REPORT NO 882/00

ANGUS COUNCIL

EDUCATION COMMITTEE

22 AUGUST 2000

IMPLEMENTING A POLICY ON ICT IN ANGUS PRIMARY SCHOOLS

REPORT BY THE DIRECTOR OF EDUCATION

ABSTRACT

This report draws the Committee's attention to research into Information and Communication Technology in Angus Primary Schools.

1 RECOMMENDATIONS

It is recommended that the Education Committee:

i notes the content of the research report prepared by Mary Simpson and Fran Payne (Appendix)

ii instructs me to arrange for the Education Department's ICT Strategy Group to prepare an appropriate follow up action plan

2 BACKGROUND

2.1 Reference is made to the meeting of the Education Committee of 8 June 1999 when the Committee endorsed arrangements to evaluate the use and impact of Information and Communication Technology in Angus Primary Schools (Article 20 of the minute of the meeting refers).

2.2 The evaluation was led by Professor Mary Simpson (formerly of Northern College and now of Edinburgh University). The work undertaken by Professor Simpson in Angus schools took place approximately 6 months after a major national survey with a similar purpose – to monitor the impact of ICT to date, and to set a baseline for future surveys.

2.3 The report of the national research is summarised in the Scottish Executive "Interchange" (No 63). The report of the Angus survey is appended.

3 KEY ISSUES

3.1 It seems clear from the research that significant progress has been made by schools, and staff should take heart from this. The speed with which ICT has progressed in the last 20 years, and the speed with which it continues to progress, means that it is highly unlikely we can ever reach a stage when we can sit back and say that no further development work is required. While such a situation can be stimulating, it can also be de-motivating, particularly when there are many aspects of learning which require just as much attention as ICT. Future development work, therefore, needs to be firmly set in the context of effective learning, within a framework of attainable goals.

3.2 The research helpfully highlights the ways in which ICT is currently most effectively used by pupils, as well as pointing to specific areas of the curriculum which may benefit from further ICT applications.

3.3 The potential of ICT to reduce administrative and clerical workload for staff has long been recognised, albeit the difficulties of taking full advantage of that potential have not yet been fully overcome. The research provides a baseline from which further progress in this key area can be measured.

3.4 The use of ICT to improve communications has also long been recognised, and this research should be used as a further catalyst to move forward in this area also.

3.5 There is a wealth of information in the research report about the kind of ICT support which teachers have available, and very useful pointers about types of support which seem to be most effective.

4 FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

5 FUTURE PLANS

5.1 The interim research findings were shared with all primary head teachers in May of this year, and further awareness raising will be an ongoing feature of the work of the Education ICT Team in 2000/2001.

5.2 There already exists a well-established departmental ICT Strategy Group, composed of school based staff and central support staff.

5.3 It is proposed that the Strategy Group should be asked to consider this research with a view to preparing a follow-up action plan consistent with ICT developments already planned as part of the Education Service Plan.

6 CONSULTATION

6.1 In accordance with the Standing Orders of the Council, this report has been the subject of consultation with the Chief Executive, the Director of Finance and the Director of Law & Administration. The Director of IT has also been consulted.

Jim Anderson
Director of Education

No background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973 (other than any containing confidential or exempt information) were relied on to any material extent in preparing the above report.

APPENDIX

JAA/CJ

IMPLEMENTING A POLICY ON ICT
IN ANGUS PRIMARY SCHOOLS

Mary Simpson and Fran Payne

1. INTRODUCTION

1.1 The National Context and Authority Policies

Transforming education

> *"Technology has revolutionised the way we work and is now set to transform education. Children cannot be effective in tomorrow's world if they are trained in yesterday's skills. Nor should teachers be denied the tools that other professionals take for granted."*
>
> Tony Blair
> 'Connecting the Learning Society' 1997

Information and communications technologies are likely to transform education not just because the children need training in the associated skills in order to make them competent in their future workplaces, but because the school itself is a workplace, the workplace of both teachers and learners. A third reason why the technologies will change the classroom is that they offer, for the first time, universal access to an unlimited amount of information – on every subject imaginable. Until now, the teacher has been the main avenue of access to the formal information of school learning for many pupils. A number of huge questions are therefore immediately raised concerning the ways in which the introduction of ICT should be funded and planned; how it can best serve as a tool for learners to learn; and what the key activities of the teacher will be in the new 'technology rich' classroom of the future.

Both national and local government staff have formulated plans to assist schools to develop the use of ICT as effective tools for teaching and learning. This project is part of a programme of monitoring to find out exactly how the technology is being used, how well staff are being supported and whether the pupils and teachers indicate that they feel any change or benefit to their experiences.

What has the Scottish Executive Education Department done so far?

Since 1997, the Scottish Executive has been setting in place a series of funded programmes to promote and support the use of ICT in schools. They comprise a complex and wide ranging set of initiatives, the effects of which have yet to be felt in schools. This survey is therefore intended to give a 'baseline' description of how things stand at this point in the programme. We expect to run a similar exercise in a year or two to see how things have changed, and whether they are going as anticipated.

The funding programme has three main aims:

- **To increase the amount of, and access to up-to-date ICT equipment in schools**.
  Money has been allocated to support schools in the installation of ICT hardware. Many teachers have been supported in buying their own computers, and targets have been set

for the provision of modern desktop computer equipment intended to realise pupil to computer ratios of one computer for every five pupils in secondary and one for every eight pupils in primary schools.

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

  The **SuperHighways Task Force** has produced the publication *ICT and Development Planning* to assist schools in the purposeful and phased introduction of ICT into their classrooms and their administrative and management processes.

  The **Scottish Virtual Teachers' Centre** has been established by SCET/SCCC to offer teachers access to a range of curriculum resources and pointers towards known, relevant, on-line resources and sites.

  A full time task force has now been set-up including several national specialists in the following areas: Educational Content, Community Education, Training and Development, Infrastructure, and a SVTC Consultant. In addition, the team that is based at SCET in Glasgow has appointed a Customer Support Executive.

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

  New Opportunities Funding is intended to provide appropriate staff development in tandem with the programme of installation of the new hardware, software and WWW links. Schools and authorities are able to choose from a range of validated training providers where the focus is on the use of ICT to deliver existing curriculum rather than on the acquisition of ICT skills and competences.

What has the Authority done so far?

The Angus Council Education and ICT Departments have set in place a number of initiatives to assist teachers, librarians and non teaching staff with ICT.

Initiatives currently underway include

- Creating an educational ICT support team which deals with all aspects of ICT in schools from hardware faults through to networks, network management, installation and training. The team comprises an education manager, sytems engineers, staff tutors, ICT officers, and clerical support based in a purpose built ICT suite with in-house training facilities.
- A phased installation programme of intranet, Internet and e-mail for all staff and pupils. This includes a fully designed **intranet** framework specifically designed to take account of the needs of learning and teaching in schools and school administration.
- The development of a multi-media programme of study for ICT stages 1-7 matched specifically to 5-14 curriculum software.
- Planning access to a wide range of ICT training opportunities available off-site, on-site either as day, twilight, or evening sessions.
- Ensuring resources are in place to provide support for teachers and librarians seeking to enhance ICT skills through New Opportunities Fund training.
- Planning for broadband (high speed) network links between primary schools, secondary schools and education offices.
- Making Management and Information Systems (MIS) software applications available to all schools. These comprise both in-house developed products and third party commercial modules (Phoenix).

1.2 The Angus Primary School Survey

As we indicated above, these funding initiatives are so recent that it is too early to see widespread effects in schools and classrooms. Yet it is clear that quite a lot has already happened in some schools and some classrooms with respect to the use of ICT. This survey was commissioned by Angus Council to monitor the impact of ICT to date, and to set a baseline for future surveys.

This survey in Angus primaries took place about six months after a major national survey with a similar purpose in a sample of primary and secondary schools, so it has been possible in some areas where the questions are similar, to compare the Angus data with information from the national picture. The findings from the national survey can be found in Interchange no 63 (Stark et al., 2000) which will soon be available at http://www.hmis.scotoff.gov.uk/riu/ The details of the Angus sample can be found in appendix 1.

The teacher sample (N=39) was a mixture of P4 and P7 staff; the pupil sample (N=201) was drawn from P7 only. The ICT coordinators (N=23) were largely in promoted posts, with about 25% having some formal ICT qualification. These tended to be post graduate qualifications from Teacher Education Colleges in the late 1980s or early 90s. Over 80% of the coordinators had qualified 16 or more years before.

1.3 The Key Questions

There are a number of key questions raised by any investigation of the use of the new technologies in schools and we use these to structure the main sections of this report.

Firstly: Where are we starting from?

What attitudes, expectancies and skills do the teacher and pupils in Angus bring into the classrooms from their lives outside schools? What ICT related activities are already established in the schools and classrooms? How competent do teachers feel in some common uses of ICT? What are the pupils' experiences and what do they feel about it all?

Secondly: What are the schools hoping to achieve?

What are the aspirations for teachers and pupils in the future?

What is already in place, what is in the development plan?

Thirdly: What support is currently in place?

What support, equipment and skills are needed to help us achieve the goals? What use is made of the guidelines supplied from outside the school?

Fourthly: What are the key obstacles?

What difficulties are getting in the way of effective development?

Finally: Reflections on progress and prospects

2. WHERE ARE WE STARTING FROM?

Even at this early stage in implementation, the majority of Angus Primary 4 and 7 teachers have positive attitudes towards ICT and are well aware of its potential to contribute significantly to their professional lives. The overwhelming majority feel that ICT has already enhanced a number of their established classroom practices, contributed in positive ways to the learning of pupils and that, in the future, their independent learning skills and attainment will also be promoted.

For many teachers, **time** is of course the great enemy. Just over half say they don't have time to become familiar with ICT resources, and half feel they are not yet really on top of strategies for managing ICT in the classroom. Around a third feel it is '*disturbing that pupils know more about ICT than I do*' Whether for better or worse, just over half '*now have a vision of the classroom of the future which is very different from the classroom as I experience it at present*'.

In order to understand more clearly exactly how things have developed so far, we look first at the already established experiences of the teachers and pupils, firstly with respect to those outside the school.

2.1 Using Computers at Home

2.1.1. How experienced are pupils in using ICT outside school?

For many teachers, ICT presents a challenge because they see it as an additional subject to be taught in an already overcrowded curriculum. The way in which the SEED 5-14 guidelines are set out almost suggests this. We were not able to devise formal assessment material for pupils, but through several questions in the pupil questionnaire we were able to paint a picture of their experiences and skills. The information in table 2.1 shows, for example, that the majority of pupils are already very confident about using computers, and that as many learned their skills at home as at school.

Table 2.1 Pupils' General Attitudes and Skills
(per cent of respondents)

	National survey	**Angus survey**
How much do you know about computers?		
Nothing at all / very little.	24	**18**
Enough to get by.	53	**46**
A lot / I'm a real expert.	23	**36**

Where did you learn most about computers?	National survey	**Angus survey**
At home / with my family.	51	**49**
At school.	40	**45**
Do you like using computers at school?		
I hate using them.	2	**2**
They are OK.	27	**19**
I like them / they are brilliant.	71	**78**

As far as skills and attitudes are concerned, the pupils in Angus are showing comparable levels of confidence and positive engagement to those of their peers across Scotland in the national sample.

However, they may not all be referring to computers as opposed to playstations etc. We tried therefore to unpick the detail of what they actually did using their home machines.

Table 2.2 Do you play with a Playstation, Nintendo or Sega outside school?
(per cent of responses)

	National	**Angus**
Never.	11	15
A few days a month.	14	10
One or two days a week.	16	14
Three or four days a week.	13	12
More than four days a week.	45	48

There is, as expected, a widespread and regular engagement with games computers. But, in addition, we ascertained that around 80% of the pupils have, by some means, access to computers which performed functions other than running packaged games and programmes; one third of the pupils use these more than three days a week (see table 2.3). The location of these computers was mainly at home (62%), but the homes of friends and relatives, the library, and mum's or dad's work were also mentioned.

Table 2.3 How often do you use a computer outside school?
(per cent of responses)

	National	**Angus**
A few days a month.	14	20
One or two days a week.	20	19
Three or four days a week.	17	13
More than four days a week.	32	28
TOTAL	**83**	**80**

We asked the pupils what they usually did using their computers at home, and compared this with the uses they reported when they used computers in school.

Although the level of use was generally lower at home than at school, there was clearly use across the whole range of items. At this stage, rather more pupils indicated the use of e-mail at home than at school.

Table 2.4 What sort of things are you using computers for?
(per cent of responses)

	In school		At home		A t h o n e
	Nat	**Angus**	Nat	**Angus**	
write stories, letters or reports for project work	91	**95**	62	**66**	
Do my homework			44	**41**	
Practise things I learn at school			43	**42**	
search for information on a CD–ROM *(like Encarta)*	62	**75**	48	**57**	
search for information in a database	48	**33**	33	**33**	
store information in a database *(like about birds or cars)*	39	**30**	28	**28**	
draw charts or graphs from a spreadsheet	40	**38**	22	**18**	
put numbers into a spreadsheet	34	**18**	21	**15**	
play adventure games	58	**73**	71	**74**	
search for information on the Web or Internet	22	**16**	32	**45**	
Use e-mail	11	**9**	24	**36**	
Display or send digital photographs	10		13		

Once again, the Angus sample ran fairly parallel with the national sample. Out of our total sample of children, over 60% are using word processing on home computers, and around half are using CD-ROM to find information and doing work related to school tasks. We estimated from all our evidence that about 30% of home computers were linked to

the internet, which made the claim of 36% to be e-mailing from home more realistic than the 45% claiming to search for information on the WWW. However, we must remember that youngsters will seek out these facilities wherever they are available, and it is very possible that 45% are indeed experiencing 'surfing' from a computer in some out-of-school location or another.

This leads us inevitably to the next question: what is the picture with respect to the out-of-school use of computers by teachers?

2.1.2 How experienced are teachers in using ICT outside school?

> *ICT is always changing. It is practically impossible to keep up unless you have a specific interest in it. Without time to access computers themselves, teachers will never have the confidence to teach skills to children.*
>
> *I would love to do more with my computer at home but I haven't worked out how to do it yet!*

The teachers have a similar level of access to home computers to the pupils – 72% indicate that they use one at home. Like their pupils, word processing is the most frequently reported activity and, like the pupils, a significant proportion use their home machines to undertake work related to school (see table 2.5).

Table 2.5 Using ICT at Home
(per cent of responses)

I use a computer/laptop at home to	Occasionally/ Fairly regularly		Never	
	Nat	**Angus**	Nat	**Angus**
word process for school use.	68	**70**	0	**3**
word process for personal use.	65	**69**	1	**3**
search for information on a CD–ROM.	49	**59**	14	**10**
make pictures using a graphics package .	46	**44**	17	**26**
search for information on the Web.	28	**46**	33	**23**
send e-mail to friends and family.	27	**41**	36	**28**
look for interesting sites on the Web.	24	**38**	37	**31**

Once again, the Angus sample responses are very similar to those of the national sample, but it would seem that rather more use is made of networked services – over 40% indicate that they are e-mailing friends and relatives and using access to the WWW.

In Summary

It would seem that the pupils and teachers in Angus primaries are well up to the national average with respect to access, use and positive engagement with computers at home. Although we can expect to see continued increase in home access, there will nevertheless be some homes which remain without the technology for some time yet. The children from these homes may lag behind somewhat in their skills, but the extent to which children appear to learn from each other in this particular area, and the extent to which computers are being introduced in nurseries and early stages seems to make it likely that **many basic technical skills will soon be almost universal among primary school pupils.**

It seems inappropriate, therefore, to build in strategies for teaching these skills to whole classes or large numbers of pupils. Most children of primary years appear to have already learned to use the technology to serve their uppermost needs – entertainment, getting in touch with others and keeping up with the gang. Unlike reading, learning to use the technology is not a chore. The main task for teachers will be to ensure that the small proportion of pupils who, for whatever reason are not keeping up with the others, are not left too far behind. However, it would seem a very promising area for trying out peer coaching.

In the next section, we look at what teachers and pupils are doing with computers in the classroom.

2.2 Using Computers in the School and Classrooms

2.2.1 The curricular areas

We asked the **coordinators** to indicate their rating for the stage of development of ICT use (1 to 3) in the curricular areas indicated below, and to indicate whether developmental assistance was a priority. It is clear that the use of word processing in language work has put the level of use in that subject well ahead of the rest. Assistance for developments in science polled most responses, but at 9% there was clearly not a widespread perception of urgency.

Table 2.6 Stages of development: curricular areas

1. Well established
2. Beginning to work towards this now
3. Not on our immediate list of priorities for development
4. Need assistance with this as a priority

Learning and teaching in the classroom	**1**	**2**	**3**	**4**
Using ICT in 5-14 Language work	44	56	0	0
Using ICT in 5-15 mathematics	26	61	9	4
Using ICT in 5-14 science	9	43	39	9
Using ICT in 5-14 Environmental Studies	17	61	17	4

2.2.2 Generic Activities

When asked to rate the level of development of the more generic ICT related activities, the use of CD-ROMs and specialist help for pupils with learning difficulties were the most frequently identified as being 'well established'. Extending opportunities for high attaining pupils was little developed, and clearly not high in the list of intended developments for the future. The most frequently identified need for support (30%) was in securing opportunities for pupils and teachers to access curriculum material directly from the WWW.

Table 2.7 Stages of development: generic activities

1. Well established
2. Beginning to work towards this now
3. Not on our immediate list of priorities for development
4. Need assistance with this as a priority

Learning and teaching in the classroom	**1**	**2**	**3**	**4**
Securing opportunities for pupils and teachers to access curriculum material directly from CD-ROMs or CDi.	44	35	17	0
Securing opportunities for pupils and teachers to access curriculum material directly from the WWW.	0	22	48	30
Setting goals for ICT experiences for all pupils at different stages.	22	48	13	17
Extending learning opportunities for high attaining pupils (e.g. after school activities; or use of laptops).	0	17	70	9
Giving specialist assistance to pupils with learning difficulties.	57	35	4	9
Enhancing the quality of reports or profiles of pupils' progress and attainment.	17	48	35	4

2.2.3 Supporting School Development and Management

> *In a 2 teacher school with a part-time secretary/clerkess, it is not humanly impossible to be a Super Head/ Class Teacher and do all that is needed in ICT in 5 hours a day. An ICT assistant would be a big asset to both the pupils and myself to ensure that ICT is well managed in the classroom.*

> *The plain fact is that we all live in a world of finite resources. With a full time engineer- a full time co-ordinator for the school and a vast hike in school budgets we could be up and running by March 2000. However there is the small matter of the fact that all other areas of 5-14 require to be maintained and developed. We need to follow up now HMI recommendations also. Time scales accordingly hard to be realistic and achievable.*

The staff of small schools suffer from the pressure of too many requirements falling on a small number of people. Nevertheless, the use of ICT to manage the budget was well established in the majority of schools. The monitoring of effectiveness and the centralisation of records were being developed by around half of the schools, but the development of administrative and managerial uses of ICT were not generally seen as a priority.

Table 2.8 Stages of development: school management

1. Well established
2. Beginning to work towards this now

3. Not on our immediate list of priorities for development
4. Need assistance with this as a priority

Supporting School Development and Management.	**1**	**2**	**3**	**4**
Centralising the assessment and testing records of pupils.	4	44	35	17
Using ICT to manage the school development budget	74	17	9	0
Using MIS to manage school administration	22	9	35	4
Using ICT for monitoring the effectiveness of the school.	13	44	44	0

2.2.4 Extending beyond the classroom

One of the difficulties felt by schools in the past has been that of extending the experiences of pupils, for example by giving them opportunities to exchange views with pupils in other countries (pen friend correspondence is so slow!), to encounter pupils with similar interests in other schools, or to make contact with those who might be able to answer the kinds of questions which often stumps the teachers (councillors, politicians, museum curators etc.) ICT offers a range of opportunities to extend communications with the outside world. We asked the coordinators to indicate their views on developments in some of these areas.

Electronic links with the wider community - whether with parents, professional colleagues, pupil peer groups or the local community were certainly the least well advanced in their development compared with the items in the tables above, and not high on the list of priority for development.

> *Remote location community computers to be available in community hall. Pupils would benefit from links with others but no internet access. Only one of the parents has computer at home*

Table 2.9 Stages of development: communicating beyond the classroom
1. Well established
2. Beginning to work towards this now
3. Not on our immediate list of priorities for development
4. Need assistance with this as a priority

Communicating and working with others outside school	**1**	**2**	**3**	**4**
Giving the local community access to school computers or the Internet.	4	13	83	0
Establishing collaborative projects with pupils in other schools using electronic networks.	9	17	70	9
Giving pupils access to subject specialists outside the school	0	0	100	0
Using e-mail to communicate with some parents	4	4	91	0
Communicating the schools' identity and role in the community and beyond (e.g. through a WWW page)	0	26	70	9

2.2.5 Competence and frequency of use.

Difficulties lie in lack of up-to-date equipment, not in enthusiasm.

I have difficulty keeping up to date – cost, type of machine etc. Also accessing computer for practice/preparation. Keeping up to date with constant changes in hardware.

A large block of 5-7 days would be the ideal way to develop my ICT strengths!

In one of the sections of the questionnaire, we asked the teachers how often they used ICT in different ways, and how competent they felt about using it in this way. Some of the results are presented below.

Our respondents were clearly regular users of word processing and educational software packages, although only a minority described themselves as 'very competent' users. The low use of electronic communications was almost certainly a reflection of the fact that few classroom computers are actually networked at present.

We're not linked to the internet but I would happily use it in class if we were.

Table 2.10 Frequency of use and competence
(percentage of responses)

	Approximately how often do you use the following ICT resources in the classroom?		**How teachers rate their competence**	
	Weekly	Never	Very competent	Not very competent
Word processing	72	5	31	23
Databases	3	26	5	46
Spreadsheets	5	51	0	46
Desktop publishing	15	39	3	36
CD-ROM information sources e.g. Encarta	39	15	28	13
Educational software packages	74	3	23	10
Internet and World Wide Web (WWW)	0	90	5	41
E-mail	8	80	10	41
Network computer conferencing	0	95	0	56

2.2.6 The pupils' classroom experiences

We asked the teachers what their pupils would be likely to use ICT for in their classroom and they responded as set out in table 2.11. Word processing, and aspects of information gathering and handling appeared to be the most advanced, and no doubt with the pupils 'making drawings' was the most popular! Staff development on the use of databases was the most frequently identified priority. The figures are not identical to those given by the pupils – we did word some questions rather differently - and the pupils' perceptions are likely to be heavily influenced by their most recent experiences. Nevertheless, the general scale and patterns are similar, and give at least a good indication of trends in what is happening.

Table 2.11 The pupils' ICT use in classrooms
(percentage of 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	Not yet working towards this	**priority** for staff development
write stories, poems or reports	95	5	0	10
store information on a database	59	33	8	23
search for information in a database	64	31	5	23
search for information on a CD-ROM	82	13	5	8
draw charts from a spreadsheet	72	26	3	5
make drawings	82	13	5	5
search for information on the Web	8	21	69	15
send e-mail to pupils in other schools	16	18	64	10
send e-mail to people outside school	10	18	69	8

2.2.7 The teachers' professional uses of ICT

Use of computer by teachers for keeping records, assessment and reports is encouraged but lack of knowledge or time with computers.

There is an additional range of professional tasks in which teachers may use ICT. We itemised some of these and asked the teachers to indicate how well established some of these uses were in their activities. Some of the national figures are presented in brackets.

Table 2.12 The teachers' professional uses of ICT
(percentage of responses)

I use ICT in the following ways:	Already well established	Likely to be introduced over next 1 to 2 years	Not yet working towards this
Keeping track of pupils' learning progress	**31**	**41**	**26**
Providing differentiated activities for pupils	**74** (36)	**18**	**5** (12)
Giving high attaining pupils additional opportunities	**49** (44)	**31**	**13** (12)
Linking some pupils with specialist teachers from outwith the school (e.g. art / music)	**3** (0)	**5**	**87** (93)
Giving specialist assistance to pupils with learning difficulties	**72** (34)	**15**	**8** (24)
Creating and updating lesson plans	**26**	**18**	**49**
Creating teaching resources for specific curricular areas	**59** (32)	**18**	**15** (30)
Downloading curricular materials from the WWW from other schools or resource providers	**15** (8)	**21**	**59** (41)

2.2.8 The pupils' views about using computers in class

Key data on the pupils' likes and dislikes about using computers are presented in tables 2.13 and 2.14. Most pupils indicated that work was more interesting and neater and, in addition, they were able to find information not accessible through books and to use their own ideas and imagination.

In the open responses to the questions, pupils indicated a range of views. The most frequently indicated positive response related to the playing of games and the use of drawing programmes. Clearly, using ICT for entertainment was high on their agenda! Using particular programmes for different activities also figured in the responses – e.g. *"I like using Encarta for my project work"; "I like using Music Explorer"*.

Table 2.13 What I Like about Using Computers in School.
(per cent of responses)

	Agree	
	National	**Angus**
Using a computer in school makes school work more interesting.	84	**87**
Using a computer in school makes my work neater.	76	**81**
Using a computer in school I can find information that I cannot find in books.	67	**73**
I get to use my own ideas and imagination.	57	**73**
Using a computer in school I get on faster with my work.	41	**45**
Using a computer in school helps me to get better at my school work.	40	**44**
I get to use e-mail.	11	**8**

What did they dislike about using computers? In the questionnaire responses, around 25% of pupils indicated a typing difficulty; but with the exception of access, the proportions of pupils indicating dislikes were lower than those indicating likes (table 2.14). The Angus data also reflected the national findings with respect to how they perceived the level of difficulty of the work given. That the work given was too easy was a perception of considerably more pupils (45%) than that the work was too hard (6%).

In the open responses, limited access to the computers, or to internet and e-mail was the most frequent category of what they did not like. One child remarked: *'I don't get on it very often, some people are always on but the teacher never notices.*' And another: '*Typing is the hardest thing for me because I am too slow at it.'*

Table 2.14 What I Don't Like about Using Computers in Schools.
(per cent of responses)

	Agree	
	National	**Angus**
I don't get to use a computer in school often enough.	58	**59**
The work I get to do on the school's computer is too easy.	32	**45**
I don't like using a computer in school because I'm too slow at typing.	24	**25**
The work I get to do on the school's computer is boring.	23	**24**
The programmes on the school's computer are not as good as the ones I use at home	45	**54**
The work I get to do on the school's computer is too hard.	4	**6**

In response to the open question on what they thought was the most difficult thing about using a computer, there was a clear majority itemising technical difficulties: *'Knowing what to do when it goes wrong'*; '*When you can't exit a programme'*. The next most frequent response category related to their lack of skills: *'Learning what programme to use'; 'Knowing what I am looking for and then seeing all the icons confuses me.'*

One child wrote: *'I'm so rubbish, everything is hard'*.

In Summary

The pattern of ICT use in Angus schools is very similar to the national picture. In **the 5-14 curricular areas** the use of word processing is well established in almost half the schools; rather less development has been undertaken in mathematics; the use of ICT in science and environmental studies generally is the least well developed. In the generic activities of class and curriculum management, applying ICT to assist **pupils with learning difficulties** is the most securely established. Unfortunately, the questionnaire responses did not allow us to identify what had been put in place, and the range of learning difficulties which had been addressed. A small proportion of schools (22%) had established goals for ICT experiences for pupils of different stages, however, again it was not clear to what extent these were treated as a separate set of skills, or embedded within the wider curriculum.

Procedures for the **centralisation of assessment and testing information**, and procedures for monitoring the effectiveness of the school are just beginning to be put in place by around half of the schools. It would seem that this is an area in which staff may need assistance to develop the use of systems. This information is regularly gathered within classrooms, and the effective management of data on school outcomes can be a powerful tool for professionals to monitor their own performance and deal with anomalies and problems before they are identified by others.

Electronic communication with the wider community - whether with parents, professional colleagues, pupil peer groups or the local community appear to be the least well developed of the activities which ICT can support, and are not on the agenda for development for the great majority of

schools. This may reflect the low level of access to electronic mail from classroom computers, but almost all schools had access to e-mail.

In comparison with the national sample, a significantly higher proportion of Angus teachers indicate that they have used ICT to put in place well established **differentiated activities for pupils** and specialist assistance for pupils with learning difficulties and to create resources for particular curricular areas. The proportions claiming well established procedures in other areas are similar to those of the national sample. For example, around half indicate that ICT use in giving **high attaining pupils** additional opportunities is well established. The questionnaire data does not allow us to investigate in any greater detail the form which these particular activities take.

The pupils' perceptions

The majority of pupils indicated that a benefit of using ICT in their school work was that their **work was more interesting and neater** and, in addition, they were able to find information not accessible through books and to use their own ideas and imagination. Around 25% indicated that their typing skills held them up, but with the exception of access, the proportions of pupils indicating dislikes were lower than those indicating likes. The Angus data also reflected the national findings with respect to how they perceived the level of difficulty of the work given. **That the work was too easy was a perception of considerably more pupils (45%) that that the work was too hard (6%). This finding does suggest that despite the teachers' claims about differentiation, the activities are not perceived by a large proportion of pupils as being at the cutting edge of their skills and understanding.**

3. ASPIRATIONS FOR THE FUTURE

Knowing whether or not we are progressing well in any enterprise depends on whether we have a clear idea of where we are going. In this section we look at the aspirations for achievements in the use of ICT set out by the school coordinators.

3.1 The Coordinators' Aspirations for the School

For the school coordinators, the main objectives as far as school development was concerned included:

- Developing a common vision for the use of computers in the school (74%)
- Having most staff trained in a range of classroom uses in ICT (74%)
- Seeing positive effects of ICT on pupil attainment in curricular areas (74%)
- Providing all teachers with their own e-mail address (56%) and pupils with access to e-mail (52%).

With the exception of electronic communications with a proportion of parents, most respondents indicated that their aspirations for their schools were likely to be acted on over the next two years. In the Angus sample, there was evidence of more being expected with respect to e-mail than in the national sample. Otherwise, the patterns of expected outcomes in the future were very similar from the two samples (see table 3.1).

Table 3.1 Primary coordinators' aspirations for their schools over the next two or three years.
(per cent of 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	
	Nat	**Ang**	Nat	**Ang**	Nat	**Ang**
Developing a common vision on the use of computers within our school.	8	**17**	88	**74**	1	**4**
Providing all pupils with access to e-mail	0	**0**	62	**52**	35	**39**
Providing all teachers with their own e-mail address.	1	**0**	48	**56**	50	**39**
Having regular ICT communications with a proportion of our parents.	1	**0**	17	**35**	80	**61**
Having a number of modern computers in every classroom.	18	**9**	69	**52**	13	**26**
Having most staff trained in a range of classroom uses in ICT.	8	**4**	86	**74**	6	**0**
Seeing positive effects of ICT on pupil attainment in curricular areas	5	**9**	87	**74**	8	**13**

3.1 The Coordinators' Aspirations for the Pupils

The aspirations for the pupils are set out below. The only one being met by most schools so far is that of the use of ICT for word processing, which is already well established in most primary schools. Around 50% anticipate that within two years pupils will be able to use the internet and e-mail regularly for information gathering and communication. However, a significant size of the sample – between 40-50% - do not see the pupils' use of e-mail as being on their agenda for development in the immediate future.

Table 3.2 Primary coordinators' aspirations for their pupils over the next two or three years.
(per cent of 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	
Most of our pupils leaving this school having:	Nat	**Ang**	Nat	**Ang**	Nat	**Ang**
regularly used word processing	60	**61**	38	**39**	3	**0**
had experience of multimedia;	27	**22**	39	**39**	32	**30**
frequently worked on projects which have been strongly ICT-based;	14	**17**	51	**52**	36	**30**
accessed information from specialists outside the school.	5	**4**	34	**34**	61	**61**
regularly used the Internet to:						
i) search for information on the WWW;	4	**4**	69	**48**	27	**48**
ii) down-load information;	4	**4**	67	**48**	29	**43**
iii) send and receive e-mail;	5	**13**	65	**30**	28	**52**
had experience of video-conferencing;	1	**0**	5	**8**	82	**83**

In Summary

The Angus primary school coordinators are clear on their plans for the future and the development of vision of ICT use in their schools is recognised by the majority as a necessary component. However, at present there is little input into their thinking from research or outside expertise. As can be seen from the data in the next section, most teachers and coordinators rely on colleagues in their own school for information. If ICT is going to be applied not just to the improvement of present practices, but for its 'transformation', what kind of vision does this indicate for the future? They might find it helpful if opportunities were given to staff to talk together in Authority wide groups in order to determine what features the vision of ICT use should have, and what 'transformation' might mean in their classroom and school practices.

4 ACCESS AND TECHNICAL AND PROFESSIONAL SUPPORT

If the potential for the use of ICT as a tool for improved teaching and learning is to be realised, school staff need to have access to modern computers in their classrooms, technical support in their use and maintenance, and training in their use for professional purposes. In our questionnaire we explored some of these areas with the teachers and the coordinators.

4.1 Access to Appropriate Hardware

> *It has been difficult to build up teacher confidence when so many different machines have been used. Lack of time to become familiar with programmes. (Not all teachers have their own PC).*

As we indicated in the introduction, a major aim of centrally provided ICT funding is to provide both teachers and pupils with access to modern computers and communication networks. However, prior to the impact of the national initiatives many local authorities had begun their own programme of developments in ICT hardware provision and technical support, so there are considerable variations in the experiences of schools up to this point. So what is the picture in Angus?

As table 4.1 shows, a high proportion of schools already have at least one modern computer in each classroom. This doesn't mean the national target ratio of one computer for every eight pupils has yet been met, but things are well advanced for this stage in the programme. The additional changes in the pipeline will bring networking to these machines, although the fact that not all are of the same type may cause a few hiccoughs.

Table 4.1 Computers in the Classrooms
(per cent of responses)

	Yes
Do you have a modern computer in each classroom?	78
Do you have a computer Base or Area?	39
Are the machines all the same type?	26
Are the computers networked?	4
Do you have internet and e-mail connection?	74

Fifty two percent indicated that there was also a computer in the school office, 17% that there was one within the library, learning support room, GP room or reception area. It is more likely that it is these which are connected to e-mail and internet access than those within classrooms, although, again, this will no doubt change in the future.

4.2 Sources of Technical and Professional Support

We asked the school **ICT coordinators** where they obtained most support in undertaking their remit, and the key results are presented below in table 4.2. Clearly the Angus staff rely rather more on their contacts with local authority staff than the national average. This is not surprising, perhaps, given the fact that many more small schools are in the Angus sample. This might also account for the finding that contacts with colleagues through networks are more frequently indicated. That the contact with SCET is very low is not surprising, given the geographical distance, but SEED will be concerned if SCET does not in future manage to reach out more to teachers in locations outwith the central belt through the Scottish Virtual Teachers' Centre (http://www.svtc.org.uk/).

Table 4.2 Sources of support for ICT Coordinators
(per cent of responses)

Source of support		
	National	**Angus**
Local authority staff.	64	**87**
Scottish Council for Educational Technology (SCET).	46	**17**
Colleagues in own school.	44	**48**
Publishers' catalogues.	25	**40**
Primary teachers' networks.	18	**35**
Staff in your secondary computing studies department/computing studies department.	13	**4**
Government information on ICT in schools.	5	**0**
Scottish Consultative Council on the Curriculum (SCCC).	4	**0**
The World Wide Web/Internet.	4	**9**
Scottish Virtual Teachers' Centre (SVTC).	3	**0**

For **classroom teachers**, one of the greatest needs is to have easily accessible technical support when needed. We asked the teachers how easy it is for them to get support, particularly from the technical support services of the Authority. It appears from the responses (see table 4.3), that at the time of the survey the Authority support services were working well for the majority of teachers. However, as more machines are located in the classrooms and as more regular use is made of the machines, the Authority need to monitor the quality of the service they offer to ensure that it keeps pace with demand.

Table 4.3 Technical Support for Classroom Teachers

(per cent of sample responses)

How easy is it:	Fairly simple	Difficult / Very difficult
for you to contact technical support from the Local Authority?	64	28
for you to get information on a software package for a particular educational aim with your pupils?	56	31
for your pupils to access a computer 'on demand' for a project?	64	28
for you to get technical assistance with a hardware problem?	72	21
for you to get technical assistance with a software problem?	74	18
for you to access appropriate staff development?	62	31
for you to contact knowledgeable colleagues in your Cluster?	64	24
for you to contact external experts (e.g. in museums)?	36	36

The second form of support needed by teachers concerns access to information on the range of software and resources available. When asked where they gain access to this type of information, the teachers most frequently cited their colleagues in school (see table 4.4), followed by publishers' catalogues.

Table 4.4 Sources of Information for Classroom Teachers

(per cent of responses)

Teachers can get information on classroom ICT resources from a number of sources. Of those listed below which do you currently use most to get **information on what is available?**

Colleagues in own school	67
Publishers' catalogues	56
Local authority staff	49
Primary teachers' networks. (Clusters)	23

4.3 The School Development Plans

Another aspect of support is that which is offered by the framework of a school or Authority development plan. This assists both teachers and ICT coordinators to be familiar with the overall aims of their implementation plans for ICT, what they hope to achieve, and by when. We asked the

coordinators how familiar they were with the development planning documents sent out by the Authority and the Scottish Office. The responses are set out in table 4.5.

Table 4.5 ICT and Planning
(per cent of responses)

	Yes	No	Don't Know
Does your local Authority have a written policy for ICT in its schools?	52	17	22
Have you read your local authority policy?	30	44	4
If yes, did you find it helpful?	30	4	4
Do you have a written policy for ICT in YOUR school?	61	35	0
If yes, do you find having a policy helpful?	57	9	4
Does the policy reflect the national initiatives for ICT such as 'Using the Superhighways: ICT and Development Planning ' document?	9	52	9

The 30% who have read the Authority policy have found it helpful, but the majority of schools appear to be working confidently with their own policy. The national guidelines '*Using the Superhighways: ICT and Development Planning*' do not appear to have made much of an impact. Around 20% of the coordinator respondents indicated that they do not yet have ICT in their development plan (see table 4.6).

Table 4.6 The Stage of Planning
(per cent of responses)

ICT is not yet in the development plan	22
ICT is in the development plan but no action has yet been taken	0
We are actively putting an ICT policy into practice	70
An ICT policy is fully implemented in our school	8

When **coordinators** were asked about the ICT priorities in the school development plan, 22% indicated that the implementation of Angus Council's ICT Programme of Study was a main priority. Priorities also mentioned, by about 15% each, were: staff development, curriculum review, review of the use of ICT programmes e.g. spreadsheets and databases, school policy review, and review of resources.

4.4 The Use of Guidelines by Teachers

Both the Authority and the SOEID have produced guidelines intended to assist teachers to become more informed about the use of ICT as a professional tool. We asked the teachers whether they had seen, read and or used the SOEID document '*Describe IT*' which gave teachers information on the use of ICT within the 5-14 curriculum. The majority had not seen it (69%) and few who had read it

found it helpful (3%). Things were only slightly more positive with respect to the Authority document *'IT Strategy'*. Only a minority had seen and read it (23%),and overall, eighteen percent found it useful. Clearly the guidelines which are produced by agencies outside the schools are not experiencing much success in providing materials which have a wide readership or are found to be compelling and useful.

Summary

The Angus schools seem to be well advanced into their programme of provision for access in every classroom to several modern computers. It also appears that the Authority support services are working well for the majority of teachers. However, as more machines are located in the classrooms and as more regular use is made of the machines, the Authority need to monitor the quality of the service they offer to ensure that it keeps pace with demand.

The second form of support needed by teachers concerns access to information on the range of software and resources available. When asked where they gain access to this type of information, the teachers most frequently cited their colleagues in school and publishers' catalogues. Since the guidelines which have been produced by agencies external to the school have not apparently been found very helpful, it would seem that the needs of teachers to get impartial and good quality information on the potential for the professional use of ICT in their classrooms has yet to be met.

5. PERCEIVED OBSTACLES TO THE DEVELOPMENT OF ICT USE IN SCHOOLS

The difficulties and obstacles which we investigated are set out fully in table 5.1. All the coordinators identified competing priorities as the major difficulty. Lack of technical support, underdeveloped skills and lack of appropriate staff development were among the next most frequently ticked items. These are all aspects which are recognised centrally and are targeted to be addressed through different parts of the national support programme and in the Authority planning.

Table 5.1 Obstacles to ICT use. (Primary Coordinators)
(per cent of responses)

	Strongly agree / agree	
	National	**Angus**
Too many other priorities are competing for staff time and attention.	97	**100**
Not enough appropriate staff development		**74**
Management of pupils' use of ICT is difficult		**56**
Not enough (Authority)technical support is available to the teaching staff in their classrooms.	91	**78**
Teachers' skills are not yet well enough developed. Most teaching staff find difficulty in progressing their skills in the use of ICT	84	**87**
Weak infrastructure (telephone links, available rooms and space etc.)	83	**70**
Not enough (Authority)technical support is available to me as co-ordinator.	79	**61**
Insufficient number of modern computers in each classroom.	75	**69**
Insufficient funds to use the resources effectively.	72	**65**
Outdated or lack of internal school network.	69	**61**
There is a lack of convenient (pupil) access to machines.	68	**61**
There are too many confusing copyright/licensing regulations.	63	
There are not yet enough examples of good use of ICT in the classroom to enthuse and interest teachers.	60	**48**
Not enough school/authority co-ordination of software purchase and availability.	56	
Incompatibility of the school's ICT equipment with other systems.	52	**30**
Network connection procedures are too complex/time-consuming/unreliable.	51	**48**
Most teaching staff don't see the development of ICT as a priority.	50	
Insufficient number of peripherals (eg printers, scanners)	42	**70**
There is not yet enough relevant curricular material available to interest staff.	41	

There are no huge discrepancies between the patterns of responses from the national sample and the Authority sample. The Angus primary school staff are rather better pleased by the level of Authority support, the examples of good use of ICT in classrooms and the compatibility of their systems. The low level of supply of peripherals such as printers and scanners, however, seems to elicit a higher level of expressed dissatisfaction.

In the open responses the coordinators and teachers expressed in greater detail their views on:

Resources

Increased number of colour printers has greatly increased the price of computer consumables, without increased allocation of corresponding budget.

Lack of resources - Not enough computers in the room as all pupils need a fair share of time. There is a lack of software.

Staff development

On the one training day I attended so much work was covered I and quite a few others were totally lost by 12 o clock.

I need appropriate training - for my personal staff development this has been identified as very much a priority as I feel I do not know enough in this area.

Pressure of work restricts our professional development in this area. We need definite IN-SET days on this.

My staff development needs in ICT need to be met in a way that produces positive results in as much as I become confident in using a computer and in the classroom management of ICT.

Time

The management is not a problem but there is not enough time in the school day. Too many interruptions in a small rural school. I need a full-time clerkess to allow me to TEACH!!

6. Reflections on Progress and Prospects

The power and versatility of modern information and communications systems are affecting activities in almost every area of life – finance, distance learning, family communications, catalogue shopping, home entertainment, monitoring medical performance, traffic flow systems, mountain rescue, TV advertisements – the list is endless.

What of activities in the classroom? Research has been overtaken by the speed of events, no researcher has yet had time to investigate innovative but effective uses of ICT in teaching and learning. Teacher educators, authority staff, headteachers, classroom teachers with long experience who thought they had seen it all in their time – all find themselves faced with an unexpected challenge in a field in which they have no well practiced, direct experience and in which there are no established experts.

Local and central government planning has followed a strong thread of logic: teachers cannot use ICT until they have computers in their classrooms; they cannot use these until they are trained; people learn faster if they have a computer at home. The funding programmes have been targeted to push forward these enabling conditions. From the evidence of our survey, Angus Council has served its teachers well so far with respect to giving access to a computer in the classroom and offering the technical support which keeps things working. The training programmes, especially the NOF programmes are still in the early stages.

The Scottish Virtual Teachers' Centre has yet to prove its worth. While it may develop as a focus of good practice, there is a danger that it offers only 'tips for teachers' rather than a good quality framework for understanding how to select and use technological tools for the promotion of learning in their particular pupils.

Changes in education are usually slow to be universally adopted and often make only small additions or marginal differences to long established practices. Why should ICT be seen as anything very different? Well, there is one significant difference, and it lies in the skills and attitudes of the pupils. The finding that in the Angus area so many pupils (80%) have access to a computer at home or some other location outside school should not be a surprise. This is exactly in line with the national picture. A few years ago a Finnish study showed that having one or two children in the family correlated very highly with having a computer in the home. Soon, many pupils will be walking around with mobile phones which are almost as powerful in their operations as the computers which launched the first rocket to the moon.

Of course there is still the question of equality of access. It is inevitable that a relatively small proportion will not have the same easy access as others, but with the advent of network access through television sets, the day is not far off when almost all will have access to what only a minority have now, the full WWW facilities.

What does an educational system look like when young children can access any information they wish on almost any topic? When they teach each other how to find sources of information the teachers don't even know exists? When they can access experts in museums and galleries anywhere in the world? When they can communicate instantly with peer groups all over the Authority, and beyond?

Whatever lies ahead - the changes in workplaces, in the values and expectancies of society, and especially in the attitudes of pupils, - nonetheless the needs of young learners will retain some very familiar characteristics, though they will have to be met in new ways.

Like their teachers, they too will continue to need reassurance in this confusing modern age, to need guidance on what is relevant information and where to find it among the confusion of the

Superhighways; to engage in discussion and reflection on what it all could mean for them, and how it can be interpreted and re-structured to help them make better sense of their world.

For the teachers, their professional world consists of teaching and learning and there is an urgent need for all in education to set aside some time from thinking about access to machines and training in ICT skills, and to give serious thought to the kind of transformations we wish to see happening in the heart of classrooms, at the teaching and learning interface.

Appendix 1

The Samples

From the total number of 62 Angus schools the population was stratified into four categories: a school roll of less than 100; 101-200; 201-300 and over 300. From each category a fifty percent sample (31) was selected proportional to the number in the total population to ensure that the sample was a representative one. The sample thus included 18 schools with a roll of less than 100; 3 schools with a roll 101-200; four schools with a roll of 201-300 and 6 schools with a roll of over 300.

Questionnaires were sent out to the 31 schools to be completed by **primary school ICT co-ordinators**, or by headteachers as appropriate, along with those to be distributed within each school to the **teachers of P7 and P4 classes**. Responses were received from 23 co-ordinators and from 39 teachers. In a number of small schools the same person completed both the co-ordinator and teacher questionnaire. The data on the school size indicated that around half of the schools had a roll of 100 or less.

The fifty percent sampling of schools generated too large a number (636) to be able include all the **pupils.** Therefore approximately one third of this number were used, again in proportion to the population of Angus schools. For ease of administration in the larger schools all pupils in some classes completed the questionnaire and the desired number for the school were then randomly selected. 201 questionnaires were used for data entry.