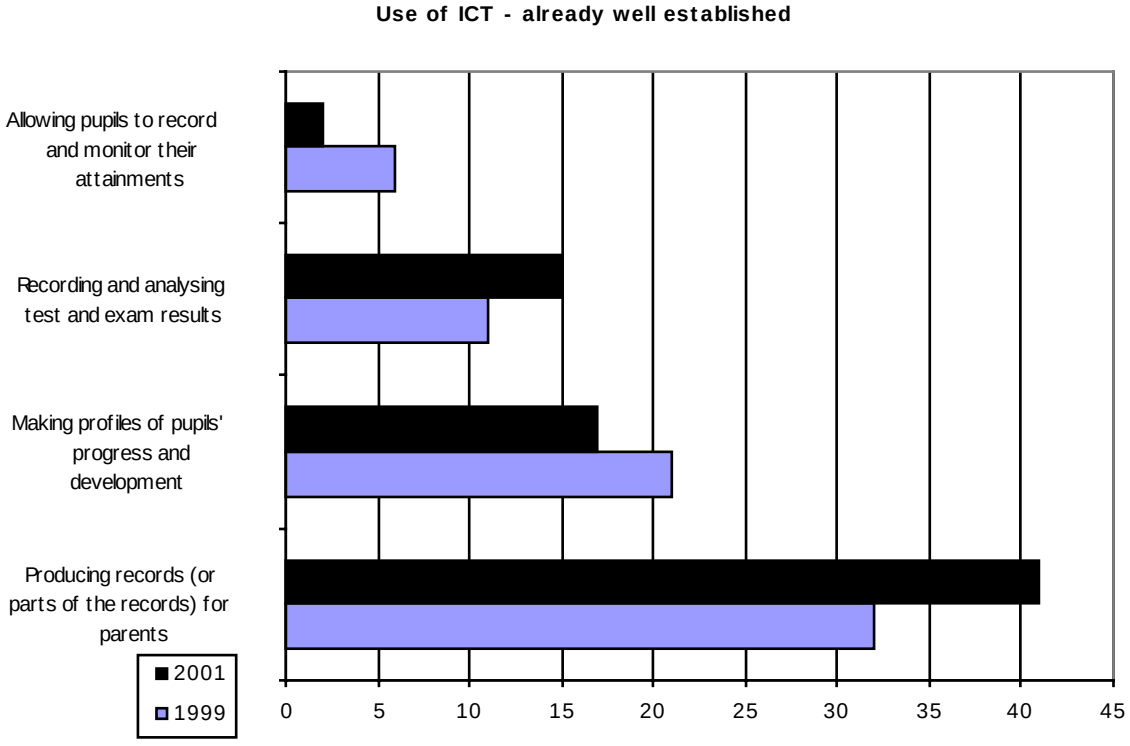
Figure PT4 above and table PT 5 in the appendix presents the data on the use of ICT for selected teaching purposes. There has been little change in the proportions of teachers indicating that procedures are well established for the use of ICT to assist high attaining pupils (40%; *44%*) and providing differentiated activities (40%; *36%*). However, the proportion giving specialist assistance to pupils with learning disabilities has increased (47%; *34%*). The largest increase in use indicated was in the downloading of curricular materials from other schools, the WWW or resource providers (26%; *8%*). And there was a decrease in the proportions of those who had previously ruled out future developments in the creation of teaching resources for specific curricular areas (15%; *30%*). For the great majority there remained little anticipation that in the future they would use ICT to communicate with professionals outside education, (71%; *79%*), to join in virtual meetings with colleagues, (83%; *84%*) or give pupils access to minority subject teachers outside the school, e.g. in modern languages, (83%; *86%*).

7.2.5 Question 4: Where did they get information on ICT resources?

As with the primary coordinators, for the greatest proportions of teacher respondents colleagues in their own school (79%; *82%*) and Local Authority staff (39%; *50%*) remained the main sources of information about the range of resources available (see table PT 6 in the appendix).. Previously favoured sources, e.g. publishers' catalogues (23%; *40%)* and SCET (20%; *28%*) had been overtaken by the proportion now using the WWW (33%; *12%*). However, The Scottish Virtual Teachers' Centre was clearly no more favoured than previously (3%; *2%*) and primary teachers' networks (10%; *5%*) and professional journals were not used by many (10%; *8%*).

7.2.6 Question 5: How well established was the use of ICT in monitoring, evaluation and assessment?

Figure PT 5 Primary Teachers' Use of ICT in Monitoring, Evaluation & Assessment



The overall pattern of responses has remained fairly similar over the two years between surveys with little indication of significant changes in practice (see Fig.PT5 above and table PT 7 in the appendix). Forty one percent are using ICT for the production of some pupil records for parents, less than 17% for other assessment data management.

While around 10% have become more positive in their views on whether some of these assessment related uses are likely to be adopted at some stage, for many respondents these kinds of development remain unlikely in the foreseeable future, e.g. producing records for parents (22%; *38%*); making profiles of pupil progress (29%; *37%)*; the recording and analysis of test or exam results (46%; *58%*); and setting up systems which would allow pupils to use ICT to record and monitor their own attainments (54%: *65%*).

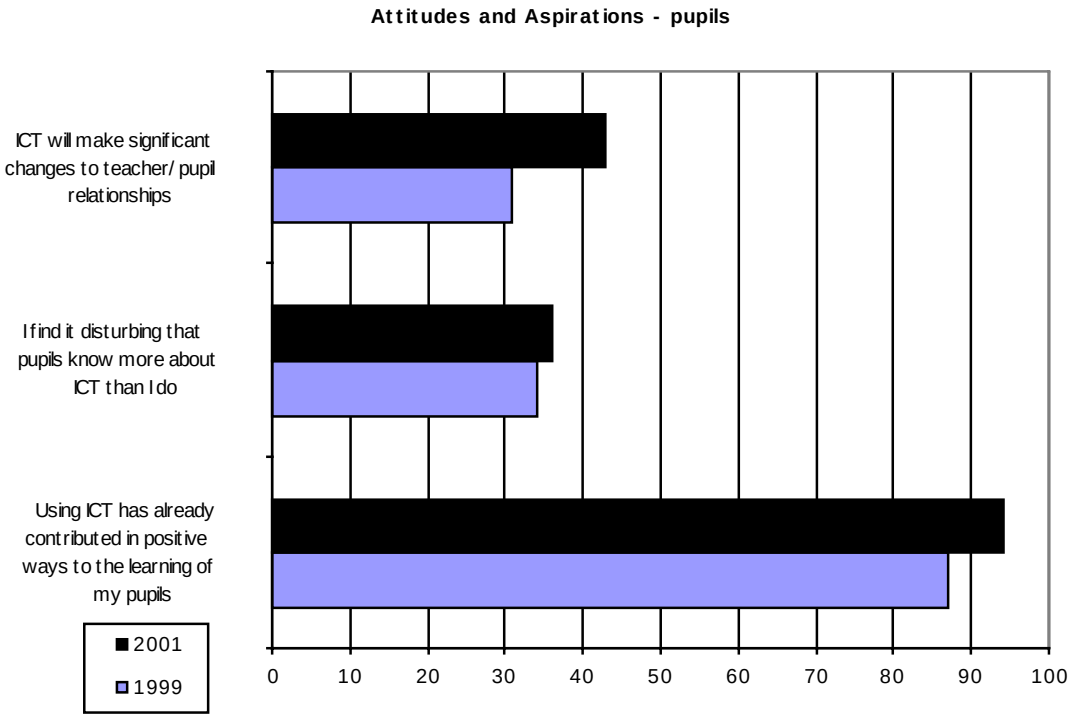
7.2.7 Question 6: What are Their General Attitudes and Aspirations?

Overall, the teachers' views on the impact of ICT on the pupils, the staff and the schools remained substantially the same as they had been two years previously (see tables PT 8a, b and c in the appendix and Figs PT 6a, 6b and 6c below).

Attitudes and Aspirations – Pupils

We had introduced a change of wording in two questions relating to the effects on the pupils in order to focus on the evidence for ICT effects. Whereas in the earlier survey *97%* of teachers had agreed with the statement that "ICT will assist in developing the independent skills of our pupils", 63% now indicated that their pupils actually showed a higher level of independence than usual from the teacher when working on the computer. Whereas *76%* had indicated an expectancy that the use of ICT would raise the level of attainment, 45% now indicated that they believed had evidence that this had happened (see table PT 8a).

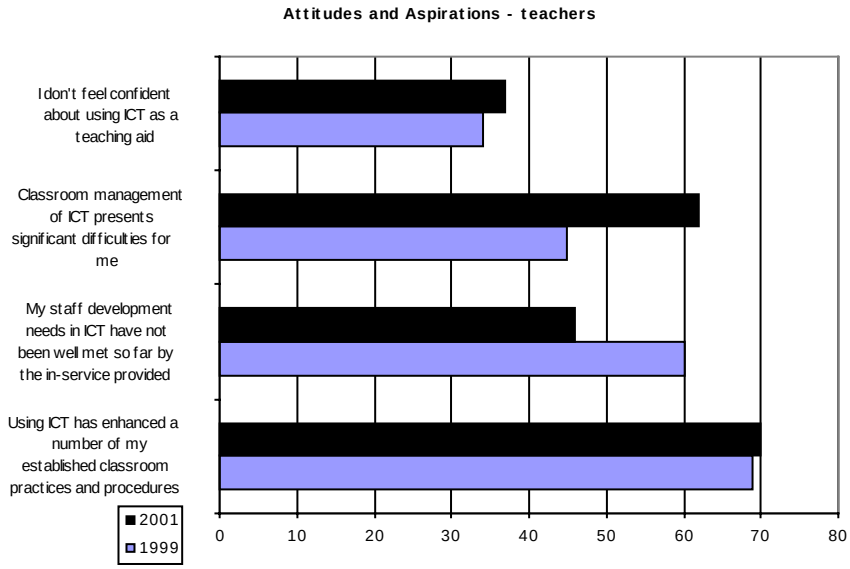
Figure PT 6a Primary Teachers' Attitudes and Aspirations - Pupils



Attitudes and Aspirations - Teachers

The proportion agreeing that they had 'significant difficulties' with the classroom management of ICT had increased from *45%* to 62%. Nevertheless, 84% continued to agree that ICT opened up interesting prospects for their future professional development, and the responses they had experienced to their staff development needs were positively viewed by a greater proportion – 54% (40%). Seventy percent considered that the use of ICT had enhanced their established classroom practices (see Fig. PT 6b below and table PT 8b in the appendix).

Figure PT 6b Primary Teachers' Attitudes and Aspirations - Teachers

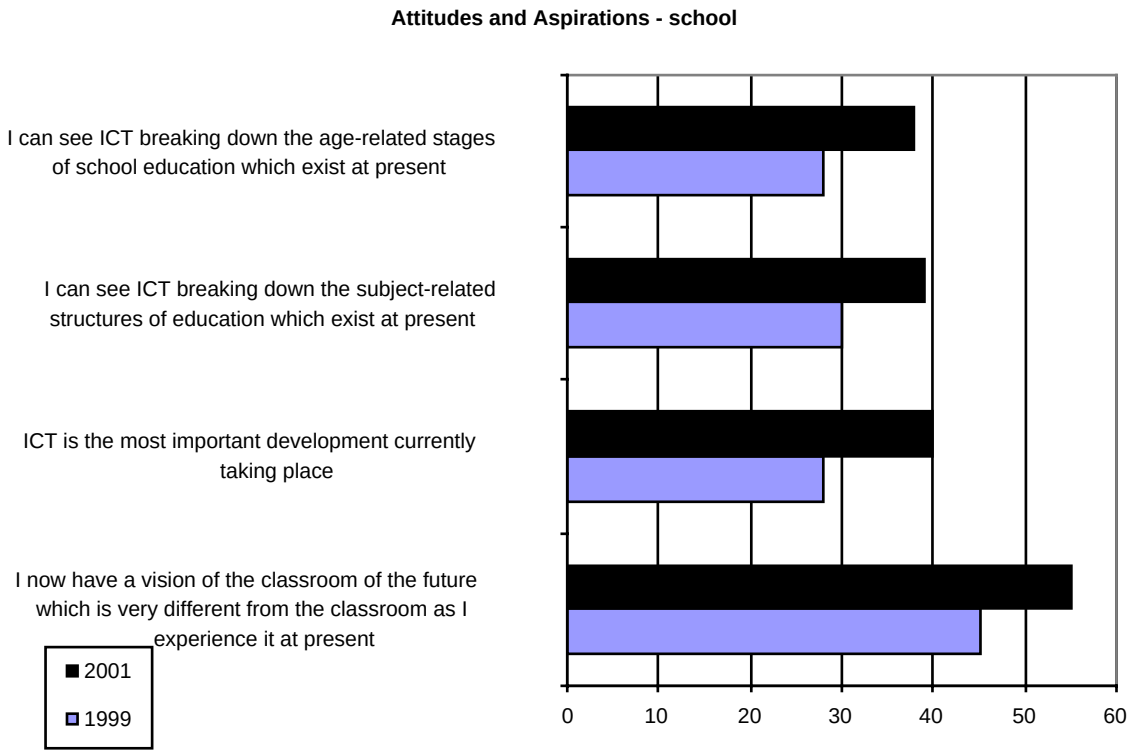


With respect to the wider context, the proportion agreeing with the statement that ICT was the most important development currently taking place in education increased from *28%* to 40%, although 40% considered that its importance has been greatly exaggerated.

Attitudes and Aspirations - Schools

Although the change in proportions was not huge, there were indications that more primary teachers were becoming aware of the potential impact which ICT might have in schools and classrooms. Ten percent more (now 55%) indicated that their vision of future classrooms was very different from their experiences of the present; and around ten percent more agreed that the influence of ICT might break down the subject related (now 39%) and age related (now 38%) structures of the school. (See Figure PT 6c below and table PT 8c in the appendix).

Figure PT 6c Primary Teachers' Attitudes and Aspirations - Schools



7.2.8 Question 7: What are their concerns with respect to support and training?

a) *Provision of guidelines*

In the 2001 questionnaire we again included a set of questions relating to the kind of guidelines through which teachers had been offered support and information (see table PT 9). The majority of teachers have now been issued with guidelines relating to copyright laws (73%; *67%*); security e.g. via passwords (71%; *47%*); protection of young people from exploitation by others (62%; *30%*); and from exposure to unsuitable materials e.g. pornography (63%; *33%*).

b) NOF and other inservice training

As can be seen from table PT 8b in the appendix, rather fewer teachers now indicated that the inservice they had been offered was not meeting their needs (46%; *60%*). However, some of these respondents were clearly reflecting attitudes formed within the context of Local Authority training or the school based inservice mentioned as part of the duties of ICT coordinators. By 2001 it had been anticipated that NOF training would be well underway for a considerable proportion of teachers. The uptake clearly had fallen behind the timetable to which the planners aspired. Only 10% of primary teachers indicated that they had completed NOF training; 10% that they were currently undertaking it and 14% that they had signed up but had yet to start. 42% indicated that no plans had yet been made for them to undertake it. . It should be noted that by March 2002, 87% of teachers had undertaken some variety of NOF training (information supplied by SEED).

Question 8: What were their final comments?

35% (*25%*) of primary staff offered final comments. Unfortunately these questionnaires went astray in transit between the quantitative data entry company and Strathclyde University for reasons and at a point we have been unable to determine, despite considerable investigation. The final comments of the primary teachers must remain unknown.

7.3 Summary of Findings – Secondary Teachers

- 88% of teachers have a computer at home and 75% of these are linked to the Internet.
- The most frequently identified uses of these is word processing for school (87%) and personal use (85%), using CD-ROM (75%), Internet searches (72%), and e-mailing for personal (69%) and professional (53%) purposes.
- 62% of secondary teachers indicated that they had at least one computer in their classroom regularly in use by pupils and 48% that they also used a school ICT base, suite or lab or other shared computer facilities.
- The proportion indicating that their pupils are using the Web to search for information has increased from 8% to 25%, the use of CD-ROM from 19% to 28%. There has been generally little change in other pupil uses since 1999.
- The main changes in the teachers' use of ICT was the increased proportion that created curriculum materials (46%), or downloaded materials from the Web (25%).
- There was an increase in the proportions of teachers indicating that procedures are established for the use of ICT to assist high attaining pupils (40%) and for providing differentiated activities (44%); the proportion giving specialist assistance to pupils with learning disabilities has increased from 15% to 24%.
- Key information on ICT was derived from colleagues in their own school (57%), the WWW (35%) and publishers' catalogues (30%).
- 28% are using ICT for the production of some pupil records for parents, 20% for other types of assessment data management.
- 27% of respondents indicated that producing records for parents; making profiles of pupil progress (29%); recording and analysing test results (30%) and setting up systems that would allow pupils to use ICT to record and monitor their own attainments (73%) are unlikely to be developed in the foreseeable future.
- 66% indicated that their pupils showed a higher level of independence than usual from the teacher when working on the computer.
- 41% now indicated that they had evidence that pupil attainment had improved and that ICT had contributed in significant ways to the learning of their pupils (84%).
- 55% now had a vision of the classroom of the future which was very different from the classroom as they experienced it at present; 49% agreed that the importance of ICT had been greatly exaggerated

7.4 The Full Report of the Findings - Secondary Teachers

7.4.1 The Data Collection Procedures

The secondary schools were sent 10 copies of the questionnaire with the request that they sample their teachers in a manner similar to that of the previous survey across the subjects, but with different instructions with regards to the random selection of the teachers. Thus, although the schools were also largely the same as in the previous survey, the individual teachers who were sampled were likely to be different. The subject areas were: English language, foreign languages, religious and moral education, technological studies, science, physical education, mathematics, creative and aesthetic subjects, social subjects. Responses were received from 573 (*397*) teachers, fairly evenly spread across ten subject areas, of whom only 6% had previously answered our questionnaire (see table ST1 in the appendix). For the purposes of analysis of the open questions, 250 questionnaires were randomly sampled to give roughly even numbers in each of the subjects, with the exception of the final comments, all of which were extracted.

(Where appropriate equivalent data from the previous survey in 1999 are presented in italics and underlined.)

7.4.2 Question 1: What Were the Key Characteristics of the Secondary Teacher Respondents?

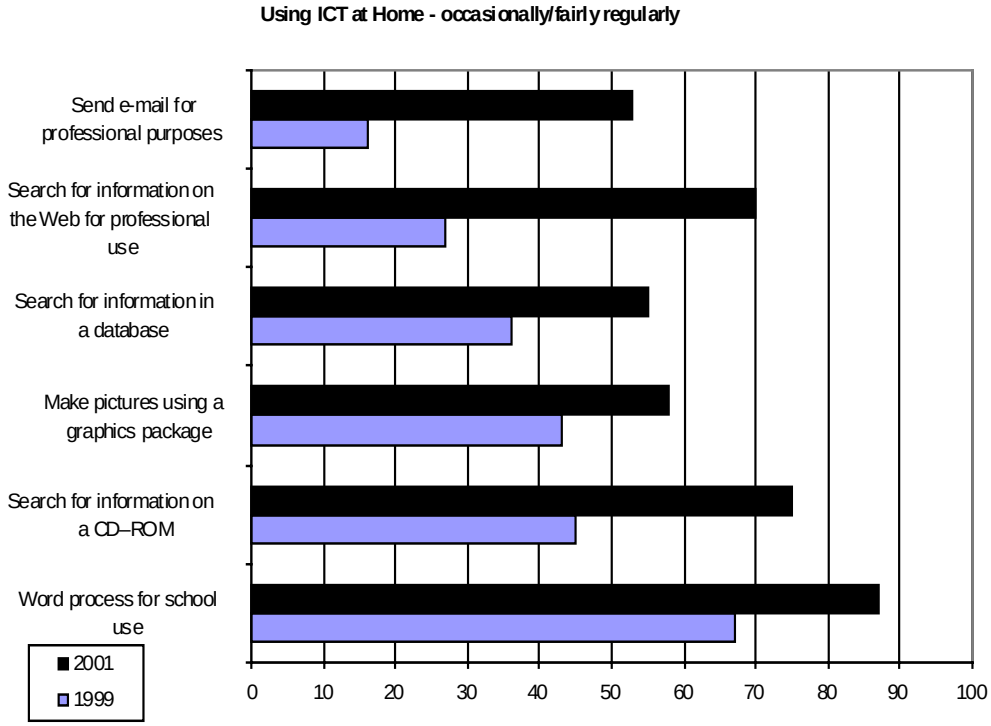
Of the 573 secondary teachers who teachers responded to our questionnaire in 2001, 86% had not previously answered our questionnaire in 1999. Sixty one percent (*52%*) were male and the majority, 66% (*57%*) had been teaching for 16 years or more. 8% percent taught in schools with rolls of 600 pupils or less (*16%*) and 37% (*26%*) in schools with rolls of 1000 or more. They were fairly evenly spread (8-12%) across a range of ten subject areas (see table ST 1 in the appendix). 8% (*9%*) had some form of qualification in ICT, the majority of these being part of the degree courses for some subjects, or part of the teaching qualifications for technological studies. The majority (70%) taught in both S1/2 and S3/4.

7.4.3 Question 2: What Were Their Home Experiences and Skills in ICT Use?

It would seem that a greater proportion of teachers than previously are now active in the home use of ICT for a range of purposes, the greatest increases being associated with the use of the Internet and CD ROM (see Fig ST 1 below and table ST 2 in the appendix). A large majority of secondary teachers (88%) now have a computer at home and three quarters of these are linked to the Internet.

Dealing with changes in the overall patterns and **level of home use in the population of Scottish secondary teachers as a whole**, it would seem that a greater proportion of teachers than previously are now active in the use of ICT for a range of purposes. The largest increases have been in the use at home of e-mail to friends and family, up by around 44% to 69% (*25%*); E-mailing for professional purposes was up by 37% to 53% (*16%*); searching for information on the WWW for personal purposes, 72% and for professional use 70% were up by around 40% from *27%.*

Figure ST 1 Secondary Teachers' Use of ICT at Home

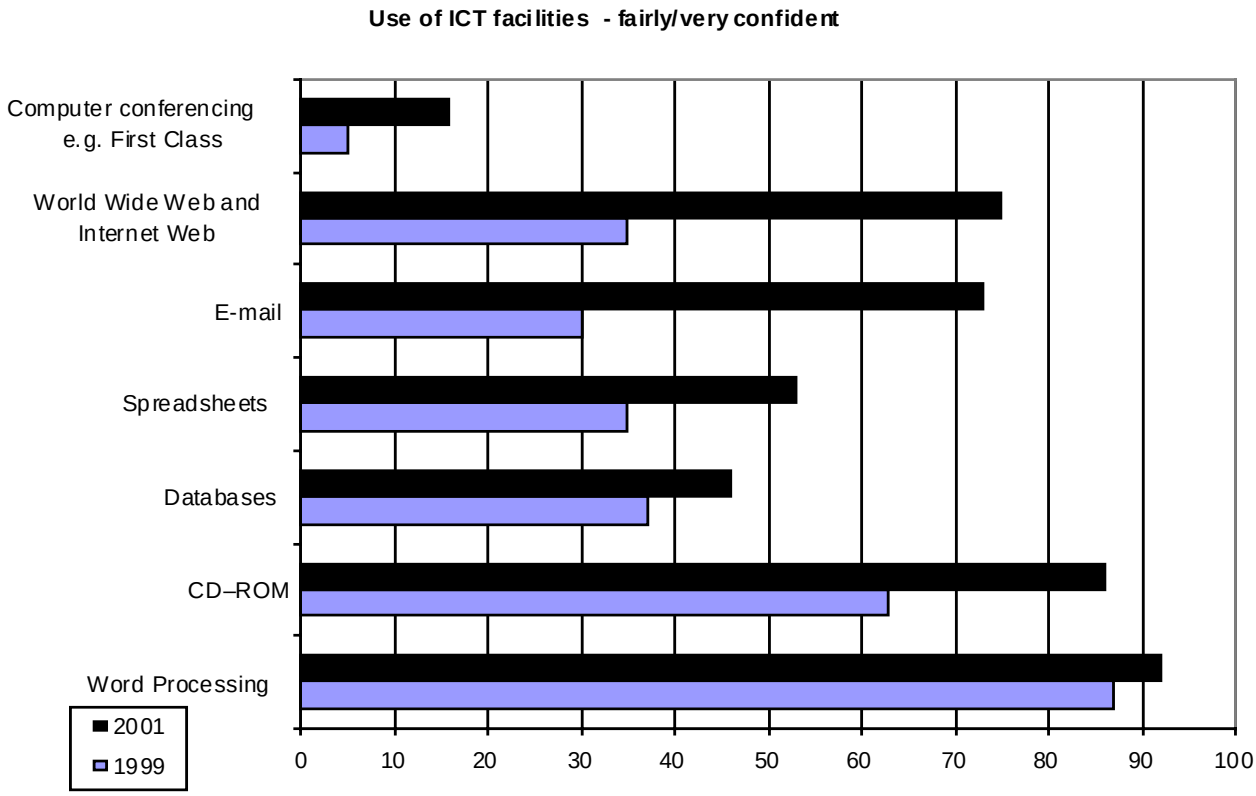


Searching for information on CD ROM was up by 30% to 75% (*45%*); using data bases and spreadsheets were both up by 20% to 55%; word-processing for school use and personal use showed a similar increase to 85/87% (See table ST 2 in the appendix).

One third of the teachers (36%) indicated that they already used or were planning to purchase additional ICT equipment to those items listed in the questionnaire. The most frequently indicated was a DVD player (half of those responding to the question), followed by a digital television and a digital camera. Some arts and social subject teachers indicated a scanner, and a few individuals indicated a mobile phone with WWW access or plans for a general computer upgrade.

An increased proportion of secondary teachers indicated **some degree of confidence** (fairly or very confident) in the use of ICT for a range of purposes (see Fig ST 2 below and table ST 3 in the appendix for details).

Figure ST2 Secondary Teachers' Level of Confidence



The greatest increases were again associated with e-mail and use of the WWW both of which were up by over 40% to 73% and 75% respectively. The proportions indicating confident use of CD-ROM (86%) and digital scanners (44%) had increased by around 20%; and 18% more now indicated a degree of confidence in the use of spreadsheets (53%).

7.4.4 *Question 3: How is ICT Used in Teaching and Learning?*

a) What Computers Are Available?

Sixty two percent of secondary teachers indicated that they had at least one computer in their classroom regularly in use by pupils. But the majority indicated that none of the computers used by pupils in their classroom were linked to the Internet. Forty eight percent indicated that they also used a school ICT base, suite or lab or other shared computer facilities. For details see table ST 4a in the appendix.

b) What Are their Pupils' Uses of ICT ?

Figure ST 3 Secondary Pupils' Use of ICT in the Classroom

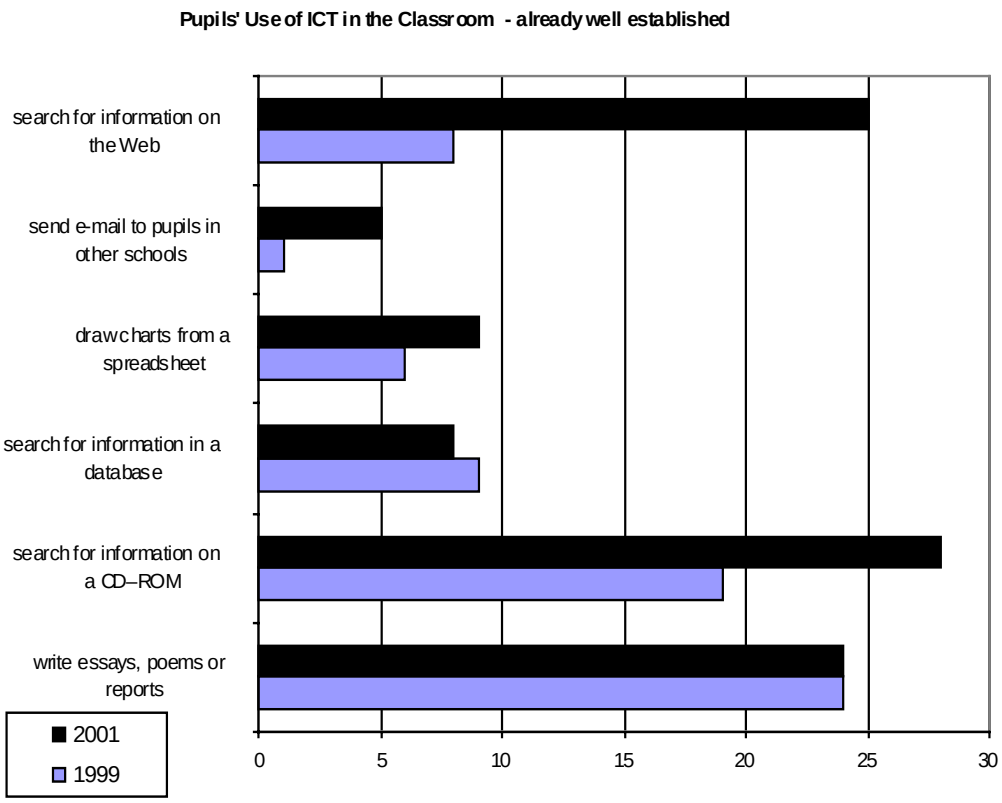


Figure ST 3 above (see also table ST 4b in the appendix) gives a picture of some of the uses to which pupils put ICT in the classrooms of our sample. Although the proportion searching for information on the Web has increased from *8%* to 25%, and from CD-ROM from *19%* to 28% there has generally been little increase in other pupil activities which teachers describe as being 'well established'.

However, attitudes towards the future development of ICT uses had become more positive. Ten percent fewer teachers now felt that developments in the use of e-mail were not likely in the future (from *68%* in 1999 to 58%), and 25% fewer thought that pupils searching for information on the Web was not appropriate (from *42%* to 17%). However, there was little change in the proportions of respondents indicating that the pupils' use of some technologies in their class was not on their development agenda (e.g. writing reports now at 43%; searching for information on a database around 52%; storing information on a database around 65%. Also not yet into the foreseeable development plan of the majority of teachers was the use in classrooms of the more complex and innovative technologies such as videoconferencing, multi-media, or authoring software such as Hyperstudio.

c) ***How is ICT used for Teaching Purposes?***

Figure ST4 Secondary Teachers' use of ICT in Teaching and Learning

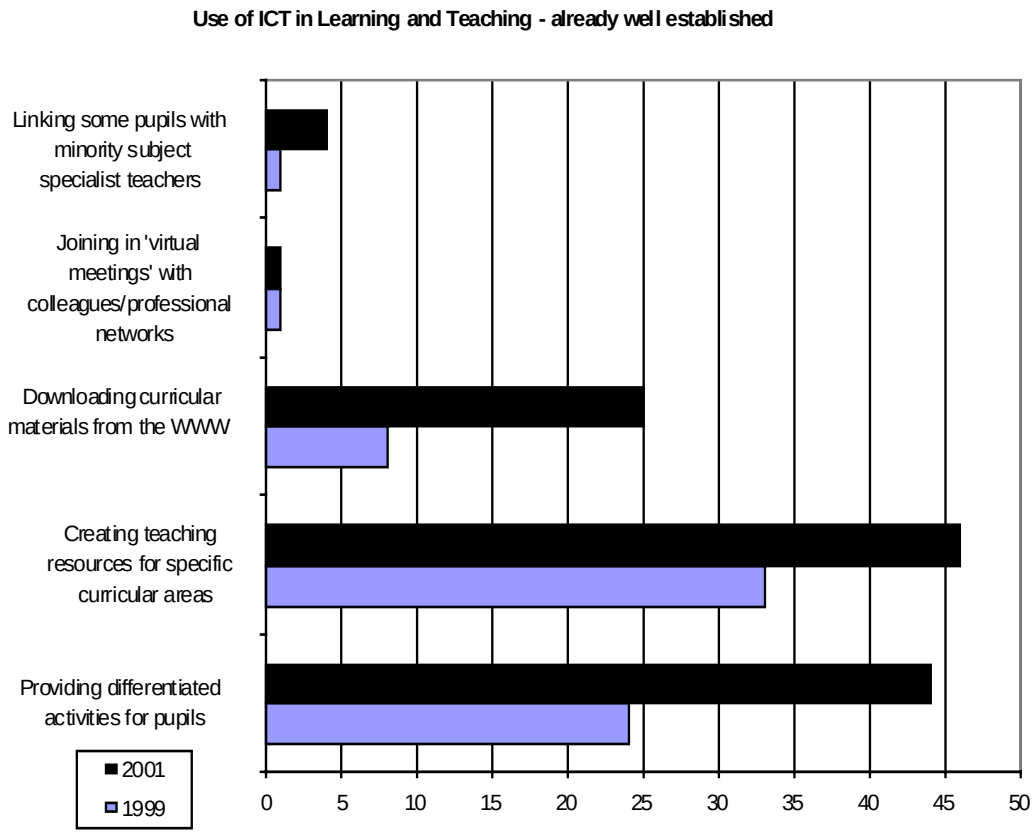


Figure ST 4 above shows details of the progress which has been made in secondary schools over the past two years with respect to the use of ICT in a variety of teaching activities. Contributions to differentiation – whether in respect of the curriculum levels or in aiding access of pupils with disabilities are identifiable as areas of progress. The Internet links have clearly played their part as the majority now identify the downloading of curriculum materials as on their immediately foreseeable plans. However, as before, despite a slight drop in the proportions, the majority still see professional communications outwith the school as not on their development agenda for the foreseeable future (see table ST 5 in the appendix).

Responses to open questions

Just over 80% of teachers responded to open questions on the use they made of ICT in the classrooms and we also solicited their views on the positive effects on learning and teaching. The most frequent responses referred to quite specific subject related uses, particularly specific programmes, and with respect to the effects, the most frequent responses referred to increased motivation, better appearance or presentation of work and the acquisition of or access to more knowledge. However, quite a number of these responses also related these features to the manner of engagement with the subject knowledge or with the learning process.

The numbers are too small and the responses too variable to undertake a comparative subject specific breakdown, but a selection of responses from teachers in different subject areas are presented below.

Craft, Design Technology

One teacher's response: *Graphic communication –CAD, Illustration, DTP. Web searches.*

And the ways in which learning is improved: *Better quality worksheets etc. can be provided. Pupils enjoy using equipment therefore learn better. Vast range of materials available via the net.*

English

One teacher's response: *I've not got a big enough space – but e.g. producing high quality resources (including multi media productions); interactive teaching resources etc. Pupils – word process, publish, use Internet etc. Work in groups.*

And the ways in which learning is improved: *Provides a focus, extensive knowledge bank, research facilities, communication centre, support. Improves morale – better looking, readable, quality end products. Easy to share information.*

Chemistry

One teacher's response: *CD-ROM simulations/video clips of dangerous experiments, interactive quizzes. Spreadsheets to produce graphs and charts. Data logging. Tapes for pupils with dyslexia. PC with Speechtext (for dyslexia in my previous school).*

And the ways in which learning is improved: *Simulations and demonstrations make certain aspects of coursework more accessible for pupils. ICT allows access to the curriculum for pupils with learning difficulties. Data logging and using charts and graphs allows time for the more important task of analysing the results rather than spending time taking measurements and drawing graphs once these skills have been acquired.*

Music

One teacher's response: *Research/investigations CD-ROM. Music – composing with 'Sibelius' software + MIDI keyboard.*

And the ways in which learning is improved: *Quality and quantity of information available. Quality of composing work.by students. Promotes independent learning, critical awareness, discriminating skills.*

Art and Design

One teacher's response: *Digital manipulation of photos. Creating artwork and lettering. Worksheets. Information sheets including images from WWW.*

And the ways in which learning is improved: *More professional results from pupils (and staff) Speeds up work of staff and pupils. Raises achievement of pupils. Inspires more innovative ideas at the development stage of pupil artwork. Motivational to pupils.*

Mathematics

One teacher's response: *Computer software for graphing and for revision and practice of number work and exam materials. Graphics calculators – graphing, sequences, simple programmes.*

And the ways in which learning is improved: *More professional results from pupils (and staff). Speeds up work of staff and pupils. Raises achievement of pupils. Inspires more innovative ideas at the development stage of pupil artwork. Motivational to pupils.*

History

One teacher's response: *A bit in 5-14 with CD-ROMs and Internet sites for areas like the Vikings unit and the Egyptian unit.*

And the ways in which learning is improved: *It gives pupils visions and interactions with historical people or situations they would perhaps not normally be able to do.*

Geography

One teacher's response: *S1- maps 1+2 and interactive Amazonia CD. S2 – weather station and Violent Earth CD (extract information). S3 – Weather Watch CD. S4 – Amazonia CD, Weather Station data, Hyperstudio presentations – Glacial Interactive. S5 – Scetnet CD (links to WWW). Europe in the round CD + Paris CD + Talkabout Scotland. Travel and Tourism + CSYS use WWW extensively.*

And the ways in which learning is improved: *Amazonia – added information and visual impact. Weather Station data – manipulation own figures. Glaciation – reinforcing prior learning, working at own pace.*

Physics

One teacher's response: *Mainly for data capture in experimental situations. Inputting data from experiments to spreadsheets to draw graphs. Search Internet for information.*

And the ways in which learning is improved: *Visibly speeded up data handling. Spreadsheet allows pupils to manipulate data to come up with conclusions. Use of the Internet to access information, i.e. space physics has almost become the Internet section as there are vast amounts of data to hold pupils' interest.*

Biology

One teacher's response: *CD-ROM disc to retrieve information. Simulation of experiments to obtain results.*

And the ways in which learning is improved: *Gave pupils excellent diagrams, 3D images to improve their learning. Gives results in experiments which do not work well in practice.*

Modern Languages

One teacher's response: *Word-processing topic areas (helps accuracy there and then, keeps a record, builds up information); Internet (Encarta for background information. Feline / Felinx / Start Depart (for reading and writing at all levels)*

And the ways in which learning is improved: *Motivates pupils, helps with accuracy, contributes to topic areas. Pupils can keep a record of work by printing and saving.*

However, these are the most articulate and illustrative of the responses from teachers who are clearly comfortable with and skilled in using the technology within their teaching repertoires to give positive effects. Many teachers also voiced reservations.

The limited use so far could have been just as effectively, if not more effectively, done using slides, videos etc. The exception is data logging with Advanced Higher. (Biology)

It does not always, or even often, improve learning; in general it hinders it unless teachers are careful about using it. (Physics)

Is a change for the pupils – for a little while. (Mathematics)

In what ways does the use of ICT improve learning? In no way.....yet. ICT facilities are outwith the classroom and proper supervision is impossible. Some pupils do OK, others don't. (Chemistry)

The full impact and effectiveness of ICT (with regard to learning and teaching) will not be met until we are using computers daily – at home and in school. Also provision/training needs to improve greatly. Staff development is a huge issue. (Geography).

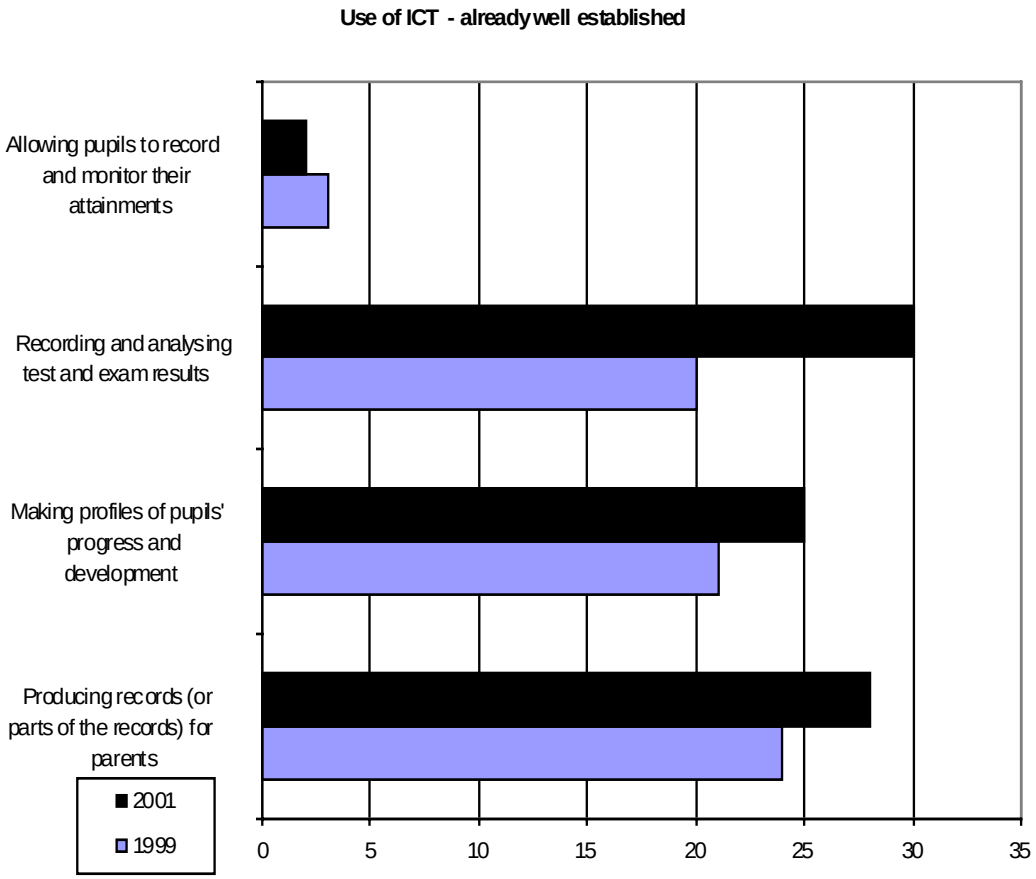
7.4.5 Question 4: Where Did They Get Information on ICT Resources?

As with the secondary coordinators, **colleagues in their own school** (57%; *57%*) was the source identified by the greatest proportion of respondents in their list of main sources of information. Around one third (35%) now mentioned the WWW (previously *16%*) and publisher's catalogues (30%) are the next most frequently identified, though by slightly fewer than previously (*36%*). Subject teachers networks are indicated by the same proportion – 27%. Also, as in the previous survey, the staff of the Teacher Education Institutes (2%), government information on ICT in schools (2%) and the Scottish Virtual Teachers Centre (8%) barely register as regularly used sources. (See table ST 6 in the appendix)

7.4.6 Question 5: How Well Established was the Use of ICT in Monitoring, Evaluation and Assessment?

The overall pattern of responses has remained fairly similar over the two years between surveys with little indication of significant changes in practice. Just under one third are using ICT to produce records or parts of records for parents and to record test or exam results (see Fig. ST 5 below). But similar proportions are indicating that these uses are unlikely to be developed in the foreseeable future. Over 70% consider that allowing pupils to record and monitor their own results is equally unlikely. For details see table ST 7 in the appendix.

Figure ST 5 Secondary Teachers' Use of ICT in Monitoring, Evaluation and Assessment



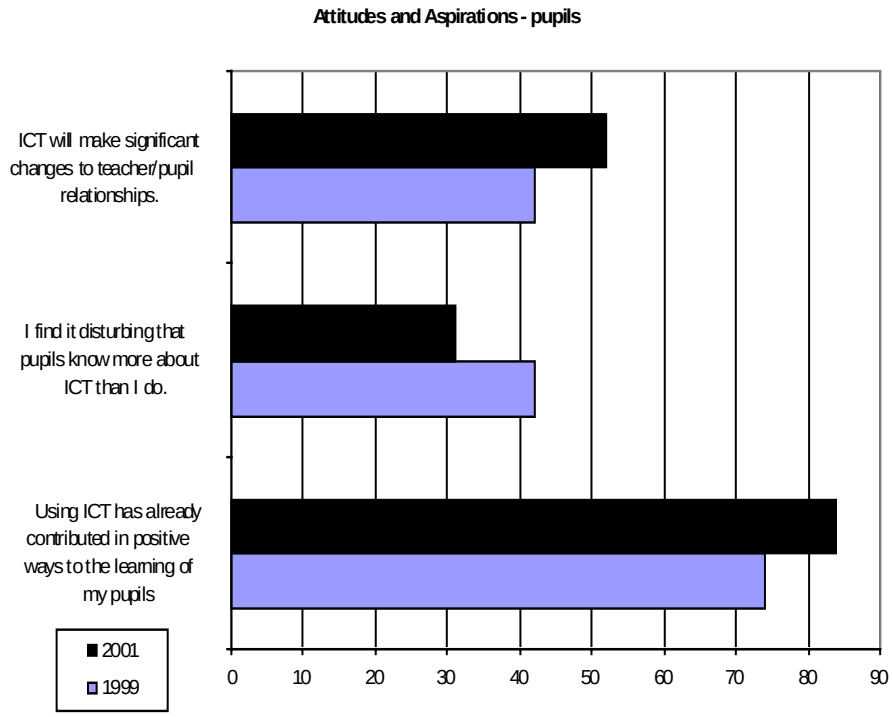
7.4.7 Question 6: What are their General Attitudes and Aspirations?

The secondary teachers' views on the impact of ICT on the pupils, the staff and the schools remained substantially the same as they had been two years previously (see table ST 8 in the appendix and Figs. ST 6a, 6b and 6c below).

Attitudes and Aspirations – Pupils

The most positive indicators with respect to pupils were the high proportions indicating their belief that ICT had already contributed in positive ways to the learning of their pupils (84%); that their pupils showed a higher level of independence than usual when working on the computer (66%), and those who now indicated that they had evidence that pupil attainment had improved (41%). Rather fewer (31%) felt disturbed by the comparative degree of competence of the pupils. See Figure ST 6a below and table ST 8 in the appendix.

Figure ST 6a Secondary Teachers' Attitudes and Aspirations - Pupils

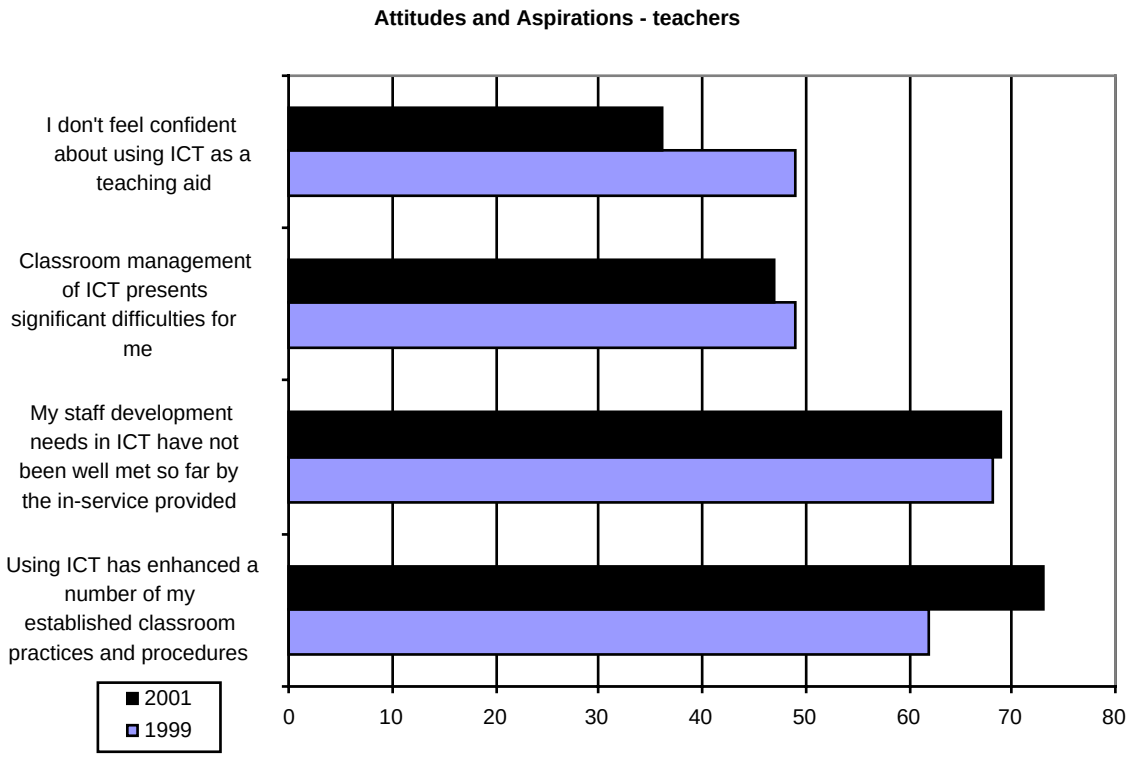


Attitudes and Aspirations - Teachers

Rather fewer than previously indicated that they did not feel confident about using ICT as a teaching aid (36%; *49%*), and rather more that ICT had enhanced a number of their established classroom practices (73%; *62%*) (see Figure ST 6b below).

Although 89% continued to agree that ICT opened up interesting prospects for their future professional development almost the same proportion as previously (69%) indicated that their staff development needs had not been well met so far by the inservice provided (see table ST 8 in the appendix). Their experiences of staff development are dealt with in greater detail in section 7.4.8 below.

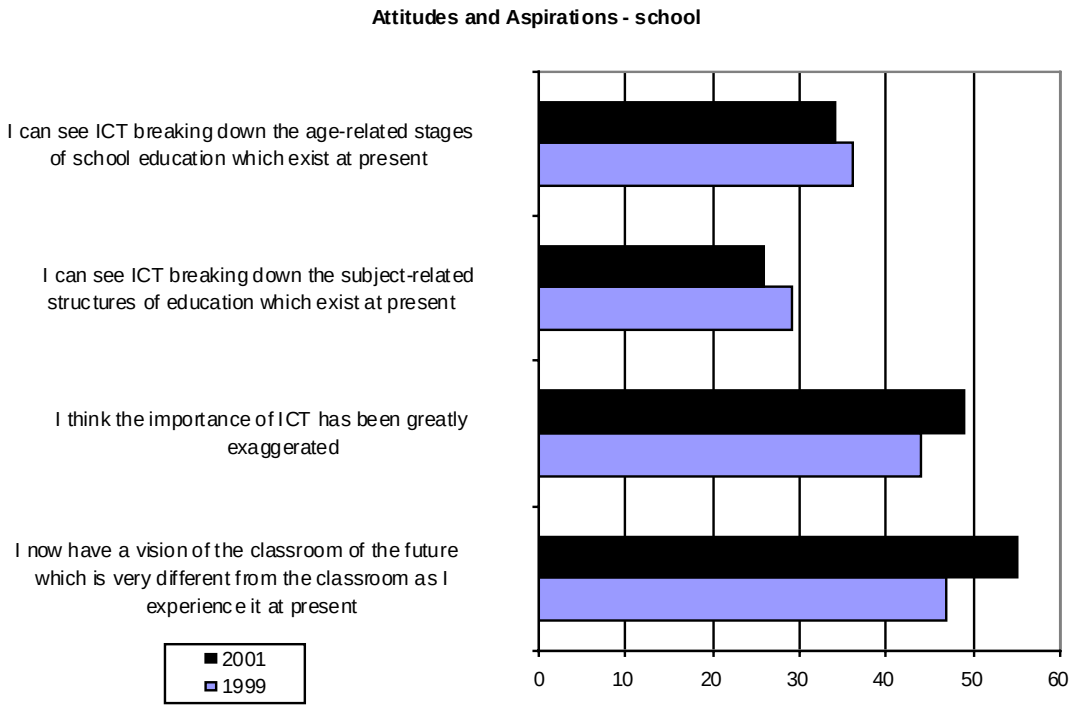
Figure ST 6b Secondary Teachers' Attitudes and Aspirations - Teachers



Attitudes and Aspirations - Schools

Views on the power of ICT to make an impact on the age related or subject related structures of schools remained substantially the same – around one third saw it as a potentially revolutionary force. The respondents were fairly evenly divided between those who saw the importance of ICT as being greatly exaggerated (49%) and those who had visions of a very different classroom in the future (55%). (See Figure ST 6c below and table ST 8 in the appendix). Nevertheless, only a minority saw the use of ICT breaking down the subject related structures (26%) or age related stages (34%) of education which exist at the moment

Figure ST 6c Secondary Teachers' Attitudes and Aspirations - Schools



7.4.8 Question 7 What are their Concerns with Respect to Support and Training?

a) Provision of guidelines

In the 2001 questionnaire we again included a set of questions relating to the kind of guidelines through which teachers had been offered support and information. The majority of teachers indicate that they have now been issued with guidelines relating to copyright laws (81%), security e.g. via passwords (82%), protection of young people from exploitation by others (66%) and from exposure to unsuitable materials e.g. pornography (74%). A rather smaller proportion have offered guidance to their pupils on the copyright laws (36%). (For details see table ST 9 in the appendix).

b) NOF and other inservice training

As indicated in table ST 8 in the appendix, although the majority of teachers (84%) considered that ICT opens up interesting prospects for their staff development, this optimism clearly did not relate to their immediate staff development experiences, since 69% also indicated that their needs had not been well met so far.

By the time of this survey in the spring of 2001 it had been anticipated that NOF training would be well underway for a considerable proportion of teachers. The uptake clearly has fallen behind the timetable to which the planners aspired at that stage. Only 7% of secondary teachers indicate that they have completed NOF training; 16% that they are currently undertaking it and 10% that they have signed up but have yet to start. However, 44% indicate that it was somewhere in their development plan. It should be noted that by March 2002, 87% of teachers had undertaken some variety of NOF training (information supplied by SEED).

Those answering our questionnaire in 2001 who had experiences of NOF training, were asked to indicate in responses to open questions whether it had met their needs, how it had (or had not) influenced their practice and other general observations on their training experiences. The overwhelming impression from reading the views they offered was that the levels of initial skills, their perceived needs and specific requirements were very diverse indeed and as a consequence, only a minority of comments were wholeheartedly positive. Clearly, the content and delivery of training required to satisfy the requirements of the teaching force requires further thought on the part of the providers.

We asked the teachers who had experienced some NOF training how it had influenced their practice. Positive exemplars were identified from every subject specialism, e.g.:

> *Use of School Network system. Increased confidence. Cascade ICT information for other staff.* (Biology teacher)
>
> *Trying to incorporate more pupil access to ICT resources for information retrieval rather than conventional resources i.e. textbooks, teacher info. etc.* (Chemistry teacher)
>
> *More confident. More aware of what to do. Increased my use of ICT.* (History teacher)
>
> *My information is better structured. My materials are better presented. My admin. material is better organised.* (Music teacher)
>
> *I can now put together "VIRTUAL" experiences from variety of sources - it will revolutionise my course content and how my pupils learn. I am now more*

confident with "things" like scanners/ cameras etc. - I had no prior experience - so am now using them especially with CSYS. (Geography teacher)

Far more confident in overall uses and practices in general computer use e.g. file management, good/bad practices, etc. Good to know basic grounding in packages/software which even though I will possibly not use but I understand better how colleagues and pupils use computers at other times/other subjects i.e. good overview! (Also happy to use these resources in future). (Art teacher)

Prepared a PowerPoint presentation. Attempt to find new ways to inspire both more able and less able (Mathematics teacher)

Confident now to incorporate ICT into my teaching. Looking forward to starting using ICT. Keen to smarten up my classroom presentations (Modern Languages teacher)

*More confidence in use of software and teaching in ICT suite. (*CDT teacher)

Finding resources on the web. Ideas on how to use computers in the classroom. The use of electronic text in English. (English teacher).

The main criticisms of the training experienced fell under the following headings:

a) the failure to meet needs or match different initial skill levels - even when these had been identified in advance:

Needs analysis forms completed, but ignored. (Biology teacher)

No attempt was made to match my needs to the NOF course. Sessions are too quick – not enough time for practice. (Modern Languages teacher)

It tended to go over what I already knew. (Modern Languages teacher)

It was pitched at too low a level. The needs I had expressed were not addressed. (Physics teacher)

Found myself using equipment that I currently have no access to e.g. producing slide shows or whatever they were called. (Biology teacher)

d) the poor quality of the training offered:

Hardware - computers slow. Software to view online presentations not available - access at home requires teacher to purchase additional software. Units of practice available of poor quality. Difficulty in using Internet material on local authority intranet. Learning outcomes for course were not clear. Insufficient glossary of jargon provided. (Physics teacher)

Need to wait until NOF training is finished but feedback from staff colleagues already trained has been very negative and disturbing at the poor quality and in some cases wasted time. (CDT teacher)

e) the lack of subject specific material:

Although there was some evidence in the responses that the teachers had been introduced to the use of some subject specific programmes, one of the main criticisms made was that the training had failed to introduce or explore ICT use within subject specific areas. This was the aspect most frequently identified as the main need to be addressed in the future:

Subject specific training on graphics manipulation packages – Photoshop, CorelDraw and Paintshop Pro 7. (Art teacher)

Using sensor devices/data capture/data logging for use in scientific experiments and investigations. (Biology teacher)

More specific training on the use of Music Programmes – e.g. Logic Audio, Fibilous etc – it is necessary on a wider scale. (Music teacher)

f) inappropriate pacing:

Some bits repeated what I already knew, new bits went too quickly at times. (English teacher)

The general views on training expressed by respondents

There were many negative reflections and comments on the arrangements for ICT related staff development in the final open section. For example:

Some teachers indicated that they knew nothing about NOF training:

I am unaware of NOF. ICT will not really take off in schools until either i) teachers are given time and training to master it, or ii) most teachers have been ICT trained as part of their teacher training. (History teacher)

Some had experienced little or no access to any training:

I feel I have had no access to ICT training. ICT resources in my dept. are poor. (Biology teacher)

Why do we get no training? I've taught myself for years. This state of things is appalling. (Modern Languages teacher)

Some indicated that their support came from trial and error and from sources outside the school:

What I know about computers I have in the main picked it up over the last 10 / 11 years by trail and error and listening to colleagues. (Biology teacher)

Teachers must get more ICT training. I rely on my son (16/S5) to "train" me! (Science teacher)

I have to pick things up as I go along. This is not a sound basis – nor does it give me confidence. (Geography teacher)

Almost all my knowledge of ICT was acquired in my own time at my own expense and has been through people not involved in secondary education. (English teacher)

Fears were voiced that pupils would soon be outstripping even the technology teachers in their skills:

Lack of staff training in the last few years means even 'ICT' staff are falling behind the pupils in terms of knowledge and practical skills. (Technology teacher)

Some argued that the the investments made in the infrastructures and the realisation of the potential of ICT would be lost unless better arrangements for training were found:

I am very optimistic about the development of ICT and see it as a huge step forward. There is no doubt that it really boosts motivation. It is a pity, however, that computers have appeared around the school but little or no

effort has been made by the local authority to provide training. Any training is rushed and ineffective, normally appealing only to those people who already have skills in the area. (Modern Languages teacher)

I would like to undertake NOF training. I realise that using ICT is the way forward in education. I am not fully equipped without the training. I feel that a one day course is not enough to equip a beginner. Regular training is essential and time set aside within the school day to practise using this new tool. (Music teacher)

A variety of suggestions were made on how training arrangements could be improved:

ICT training should be made available for those who want to use it on a regular basis. I have completed a five-day course but may have to wait another five years to attend another as the rest of the department needs training – everything takes too long. (Art teacher)

I'd like training that is accessible on a 'need to know' basis when a need occurs. (English teacher)

A week's training in holiday time – staff who attend to be paid. More training in interactive learning aids. (English teacher)

7.4.9 The Final Comments from the Secondary Teachers

Typically, questionnaires offer a slot for teachers to express whatever views they wish on the substance of the questionnaire, and invariably the comments are predominantly negative. The responses on this occasion were no exception. Over 40% of the teachers offered final comments and reflections on their experiences.

The most frequent themes of their final comments were the following.

a) Access to hardware and software:

A lack of a computer with WWW access and CD-ROM facility hampers my progress in developing ICT skills let alone denying easy access for pupils to utilise the range of resources it would offer. (Modern Studies teacher)

It is all very well getting the training, but until we have the necessary hardware there is no point in spending what limited resources we have on software and spending time developing teaching strategies that cannot be implemented. (Biology teacher)

Computers will only aid teaching if appropriate funding is put into software as well as hardware. I only have 1 CD-ROM for the whole department (Chemistry teacher)

*If I had a computer in the classroom where pupils regularly had access to it - these questions would be more relevant.(*History teacher)

There should be more computers in classrooms where they are readily accessible rather than in computer suites. (Physics teacher)

There will be little development in this area until I can be certain that I can have appropriate access at all times to the required hardware, software and possibly the Internet. (Physics teacher)

b) The affirmation of the central role of the teacher:

I think we should remember that ICT is a resource. A good classroom teacher will always be the best resources if he / she uses varied styles and techniques and a variety of supporting resources, including ICT. (Biology teacher)

I think ICT is the newest bandwagon on which lots of people have jumped. Latest research has shown that ICT does not improve kids' learning - a teacher does. Kids do <u>not</u> make good use of CD-ROMs / Internet. They don't know how to. Complex searches are needed to find useful information. Kids don't know how to narrow a search effectively! A goodly % of Internet information is JUNK. (Biology Teacher)

Although ICT is a helpful part of life in school it must not be used to replace the other valuable human resources which come into play in providing a whole-child education. (Modern Languages teacher)

ICT is only one of a number of ways in which pupils can be introduced to new ideas and concepts. At present there is a danger that it is seen as being the solution to all the problems in education. <u>It isn't</u>. Pupils must still be given the opportunity to react with people. Humans are less predictable than machines. Responding to people depends on picking up many more signals before selecting a suitable. (Geog/Modern Studies teacher)

d) The integration of ICT into the present system:

While I support the introduction of ICT into schools, the pace is so slow that schools are going to have obsolete equipment before trained to use it. ICT could have a MAJOR impact on 'administrative' workloads of teachers. Teaching implications will be held up by lack of equipment (e.g. projector). (Physics teacher)

I have a strong vision of the classroom of the future and the educational benefit this will bring but what can I realistically do with one PC between myself and 18 pupils on minimum free time? (Physics teacher)

Need training in web uploading, website design, multimedia, using HTML format. Classrooms still need more computers. 1 per 20 (or 33) is inadequate. Even where there are several computers, lack of network and power points to run all - trailing leads and extension cables – hazardous situations. For me, a problem is that schools are moving away from MAC platform (this is the professional platform of designs and film makers) because of poor technical and financial support for MACS. (Art teacher)

e) Deficiencies of management

One of the major problems we face is that managers and inspectors/government see ICT as computers. The way forward for my subject is more interfacing which needs considerable funding but is not supported in any way. My interfacing equipment came from the H. Still development budget! The people in charge from the minister down require more education on ICT. (Physics teacher)

> *ICT needs to be professionally managed with resourced experts and backup. My authority and school are lacking in this provision, relying on enthusiastic amateurs.* (Physics teacher)

Notwithstanding the difficulties and frustrations, a very small number of teachers used the final open section to give a wholeheartedly positive endorsement to their experiences with respect to ICT in their professional lives. They are all presented below.

> *ICT is an excellent resource for any classroom, whether it be Internet or CD-ROMs. I just hope what is available is only the start.* (Biology teacher)

> *ICT is now a vital resource within our department. ICT resources such as the use of the Internet by pupils are well established in our school and have played a significant role in raising the attainment in the majority of pupils concerned.* (Biology teacher)

> *I am enjoying learning about ICT.* (History Teacher)

> *The benefits that ICT have provided to my teaching has far outweighed the minor problems encountered on the way. The support from the computing Department and SMT I have received so far has been wonderful.* (Music teacher)

> *ICT has made a significant change to visual education and design. Its ability to enhance final products; its speed in the creation of variations and choices is highly significant.* (Art teacher)

> *Two years ago I could not see the Internet as being useful in my teaching. Now I look for useful sites all the time and take my pupils to the library where there is a full set of computers. The information and presentations are well set out on some and the pupils are happy to use the computers. The use of ICT in schools can only improve the quality of the educational experience on offer.* (Physics teacher).

> *Within Graphics Communication some pupils are performing far better on the computer generated graphics packages than they have done on the manual drawings. Enthusiasm for computer graphics work is high.* (CDT Teacher)

8. THE PUPILS' PERCEPTIONS AND EXPERIENCES OF ICT

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8.1 Summary of Findings

- One of the most striking things about the data from the pupil questionnaires was the stability over the two-year interval in many response patterns and the fact that in the overwhelming majority of responses, no age-related differences were evident. In those in which there was an age difference, the S2 figures fell between those for P7 and S4.
- Between 54% and 56% of pupils in the three pupil groups (P7/S2/S4) considered they 'knew enough to get by' about computers; 30 to 35% indicated they knew 'a lot or were real experts'.
- The younger the group the more likely they are to have learned at home.
- 51%-65% regarded learning to use computers as very important; almost all the remainder regarded it as quite important.
- 55% of S4 pupils used a computer three or more times a week in school; the most common frequency for the younger ages were once or twice a week or less.
- More than half the S4 pupils who had been in subjects in which computers were regularly used (e.g. Business Management, Graphic Communication, Accounting). had used them in the previous week. 20-25% had used them while attending English and Art and Design. In all other subjects the use of computers was very low. These figures had changed little since 1999.
- The range of typical uses in school had changed little e.g. word processing, drawing, using CD-ROM. The exceptions were increases in the use of the Internet and e-mail.
- Less than ten percent of all ages considered that the computer based work given in school was too hard; 39% at P7, 33% at S2 and 17% at S4 considered it was too easy.
- The majority indicated that the work given using computers was more interesting (86%-78%) and their product neater 75%-90%; that they liked being able to find information not accessible through books (76%-68%) and that they got to use their own ideas and imagination (58%-52%).
- 9% of P7 and 19% of S4 never played with a Playstation, Nintendo or Sega; 60% and 33% respectively played on three or more days a week.
- 80-83% of pupils at the three stages indicated that they have access to a computer outside of school and half of all pupils are using such computers on three or more days a week.
- Of the total pupil samples, 73-77% have a computer in their own home, 57-60% of these are linked to the Internet. 26-33% have a computer in their own room; 25-26% have this personal computer linked to the Internet and 31-35% of these have DVD players.
- 78-87% indicate that they can spend as long as they like doing their work on the computer at home; the corresponding figures for school are 6-12%.
- 89-92% indicate that at home they can try out different things; the corresponding figures for school computer use are 42-32%.

8.2 The Findings from the Pupils' Questionnaires

One of the most striking things about the data from the pupil questionnaires was the stability over the two-year interval in many response patterns and the fact that in the overwhelming majority of responses, no age-related differences were evident. In those data in which there was an age difference, the S2 figures almost always fell between those for P7 and S4.

8.2.1. The Data Collection Procedures

Questionnaires were sent out in the spring of 2001 to be completed by a random sample of 20 pupils (10 boys and 10 girls) in P7 and S4 classes in the randomly selected schools (80 primary; 90 secondary). These were largely the same schools as had been involved in our first survey, with the addition of some schools who had been originally approached in 1999 but had been unable for a variety of reasons to participate. In addition, 45 (out of the 49 returning S2 pupil booklets) of the secondary schools also returned S2 questionnaires from pupils who had answered the questionnaire in 1999 while in P7 and who had progressed to S2 by 2001. Responses were received from 1340 primary 7, 687 S2 and 1336 S4 pupils.

8.2.2 Question 1 What were their views and attitudes towards computers?

a) Do they think computing skills are important?

As in 1999, learning to use computers was regarded as very important by most pupils in all groups (51-65%), and as quite important by almost all the remainder. The main reasons given in open responses were substantially as previously, i.e. that computer knowledge and qualifications are essential for future employment; the permeation of computers throughout life in general; the usefulness /speed in which they enable tasks to be carried out and that they are a source of information and help with learning. The two first reasons were seen increasingly important by pupils as they progressed from P7 to S4, and for employment by more girls than boys. Computers as a source of knowledge were seen as less important by secondary than primary pupils. (For details see table Pupil 1a in the appendix).

You can get advanced on all that is going on in the world. (P7 boy)

Most people are using computers and I don't want to be left out. (P7 girl)

We're living in a modern society and must keep up to date with new developments. (S2 girl)

Internet has become a major source of information and to speak to others – you may miss out on meeting new people and learning new things. (S4 girl)

You get good money in jobs that involve computers. (S4 boy)

b) How confident are they in their engagement with computers?

The majority of pupils at all three stages still indicate that they know enough, or more than enough to get by. The proportions of pupils who learn about computers at home and in school remain similar to previously, with barely 10% more than previously at P7 and S4 stages indicating school as the site. Nevertheless, the differential between primary and secondary remained at the same level as before, with 20% more primary pupils (62%) than secondary (42%) indicating that they had learned at home.

Almost without exception the S2 data fell in an intermediary position to that of P7 and S4, and in those questions to which the answers should not have changed, the proportions corresponded almost exactly with those of the previous survey, e.g. responding when P7 pupils, *51*% claimed they had learned at home, responding in S2 the proportion was 50%. For further details see table Pupil 1b in the appendix.

8.2.3 Question 2 What are their experiences of using computers in school?

a) What is their access and frequency of use?

In this survey an additional question tried to gain a general indication of the general frequency of computer use in the schools. The information gathered suggests that 55% of S4 pupils used a computer 3 or more times a week. The corresponding figures for the other stages were: S2: 15%, P7: 12%. The more common frequencies of use with the younger ages were once or twice a week or less (see table Pupil 2 below).

Table Pupil 2 Frequency of Computer Use in School

(percentage of questionnaire responses)

Roughly how often do you use a computer **in school?**	**P7 2001**	S2 2001	S4 2001
Every day.	**2**	5	7
Three or four times a week.	**10**	10	48
Once or twice a week.	**51**	68	25
Hardly ever.	**36**	16	20

Within the secondary school subjects more S4 pupils were studying standard grade computing studies than in 1999, 40%, (*33%*), but the numbers were almost identical for standard grade office and information studies 29% (*30%*). At standard grade the overall indicators of computer use across other subjects had changed little, 19% *(24%)* of pupils indicated that during the previous week they had used a computer in English (a subject taken by all). While 90% indicated that they had experienced a modern language class in the previous week, only 3% indicated that they had used a computer. For other subjects in which computer use might be regarded as typical or useful, the majority of the pupils who took the subject had used a computer: Business Management, 94% of the 14% of our sample who took the subject; Technological Studies, 76% of the 6%; Graphic Communication, 74% of the 16%; Accounting and Finance, 49% of the 9%; and Art and Design 25% of the 36%. In all other subjects computer use fell below 20% and in the case of mathematics and sciences even below 10%. These figures

have changed little over the two years. These data are presented in detail in table Pupil 3 below.

Table Pupil 3 The level of Computer use in Standard Grade subjects.

(**The percentage of the total sample of pupils using computers**, whether they are taking the subject or not) (*The figures in parenthesis give the percentage of those taking the subject who used a computer in the previous week)*

SUBJECT	% of total S4 sample who had the subject in the previous week 2001	**% of total S4 sample who used a computer in the subject in the previous week 2001**	% of total S4 sample who used a computer in the subject in the previous week 1999
Business Management	14	**13** *(94)*	8
Technological Studies	6	**5** *(76)*	5
Graphic Communication	16	**12** *(74)*	11
Accounting/Finance	9	**4** *(49)*	6
Art and Design	36	**9** *(25)*	9
English	99	**19** *(20)*	24
Music	20	**3** *(18)*	5
Craft and Design	23	**3** *(12)*	6
Drama	9	**1** *(12)*	1
General Science	21	**2** *(9)*	2
Biology	39	**1** (3)	3
Chemistry	40	**1** *(3)*	4
Physics	34	**2** *(7)*	5
Any Foreign Lang.	90	**3** *(3)*	6
Mathematics	97	**1** *(1)*	8

b) What is the range of uses in schools?

In both sectors, the overall pattern was largely unchanged over the two years for specific computer uses (see table Pupil 4a in the appendix). For example: searching for information on a CD-ROM, S4: 48% *(49%)*, P7: 65% *(62%)*; searching for information in a database, S4: 62% *(62%)*, P7: 45% *(48%)*; playing simulations, S4: 25% *(24%)*, P7: 38% *(40%).* Word processing was still the use indicated by the largest proportion of pupils.

The only frequency of use proportions which had increased, were the use of the Internet, i.e. searching for information on the web or Internet, S4: 74%, *(36%)*, P7 48% *(22%)*; and using e-mail, S4: 37% *(10%)*, P7 14% *(11%).* (See table Pupil 4a).

c) What do pupils like and dislike about their computer experiences?

Just as their experiences of computer use in school had not significantly changed over two years, the pupils' likes and dislikes remained fairly similar to those of two years earlier (for details see tables Pupil 5a and 5b in the appendix). The majority indicated that the work was more interesting and neater, and in addition that they were able to find information not accessible through books and that they got to use their own ideas and imagination. Once again, at P7 and S2 just over 20% indicated a typing difficulty, although in S4 the proportion had fallen slightly (16%; *23%).*

That the work given on computers was too easy was once again a perception of considerably more pupils (S4: 17% (*20%*), P7: 39% (*32%*) than that the work was too hard (S4: 7% (*5%*), P7: 4% (*4%*).

In the open responses, the results for boys and girls were similar overall (for details see tables Pupil 6a and 6b in the appendix). In identifying **the two best things** about using computers in school, a higher proportion of secondary pupils suggested: enabling speed, accuracy and neatness of work; a higher proportion of primary pupils indicated making work more fun. Internet use and the computer being a source of information were roughly similar across the age groups. Other valued uses identified by some pupils were writing stories/typing letters and designing/drawing pictures on computers.

You're learning but having fun. (P7 girl)

The Internet for research. (P7 boy)

I can't draw so it's okay for graphics. (S2 girl)

Being able to spot mistakes in essays. (S4 boy)

The most **disliked things about using computers** in school were the limited time for using them, boring work, out of date or slow machines, and the mode of teaching and learning. The last of these was seen as less of a problem by secondary than primary pupils. The highest proportion indicating limited access occurred in the S2 pupils and by over twice as many S2 girls as S2 boys. Inadequate or out of date games and programs, and being too slow at typing were mentioned by a smaller number of pupils, but there were more of such responses from secondary pupils.

You never get to work on your own. (P7 girl)

You only get onto the teacher's web site for learning. (P7 boy)

We do the same thing every week. (S2 boy)

The work is too easy. (S2 girl)

You have to stick to the same task as everyone else. (S4 boy)

The work I do is repetitive and boring. (S4 girl)

d) What would pupils like to be doing though the use of computers?

The most frequently mentioned activities that pupils wanted to use a computer for that they were not able to do currently were: using the Internet to find web sites; email and video communication with friends and pupils in other schools and countries, personal interest activities (*e.g. make music, create programs, make animations, make a video, make a homepage)* and playing games. The last activity was mentioned by just over twice as many boys as girls, (though the numbers decreased between P7 and S4 boys), compared to twice as many girls as boys mentioning communication activities. Less frequent responses from pupils included finding information, use for school work/homework and desire to work at their own pace or work on their own. (See table Pupil 7a)

Create simulations. (P7 boy*)*

Spend as long as I like (P7 girl)

Go online with other schools. (S2 girl)

Get lessons on how to use the Internet. (S4 boy)

I'd like a little more freedom on the Internet and better technology to work on. (S4 girl)

Put camcorder films into the computer and watch them and even modify them.. (S4 boy)

The most **difficult things about using a computer** for pupils were: developing skills, i.e. having to learn how to use the computer; difficulty with typing, use of specific programs (e.g. spreadsheets) and functions (e.g. copying and pasting), and following simple procedures such as opening files/saving and shutting down a computer. Difficulty with learning to use computers and developing general computer skills increased between P7 and S4 pupils. Less frequent responses mentioned getting stuck with a general problem, e.g. pressing the wrong button and all the work disappearing, finding lost files. (See table Pupil 7b).

Trying to type fast on the computer. (P7 boy)

When you go onto the Internet and don't know what to do. (P7 girl)

Scanning and editing photos. (S2 boy)

The old software is rubbish and holds you back so if the computer doesn't recognise something then it will muck up. (S4 girl)

I cannot do programming, it is not explained well enough. (S4 boy)

8.2.4 Question 3 What were their home computing skills and experiences?

a) What is their access and frequency of use?

For the P7 pupils over the two years, the level of play with a Playstation, Nintendo or Sega had changed little, only 9% *(11%)* never played; 44% *(45%)* played more than four days a week. This latter level of use fell to 20% *(24%)* by S4, with S2 pupil use again at an intermediary level (33%) (see table Pupil 8 in the appendix).

In our previous survey, we had asked pupils if they had access to a computer outside school and our data indicated that by some means, around 80 % of P7 and S4 pupils had this access. In this survey, we tried to ascertain more exactly the location and use of computers outside school and, in particular, the availability of computers in their homes and bedrooms which could potentially be available for regular use by the young person.

Overall, 82% of P7, 80% of S2 and 83% of S4 pupils indicate that they have access to a computer outside of school and 59% of these pupils (49% of the total sample) indicate they are using it three or more days a week (see tables Pupil 10a in the appendix and 10b below).

Table Pupil 10b Frequency Of Use Of Computer Outside School

(percentage of total pupil sample) (1999 data in italics)

Roughly how often do you use a computer **outside school?**	Primary P7	**Secondary S2**	Secondary S4
More than four days a week.	31 *(32)*	**31**	32 *(22)*
Three or four days a week.	18 *(17)*	**17**	17 *(16)*
One or two days a week.	21 *(20)*	**19**	21 *(21)*
A few days a month.	12 *(14)*	**14**	14 *(21)*
TOTAL% of pupils using a computer outside of school	**82** ***(83)***	**80**	**83** ***(80)***

The majority of these out-of-school computers are in the child's own home (90%) and just over 70% of these are linked to the Internet; around a third are in the room of the child and are linked to the Internet. 40% of these home computers have a DVD player, though 10% of the pupils having this have no discs to play on it (see table Pupil 9a in the appendix). Details of the figures **adjusted to refer to the whole population** are presented in table 9b below.

These figures show an overall national picture, which will no doubt vary from community to community. However, it would seem from the responses from pupils, which are remarkably similar across the three age groups, that in homes in which there are children between eleven and sixteen years, the availability of modern computers and Internet access is substantially higher than that reported in surveys of the population as a whole. About one quarter of pupils at all stages had a computer in their room which was linked to the www.

Table Pupil 9b Using a Computer Outside School

(percentage of overall total pupil sample)

	'Yes'		
	P7 2001	S2 2001	**S4 2001**
Do you use a computer outside school? (Outside school can be anywhere : at home, at a friend or relative's house(e.g. an aunt or uncle) or somewhere else)	**82**	80	**83**
Do you have a computer in the house where you usually live?	**73**	73	**77**
Is it linked to the WWW or Internet?	**57**	58	**60**
Is there a computer in your room?	**26**	32	**33**
Is it linked to the WWW or Internet?	**25**	27	**26**
Does the computer you use have a DVD player?	**31**	33	**35**
Do you have any DVDs to play on it?	**22**	27	**26**

In addition to computer use in their homes, over 60% of all age groups indicated they used a computer outside of their home. For over half of these pupils it was in a friend's house, followed by use in the house of another relative or a library. The numbers were similar in all age groups apart from in a library where there was greater use by S2 pupils, especially girls. Other minority venues were an Internet café, the workplace of a parent or in a shop.

b) What are they using computers outside school for?

Table Pupil 4b in the appendix presents the data for computer use outside school. As with the data for school use, there are no significant changes over the two year period, except in the categories of e-mails and Internet use which have doubled, email to 47%P, 63% S4 and Internet searches to 61%P, 68%S4. Apart from a progressively increasing proportion of pupils using e-mail between P7 (47%), S2 (58%) and S4 (63%), there are no noteworthy age related differences.

Information from the open data indicated that, with respect to pupil use of the Internet outside of school, the most popular activity was visiting the web sites of chat groups and exploring/surfing the net. This was followed by the use of e-mail and playing games. Other web sites visited which were mentioned less frequently included educational, sporting (e.g. football clubs, wrestling), music, pop stars, hobbies, cartoons and shopping.

Overall there was a higher use of chat groups and email by girls than boys, with a greater frequency of Internet use by boys than girls for sporting web sites and playing games. The frequency of participation was similar in all age groups of boys except for a much rather higher use for playing games in P7(18%) and S2(14%) than S4(8%). With regard to use by girls, chat groups and email were used much less frequently by P7 (26%) than S2(49%) and S4(71%) pupils.

8.2.5 Question 4: What are the differences between home and school use?

Teachers are always watching you. (S4 girl)

You can't explore it. (S4 boy)

Almost all novice users of ICT, adult or child, and whether for professional/educational or personal purposes, identify some common key factors as conducive to assisting the development of their skills. These include: computer use in a context in which they have ready access to a computer, immediately available help, as and when required, and time to 'play' with the different uses and programs. Research studies which have as their focus home and school use of computers have identified different patterns in learning approaches which are associated with these two different locations**.** In order to acquire some indication of the prevalence of these patterns in the experiences of Scottish pupils, we added a couple of questions to the survey, while bearing in mind that survey data collection is not the most effective form of data collection to illuminate these areas of experience.

The findings are presented in detail in table Pupil 11 in the appendix. The data suggest that although the patterns of use of different ICT programs at home and school are fairly similar, key conditions of the context of this use are different. In school, the majority of pupils (68-78%) indicate that there is usually someone available to assist. For those pupils who have a computer at home, home, the figures for support being available there vary from 80% for P7 pupils, to 51% for S4 pupils. However, the major differences are to be found in the time which they can choose to spend using the computer, and the fact they '*can try out lots of different things on the computer'*.

At home, the majority (78-87%) indicate that they can spend as long as they like doing their work on the computer, while the corresponding figures for school range between 6-12%. This school related figure perhaps relates to the extent of 'open access' machines in suites or libraries. With respect to learning opportunities for "trying out things", the home proportions, 89-92% differ sharply from the 32-44% range of the school. Both these features of the home use – plenty of time and the opportunity for trial and error learning are conducive to the development of fluency of use and general expertise. These figures highlight the disadvantages experienced by that proportion of pupils who do not have computers at home. It is also perhaps this time to 'play' with the different uses and programs that may be responsible for the 'skills gap' which several teachers have perceived exists between themselves and some pupils whose skills are more advanced than most of their teachers.

8.2.6 The longitudinal thread: P7/S2 progression over two years

Almost seven hundred pupils who had answered the questionnaire in 1999 were traced to the secondary school they had transferred to and answered the questionnaire thus giving us a longitudinal picture of their experiences from P7 to S2.

Tables Pupil 12 to 16 in the appendix present the data gathered from this sample by the two surveys.

Their own estimation of their skills lead fewer to indicate that they know very little (11%, *24%*) and more to claim they know 'a lot' (35% *23%*). The

proportions playing with Nintendo or Playstations have stayed remarkably steady with a decrease of those playing on three or more days a week from 58% to 47%. The frequencies of home computer use at the two different ages has shown absolutely no change (see table Pupil 14 in the appendix). These figures suggest what the commercial figures for computer sales also indicate, which is that the number of people purchasing and introducing themselves to home computers and their use has somewhat peaked, and that the future market lies in persuading customers to upgrade or diversify accessories.

For this sample over the past two years, the proportions using ICT for different purposes at home and in school has not also changed in any marked fashion, but upgrading appears to have taken place in the area of Internet and e-mail use, both inside and outside school. Taking figures for the total sample, searching on the Internet has increased both in school use, from *22%* in P7 to 65% at S2, and at home, from *32%* in P7 to 63% in S2. The use of e-mail in school has increased from *11%* in primary to 34% in S2, and at home from *24%* to 58%.

This increase in Internet use is the most marked change in 'what they like about computers'. Other minor changes are indicated in the proportions which perceive that their work is neater (89% at S2, *76%* at P7) and done more quickly (63% at S2, *41%* at P7).

Clearly the upgrades in primary schools were perceived to be further on. Thirty percent at S2 indicate that their school's computers 'are old' (*18%* in P7); and a more concerning increase in the proportion who consider that the work given them to do on the computer is boring, (*23%* in P7, 42% in S2). The proportion who consider that the work is too easy remains steady at 33%, and perceptions of it being 'too hard' have slightly increased from *4%* to 9%. Clearly the majority are not overstretched by the current demands on their computing skills and the uses to which these are directed in secondary schools.

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THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY INITIATIVES IN SCOTTISH SCHOOLS

Appendices

May 2002

THE IMPACT OF ICT INITIATIVES FRAMEWORK — APPENDIX 1

Strand	Knowledge & Understanding	Practical Competences	Personal Appropriation
Hardware (H)	1. identification of the main components of a computer system and commonly used communications devices, peripherals and media 2. understand that a computer system can be stand alone or networked to other computers 3. knowledge of the uses/purposes of above 4. knowledge of how to use ICT equipment safely 5. familiarity with a WIMP environment, multi-media environment 6. awareness of the existence of computer viruses and the need to protect against them 7. correct and appropriate use of commonly used terminology relating to ICT equipment	1. perform basic operations using ICT equipment – start up and close down, navigate folders, insert and remove CD, insert and remove floppy disk 2. initialise and name a floppy disk 3. select and use correctly commonly used peripherals 4. perform basic file handling operations 5. adopt appropriate checking strategies when equipment or software difficulties arise	1. personal purposes for which ICT can be used: be able to select and use appropriately common ICT equipment for a given purpose 2. be able to identify useful purposes for given ICT equipment 3. be aware of the limitations/strengths of ICT equipment for any given purpose This would encompass ICT equipment that would be found at school, in the home,(including for leisure), and at work.
Software (S)	1. Familiarity with the main features and facilities of: work processing, database/file handling, spreadsheets, graphics, packages, whether as stand-alone or integrated packages 2. knowledge of software integration e.g. text and graphics 3. familiarity with other types of software: reference material, simulations, adventure game/games, talking books, HyperMedia, programming language, control software, integrated learning systems **4.** correct and appropriate use of commonly used terminology relating to software applications	1. perform basic operations using the applications referred to: enter/create/insert, edit, format, use main features of each package, use background resources/tools 2. ability to select and integrate data from different software packages 3. demonstrate basic competence in using some of the categories of software listed under K&U 4. be able to use the Help facilities built into each package	1. personal purposes for which ICT can be used: be able to select and use appropriately a range of software packages to achieve a given purpose(s). 2. be able to identify useful purposes for given software and know why it is appropriate This would encompass ICT equipment that would be found at school, in the home,(including for leisure), and at work.

Strand	Knowledge & Understanding	Practical Competences	Personal Appropriation
Communications & Networks	1. familiarity with the main facilities of email, WWW, conferencing 2. knowledge of how to carry out common procedures using email, WWW, conferencing 3. knowledge of how to create and using a WWW page and site 4. knowledge of other means of electronic communication (fax, digital telephone) 5. correct and appropriate use of commonly used terminology relating to communications networks	1. perform basic operations using email and WWW; send a short email; reply to an email; attach a document, set up a mailing list, access a known WWW address, use an Internet browser when the address Is not known, search for/retrieve information by navigating the WWW using an Internet browser 2. create and design a simple WWW page and site 3. ability to access and use video-conferencing facilities appropriately 4. ability to use other means of digital communication 5. be able to use the Help facilities built into the package	1. personal purposes for which communications technologies can be used: be able to select and use the appropriate tool/feature(s) for a given purpose 2. be able to identify useful purposes for given communications technologies 3. be aware of the limitations/strengths of communications technologies for any given purpose This would encompass ICT equipment that would be found at school, in the home,(including for leisure), and at work.
Uses and Impact of ICT (U)	1. knowledge of the common ICT uses in society 2. awareness of the general impact of IT on society and the individual 3. awareness of the general impact of communications technologies on society and the individual 4. recognition of commonly used technologies e.g. bar codes, URL, web browsers		1. How ICT affects and will affect the pupil in all aspects of her/his life.

Notes on the Strands

- **ICT equipment:** relates to the main components of stand-alone microcomputer systems, including commonly used peripherals, and their functionality.
- **IT applications:** relates to standard applications software packages for microcomputers e.g. word processing, and their functionality (excluding communications packages).
- **Communications networks:** relates to common modes of computer-mediated communications e.g. email.
- **Uses and Impact of ICT:** ICT in the workplace, education, leisure and the home; how ICT impacts on society and the individual.

WRITTEN TASKS AND FRAMEWORK CATEGORIES: 2001 — APPENDIX 2

Note: * denotes tasks common across all booklets (P7 and S2/4)
Changed = task modified and score different from 1999

P7 Book 1

Task	Category	Score Possible	Comments
1. New Disk	H/K	2	
2. Labelling	H/K	5	
3. Web search*	C/K	4	
4. Job Match	U/K	4	
5. Communications 1*	C/K	5	
6. Barbecue	C/K	2	
7. Ireland	C/PA	4	
8. E-mail	C/K	6	
9. Web*	C/K	5	
10. CD ROM*	S/K	4	
11. Graphics*	S/K	7	Changed for 2001
12. Smoking	S/K	7	
13. Turtle	S/K	12	
14. For Sale	H/PA	4	
15. Birthdays	S/K	5	
16. Communications 2	C/K	7	
17. Newsletter	S/K	6	
18. School Club	H/PA	8	
19. Networks	H/K	4	
20. Toolbar*	S/K	11	
21. Canada	C/PA	6	New in 2001
22. Parts	H/K	4	

P7 Book 2

Task	Category	Score Possible	Comments
1. Hardware	H/K	4	
2. Frankie's Icons	H/K	3	
3. Jennifer's Tasks	S/PA	4	New in 2001
4. SAN software	S/K	7	New in 2001
5. Websearch*	C/K	4	
6. Remote School	C/PA	2	
7. Tom Smith	C/K	3	
8.Communications 1*	C/K	5	
9. Intray	C/K	4	
10. Susan's Story	S/K	2	
11. Web*	C/K	5	
12. Ladybird	S/K	6	
13. Bird database	S/K	3	
14. Shabeena's	H/K	3	
15. Toolbar*	S/K	11	
16. Communications 3	H/PA	6	
17. Graphics*	S/K	7	Changed for 2001
18. Disks	H/K	5	
19. CD ROM*	S/K	4	
20. (A) Activities	S/K	4	
20. (B) Internet	H/K	2	
21. Dalek	S/K	10	
22. Voice Software	S/K	2	

Secondary 2 and Secondary 4 Book 1

Task	Category	Score Possible	Comments
1. New Disk	H/K	2	
2. Labelling	H/K	5	
3. Teleworking	U/K	4	
4. Software 1	S/PA	5	
5. Jobmatch	U/K	4	
6. Barbecue	C/K	2	
7. Websearch	C/K	4	
8. Ireland	C/PA	4	
9. Fictionhouse	S/K	4	
10. E-mail	C/K	6	
11. Web	C/K	5	
12. CD ROM	S/K	4	
13. Video-conference	C/K	3	
14. Graphics	S/K	7	Changed for 2001
15. Workers	C/K	4	
16. Word processing	U/K	7	
17. Smoking	S/K	7	
18. Grandad	H/K	1	Changed for 2001
19. Turtle	S/K	12	
20. For Sale	H/PA	4	
21. Newsletter	S/K	6	
22. School club	H/PA	8	
23. Networks	H/K	4	
24. Vikings	C/K	4	
25. Communications 1	C/K	5	
26. British Library	S/K	3	
27. Canada	C/PA	6	New for 2001
28. Toolbar	S/K	11	
29. Ticket Sales	S/K	5	
30. Printing	S/K	3	

Secondary 2 and Secondary 4 Book 2

Task	Category	Score Possible	Comments
1. Hardware	H/K	4	
2. Frankie's Icons	H/K	3	
3. Jennifer's Tasks	S/PA	4	New for 2001
4. Integrated package	S/K	2	
5. SAN Software	S/K	7	New for 2001
6. Graeme	S/K	2	
7. Websearch*	C/K	4	
8. Remote school	C/PA	2	
9. Dr. Campbell	S/K	2	
10. Tom Smith	C/K	3	
11. Communications 1*	C/K	5	
12. E-mail tray	C/K	4	
13. Susan's Story	S/K	2	
14. Web*	C/K	5	
15. World Wide Web	C/K	2	
16. Ladybird	S/K	6	
17. Victorian	S/PA	1	New for 2001
18. Bird Database	S/K	3	
19. Shabeena's	H/K	3	
20. Toolbar*	S/K	11	
21. Communications 3	H/PA	6	
22. Software 2	S/K	3	
23. CD-ROM*	S/K	4	
24. Disks	H/K	5	
25. Passwords	C/K	4	
26. Keyboard	H/K	11	
27. Graphics*	S/K	7	Changed for 2001
28. a. Activities	S/K	4	
b. Virus	H/K	2	
29. Dalek	S/K	10	
30. Voice Software	S/K	2	

WRITTEN PAPERS: DETAILED ITEM STATISTICS BY CATEGORY — APPENDIX 3

Primary 7 by category: Knowledge & Understanding

Table 3.1: K&U – Hardware

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.2.18	H/K	Disks	2.47	2.47	1.24	0	5	622
7.2.2	H/K	Frankie's icons	2.37	2.32	.82	0	3	581
7.2.1	H/K	Hardware	3.79	3.55	1.20	0	4	663
7.1.2	H/K	Labelling	2.65	3.60	1.37	0	5	598
7.1.19	H/K	Networks	1.50	1.10	.88	0	4	589
7.1.1	H/K	New disk	1.28	1.33	.50	0	2	617
7.1.22	H/K	Parts	3.23	3.53	.50	2	4	617
7.2.14	H/K	Shabeena's	1.06	1.20	.95	0	3	564
7.2.20b	H/K	Virus	1.29	1.15	.69	0	2	604
7.2.22	H/K	Voice	2.44	1.16	.90	0	2	610
10			22.08	21.41			34	

Table 3.2: K&U – Software

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.2.20	S/K	Activities	2.64	2.14	1.45	0	4	591
7.2.13	S/K	Bird database	1.03	.79	.82	0	3	532
7.1.15	S/K	Birthdays	*new*	2.02	1.26	0	5	572
7.1.10	S/K	CD ROM	3.63	3.69	.79	0	4	623
7.2.19	S/K	CD ROM	3.63	3.50	1.05	0	4	579
7.2.21	S/K	Dalek	3.84	7.06	1.48	0	10	595
7.1.11	S/K	Graphics	*changed*	6.49	.98	0	7	669
7.2.17	S/K	Graphics	*changed*	6.61	1.03	0	7	636
7.2.12	S/K	Ladybird	3.39	3.43	2.48	0	6	575
7.1.17	S/K	Newsletter	2.34	4.19	1.60	0	6	630
7.1.12	S/K	No smoking	5.15	6.09	1.23	2	7	652
7.2.4	S/K	SAN Software	*new*	3.66	1.90	0	7	537
7.2.10	S/K	Susan's story	1.62	1.59	.61	0	2	639
7.2.15	S/K	Toolbar*	5.58	6.24	2.61	0	11	640
7.1.20	S/K	Toolbar*	5.58	7.11	2.29	1	11	631
7.1.13	S/K	Turtle	7.33	9.64	3.83	0	12	551
16			45.76	74.25			106	

Table 3.3: K&U – Communications

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.1.6	C/K	Barbecue	1.45	1.92	1.12	0	2	629
7.1.5	C/K	Communications 1	2.34	2.66	1.48	0	5	624
7.2.8	C/K	Communications 1	2.34	2.59	1.62	0	5	663
7.1.16	C/K	Communications 2	5.86	6.03	1.04	0	7	627
7.1.8	C/K	Email	3.95	3.90	1.51	0	6	630
7.2.9	C/K	In-tray	2.35	1.93	1.38	0	4	604
7.1.9	C/K	Web	1.8	1.39	1.34	0	5	601
7.2.11	C/K	Web	1.8	1.25	1.30	0	5	612
7.2.7	C/K	Tom Smith	1.88	1.45	.99	0	3	615
7.1.3	C/K	Web search	1.09	1.87	1.25	0	4	518
7.2.5	C/K	Web search	2.00	1.68	1.28	0	4	510
11			26.86	26.67			50	

Table 3.4: K&U – Uses and Impact on Society

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.1.4	U/K	Job match	2.48	2.81	1.36	0	4	606
1			2.48	2.81			4	

Primary 7 by category: Personal Appropriation

Table 3.5: PA – Hardware

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.1.14	H/PA	For Sale	2.34	1.56	1.28	0	4	593
7.1.18	H/PA	School Club	6.02	5.40	1.21	2	8	621
7.2.16	H/PA	Communications 3	2.31	1.91	1.41	0	6	570
3			10.67	8.87			18	

Table 3.6: PA - Software

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.2.3	S/PA	Jennifer's tasks	*New*	1.33	1.06	0	4	545
1				1.33			4	

Table 3.7: PA – Communications

Quest	Category	Label	Mean 1999	Mean 2001	SD 2001	Range		Valid N
						Min	Max	
7.1.21	C/PA	Canada	*New*	2.37	1.45	0	6	574
7.1.7	C/PA	Ireland	0.94	1.15	.78	0	4	540
7.2.6	C/PA	Remote school	0.93	0.73	.48	0	2	585
3			1.87	4.25			12	

Secondary 2 by category: Knowledge & Understanding

There was no S2 sample in 1999 therefore no figures have been entered in the 'Mean 1999' columns.

Table 3.8: K&U – Hardware

	Category	Label	Mean 1999	Mean 2001	SD	Min	Max	N
2.2.24	H/K	Disks	-	2.91	1.44	0	5	352
2.2.2	H/K	Frankie's icons	-	2.23	1.87	0	3	352
2.1.18	H/K	Grandad	*changed*	0.74	0.44	0	1	332
2.2.1	H/K	Hardware	-	3.58	1.18	0	4	352
2.2.26	H/K	Keyboard	-	6.78	3.18	0	11	352
2.1.2	H/K	Labelling	-	3.85	1.38	0	5	332
2.1.23	H/K	Networks	-	1.81	1.19	0	4	330
2.1.1	H/K	New disk	-	1.38	0.58	0	2	337
2.2.19	H/K	Shabeena's	-	0.65	0.83	0	3	352
2.2.29	H/K	Virus	-	1.08	0.76	0	2	352
10			-	20.82			40	

Table 3.9: K&U – Software

	Category	Label	Mean 1999	Mean 2001	SD	Min	Max	N
2.2.28	S/K	Activities	-	2.07	1.64	0	4	352
2.2.18	S/K	Bird database	-	0.68	.81	0	3	352
2.1.26	S/K	British Library	-	1.35	.77	0	3	314
2.1.12	S/K	CD ROM	-	3.65	.95	0	4	328
2.2.23	S/K	CD ROM	-	3.29	1.38	0	4	352
2.2.30	S/K	Dalek	-	3.54	1.90	0	10	352
2.2.9	S/K	Dr Campbell	-	1.31	.77	0	2	352
2.1.9	S/K	Fictionhouse	-	3.04	1.26	0	4	333
2.2.6	S/K	Graeme	-	1.30	.71	0	2	352
2.1.14	S/K	Graphics 1	*Changed*	6.47	1.44	0	7	339
2.2.27	S/K	Graphics 1	*Changed*	6.05	2.19	0	7	352
2.2.4	S/K	Integrated package	-	0.62	.58	0	2	352
2.2.16	S/K	Ladybird	-	3.20	2.60	0	6	352
2.1.21	S/K	Newsletter	-	4.01	1.41	0	6	332
2.1.17	S/K	No smoking	-	5.23	1.43	0	7	331
2.1.31	S/K	Printing	-	1.79	.95	0	3	312
2.2.5	S/K	SAN Software	*New*	3.51	2.56	0	7	352
2.2.22	S/K	Software 2	-	2.04	1.13	0	3	352
2.2.13	S/K	Susan's story	-	1.56	.70	0	2	352
2.1.30	S/K	Ticket sales	-	2.69	1.43	0	5	323
2.2.20	S/K	Toolbar	-	8.33	2.79	1	11	352
2.1.28	S/K	Toolbar	-	9.00	2.22	0	11	328
2.1.19	S/K	Turtle	-	8.82	4.47	0	12	312
2.2.31	S/K	Voice	-	1.32	0.91	0	2	352
24			-	84.87			127	

Table 3.10: K&U – Communications

	Category	Label	Mean 1999	Mean 2001	SD	Min	Max	N
2.1.6	C/K	Barbecue	-	1.54	.68	0	2	332
2.2.11	C/K	Communications 1	-	2.12	1.40	0	5	352
2.1.25	C/K	Communications 1	-	3.09	1.49	0	5	328
2.1.10	C/K	Email	-	3.97	1.92	0	6	330
2.2.12	C/K	In-tray	-	2.02	1.46	0	4	352
2.2.25	C/K	Passwords	-	1.92	1.04	0	4	352
2.2.10	C/K	Tom Smith	-	1.20	.82	0	3	352
2.1.13	C/K	Video-conference	-	1.40	1.09	0	3	300
2.1.24	C/K	Vikings	-	2.12	1.23	0	4	323
2.1.11	C/K	Web	-	1.91	1.43	0	5	332
2.2.14	C/K	Web	-	1.71	1.49	0	5	352
2.1.7	C/K	Web search	-	2.26	1.39	0	4	317
2.2.7	C/K	Web search	-	1.70	1.48	0	4	352
2.1.15	C/K	Workers	-	3.34	1.21	0	4	324
2.2.15	C/K	WWW	-	1.39	0.77	0	2	352
15			-	31.69			60	

Table 3.11: K&U – Communications

	Category	Label	Mean 1999	Mean 2001	SD 2001	Min	Max	N
2.1.5	U/K	Job match	-	3.14	1.32	0	4	333
2.1.3	U/K	Teleworking	-	2.20	1.11	0	4	336
2.1.16	U/K	Word processing	-	2.80	0.63	0	7	328
3				8.14			15	

Secondary 2 by category: Personal Appropriation

Table 3.12: PA – Hardware

	Category	Label	Mean 1999	Mean 2001	SD 2001	Min	Max	N
2.2.21	H/PA	Communications 3	-	2.13	1.61	0	6	352
2.1.20	H/PA	For sale	-	1.93	1.45	0	4	327
2.1.22	H/PA	School club	-	6.48	1.39	0	9	333
3				10.54			19	

Table 3.13: PA – Software

	Category	Label	Mean 1999	Mean 2001	SD 2001	Min	Max	N
2.2.3	S/PA	Jennifer's tasks	*new*	1.39	1.15	0	4	352
2.1.4	S/PA	Software 1	-	3.89	1.51	0	5	329
2.2.17	S/PA	Victorian	*new*	0.23	0.42	0	1	352
3				5.51			10	

Table 3.14: PA – Communications

	Category	Label	Mean 1999	Mean 2001	SD 2001	Min	Max	N
2.1.27	C/PA	Canada	*new*	1.60	1.40	0	6	329
2.1.8	C/PA	Ireland	-	3.04	1.26	0	4	316
2.2.8	C/PA	Remote school	-	0.78	0.60	0	2	352
3				4.72			12	

Secondary 4 by category: Knowledge & Understanding

Table 3.15: K&U – Hardware

	Category	Name	Mean 1999	Mean 2001	SD 2001	Min	Max	N
4.2.24	H/K	Disks		3.40	1.17	.00	5.00	696
4.2.2	H/K	Frankie's icons		2.57	1.66	.00	3.00	696
4.1.18	H/K	Grandad	*changed*	0.74	0.44	.00	1.00	713
4.2.1	H/K	Hardware		3.74	0.87	.00	4.00	696
4.2.26	H/K	Keyboard		8.36	2.47	.00	11.00	696
4.1.2	H/K	Labelling		3.94	1.44	.00	5.00	713
4.1.23	H/K	Network		1.84	1.18	.00	4.00	713
4.1.1	H/K	New disk		1.58	0.59	.00	2.00	713
4.2.19	H/K	Shabeena's		1.08	1.02	.00	3.00	696
4.2.29	U/K	Virus		1.26	0.66	.00	2.00	696
10				28.51			40	

Table 3.16: K&U – Software

	Category	Name	Mean 1999	Mean	SD 2001	Min	Max	N
4.2.28	S/K	Activities		2.65	1.51	.00	4.00	696
4.2.18	S/K	Bird database		1.30	1.01	.00	3.00	696
4.1.26	S/K	British Library		1.62	0.91	.00	3.00	713
4.1.12	S/K	CD ROM		3.73	0.88	.00	4.00	713
4.2.23	S/K	CD ROM		3.72	0.90	.00	4.00	696
4.2.30	S/K	Dalek		4.05	1.64	.00	10.00	696
4.2.9	S/K	Dr Campbell		1.66	0.56	.00	2.00	696
4.1.9	S/K	Fictionhouse		3.18	1.25	.00	4.00	713
4.2.6	S/K	Graeme		1.48	0.62	.00	2.00	696
4.1.14	S/K	Graphics 1	*Changed*	6.66	1.23	.00	7.00	713
4.2.27	S/K	Graphics 1	*changed*	6.55	1.46	.00	7.00	696
4.2.4	S/K	Integrated package		0.77	0.58	.00	2.00	696
4.2.16	S/K	Ladybird		3.32	2.57	.00	6.00	696
4.1.21	S/K	Newsletter		5.24	1.41	.00	6.00	713
4.1.17	S/K	No smoking		5.38	1.27	.00	7.00	713
4.1.31	S/K	Printing		1.90	0.98	.00	3.00	713
4.2.5	S/K	SAN Software	*new*	3.97	2.59	.00	7.00	696
4.2.22	S/K	Software 2		2.54	0.81	.00	3.00	696
4.2.13	S/K	Susan's story		1.76	0.51	.00	2.00	696
4.1.30	S/K	Ticket sales		3.31	1.59	.00	5.00	713
4.2.20	S/K	Toolbar		9.05	2.01	.00	11.00	696
4.1.28	S/K	Toolbar		8.76	2.55	.00	11.00	713
4.1.19	S/K	Turtle		7.56	5.19	.00	12.00	713
4.2.31	S/K	Voice		1.68	0.70	.00	2.00	696
24				91.84			127	

Table 3.17: K&U – Communications

	Category	Name	Mean 1999	Mean 2001	SD 2001	Min	Max	N
4.1.6	C/K	Barbecue		1.58	0.64	.0	2.00	713
4.2.11	C/K	Communications 1		2.77	1.22	.	5.00	696
4.1.25	C/K	Communications 1		3.52	1.46	.0	5.00	713
4.1.10	C/K	Email		4.24	1.92	.0	6.00	713
4.2.12	C/K	In-tray		2.65	1.32	.	4.00	696
4.2.25	C/K	Passwords		1.97	0.78	.	4.00	696
4.2.10	C/K	Tom Smith		1.32	0.77	.	3.00	696
4.1.13	C/K	Video-conference		1.55	1.13	.0	3.00	713
4.1.24	C/K	Vikings		2.40	1.26	.0	4.00	713
4.1.11	C/K	Web		2.36	1.53	.0	5.00	713
4.2.14	C/K	Web		2.39	1.55	.	5.00	696
4.1.7	C/K	Web search		2.44	1.38	.0	4.00	713
4.2.7	C/K	Web search		2.27	1.44	.	4.00	696
4.1.15	C/K	Workers		3.31	1.15	.0	4.00	713
4.2.15	C/K	WWW		1.66	0.61	.	2.00	696
15				36.43			60	

Table 3.18: K&U – Uses and Impact on Society

	Category	Name	Mean 1999	Mean 2001	SD 2001	Min	Max	N
4.1.5	U/K	Job match		3.40	1.21	.0	4.00	713
4.1.3	U/K	Teleworking		2.57	1.13	.0	4.00	713
4.1.16	U/K	Word processing		2.68	0.67	.0	7.00	713
3				8.65			15	

Secondary 4 by category: Personal Appropriation

Table 3.19: PA – Hardware

	Category	Name	Mean 1999	Mean 2001	SD 2001	Min	Max	N
4.2.21	H/PA	Communications 3		2.55	1.51	.	6	696
4.1.20	H/PA	For sale		2.44	1.40	.0	4	713
4.1.22	H/PA	School club		6.05	1.63	.0	8	713
3				11.04			18	

Table 3.20: PA - Software

	Category	Name	Mean 1999	Mean 2001	SD 2001	Min	Max	N
4.2.3	S/PA	Jennifer's tasks	*new*	1.79	1.21	.	4.00	696
4.1.4	S/PA	Software 1		4.03	1.45	.0	5.00	713
4.2.17	S/PA	Victorian	**New**	0.32	0.47	.	1.00	696
3				6.14			10	

Table 3.21: PA – Communications

	Category	Name	Mean 1999	Mean 2001	SD	Min	Max	N
4.1.27	C/PA	Canada	*new*	1.62	1.47	.0	6.00	713
4.1.8	C/PA	Ireland		2.89	1.36	.0	4.00	713
4.2.8	C/PA	Remote school		0.92	0.46	.	2.00	696
3				5.43			12	

WRITTEN PAPERS: COMPARISONS ACROSS STAGES — APPENDIX 4

1. KNOWLEDGE & UNDERSTANDING - HARDWARE

Table 4.1: K&U Hardware - Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Disks	2.47	2.91	0.44	5	S2
Frankie's icons	2.32	2.23	-0.09	3	P7
Hardware	3.55	3.58	0.03	4	S2
Labelling	3.60	3.85	0.25	5	S2
Networks	1.10	1.81	0.71	4	S2
New disk	1.33	1.38	0.05	2	S2
Shabeena's	1.20	0.65	-0.55	3	P7
Virus	1.15	1.08	-0.07	2	P7

Table 4.2: K&U Hardware - Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Disks	2.47	3.40	0.93	5	S4
Frankie's icons	2.32	2.57	0.25	3	S4
Hardware	3.55	3.74	0.19	4	S4
Labelling	3.60	3.94	0.34	5	S4
Networks	1.10	1.84	0.74	4	S4
New disk	1.33	1.58	0.25	2	S4
Shabeena's	1.20	1.08	-0.12	3	P7
Virus	1.15	1.26	0.11	2	S4

Table 4.3: K&U Hardware - Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Disks	2.91	3.40	0.49	5	S4
Frankie's icons	2.23	2.57	0.34	3	S4
Grandad	0.74	0.74	0	1	S4
Hardware	3.58	3.74	0.16	4	S4
Keyboard	6.78	8.36	1.58	11	S4
Labelling	3.85	3.94	0.09	5	S4
Networks	1.81	1.84	0.03	4	S4
New disk	1.38	1.58	0.02	2	S4
Shabeena's	0.65	1.08	0.43	3	S4
Virus	1.08	1.26	0.18	2	S4

Table 4.4: K&U Software - Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Activities	2.14	2.07	-0.07	4	P7
Bird database	0.79	0.68	-0.11	3	P7
CD ROM	3.60	3.46	-0.14	4	P7
Dalek	7.06	3.54	-3.52	10	P7
Graphics 1	6.55	6.26	-0.29	7	P7
Ladybird	3.43	3.20	-0.23	6	P7
Newsletter	4.19	4.01	-0.18	6	P7
No smoking	6.09	5.23	-0.86	7	P7
SAN Software	3.66	3.51	-0.15	7	P7
Susan's story	1.59	1.56	-0.03	2	P7
Toolbar	6.67	8.65	1.98	11	S2
Turtle	9.64	8.82	-0.82	12	P7
Voice	1.16	1.32	0.16	2	P7

Table 4.5: K&U Software - Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Activities	2.07	2.65	0.58	4	S4
Bird database	0.68	1.30	0.62	3	S4
British Library	1.35	1.62	0.27	3	S4
CD ROM	3.46	3.72	0.26	4	S4
Dalek	3.54	4.05	0.51	10	S4
Dr Campbell	1.31	1.66	0.35	2	S4
Fictionhouse	3.04	3.18	0.14	4	S4
Graeme	1.30	1.48	0.18	2	S4
Graphics 1	6.26	6.61	0.35	7	S4
Integrated package	0.62	0.77	0.15	2	S4
Ladybird	3.20	3.32	0.12	6	S4
Newsletter	4.01	5.24	1.23	6	S4
No smoking	5.23	5.38	0.15	7	S4
Printing	1.79	1.90	0.11	3	S4
SAN Software	3.51	3.97	0.46	7	S4
Software 2	2.04	2.54	0.5	3	S4
Susan's story	1.56	1.76	0.2	2	S4
Ticket sales	2.69	3.31	0.62	5	S4
Toolbar	8.65	8.90	0.25	11	S4
Turtle	8.82	7.56	-1.26	12	S2
Voice	1.32	1.68	0.36	2	S4

Table 4.6: K&U Software - Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Activities	2.14	2.65	0.51	4	S4
Bird database	0.79	1.30	0.51	3	S4
CD ROM	3.60	3.72	0.12	4	S4
Dalek	7.06	4.05	-3.01	10	P7
Graphics	6.55	6.61	0.06	7	S4
Ladybird	3.43	3.32	-0.11	6	P7
Newsletter	4.19	5.24	1.05	6	S4
No smoking	6.09	5.38	-0.71	7	P7
SAN Software	3.66	3.97	0.31	7	S4
Susan's story	1.59	1.76	0.17	2	S4
Toolbar	6.67	8.90	2.23	11	S4
Turtle	9.64	7.56	-2.08	12	P7
Voice	1.16	1.68	0.52	2	S4

Table 4.7: K&U Communications - Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Barbecue	1.92	1.54	-0.38	2	P7
Communications 1	2.62	2.59	-0.03	5	P7
Email	3.90	3.97	0.07	6	S2
In-tray	1.93	2.02	0.09	4	S2
Web	1.32	1.81	0.49	5	S2
Tom Smith	1.45	1.20	-0.25	3	P7
Web search	1.78	1.97	0.19	4	S2

Table 4.8: K&U Communications - Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Barbecue	1.92	1.58	-0.34	2	P7
Communications 1	2.62	3.15	0.53	5	S4
Email	3.90	4.24	0.34	6	S4
In-tray	1.93	2.65	0.72	4	S4
Web	1.32	2.37	1.05	5	S4
Tom Smith	1.45	1.32	-0.13	3	P7
Web search	1.78	2.36	0.58	4	S4

Table 4.9: K&U Communications - Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Barbecue	1.54	1.58	0.04	2	S4
Communications 1	2.59	3.15	0.56	5	S4
Email	3.97	4.24	0.27	6	S4
In-tray	2.02	2.65	0.63	4	S4
Passwords	1.92	1.97	0.05	4	S4
Tom Smith	1.20	1.32	0.12	3	S4
Video-conference	1.40	1.55	0.15	3	S4
Vikings	2.12	2.40	0.28	4	S4
Web	1.81	2.37	0.56	5	S4
Web search	1.97	2.36	0.39	4	S4
Workers	3.34	3.31	-0.03	4	S2
WWW	1.39	1.66	0.27	2	S4

Table 4.10: K&U Uses and Impact - Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Job match	2.81	3.14	0.33	4	S2

Table 4.11: K&U Uses and Impact - Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Job match	3.14	3.40	0.26	4	S4
Teleworking	2.20	2.57	0.37	4	S4
Word processing	2.80	2.68	-0.12	7	S2

Table 4.12: K&U Uses and Impact - Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Job match	2.81	3.40	0.59	4	S4

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Table 4.13: PA Hardware – Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Communications 3	1.91	2.13	0.22	6	S2
For Sale	1.56	1.93	0.37	4	S2
School Club	5.40	6.48	1.08	8	S2

Table 4.14: PA Hardware – Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Communications 3	1.91	2.55	0.64	6	S4
For Sale	1.56	2.44	0.88	4	S4
School Club	5.40	6.05	0.65	8	S4

Table 4.15: PA Hardware – Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Communications 3	2.13	2.55	0.42	6	S4
For Sale	1.93	2.44	0.51	4	S4
School Club	6.48	6.05	-0.43	8	S2

Table 4.16: PA Software – Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Jennifer's tasks	1.33	1.39	0.06	4	S2

Table 4.17: PA Software – Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Jennifer's tasks	1.33	1.79	0.46	4	S4

Table 4.18: PA Software – Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Jennifer's tasks	1.39	1.79	0.04	4	S4
Software 1	3.89	4.03	0.14	5	S4
Victorian	0.23	0.32	0.09	1	S4

Table 4.19: PA Communications – Comparing P7 and S2

Label	P7 Mean 2001	S2 Mean 2001	Difference (S2-P7)	Max score possible	Superior performance
Canada	2.37	1.60	-0.77	6	P7
Ireland	1.15	3.04	1.89	4	S2
Remote school	0.73	0.78	0.05	2	S2

Table 4.20: PA Communications – Comparing P7 and S4

Label	P7 Mean 2001	S4 Mean 2001	Difference (S4-P7)	Max score possible	Superior performance
Canada	2.37	1.62	-0.75	6	P7
Ireland	1.15	2.89	0.74	4	S4
Remote school	0.73	0.92	0.19	2	S4

Table 4.21: PA Software – Comparing S2 and S4

Label	S2 Mean 2001	S4 Mean 2001	Difference (S4-S2)	Max score possible	Superior performance
Canada	1.60	1.62	-0.02	6	S2
Ireland	3.04	2.89	-0.15	4	S2
Remote school	0.78	0.92	0.14	2	S4

WRITTEN PAPERS: COMPARISONS ACROSS SURVEYS, 1999-2001 APPENDIX 5

Table 5.1: P7 data across surveys, 1999 - 2001

Cat	Item name	1999	2001	Difference (2001-1999)	Better performance
C/K	Barbecue	1.45	1.92	0.47	2001
C/K	Communications 1	2.34	2.62	0.28	2001
C/K	Communications 2	5.86	6.03	0.17	2001
C/K	Communications 3	2.31	1.91	-0.4	1999
C/K	Email	3.95	3.9	-0.05	1999
C/K	In-tray	2.35	1.93	-0.42	1999
C/K	Web	1.80	1.32	-0.48	1999
C/K	Tom Smith	1.88	1.45	-0.43	1999
C/K	Voice	2.44	1.16	-1.28	1999
C/K	Web search	1.09	1.78	0.69	2001
C/PA	Ireland	0.94	1.15	0.21	2001
C/PA	Remote school	0.93	0.73	-0.2	1999
H/K	Disks	2.47	2.47	0	-
H/K	New disk	1.28	1.33	0.05	2001
H/K	Frankie's icons	2.37	2.32	-0.05	1999
H/K	Labelling	2.65	3.6	0.95	2001
H/K	Parts	3.23	3.53	0.3	2001
H/K	Networks`	1.5	1.1	-0.4	1999
H/K	Hardware	3.79	3.55	-0.24	1999
H/K	Shabeena's	1.06	1.2	0.14	2001
H/K	Virus	1.29	1.15	-0.14	1999
H/PA	For Sale	2.34	1.56	-0.78	1999
H/PA	School Club	6.02	5.4	-0.62	1999
S/K	Newsletter	2.34	4.19	1.85	2001
S/K	Activities	2.64	2.14	-0.5	1999
S/K	Bird database	1.03	0.79	-0.24	1999
S/K	CD ROM	3.63	3.6	-0.03	1999
S/K	Dalek	3.84	7.06	3.22	2001
S/K	Ladybird	3.39	3.43	0.04	2001
S/K	No smoking	5.15	6.09	0.94	2001
S/K	Susan's story	1.62	1.59	-0.03	1999
S/K	Toolbar*	5.58	6.67	1.09	2001
S/K	Turtle	7.33	9.64	2.31	2001
U/K	Job match	2.48	2.81	0.33	2001

Table 5.2: S4 data across surveys, 1999 - 2001

Category	Item	1999	2001	Difference 1999-2001	Better performance?
C/K	Barbecue	1.7	1.58	-0.12	1999
C/K	Communications 1	3.25	3.15	-0.1	1999
C/K	Email	3.95	4.24	0.29	2001
C/K	In-tray	2.35	2.65	0.30	2001
C/K	Passwords	2.45	1.97	-0.48	1999
C/K	Tom Smith	1.88	1.3	-0.56	1999
C/K	Video-conference	2	1.55	-0.45	1999
C/K	Vikings	2.86	2.40	-0.48	1999
C/K	Web	1.8	2.37	0.57	2001
C/K	Web search	2	2.36	0.36	2001
C/K	Workers	3.38	3.31	-0.07	1999
C/K	WWW	1.29	1.66	0.37	2001
C/PA	Ireland	0.94	2.89	1.95	2001
C/PA	Remote school	0.93	0.92	-0.01	1999
H/K	Disks	3.02	3.40	0.38	2001
H/K	Frankie's icons	2.37	4.36	1.99	2001
H/K	Hardware	3.79	3.74	-0.06	1999
H/K	Keyboard	8.23	8.36	0.13	2001
H/K	Labelling	3.66	3.94	0.28	2001
H/K	Network	1.5	1.84	0.34	2001
H/K	New disk	1.55	1.58	0.03	2001
H/K	Shabeena's	1.06	1.08	0.02	2001
H/K	Virus	1.29	1.26	-0.03	1999
H/PA	For sale	2.34	2.44	0.10	2001
H/PA	School club	6.02	6.05	0.03	2001
H/PA	Communications 3	2.31	2.55	0.24	2001
S/K	Activities	2.64	2.65	0.01	2001
S/K	Birds	1.03	1.30	0.27	2001
S/K	British Library	1.6	1.62	0.02	2001
S/K	CD ROM	3.63	3.72	0.09	2001
S/K	Dalek	3.84	4.05	0.21	2001
S/K	Dr Campbell	1.61	1.65	0.05	2001
S/K	Fictionhouse	2.88	3.18	0.30	2001
S/K	Graeme	1.52	1.48	-0.04	1999
S/K	Integrated package	0.72	0.77	0.05	2001
S/K	Ladybird	3.39	3.32	-0.07	1999
S/K	Newsletter	2.34	5.24	2.90	2001
S/K	No smoking	5.15	5.38	0.23	2001
S/K	Printing	1.85	1.90	0.05	2001
S/K	Software 2	2.44	2.54	0.10	2001
S/K	Susan's story	1.62	1.76	0.14	2001
S/K	Ticket sales	2.85	3.31	0.47	2001
S/K	Toolbar	5.58	8.9	3.32	2001
S/K	Turtle	7.33	7.56	0.23	2001
S/PA	Software	3.96	4.03	0.07	2001
U/K	Job match	3.51	3.40	-0.12	1999
U/K	Teleworking	2.35	2.57	0.22	2001
U/K	Word processing	3.8	2.68	-1.12	1999

Table 5.3: P7 to S2 comparisons (1999-2001 longitudinal element)

Category	Item name	**P7**	**S2**	**Difference**	**Better performance**
C/K	Barbecue	1.45	1.54	0.09	S2
C/K	Communications 1	2.62	2.59	-0.03	P7
C/K	Email	3.95	3.97	0.02	S2
C/K	In-tray	2.35	2.02	-0.33	P7
C/K	Tom Smith	1.88	1.2	-0.68	P7
C/K	Web	1.32	1.81	0.49	S2
C/K	Web search	1.78	1.97	0.19	S2
C/PA	Ireland	0.94	3.04	2.1	S2
C/PA	Remote school	0.93	0.78	-0.15	P7
H/K	Disks	2.47	2.91	0.44	S2
H/K	Frankie's icons	2.37	2.23	-0.14	P7
H/K	Hardware	3.79	3.58	-0.21	P7
H/K	Labelling	2.65	3.85	1.2	S2
H/K	Networks`	1.5	1.81	0.31	S2
H/K	New disk	1.28	1.38	0.1	S2
H/K	Shabeena's	1.06	0.65	-0.41	P7
H/K	Virus	1.29	1.08	-0.21	P7
H/PA	Communications 3	2.31	2.13	-0.18	P7
H/PA	For Sale	2.34	1.93	-0.41	P7
H/PA	School Club	6.02	6.48	0.46	S2
S/K	Activities	2.64	2.07	-0.57	P7
S/K	Bird database	1.03	0.68	-0.35	P7
S/K	CD ROM	3.6	3.46	-0.14	P7
S/K	Dalek	3.84	3.54	-0.3	P7
S/K	Ladybird	3.39	3.2	-0.19	P7
S/K	Newsletter	2.34	4.01	1.67	S2
S/K	No smoking	5.15	5.23	0.08	S2
S/K	Susan's story	1.62	1.56	-0.06	P7
S/K	Toolbar	6.67	8.65	1.98	S2
S/K	Turtle	7.33	4.47	-2.86	P7
S/K	Voice	2.44	1.32	-1.12	P7
U/K	Job match	2.48	3.14	0.66	S2

PERFORMANCE DATA 2001: PRACTICAL ASSESSMENT **APPENDIX 6**

This table sets out the percentages of pupils in each sample who were rated as successful, without assistance, on each part of each task in the Practical Assessment Booklet.

Table 6.1: Percentages of pupils completing parts of tasks 'without assistance'

Tasks		**Primary % N = 198**	**Secondary % N = 195**
1	**Wordprocessing (1)**		
1.1	Create file	69.2	76.4
1.2a	type name and address	89.9	93.3
1.2b	each part of address on new line	84.8	82.1
1.3a	name delete/insert ms, mr, etc	89.4	94.4
1.3b	Scotland typed	84.8	90.8
1.4a	copy and paste	28.3	60.0
1.4b	find and replace	7.1	33.8
1.5a	change font	80.3	88.7
1.5b	change font size	87.9	91.8
1.5c	bold and underline	82.3	89.7
1.6a	centre text	66.7	82.1
1.6b	spell check	57.1	76.4
1.6c	work saved correctly	84.3	94.9
1.7	use printe option	92.4	96.9
1.8	close file	79.8	90.3
2	**Wordprocessing (2)**		
2.1	open file	60.1	77.4
2.2a	headings centred	64.6	85.1
2.2b	headings bold/underlined	70.2	87.7
2.2c	pictures placed correctly	37.9	57.9
2.2d	pictures centred	45.5	65.1
2.2e	pictures labelled	33.8	56.9
2.2f	file closed/quit application	72.2	83.6
3	**Spreadsheets (1)**		
3.1	start application/create file	45.5	62.1
3.2a	columns labelled	55.1	79.5
3.2b	headings centred	36.4	65.1
3.2c	headings bold	60.6	80.5
3.2d	information correct	68.2	84.1
4	Spreadsheets (2)		
4.1	opened file	63.6	76.4
4.2a	made column wider	23.7	59.0
4.2b	headings bold	61.1	79.0
4.2c	headings centred	58.6	77.4
4.2d	total in correct cell	67.7	82.1
4.2e	formula in correct cell	8.6	27.2
4/2F	formula replicated	18.7	44.1

Table 6.1 ctd.: Percentages of pupils completing parts of tasks 'without assistance'

Tasks		**Primary % N = 198**	**Secondary % N = 195**
5	**Spreadsheets (3)**		
5.1a	chart created	18.2	46.2
5.1b	correct chart format	47.0	69.2
5.2a	x axis labelled	17.7	41.5
5.2b	y axis labelled	27.3	53.8
5.2c	chart title	32.3	60.0
5.3	file closed and quit	56.1	75.9
6	**CD-ROM (1)**		
6.1	insert CD disk and start up	51.0	57.4
6.2a	find text	51.5	63.6
6.2b	find picture	50.0	58.5
6.3a	copy text to WP	17.7	40.5
6.3b	copy picture to WP	16.7	29.2
7	**CD-ROM (2)**		
7.1a	find video film	29.8	47.2
7.1b	play video film	44.9	59.0
8	**CD-ROM (3)**		
8.1a	find instrument	43.9	62.1
8.1b	play sound	43.4	57.9
8.2	close application	56.1	66.2
9	**Using email**		
9.1	open email	19.7	33.8
9.2a	address correct	28.3	45.1
9.2b	subject correct	27.8	45.1
9.2c	message correct	30.8	47.7
9.2d	name and school added	30.8	48.2
9.3	file attached	9.1	20.0
9.4	message sent	29.3	47.7
10	**Using the WWW**		
10.1	WWW application opened	40.4	66.7
10.2a	Blue Peter site found	30.3	54.4
10.2b	Robots page found	29.3	51.3
10.3	Internet quit	42.9	67.2

Practical Problems

Tables 6.2 and6.3 show the percentages of pupils who experienced practical difficulties in completing each task for the three main reasons identified.

Table 6.2: Percentages of P7 pupils experiencing practical problems in completing tasks

Primary 7 N = 198	**technical problem**	**out of time**	**application unavailable**	**Total % experiencing problems**
1	0.2	0.0	0.1	**0.4**
2	0.7	6.4	3.2	**10.4**
3	0.0	1.0	1.1	**2.1**
4	0.1	3.1	3.1	**6.3**
5	2.9	10.9	1.0	**14.7**
6	7.4	3.1	12.6	**23.1**
7	5.6	5.8	12.6	**24.0**
8	4.7	6.1	12.5	**23.2**
9	1.1	1.9	32.8	**35.8**
10	1.3	2.3	27.4	**30.9**

Table 6.2: Percentages of S4 pupils experiencing practical problems in completing tasks

Secondary 4 N = 195	**technical problem**	**out of time**	**application unavailable**	**Total % experiencing problems**
1	0	0	0	**0**
2	0.2	2.3	0.8	**3.4**
3	0.0	0.3	1.0	**1.3**
4	1.5	1.5	1.5	**4.6**
5	1.8	5.0	0.5	**7.3**
6	10.1	1.9	7.6	**19.6**
7	8.2	2.8	7.9	**19.0**
8	9.1	2.7	7.7	**19.5**
9	4.8	1.1	22.3	**28.3**
10	2.4	1.0	12.6	**16.0**

THE QUESTIONNAIRES: FULL TABLES — APPENDIX 7

Perceptions And Experiences Of The ICT Co-ordinators

Table Co 1
Subjects taught by Secondary ICT Co-ordinators
(percentage of questionnaire responses)

Mode	1999 (N=52) Percent	**2001 (N=69) Percent**
Technological Subjects	40	**44**
Mathematics	17	**10**
Science (Biology/chemistry/physics)	13	**18**
English Language	9	**7**
Foreign Languages	8	**1**
Religious and Moral Education	4	**1**
Social Subjects/history/geography	4	**5**
Creative and Aesthetic subjects 1999 Art, Craft and Design 2001	4	**4**
PE	0	**1**

Table Co 2 (2001) Role Changes for the Coordinators over the Past two Years
(Percentage of questionnaire responses)

In what ways has your role changed over the last 2 years?	Primary (N = 44)	**Secondary (N = 47)**
Increase in volume/scale	45	**28**
Hard/software/ resources	41	**19**
Staff development	11	**21**
Network	9	**45**
Management responsibilities	32	**26**
Demands of ICT curriculum	16	**4**
ICT suite	14	**2**
Internet management	7	**2**
Technical support (lack of/giving)	7	**9**
Increased staff demands (& pupil)	7	**6**
Is less demanding	3	**0**
ICT Committee	0	**2**
Encouraging use of ICT in teaching and learning	0	**3**

Table Co 7 Sources of support for ICT Co-ordinators
(percentage of questionnaire responses)
(The data for 1999 are presented in italics)

Source of support	Primary	**Secondary**
Local authority staff.	68*(64)*	**59** ***(58)***
Scottish Council for Educational Technology (SCET).	41 *(46)*	**19** ***(40)***
Colleagues in own school.	41 *(44)*	**59** ***(60)***
Commercial ICT Publications e.g. computing magazines.	15 *(25)*	**17** ***(19)***
Publishers' catalogues.	7 *(25)*	**3** ***(2)***
Primary teachers'/subject teachers' networks.	12 *(18)*	**6** ***(12)***
Conferences and Seminars.	23 *(17)*	**30** ***(35)***
Staff in Teacher Education Institutions.	12 *(14)*	**1** ***(0)***
Staff in your secondary computing studies department/computing studies department.	10 *(13)*	**55** ***(50)***
Professional journals.	1 *(8)*	**1** ***(2)***
Government information on ICT in schools.	12 *(5)*	**7** ***(13)***
Scottish Consultative Council on the Curriculum (SCCC).	3 *(4)*	**3** ***(0)***
The World Wide Web/Internet.	19 *(4)*	**20** ***(10)***
Scottish Virtual Teachers Centre (SVTC).	6 *(3)*	**1 (4)**

Table Co 8a The 5-14 National Guidelines
(percentage of questionnaire responses)

	Yes (draft) 1999		**Yes (final) 2000**		**No**	
	Prim	**Sec**	Prim	**Sec**	Prim	**Sec**
Have you seen this document?	28	**1**	48	**78**	22	**10**
Have you read it?	22	**13**	28	**58**	39	**22**

Co 8b Local authority and School ICT policy
(percentage of questionnaire responses)

	Yes		**No**		**Don't Know**	
	Prim	**Sec**	Prim	**Sec**	Prim	**Sec**
Does your local authority have a written policy for ICT in schools?	44	**54**	19	**22**	35	**13**
Do you have a written policy for ICT in your school?	62	**81**	35	**19**	0	**0**
If yes, does it reflect the national initiatives for ICT such as "Using the Superhighways:ICT and Development Planning" document?	19	**48**	30	**22**	12	**9**

Table Co 10a Communications about ICT in the School. (Primary Co-ordinators)
(percentage of questionnaire responses)

Ways in which information about ICT is communicated to school staff	Used by primary co-ordinators		**Considered effective**	
	1999	**2001**	1999	**2001**
Informally between colleagues	100	**100**	44	**47**
Through in-school staff development events	96	**99**	36	**51**
Through external inputs, e.g. in-service	93	**93**	35	**44**
As items regularly on the agenda at staff meetings	77	**90**	18	**37**
Through the school's own newsletter	30	**14**	3	**2**
By internal e-mail or electronic notice-board	18	**12**	0	**1**

Table Co 10 b Communications about ICT in the School. (Secondary Co-ordinators)
(percentage of questionnaire responses)

	Used by secondary co-ordinators		**Considered effective**	
	1999	**2001**	1999	**2001**
Informally between colleagues	98	**99**	41	**47**
Through in-school staff development events	92	**96**	43	**58**
Through external inputs, e.g. in-service	94	**96**	35	**43**
As items regularly on the agenda at staff meetings	81	**87**	17	**29**
Through the school's own newsletter	60	**72**	14	**25**
By internal e-mail or electronic notice-board	21	**49**	6	**18**

Table Co 11a Stages of Development. (Primary Co-ordinators)
(percentage of questionnaire responses)

	Being established/ well established		Just started/ not yet started	
	1999	**2001**	1999	**2001**
Learning and teaching in the Classroom. Securing opportunities for pupils and teachers to access curriculum material directly from CD-ROMs or CDi.	*75*	**70**	*24*	**27**
Enhancing the quality of reports or profiles of pupils' progress and attainment.	*39*	**48**	*61*	**49**
Setting goals for ICT experiences for all pupils at different stages.	*36*	**43**	*64*	**54**
Giving specialist assistance to pupils with learning difficulties.	*33*	**39**	*65*	**58**
Centralising the assessment and testing records of pupils.	*26*	**25**	*74*	**72**
Extending learning opportunities for high attaining pupils (e.g. after school activities; or use of laptops).	*11*	**9**	*88*	**87**
Securing opportunities for pupils and teachers to access curriculum material directly from the WWW.	*10*	**20**	*90*	**74**
Staff support and School Development. Delivering in-service courses on ICT for staff.	*37*	**49**	*61*	**48**
Delivering in-service courses for staff in specific professional areas	*30*	**35**	*65*	**56**
Recording test and exam results as part of the processes of monitoring and review.	*19*	**32**	*81*	**63**
Putting teachers in contact with other teachers and professionals locally.	*19*	**10**	*75*	**84**
Communicating and working with others outside school. Establishing collaborative projects with pupils in other schools using electronic networks.	*6*	**5**	*95*	**92**
Communicating the school's identity and role in the community and beyond (e.g. through a WWW page).	*4*	**13**	*95*	**85**
Giving the local community access to school computers or the Internet.	*4*	**1**	*96*	**95**
Giving pupils access to subject specialists outside the school	*4*	**6**	*97*	**92**

Table Co 11b Stages of Development. (Secondary Co-ordinators)
(percentage of questionnaire responses)

	Being established/ well established		Just started/ not yet started	
	1999	**2001**	1999	**2001**
Learning and teaching in the Classroom.				
Securing opportunities for pupils and teachers to access curriculum material directly from CD-ROMs or CDi.	58	**71**	42	**29**
Enhancing the quality of reports or profiles of pupils' progress and attainment.	48	**60**	52	**39**
Setting goals for ICT experiences for all pupils at different stages.	59	**17**	40	**82**
Giving specialist assistance to pupils with learning difficulties.	56	**74**	44	**25**
Centralising the assessment and testing records of pupils.	8	**30**	92	**68**
Extending learning opportunities for high attaining pupils (e.g. after school activities; or use of laptops).	21	**24**	79	**74**
Securing opportunities for pupils and teachers to access curriculum material directly from the WWW.	29	**74**	71	**26**
Staff support and School Development.				
Delivering in-service courses on ICT for staff.	52	**61**	48	**36**
Delivering in-service courses in specific professional areas	39	**50**	62	**47**
Recording test and exam results as part of the processes of monitoring and review.	29	**42**	71	**55**
Putting teachers in contact with other teachers and professionals locally.	17	**33**	80	**64**
Communicating and working with others outside school.				
Establishing collaborative projects with pupils in other schools using electronic networks.	6	**13**	94	**87**
Communicating the school's identity and role in the community and beyond (e.g. through a WWW page).	21	**48**	79	**51**
Giving the local community access to school computers	15	**21**	84	**78**
Giving pupils access to subject specialists outside the school	6	**10**	94	**84**

Table Co 13a Co-ordinators' Aspirations for their Schools
(percentage of questionnaire responses)

Aspirations for the School	Already well established		Beginning to happen/Likely to be introduced over next 1 to 2 years		Not yet working towards this/No intention of developing this	
	P	**S**	P	**S**	P	**S**
Having a number of modern computers in every classroom.	29	**19**	59	**63**	12	**14**
Developing a common vision on the use of computers within our school.	10	**10**	83	**85**	4	**0**
Having most staff trained in a range of classroom uses in ICT.	10	**6**	87	**89**	3	**1**
Seeing positive effects of ICT on pupil attainment in curricular areas.	6	**6**	87	**86**	4	**0**
Providing all teachers with their own e-mail address.	17	**44**	70	**51**	10	**1**
Having regular ICT communications with a proportion of our parents.	0	**0**	22	**45**	78	**52**
Providing all pupils with their own e-mail address.	6	**33**	76	**61**	18	**1**

Table Co 13b Co-ordinators' Aspirations for their Pupils
(percentage of questionnaire responses)

Aspirations for the Pupils	Already well established		Beginning to happen/Likely to be introduced over next 1 to 2 years		Not yet working towards this/No intention of developing this	
	P	**S**	P	**S**	P	**S**
regularly used word processing	61	**61**	36	**38**	51	**0**
had experience of multimedia;	19	**23**	64	**63**	15	**12**
frequently worked on projects which have been strongly ICT-based;	6	**10**	74	**71**	17	**15**
regularly used spreadsheets and databases;	7	**35**	87	**58**	4	**6**
accessed information from specialists outside the school.	1	**3**	54	**67**	42	**26**
regularly used the Internet to:						
i) search for information on the WWW;	16	**35**	71	**64**	9	**0**
ii) down-load information;	10	**32**	76	**63**	10	**1**
iii) send and receive e-mail;	6	**26**	74	**67**	16	**4**
had experience of video-conferencing;	0	**0**	29	**45**	67	**52**

Table Co 14 Obstacles to ICT use. (Primary and Secondary Co-ordinators)
(percentage of questionnaire responses)

Percentage who agree/agree strongly with these statements concerning possible obstacles to progress	Primary Co-ord		Secondary Co-ord	
	1999	**2001**	1999	**2001**
Too many other priorities are competing for staff time and attention.	*97*	**99**	*100*	**97**
Not all teachers have a computer at home on which they can develop their skills.	*95*	**96**	*96*	**98**
There is too little time to preview software.	*92*	**94**	*94*	**91**
Not enough technical support is available to the teaching staff in their classrooms.	*91*	**83**	*92*	**74**
Most teaching staff find difficulty in progressing their skills in the use of ICT.	*84*	**82**	*71*	**71**
Weak infrastructure (telephone links, available rooms and space etc.)	*83*	**72**	*65*	**40**
Not enough technical support is available to me as co-ordinator.	*79*	**67**	*87*	**67**
Insufficient number of modern computers in each classroom.	*75*	**66**	*92*	**83**
Insufficient funds to use the resources effectively.	*72*	**51**	*81*	**55**
Outdated or lack of internal school network.	*69*	**56**	*67*	**19**
There is a lack of convenient access to machines.	*68*	**58**	*86*	**76**
There are too many confusing copyright/licensing regulations.	*63*	**68**	*65*	**63**
There are not yet enough examples of good use of ICT in the classroom to enthuse and interest teachers.	*60*	**67**	*75*	**76**
Not enough school/authority co-ordination of software purchase and availability.	*56*	**62**	*73*	**64**
Incompatibility of the school's ICT equipment with other systems.	*52*	**38**	*42*	**22**
Network connection procedures are too complex/time-consuming/unreliable.	*51*	**47**	*44*	**29**
Most teaching staff don't see the development of ICT as a priority.	*50*	**47**	*33*	**27**
Insufficient number of peripherals (eg printers, scanners)	*42*	**56**	*59*	**40**
There is not yet enough relevant curricular material available to interest staff.	*41*	**51**	*73*	**71**

Perceptions And Experiences Of The Teachers – Primary

Table PT 1 Primary Teachers' Use of ICT at Home. (Fig. PT 1)
(percentage of questionnaire responses)

Primary teachers: total sample **I use a computer/laptop at home to ……..**	**Occasionally/Fairly regularly**		**Never Use this at home**	
	1999	**2001**	1999	**2001**
word process for school use.	68	**78**	34	**21**
word process for personal use.	65	**76**	33	**22**
search for information on a CD–ROM.	49	**62**	47	**35**
make pictures using a graphics package.	46	**51**	50	**47**
search for information in a database.	35	**31**	60	**62**
put numbers and formulae into a spreadsheet.	33	**37**	62	**60**
store information in a database.	32	**38**	61	**56**
search for information on the Web for personal use	24	**65**	70	**33**
send e-mail to friends and family.	27	**64**	69	**35**
Search for information on the Web for professional use.	28	**63**	66	**35**
draw graphs from a spreadsheet.	21	**27**	73	**70**
send e-mail for professional purposes.	9	**37**	85	**59**

Table PT 2 Primary Teachers Level of Confidence in the Use of ICT facilities. (Fig. PT 2)
(percentage of questionnaire responses)

Aspect of ICT	**Fairly confident user/very confident user**		**Have never used this**	
	1999	**2001**	1999	**2001**
Word processing	87	**92**	2	**0**
CD-ROM	82	**85**	6	**1**
Databases	43	**41**	14	**5**
Desktop publishing	39	**42**	24	**14**
Spreadsheets	35	**38**	16	**7**
E-mail	28	**64**	52	**19**
Fax	24	**29**	57	**46**
World Wide Web and Internet	23	**68**	49	**14**
Digital scanner	11	**28**	70	**41**
Computer conferencing e.g. First Class	2	**17**	93	**67**

Table PT 3 Number of Computers Regularly in Use by Pupils in the Primary Classroom
(percentage of questionnaire responses)

Number of computers regularly in use by pupils in the classroom	% Primary Respondents
0	6
1	45
2	26
3-5	17
6-20	5
Users of ICT Suite or Base in the school	54

Table PT 4a Pupils' Use of ICT in the Primary Classroom (Fig. PT 3)
(percentage of questionnaire responses)

In my class, pupils use a computer to	Already well established		Beginning to happen/ likely to be introduced over next 1 to 2 years		No intention of developing /not applicable /not yet working towards this	
	1999	**2001**	1999	**2001**	1999	**2001**
write essays, poems or reports	85	**77**	12	**23**	2	**1**
search for information on a CD–ROM	64	**66**	32	**33**	2	**0**
make drawings	47	**45**	41	**45**	9	**7**
play adventure games	36	**35**	30	**27**	30	**36**
search for information in a database	17	**15**	70	**75**	9	**7**
make a newspaper page	16	**21**	63	**64**	16	**14**
store information in a database	15	**14**	70	**76**	11	**10**
play simulations	13	**11**	22	**27**	59	**57**
put numbers into a spreadsheet	10	**15**	72	**74**	13	**11**
draw charts from a spreadsheet	9	**11**	71	**75**	15	**14**
send e-mail to pupils in other schools	4	**10**	52	**69**	41	**22**
search for information on the Web	3	**27**	58	**65**	36	**9**

Table PT 4b Pupils' Use of Innovative ICT in the Primary Classroom
(percentage of questionnaire responses)

	Already well established	Beginning to happen/likely to be introduced over next 1 to 2 years	Not yet working towards this/No intention of developing this
Display or send digital photographs	**5**	53	**40**
Create multimedia presentations	**3**	38	**59**
Use authoring software (e.g. Hyperstudio)	**2**	19	**76**
Link up to a music keyboard	**0**	14	**85**
Use a device (sensor) to capture data to feed into the computer	**1**	10	**87**
Add information to the school web site	**2**	53	**44**
Video conference with other schools	**0**	32	**67**

Table PT 5 Primary Teachers' Use of ICT in the Classroom (Fig. PT 4)
(percentage of questionnaire responses)

Uses of ICT in learning and teaching	Already well established		Beginning to happen/Likely to be introduced over next 1 to 2 years		Not yet working towards this/No intention of developing this	
	1999	**2001**	1999	**2001**	1999	**2001**
Giving high attaining pupils additional opportunities.	44	**40**	41	**51**	12	**8**
Providing differentiated activities for pupils.	36	**40**	50	**46**	12	**13**
Giving specialist assistance to pupils with learning disabilities.	34	**47**	40	**36**	24	**17**
Creating teaching resources for specific curricular areas.	32	**43**	36	**40**	30	**15**
Downloading curricular materials from the WWW from other schools or resource providers.	8	**26**	43	**50**	46	**23**
Communicating with professionals in businesses or other locations outside the education system.	2	**3**	16	**22**	79	**71**
Joining in 'virtual meetings' with colleagues with similar interests or concerns within your professional network.	2	**1**	10	**15**	84	**83**
Linking some pupils with minority subject specialist teachers from outwith your school (e.g. modern languages).	0	**2**	10	**13**	86	**83**

Table PT 6 Primary Teachers' Sources of Information about ICT Resources.
(percentage of questionnaire responses)

Main sources of information and educational suitability resources	Range of resources available	
	1999	**2001**
Colleagues in own school.	82	**79**
Local authority staff.	50	**39**
Publishers' catalogues.	40	**23**
Scottish Council for Educational Technology (SCET).	28	**20**
Commercial ICT publications e.g. computing magazines	13	**10**
The World Wide Web/Internet.	12	**33**
Conferences and seminars.	10	**6**
Staff in Teacher Education Institutions.	9	**6**
Professional journals.	8	**10**
Secondary school Computing Studies Department	6	**6**
Primary teachers' networks	5	**10**
Government information on ICT in schools.	5	**8**
Scottish Consultative Council on the Curriculum (SCCC).	3	**5**
Scottish Virtual Teachers Centre (SVTC).	2	**3**

Table PT 7 Primary Teachers' Use of ICT in Monitoring, Evaluating and Assessing (Fig. PT 5)
(percentage of questionnaire responses)

	Already well established		**Likely to be introduced over next 1 to 2 years/beginning to happen**		**Not yet working towards this/no intention of developing this**	
	1999	**2001**	1999	**2001**	1999	**2001**
Producing records (or parts of the records) for parents.	32	**41**	29	**37**	38	**22**
Making profiles of pupils' progress and development.	21	**17**	40	**51**	37	**29**
Recording and analysing test and exam results.	11	**15**	30	**47**	58	**46**
Allowing pupils to record and monitor their attainments.	6	**2**	26	**41**	65	**54**

Table PT 8a Primary Teachers' Attitudes and Aspirations: Pupils (Fig. PT 6a)
(percentage of questionnaire responses)

Views of the impact of ICT	**Strongly agree/Agree**	
	1999	**2001**
The impact of ICT on pupils		
Using ICT will assist in developing independent learning skills of my pupils	97	**N/A**
My pupils show a higher level of independence than usual from the teacher when working on the computer.	N/A	**63**
Using ICT has already contributed in positive ways to the learning of my pupils.	87	**94**
I have evidence that (I expect that) the use of ICT in class is raising (to raise) the attainment levels of my pupils.	(76)	**45**
I find it disturbing that pupils know more about ICT than I do.	34	**36**
ICT will make significant changes to teacher/pupil relationships.	31	**43**

Table PT 8b Primary Teachers' Attitudes and Aspirations: Teachers (Fig. PT 6b)
(percentage of questionnaire responses)

Views of the impact of ICT	**Strongly agree/Agree**	
Impact of ICT on Teachers	1999	**2001**
ICT opens up interesting prospects for my own future professional development.	83	**84**
I just don't have the time at present to become familiar with ICT resources.	69	**74**
Using ICT has enhanced a number of my established classroom practices and procedures.	69	**70**
My staff development needs in ICT have **not** been well met so far by the in-service provided.	60	**46**
Classroom management of ICT presents significant difficulties for me.	45	**62**
I don't feel confident about using ICT as a teaching aid.	34	**37**

Table PT 8c Primary Teachers' Attitudes and Aspirations: Schools. (Fig. PT 6c)
(percentage of questionnaire responses)

Views of the impact of ICT	**Strongly agree/Agree**	
Impact of ICT on the school	1999	**2001**
I now have a vision of the classroom of the future which is very different from the classroom as I experience it at present.	45	**55**
I think the importance of ICT has been greatly exaggerated.	37	**40**
I can see ICT breaking down the **subject-related** structures of education which exist at present.	30	**39**
I can see ICT breaking down the **age-related** stages of school education which exist at present.	28	**38**
ICT is the most important development currently taking place in Scottish education.	28	**40**

Table PT 9 Ethical and Legal Guidelines (Primary teachers)
(percentage of questionnaire responses)

Has your school offered you guidelines or information on the following:	'Yes' 1999	**'Yes' 2001**
Ethical and legal considerations	50	**55**
Copyright laws and regulations	67	**73**
Guidance to pupils on the copyright implications	18	**30**
Importance of security (e.g. passwords)	47	**71**
Protection of young people from possible exploitation (e.g. via the internet)	30	**62**
Protection of young people from exposure to unsuitable materials (e.g. pornography)	33	**63**
Suitable and safe use of e-mails by pupils	N/A	**39**
Data Protection Act	N/A	**34**

Perceptions And Experiences Of The Teachers – Secondary

Table ST 1 Secondary Teacher Sample
(Percentage of questionnaire responses)

Subject areas	**No of teachers in sample N = 573**	**Percentage**
Art/Craft & Design	67	**12**
Biology	55	**10**
Chemistry	50	**9**
Craft/Design/Technology	44	**8**
English language	56	**10**
Mathematics	64	**11**
Modern Languages	52	**9**
Music	53	**9**
Physics	54	**9**
Social Subjects: Geography History Modern Studies	19 22 14	**10**

Table ST 2 Secondary Teachers' Use of ICT at Home (Fig ST1)
(Percentage of questionnaire responses)

Secondary Teachers: Total sample **I use a computer/laptop at home to .....**	**Occasionally/ Fairly regularly**		**Never**	
	1999	**2001**	1999	**2001**
word process for school use.	67	**87**	33	**13**
word process for personal use.	65	**85**	34	**14**
search for information on a CD–ROM.	45	**75**	52	**24**
make pictures using a graphics package.	43	**58**	54	**41**
search for information in a database.	36	**55**	59	**41**
put numbers and formulae into a spreadsheet.	36	**55**	62	**43**
store information in a database.	42	**55**	55	**42**
search for information on the Web for personal use	27	**72**	69	**27**
send e-mail to friends and family.	25	**69**	71	**30**
Search for information on the Web for professional use.	27	**70**	71	**28**
draw graphs from a spreadsheet.	23	**38**	73	**60**
send e-mail for professional purposes.	16	**53**	79	**46**

Table ST 3 Secondary Teachers' Confidence in Use of ICT Facilities. (Fig. ST2)
(percentage of questionnaire responses)

Secondary Teachers **Aspects of ICT**	**Fairly /very confident user**		**Never used this**	
	1999	**2001**	1999	**2001**
Word processing	87	**92**	2	**0**
CD-ROM	63	**86**	13	**3**
Databases	37	**46**	23	**14**
Desktop publishing	42	**51**	32	**18**
Spreadsheets	35	**53**	27	**13**
E-mail	30	**73**	51	**10**
Fax	41	**52**	37	**24**
World Wide Web and Internet	35	**75**	38	**7**
Digital scanner	25	**44**	56	**35**
Computer conferencing e.g. First Class	5	**16**	90	**67**

Table ST 4a Number of Computers Regularly in Use in the Secondary Classroom
(Percentage of questionnaire response)

Number of computers regularly in use by pupils in the classroom	**Secondary teachers %**	**% classroom computers used by pupils and linked to the WWW**
0	**37**	
1	**36**	3
2	**9**	3
3-5	**6**	4
6-20	**11**	4
Users of ICT Suite or Base in the school	**48**	

Table ST 4b Secondary Pupils' Use of ICT in the Classroom (Fig. ST3)
(percentage of questionnaire responses)

In my class pupils use a computer to……	**Already well established**		**Beginning to happen/Likely to be introduced over next 1 to 2 years**		**No intention of developing, or not applicable to subject/Not yet working towards this**	
	1999	**2001**	1999	**2001**	1999	**2001**
write essays, poems or reports	24	**24**	30	**28**	44	**43**
search for information on a CD–ROM	19	**28**	49	**50**	30	**20**
make drawings	18	**15**	17	**22**	62	**57**
play adventure games	1	**1**	4	**5**	92	**89**
search for information in a database	9	**8**	31	**33**	57	**52**
make a newspaper page	9	**7**	15	**14**	72	**73**
store information in a database	6	**5**	22	**23**	68	**65**
play simulations	5	**7**	11	**19**	81	**67**
put numbers into a spreadsheet	6	**8**	23	**27**	68	**59**
draw charts from a spreadsheet	6	**9**	23	**30**	68	**55**
send e-mail to pupils in other schools	1	**5**	28	**31**	68	**58**
search for information on the Web	8	**25**	48	**54**	42	**17**

Table ST 5 Secondary Teachers' Use of ICT in the Classroom (Fig. ST4)
(percentage of questionnaire responses)

Uses of ICT in Learning and Teaching	Already well established		Beginning to happen/Likely to be introduced over next 1 to 2 years		Not yet working towards this/No intention of developing this	
	1999	**2001**	1999	**2001**	1999	**2001**
Giving high attaining pupils additional opportunities.	22	**40**	50	**46**	27	**11**
Providing differentiated activities for pupils.	24	**44**	44	**40**	31	**14**
Giving specialist assistance to pupils with learning disabilities.	15	**24**	34	**34**	50	**39**
Creating teaching resources for specific curricular areas.	33	**46**	35	**32**	31	**20**
Downloading curricular materials from the WWW from other schools or resource providers.	8	**25**	49	**57**	41	**16**
Communicating with professionals in businesses or other locations outside the education system.	2	**9**	13	**27**	84	**62**
Joining in 'virtual meetings' with colleagues with similar interests or concerns within your professional network.	1	**1**	5	**15**	92	**83**
Linking some pupils with minority subject specialist teachers from outwith your school (e.g. modern languages).	1	**4**	5	**14**	93	**79**

Table ST 6 Secondary Teachers' Sources of Information about ICT Resources.
(percentage of questionnaire responses)

Main sources of information and educational suitability of resources:	**Range of resources available**	
	1999	**2001**
Colleagues in own school.	57	**57**
Local authority staff.	20	**19**
Publishers' catalogues.	36	**30**
Scottish Council for Educational Technology (SCET).	21	**26**
Commercial ICT publications e.g. computing magazines	12	**12**
The World Wide Web/Internet.	16	**35**
Conferences and seminars.	22	**19**
Staff in Teacher Education Institutions.	6	**2**
Professional journals.	13	**9**
Staff in your Computing Studies Department	32	**26**
Subject teachers' networks	27	**27**
Government information on ICT in schools.	2	**2**
Scottish Consultative Council on the Curriculum (SCCC).	5	**6**
Scottish Virtual Teachers Centre (SVTC).	1	**8**

Table ST 7 Secondary Teachers' Use of ICT in Monitoring, Evaluating and Assessing. (Fig. ST5)
(percentage of questionnaire responses)

Using ICT in monitoring, evaluating and assessing	Already well established		Likely to be introduced over next 1 to 2 years/ Beginning to Happen		Not yet working towards this/ No intention of developing this	
	1999	**2001**	1999	**2001**	1999	**2001**
Producing records (or parts of the records) for parents.	24	**28**	37	**44**	37	**27**
Making profiles of pupils' progress and development.	21	**25**	46	**63**	32	**29**
Recording and analysing test and exam results.	20	**30**	40	**39**	39	**30**
Allowing pupils to record and monitor their attainments.	3	**2**	23	**24**	72	**73**

Table ST 8 Attitudes and Aspirations of Secondary Teachers (Figs. St 6a; 6b; 6c)
(percentage of questionnaire responses)

Views on the impact of ICT.	**Strongly agree/agree**	
Pupils	1999	**2001**
Using ICT will assist in developing the independent learning skills of our pupils.	93	**N/A**
My pupils show a higher level of independence than usual from the teacher when working on the computer	N/A	**66**
Using ICT has already contributed in positive ways to the learning of my pupils.	74	**84**
I have evidence that (I expect) the use of ICT in class is raising (to raise) the attainment levels of my pupils.	(71)	**41**
I find it disturbing that pupils know more about ICT than I do.	42	**31**
ICT will make significant changes to teacher/pupil relationships.	42	**52**
Teachers		
ICT opens up interesting prospects for my own future professional development.	85	**89**
I just don't have the time at present to become familiar with ICT resources.	67	**65**
Using ICT has enhanced a number of my established classroom practices and procedures.	62	**73**
My staff development needs in ICT have **not** been well met so far by the in-service provided.	68	**69**
Classroom management of ICT presents significant difficulties for me.	49	**47**
I don't feel confident about using ICT as a teaching aid.	49	**36**
School		
I now have a vision of the classroom of the future which is very different from the classroom as I experience it at present.	47	**55**
I think the importance of ICT has been greatly exaggerated.	44	**49**
I can see ICT breaking down the **subject-related** structures of education which exist at present.	29	**26**
I can see ICT breaking down the **age-related** stages of school education which exist at present.	36	**34**
ICT is the most important development currently taking place in Scottish education.	30	**30**

Table ST 9 Secondary Teachers : Ethical and Legal Guidelines
(percentage of questionnaire responses)

Has your school offered you guidelines or information on the following?:	Yes 1999	**Yes 2001**
Ethical and legal considerations	53	**70**
Copyright laws and regulations	73	**81**
Guidance to pupils on the copyright implications	17	**36**
Importance of security (e.g. passwords)	51	**82**
Protection of young people from possible exploitation (e.g. via the internet)	33	**66**
Protection of young people from exposure to unsuitable materials (e.g. pornography)	36	**74**
Suitable and safe use of e-mails by pupils	N/A	**50**
Data Protection Act	N/A	**52**

Perceptions And Experiences Of The Pupils

Table Pupil 1a The Importance of Learning to Use Computers: Open Responses
(percentage of questionnaire open responses from a 10% sample)

Why do you think it is important to learn to use computers.	**P7 Girls**	**S2 Girls**	**S4 Girls**	**P7 Boys**	**S2 Boys**	**S4 Boys**
1. Mention of job/work	35	**65**	62	**35**	42	**43**
2, Getting information/knowledge	51	**26**	15	**57**	14	**12**
3. Usefulness/speed	26	**35**	31	**26**	25	**28**
4. Things being run/controlled by computers	8	**15**	40	**8**	20	**40**

Table Pupil 1b Pupils' Confidence in Using Computers
(percentage of questionnaire responses) (1999 data in italics)

How much do you know about computers?	Primary P7	**Secondary S2**	Secondary S4
Nothing at all/very little.	16 *(24)*	**11**	9 *(15)*
Enough to get by.	54 *(53)*	**54**	56 *(59)*
A lot/I'm a real expert.	30 *(23)*	**35**	34 *(26)*
Where did you learn most about computers?			
At home/with my family.	62 *(51)*	**50**	42 *(33)*
At school.	31 *(40)*	**42**	51 *(60)*

Table Pupil 2 Frequency of Computer Use in School
(percentage of questionnaire responses)

Roughly how often do you use a computer **in school?**	**P7 2001**	S2 2001	S4 2001
Every day.	**2**	5	7
Three or four times a week.	**10**	10	48
Once or twice a week.	**51**	68	25
Hardly ever.	**36**	16	20

Table Pupil 3 The level of Computer use in Standard Grade subjects.
(The percentage of the total sample of pupils using computers, - whether they are taking the subject or not)
(**The figure in parenthesis is the % of those who used a computer while taking the subject in the previous week)*

SUBJECT	% of total S4 sample who had the subject in the previous week 2001	**% of total S4 sample who used a computer in the subject in the previous week. (*) 2001**	% of total S4 sample who used a computer in the subject in the previous week 1999
Business Management	14	**13** *(94)*	8
Technological Studies	6	**5** *(76)*	5
Graphic Communication	16	**12** *(74)*	11
Accounting/Finance	9	**4** *(49)*	6
Art and Design	36	**9** *(25)*	9
English	99	**19** *(20)*	24
Music	20	**3** *(18)*	5
Craft and Design	23	**3** *(12)*	6
Drama	9	**1** *(12)*	1
General Science	21	**2** *(9)*	2
Biology	39	**1** (3)	3
Chemistry	40	**1** *(3)*	4
Physics	34	**2** *(7)*	5
Any Foreign Lang.	90	**3** *(3)*	6
Mathematics	97	**1** *(1)*	8

Table Pupil 4a Range of Computer Uses inside School
(percentage of questionnaire responses) (1999 data in parenthesis and italics)

	In school		
What sort of things are you using computers for in school?	P7 2001	**S2**	S4
write stories, letters or reports for project work	87 *(91)*	**66**	77 *(76)*
make drawings	81 *(82)*	**80**	62 *(62)*
search for information on a CD–ROM *(like Encarta)*	65 *(62)*	**49**	48 *(49)*
search for information in a database	45 *(48)*	**68**	62 *(62)*
store information in a database *(like about birds or cars)*	41 *(39)*	**68**	56 *(50)*
draw charts or graphs from a spreadsheet	43 *(40)*	**62**	62 *(50)*
put numbers into a spreadsheet	35 *(34)*	**75**	65 *(61)*
play simulations	38 *(40)*	**27**	25 *(24)*
search for information on the Web or Internet	48 *(22)*	**65**	74 *(36)*
Do my own programming using Turtlegraphics or Logo	16 *(22)*	**24**	18 *(18)*
Use e-mail	14 *(11)*	**34**	37 *(10)*
Display or send digital photographs	13 *(10)*	**10**	11 *(10)*

Table Pupil 4b Range of Computer Uses outside School
(percentage of questionnaire responses) (1999 data in parenthesis and italics)

	Outside school		
What sort of things are you using computers for outside school?	P7 2001	**S2**	S4
write stories, letters or reports for project work	56 *(62)*	**62**	71 *(69)*
make drawings	76 *(72)*	**70**	59 *(61)*
search for information on a CD–ROM *(like Encarta)*	59 *(48)*	**57**	57 *(49)*
search for information in a database	34 *(33)*	**33**	24 *(28)*
store information in a database *(like about birds or cars)*	30 *(28)*	**27**	21 *(21)*
draw charts or graphs from a spreadsheet	22 *(22)*	**26**	19 *(18)*
put numbers into a spreadsheet	20 *(21)*	**27**	21 *(17)*
play simulations	51 *(45)*	**51**	48 *(43)*
search for information on the Web or Internet	61 *(32)*	**63**	68 *(40)*
Do my own programming using Turtlegraphics or Logo	29 *(28)*	**28**	18 **(***18)*
Use e-mail	47 *(24)*	**58**	63 *(29)*
Display or send digital photographs	18 *(13)*	**24**	24 *(15)*

Table Pupil 5a What Pupils' Like about Using Computers in School.
(percentage of questionnaire responses) (1999 data in parenthesis and italics)

	Agree		
What I like about using computers in school.	Primary P7	**Secondary S2**	Secondary S4
Using a computer in school makes school work more interesting.	86 *(84)*	**83**	78 *(78)*
Using a computer in school makes my work neater.	75 *(76)*	**89**	90 *(91)*
Using a computer in school I can find information that I cannot find in books.	76 *(67)*	**70**	68 *(55)*
I get to use my own ideas and imagination.	58 *(57)*	**54**	52 *(51)*
Using a computer in school I get on faster with my work.	48 *(41)*	**63**	62 *(62)*
Using a computer in school helps me to get better at my school work.	45 *(40)*	**51**	43 *(42)*
I get to use e-mail.	14 *(11)*	**34**	41 *(12)*

Table Pupil 5b P7/S2/4 What Pupils' Dislike about Using Computers in School.
(percentage of questionnaire responses) (1999 data in parenthesis and italics)

	Agree		
What I don't like about using computers in school.	Primary P7	**Secondary S2**	Secondary S4
I don't get to use a computer in school often enough.	59 *(58)*	**69**	54 *(60)*
The work I get to do on the school's computer is too easy.	39 *(32)*	**33**	17 *(20)*
I don't like using a computer in school because I'm too slow at typing.	24 *(24)*	**20**	16 *(23)*
The work I get to do on the school's computer is boring.	28 *(23)*	**42**	42 *(40)*
The computers I use at school are old.	17 *(18)*	**30**	24 *(35)*
The work I get to do on the school's computer is too hard.	4 *(4)*	**9**	7 *(5)*

Tables Pupil 6a The Best Things About Using Computers: Open Responses
(percentage of questionnaire open responses from a 10% sample)

The two best things about using a computer in school are ….	**P7 Girls**	**S2 Girls**	**S4 Girls**	**P7 Boys**	**S2 Boys**	**S4 Boys**
1. Things are made easier/more accurate/faster	29	52	49	26	34	48
2. Things to do with Fun/games/entertainment/excitement	40	22	17	40	23	18
3. Internet- use the internet/surf the web	22	22	28	20	28	32
4. Learning or finding out about things	26	20	28	25	18	17

Tables Pupil 6b The Worst Things About Using Computers: Open Responses
(percentage of questionnaire open responses from a 10% sample)

The two worst things about using a computer in school are……	**P7 Girls**	**S2 Girls**	**S4 Girls**	**P7 Boys**	**S2 Boys**	**S4 Boys**
1. Limited time on them; limited access	29	31	22	23	12	26
2. Mention of Boring work /machines/programmes	11	14	25	20	22	18
3. Out of date/too slow machines /printers	6	18	22	11	18	18
4. Mode of teaching and learning – *You are always in groups*	15	12	11	18	15	6

Table Pupil 7a What Pupils Would Like to be Able to Do: Open Responses
(percentage of open questionnaire responses from a 10% sample)

What would you really like doing using a computer that you cannot do now?	**P7 Girls**	**S2 Girls**	**S4 Girls**	**P7 Boys**	**S2 Boys**	**S4 Boys**
1. Use Internet/world wide web	38	32	31	31	28	29
2. Fax/email communication	35	40	28	28	22	12
3. Personal use/interest	22	31	18	32	20	23
4. Things to do, fun, games	25	11	8	40	32	22

Table Pupil 7b What Pupils Find Difficult about Using Computers: Open Responses
(percentage of open questionnaire responses from a 10% sample)

What do you think is the most difficult thing about using a computer?	**P7 Girls**	**S2 Girls**	**S4 Girls**	**P7 Boys**	**S2 Boys**	**S4 Boys**
1. Developing skills, learning	35	29	43	22	15	43
2. Typing	14	8	5	14	18	9
3. Specific programs	8	17	12	9	14	5
4. Simple procedures	11	8	5	8	8	6

Table Pupil 8 Frequency of Use of Playstation etc.
(percentage of questionnaire responses) (1999 data in parenthesis and italics)

Do you play with a Playstation, Nintendo or Sega outside school?	Primary P7	**Secondary S2**	Secondary S4
Never.	9 *(11)*	**11**	19 *(18)*
A few days a month.	11 *(14)*	**18**	26 *(26)*
One or two days a week.	18 *(16)*	**21**	20 *(19)*
Three or four days a week.	16 *(13)*	**14**	13 *(12)*
More than four days a week.	44 *(45)*	**33**	20 *(24)*

Table Pupil 9a Using a Computer Outside School
(Percentage of responses from those who have access to a computer outside school)

	'Yes'		
	P7 2001	S2 2001	**S4 2001**
Do you use a computer outside school? (Outside school can be anywhere : at home, at a friend or relative's house(e.g. an aunt or uncle) or somewhere else)(% of total sample)	**82**	80	**83**
*(% of those who answered 'yes' to above question) *Do you have a computer in the house where you usually live?	**89**	92	**93**
*Is it linked to the WWW or Internet?	**71**	74	**73**
*Is there a computer in your room?	**33**	41	**40**
*Is it linked to the WWW or Internet?	**33**	37	**35**
*Does the computer you use have a DVD player?	**39**	42	**42**
*Do you have any DVDs to play on it?	**29**	36	**33**

Table Pupil 9b Using a Computer Outside School
(percentage of overall total pupil sample)

	'Yes'		
	P7 2001	S2 2001	**S4 2001**
Do you use a computer outside school? (Outside school can be anywhere : at home, at a friend or relative's house(e.g. an aunt or uncle) or somewhere else)	**82**	80	**83**
Do you have a computer in the house where you usually live?	**73**	73	**77**
Is it linked to the WWW or Internet?	**57**	58	**60**
Is there a computer in your room?	**26**	32	**33**
Is it linked to the WWW or Internet?	**25**	27	**26**
Does the computer you use have a DVD player?	**31**	33	**35**
Do you have any DVDs to play on it?	**22**	27	**26**

Table Pupil 10a Frequency of Computer Use Outside School
(Percentage of responses from those who have access to a computer outside school)

Roughly how often do you use a computer **outside school?**	**P7 2001**	S2 2001	**S4 2001**
More than four days a week	**38**	38	**38**
Three or four days a week	**22**	21	**20**
One or two days a week	**25**	24	**26**
A few days a month	**15**	17	**16**

Table Pupil 10b Frequency of Use of Computer Outside School
(percentage of total pupil sample) (1999 data in parenthesis and italics)

Roughly how often do you use a computer **outside school?**	Primary P7	**Secondary S2**	Secondary S4
More than four days a week.	31 *(32)*	**31**	32 *(22)*
Three or four days a week.	18 *(17)*	**17**	17 *(16)*
One or two days a week.	21 *(20)*	**19**	21 *(21)*
A few days a month.	12 *(14)*	**14**	14 *(21)*
TOTAL% of pupils using a computer outside of school	**82** ***(83)***	**80**	**83** ***(80)***

Table Pupil 11 Home /School Differences
(percentage of questionnaire responses)

Do you agree with these statements?	**Agree**		
	P7	S2	S4
At home there is always someone handy to help me if I get stuck with the computer.	**80**	68	**51**
At school the teacher is always handy to help me if I get stuck with the computer.	**78**	72	**68**
At home I can spend as long as I like doing my work on the computer.	**78**	84	**87**
At school I can spend as long as I like doing my work on the computer.	**6**	12	**10**
At home I can try out lots of different things on the computer.	**91**	89	**92**
At school I can try out lots of different things on the computer.	**42**	32	**33**

Table Pupil 12 P7/S2 Progression: Pupils' Level of Confidence
(percentage of questionnaire responses from same sample of pupils)

	P7 1999	**S2** **2001**
How much do you know about computers?		
Nothing at all/very little.	24	**11**
Enough to get by.	53	**54**
A lot/I'm a real expert.	23	**35**
Where did you learn most about computers?		
At home/with my family.	51	**50**
At school.	40	**42**

Table Pupil 13 P7/S2 Progression: **Frequency of Use of Playstation etc.**
(percentage of questionnaire responses from same sample of pupils)

Do you play with a Playstation, Nintendo or Sega outside school?	P7 1999	**S2** **2001**
Never.	11	**11**
A few days a month.	14	**18**
One or two days a week.	16	**21**
Three or four days a week.	13	**14**
More than four days a week.	45	**33**

Table Pupil 14 P7/S2 Progression: Frequency of Computer Use Outside School.
(percentage of questionnaire responses from same sample of pupils)
(The figures in brackets present the percentages of the home user group only)

How often do you use a computer outside school?	P7 1999	**S2** **2001**
A few days a month.	14	**14** (17)
One or two days a week.	20	**19** (24)
Three or four days a week.	17	**17** (21)
More than four days a week.	32	**31** (38)
TOTAL	83	81 **(100)**

Table Pupil 15 P7/S2 Progression: Range of Computer Uses Inside and Outside School
(percentage of questionnaire responses from same sample of pupils)
(The figure in brackets refers to the percentages of home users only)

What sort of things are you using computers for?	**At School**		**Outside School**	
	P7 1999	**S2** 2001	P7 1999	**S2 2001**
write stories, letters or reports for project work	91	**66**	62	62 **(77)**
make drawings	82	**80**	72	70 **(87)**
search for information on a CD–ROM *(like Encarta)*	62	**49**	48	57 **(71)**
search for information in a database	48	**68**	33	33 **(41)**
store information in a database *(like about birds or cars)*	39	**68**	28	27 **(33)**
draw charts or graphs from a spreadsheet	40	**62**	22	26 **(32)**
put numbers into a spreadsheet	34	**75**	21	27 **(33)**
play simulations	40	**27**	45	51 **(63)**
search for information on the Web or Internet	22	**65**	32	63 **(78)**
Do my own programming using Turtlegraphics or Logo	22	**24**	28	28 **(35)**
Use e-mail	11	**34**	24	58 **(72)**
Display or send digital photographs	10	**10**	13	24 **(30)**

Table Pupil 16 P7/S2 Progression: What Pupils Don't Like About Using Computers
(percentage of questionnaire responses from same sample of pupils)

	Agree	
What I Don't Like about Using Computers in Schools.	P7 1999	**S2 2001**
I don't get to use a computer in school often enough.	58	**69**
The work I get to do on the school's computer is too easy.	32	**33**
I don't like using a computer in school because I'm too slow at typing.	24	**20**
The work I get to do on the school's computer is boring.	23	**42**
The computers I use at school are old.	18	**30**
The work I get to do on the school's computer is too hard.	4	**9**

THE ICT COMPETENCES & RELATIONSHIP TO IMPACT OF ICT FRAMEWORK — APPENDIX 8

Developing ICT Capability

	Level A		Level B		Level C	
Using the technology	• Using a mouse to point and click • Start up/shut down the computer • Use a keyboard/concept keyboard • Print by clicking a 'print' button • Save and retrieve work , with support		• Use menus and further mouse controls • Start and close an application, create a new document • Know the use of 'username' and 'password' • Save and retrieve work independently		• Use the components of a 'windows' environment • Use a computer securely and responsibly • Use a computer on a network • Use another input device • Understand differences between using hard disc and floppy discs	
Creating and Presenting	• Create, enter and amend one or more sentences without teacher support • Create a picture using simple software • Add text to picture		• Create and edit a pieces of text, e.g. menu, invitation, story • Print out work • Create a document with text and graphics using simple software • create a multimedia page using simple software.		• Create and edit a document, e.g. report, newspaper article, letter using increasingly extended text handling features • Create a document with text and graphics, using more sophisticated software • Create a simple multimedia presentation e.g., slide show/web page using appropriate software	
Collecting and analysing	• Use non-computer databases • Use simple pre-defined computer databases		• Enter data into a pre-defined database • Browse records and produce a simple report with support		• Understand the structure of a database • Interrogate a database • Create a simple database • Produce reports independently	

	Level A		**Level B**		**Level C**	
Searching and researching	• Using a mouse to point and click • Recognise that information is available electronically		• Access information on CD-ROM with support • Access websites with pre-set bookmarks		• Use Teletext • Access CD-ROMs independently • Use a web browser independently • Print selectively	
Communicating and collaborating	• Show awareness that messages can be communicated electronically • Give simple comparisons with telephone/post		• Make simple person-to person communication, e.g. mail • Describe simple comparisons between phone/fax/email		• Manage their own electronic communications e.g. managing a mail box • How an awareness of the style of communication (genre) • Be aware and describe issues surrounding responsible use	
Controlling and modelling	• Follow directional instructions		• control a screen image through simple instructions, e.g. a turtle • use simple simulation/adventure games		• Control an external device by given instructions in single steps, e.g. floor turtle/robot arm	
Developing informed Attitudes	• Recognise and appreciate the role of ICT in accessing information and knowledge, fostering creativity and facilitating the exchange of ideas • Appreciate the personal and societal benefits of ICT • Become aware of the implications of the uses of ICT in different situations, e.g. the workplace, home • Appreciate the need for responsible uses of ICT and the need to protect information individuals and society from its misuses					

	Level D		Level E		Level F
Using the technology	• Customise aspects of the system • Use help facilities • Understand that computers can be different in type • Understand the need for backing up files and be able to do so • Understand the advantage of being able to share files		• Interpret simple computer specifications • Understand the costs of accessing network services • Use other peripherals as appropriate • Copy/duplicate discs		• Use manuals and on-line help to resolve simple hardware and software problems • Understand how a computer and its peripherals and software work together in simple terms
Creating and Presenting	• create and edit a document, e.g., card, calendar, school newspaper, using more advanced text handling features • create a document, e.g. magazine, advert, using a range of drawing/painting facilities • create a more sophisticated slide show/presentation or web pages with teacher support.		• Create a document incorporating textual, graphical and statistical information • Create a document using and manipulating a wide range of graphic material • Create a multimedia presentation or web pages working independently		• Create a document using desktop-publishing software package • Produce a well presented document incorporating a high level of graphics manipulation • Create a multimedia presentation or web pages, incorporating a wide range of multimedia features
Collecting and analysing	• Use database reports including searching and sorting • Understand the structure of a spreadsheet • Enter data into a spreadsheet		• Analyse problems, implement and evaluate solutions using database and spreadsheet • Model simple scenarios using spreadsheet • Produce graphs		• compare databases and spreadsheets as solutions to problems • use more advanced function of databases and spreadsheets
Searching and researching	• search across a range of media • use a search engine • create bookmarks • capture text and graphics by copying and pasting		• apply web searches to real life situations • download files • refine searches • compare two websites		• use specialist search engines • refine searches using logical operators • file transfer and compression • make critical evaluation of websites and search engines

	Level D		Level E		Level F
Communicating and collaborating	• carry out simple shared activity e.g. group communication/collaboration by email • demonstrate integration of email with other software attachments • show awareness of advantages/misuse of appropriate styles/genres		• take part in group collaboration activity, e.g. electronic conference • show awareness of appropriate style and etiquette of conferencing		• instigate/manage a group activity e.g. electronic forum/conference • understand and use different collaborative approaches e.g. real-time/without time constraints
Controlling and modelling	• plan a sequence of instructions to be executed by a device • be aware that computers can collect information about the environment through sensors, e.g. temperature, light, sound • be aware that computers can be used to simulate real situations and be aware why they are used for this purpose e.g. hazardous situations/training		• control device through a more complex sequence of instructions .e.g. containing a loop • use a computer to collect and process data from the environment		• create a set of computer instructions to solve a problem • select appropriate input and output devices of solve problems
Developing informed Attitudes	• Recognise and appreciate the role of ICT in accessing information and knowledge, fostering creativity and facilitating the exchange of ideas • Appreciate the personal and societal benefits of ICT • Become aware of the implications of the uses of ICT in different situations, e.g. the workplace, home • Appreciate the need for responsible uses of ICT and the need to protect information individuals and society from its misuses				