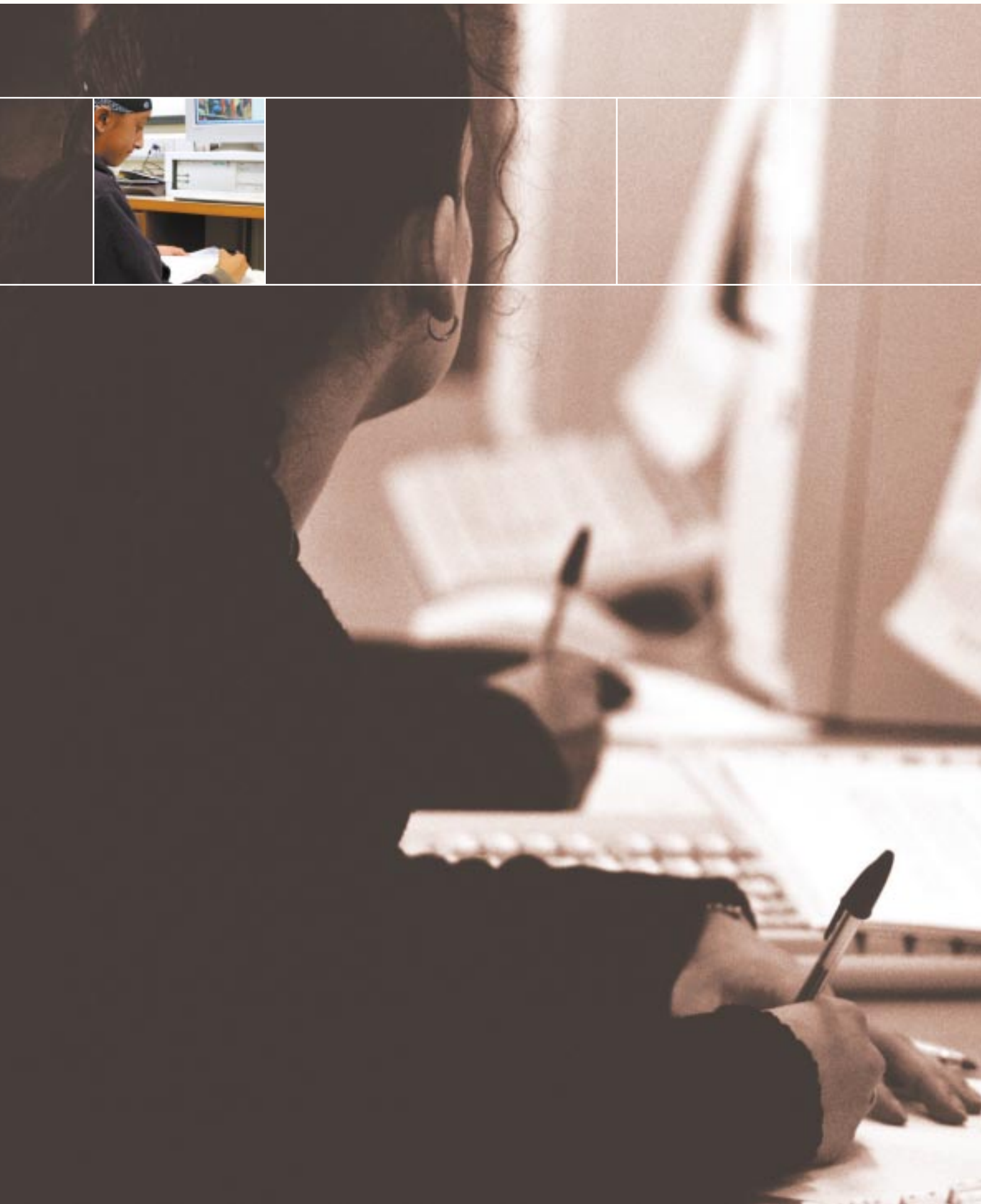


Secondary Schools - ICT and Standards

An analysis of national data from
Ofsted and QCA by Becta







Foreword

Over the past few years Becta has established a growing body of evidence on the impact of ICT on standards in our schools. This report - part of a series - is based on a detailed analysis of the results of Ofsted inspections and QCA data on schools' performance in national tests. As with previous reports in the series, it supports the case that ICT can help to improve teaching and learning in our schools.

This report focuses in particular on the quality of the opportunities to learn with ICT provided to pupils, and whether there is any link to improved standards.

The evidence from this study suggests that ICT should be regarded as central to the effort to improve standards, and that those schools which have been able to provide good opportunities to learn with ICT have benefited in terms of pupil attainment, motivation and attendance.

This is a significant report. I encourage you to read it and consider the implications for your school.

Niel McLean, Director - Learning, Becta



Contents





Introduction	6		
Executive summary	8		
Section 1 - ICT learning opportunities and pupil achievement	10	Section 6 - ICT teaching and ICT learning opportunities	36
The variation in ICT learning opportunities	11	The variation in ICT teaching	37
ICT learning opportunities and pupil achievement	12	ICT teaching and ICT learning opportunities	37
ICT learning opportunities and English at Key Stage 3	12	ICT teaching, ICT learning opportunities and pupil achievement	38
ICT learning opportunities and mathematics at Key Stage 3	13	Teacher understanding of ICT	38
ICT learning opportunities and science at Key Stage 3	13	Conclusions	39
ICT learning opportunities and GCSE results	13		
ICT learning opportunities and the overall quality of learning	14	Section 7 - Additional positive outcomes	40
Subject use of ICT	14	Pupils' attitudes	41
Conclusions	17	Pupils' behaviour	42
		Attendance	42
Section 2 - ICT resources and ICT learning opportunities	18	Parental views	42
The variation in ICT resources	19	Conclusions	43
ICT resources and ICT learning opportunities	19		
ICT resources, ICT learning opportunities and pupil achievement	20	Section 8 - ICT enablers: An overview	44
ICT resources and ICT development	21	ICT enablers and ICT learning opportunities	45
Conclusions	21	The number and type of ICT enablers and ICT learning opportunities	46
		ICT enablers and pupil achievement	47
Section 3 - School leadership and ICT learning opportunities	22	Conclusions	47
The variations in school leadership	23		
School leadership and ICT learning opportunities	23	Section 9 - Socio-economic factors	48
School leadership, ICT learning opportunities and pupil achievement	23	Social grade and ICT resources	49
Conclusions	25	Social grade and ICT learning opportunities	49
		Attainment on entry and ICT learning opportunities	50
Section 4 - ICT leadership and ICT learning opportunities	26	Social grade and teaching	50
The variation in ICT leadership	27	Subject results for different socio-economic grades	50
ICT leadership and ICT learning opportunities	27	Conclusions	51
ICT leadership, ICT learning opportunities and pupil achievement	27		
Strategic development of ICT in schools	28	Appendices	52
Conclusions	29	Appendix 1 - Ofsted framework	53
		Appendix 2 - The sample	55
Section 5 - Teaching and ICT learning opportunities	30	Appendix 3 - Statistical data and correlations	56
The variation in teaching	31		
General teaching quality and ICT learning opportunities	31		
General teaching quality, ICT learning opportunities and pupil achievement	32		
ICT and teaching in the subject	34		
Conclusions	35		



Introduction

This report is part of a series of publications aimed at exploring the relationship between schools' use of ICT and pupils' achievement in national tests and examinations. It specifically examines the relationship between ICT and standards in secondary schools, based on data obtained on schools from Ofsted inspections for the 2000 - 01 academic year, and further supplemented by test and examinations data from QCA for the same period. This report builds on earlier publications and complements reports published in the DfES/Becta ICT in Schools Research and Evaluation series.

The analysis further develops that contained in the previous Becta report *Primary Schools - ICT and Standards*, published in January 2003, which reported on primary schools inspected in the same period (2000–01). Whereas in previous reports in this series we have looked at a range of factors and investigated whether there is a relationship to higher achievement by pupils, in this report we focus on the quality of ICT learning opportunities.

This is because if ICT can really make a difference to learning and subsequently to achievement, then the quality of ICT learning opportunities should be a key factor. So the key question in this report is: if good ICT learning opportunities are present, is there a clear relationship to higher standards of achievement?

The other factors examined in previous reports are then brought into the analysis, to understand in greater depth the relationship between these factors and ICT learning opportunities. Hence the subsidiary question in this report is: to what extent do the other factors need to be present for ICT learning opportunities to make an impact on pupil achievement?

The analysis provided in this report considers data at the 'whole school' level. Judgements about teaching and learning made by Ofsted are about the school as a whole, not individual teachers and learners. The analysis looks only at the statistical relationships between different factors with the data obtained from Ofsted inspections and QCA test and examination results.

The findings from this report should also be considered alongside those contained in the reports from the ImpaCT2 study, which found a positive relationship between ICT use by pupils and their performance in national tests and GCSEs in 12 out of 13 subjects across three key stages. All of these reports are available on the Becta Research website [<http://www.becta.org.uk/research/>].

A brief description of the statistical methods, and the size and the characteristics of the sample used in this report, are included in the Appendices.





Executive summary

There is a clear and positive relationship between good ICT learning opportunities and higher pupil achievement in secondary education.

In schools that provide good ICT learning opportunities, pupils achieve higher results in the core subjects of English, mathematics and science at Key Stage 3 and at GCSE level in general. In the overwhelming majority of cases, as the quality of ICT learning opportunities improves so does pupil achievement, in particular when ICT learning opportunities are judged to be good or very good.

Similarly, schools that make good use of ICT within subjects at Key Stage 3 and GCSE level achieve better results than those who do not, especially where such schools have access to good ICT resources. These findings in secondary schools correspond with the findings from a previous study of primary schools over the same period. Whereas at primary level positive relationships could be attributed in part to the impact of the same teacher in the same classroom teaching ICT, English, mathematics and science, this is clearly not the case at secondary level.

These findings therefore suggest that where secondary school pupils have good ICT learning opportunities, they are able to apply and develop their ICT capability in subject specific work, and this in turn can have a positive impact on their achievements in other areas.

This report also identifies a number of additional positive relationships between ICT learning opportunities and other measures such as pupils' attitudes, behaviour and attendance, and the views of their parents about the school.

Previous reports in this series have identified five factors as 'ICT enablers' - those of ICT resources, school leadership, ICT leadership, general teaching and ICT teaching. Again, this analysis confirms these factors play a vital role in supporting the effective use of ICT in schools and in particular ensuring the provision of good ICT learning opportunities. It also reaffirms that the provision of good ICT learning opportunities is not dependent on the socio-economic background of schools and the prior attainment of pupils.

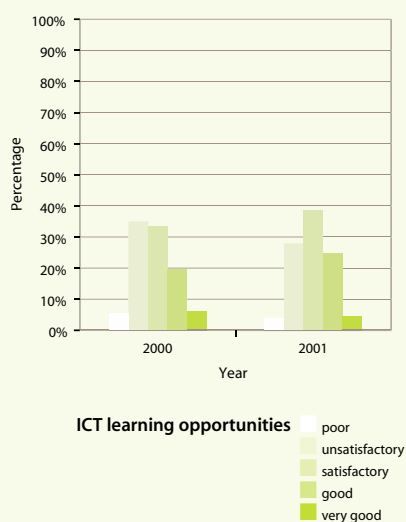
Although there is still a great deal of work to be done in improving the ICT learning opportunities available to all, an increasing number of schools and pupils from a full range of backgrounds now have the chance to harness the benefits of ICT in teaching and learning as identified in this report.

As with previous reports, the analysis is based on statistical association and so cannot prove a particular causality (that is, whether one factor causes or helps to cause another factor). However, it does give further credibility to the conclusion that the impact of ICT is dependent on how it is used in the classroom.



ICT learning opportunities and pupil achievement

Fig 1.1 ICT learning opportunities as judged by Ofsted



In this report we focus first of all on the quality of ICT learning opportunities and in particular whether there is any discernable relationship between the provision of good ICT learning opportunities and higher achievement by pupils.

The variation in ICT learning opportunities

'ICT learning opportunities' refers to the amount and quality of opportunities provided by a school for pupils to develop their ICT experience. Good ICT learning opportunities exist where ICT has been used effectively to enhance the learning process and the specific learning objectives in a lesson. This requires awareness by teachers of how ICT can enhance pupils' learning, and the appropriate selection and management of ICT resources to meet pupils' curricular needs. Although ICT learning opportunities are typically provided by the classroom teacher, the quality of leadership and management of ICT in a school is also crucial to the provision of good ICT learning opportunities.

Figure 1.1 shows the overall distribution of Ofsted judgements given for ICT learning opportunities. During an inspection, inspectors record judgements on a large range of measures. Generally, each is judged on the following seven-point scale:

- 1 – Excellent
- 2 – Very good
- 3 – Good
- 4 – Satisfactory
- 5 – Unsatisfactory
- 6 – Poor
- 7 – Very poor

Because grades 1 and 7 are rarely awarded, for the purposes of this analysis these two grades are amalgamated with the next nearest categories to give five grades. (Further information about the inspection framework and the methods used in this report can be found in the Appendices.)

As Figure 1.1 shows, there was a great deal of variation between secondary schools in the quality and range of ICT learning opportunities offered to pupils. In 2001, 31 per cent were judged 'unsatisfactory' or 'poor' and only 30 per cent judged as 'good' or 'very good'. This shows that there is still a great deal of work to be done in improving the ICT learning opportunities available in secondary schools, although a positive shift is seen when comparing figures over a two-year period.

ICT learning opportunities and pupil achievement

Fig 1.2 ICT learning opportunities and pupil achievement

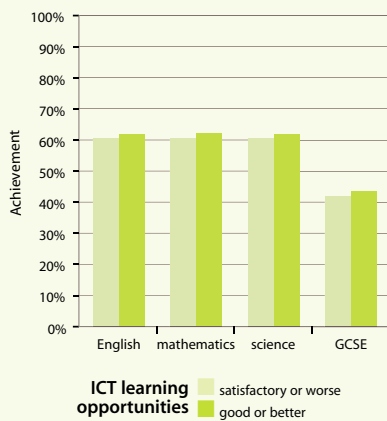
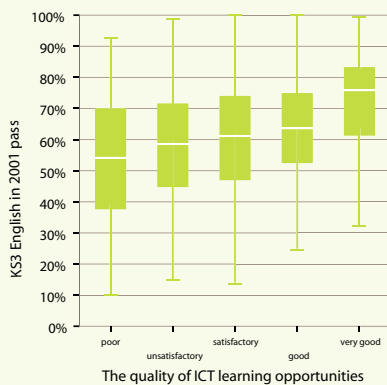


Fig 1.3 ICT learning opportunities and pupil achievement in English at Key Stage 3



ICT learning opportunities and pupil achievement

Figure 1.2 shows the relationship between ICT learning opportunities and pupil achievement in schools where there are also good resources and good ICT teaching (these factors will be explored in more depth later in the report).

The scale on the left hand side of the graph represents the percentage of pupils achieving five or more level C passes or above in English, mathematics and science at Key Stage 3, and the equivalent at GCSE level. The height of the coloured bars represents the average level of achievement by pupils in schools - differentiated by those schools where the ICT learning opportunities provided are satisfactory or worse, and those where the ICT learning opportunities are good or better.

As is clear, in every case where ICT learning opportunities are better, pupil achievement is also higher. In other words, there is a positive relationship between better ICT learning opportunities and higher achievement.

The following set of charts show the relationship between the quality and range of ICT learning opportunities and pupil achievement in English, mathematics and science at Key Stage 3, and at GCSE level.

ICT learning opportunities and English at Key Stage 3

Figure 1.3 shows the relationship between the quality and range of ICT learning opportunities and pupil achievement in English at Key Stage 3.

The scale on the left-hand side of the box plot (chart) again represents the percentage of pupils achieving five or more level C passes or above in English at Key Stage 3.

The height of the boxes represents the range of achievement for half of the schools who were given a particular judgement on the quality of the ICT learning opportunities they provide to pupils.

The lines above and below the boxes indicates the range of achievement for all of the schools who were given that judgement.

Most importantly, the line within each box represents the average level of achievement for that quality of ICT learning opportunity.

As can be seen, there is a positive relationship between better ICT learning opportunities and pupil achievement in English at Key Stage 3. In each case, a rise in the quality of ICT learning opportunities corresponds with higher pupil achievement, in particular when ICT learning opportunities are good and very good.

ICT learning opportunities and mathematics at Key Stage 3

Figure 1.4 shows the relationship between the quality and range of ICT learning opportunities and pupil achievement in mathematics at Key Stage 3.

Again, it can be seen that there is a positive relationship between better ICT learning opportunities and pupil achievement.

In each case, a rise in the quality of ICT learning opportunities corresponds with higher pupil achievement.

ICT learning opportunities and science at Key Stage 3

Figure 1.5 shows the relationship between the quality and range of ICT learning opportunities and pupil achievement in science at Key Stage 3.

Again it can be seen that there is a positive relationship between better ICT learning opportunities and pupil achievement.

In each case, as the quality of ICT learning opportunities improves so does pupil achievement, in particular when ICT learning opportunities are good and very good.

ICT learning opportunities and GCSE results

Figure 1.6 shows the relationship between the quality and range of ICT learning opportunities and pupil achievement in GCSE examinations.

The final chart in this set shows that there is a positive relationship between better ICT learning opportunities and pupil achievement in GCSE examinations. In general a rise in the quality of ICT learning opportunities corresponds with higher pupil achievement, in particular when ICT learning opportunities are good and very good.

The one exception is the very slight dip in pupil achievement between unsatisfactory and satisfactory ICT learning opportunities. This might be explained by the challenges that can be encountered when teachers first try to integrate the greater use of ICT into their classroom practice.

After these challenges have been overcome, the positive relationship between the increasing quality of ICT learning opportunities and higher achievement is resumed.

Fig 1.4 ICT learning opportunities and pupil achievement in mathematics at Key Stage 3

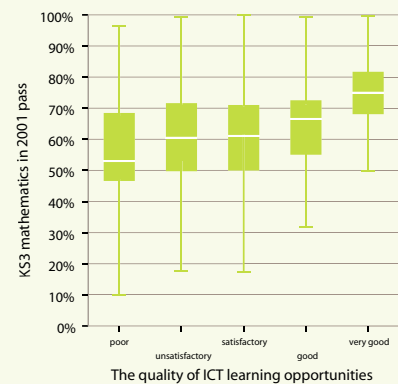


Fig 1.5 ICT learning opportunities and pupil achievement in science at Key Stage 3

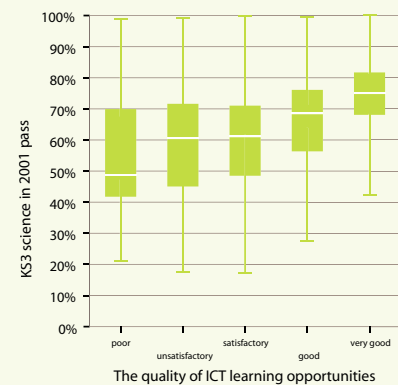
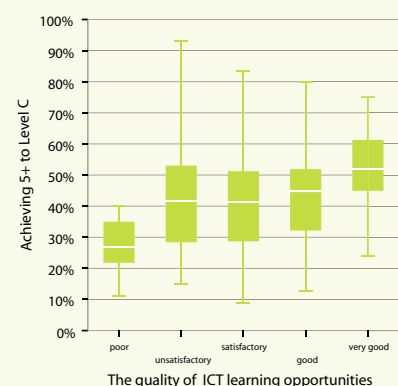


Fig 1.6 ICT learning opportunities and pupil achievement in GCSE examinations



ICT learning opportunities and pupil achievement

Fig 1.7 ICT learning opportunities and overall quality of learning

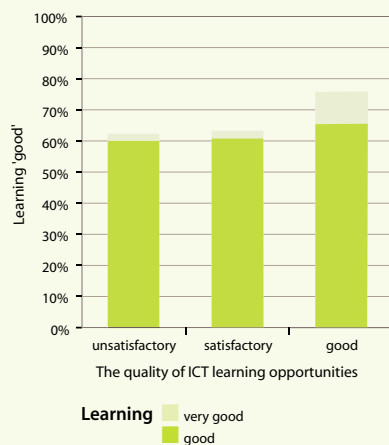
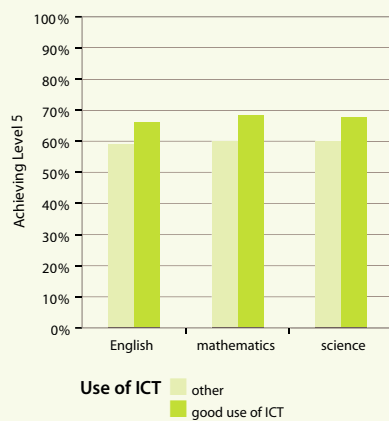


Fig 1.8 ICT use in subjects and Key Stage 3 results



ICT learning opportunities and the overall quality of learning

Figure 1.7 shows the relationship between ICT and the quality of learning in secondary schools.

Clearly, there is a relationship between ICT learning opportunities and the quality of learning. In particular, where ICT learning opportunities are good, learning tends to be judged as good or very good.

It suggests that ICT learning opportunities may play an important role in the quality of learning.

Subject use of ICT

Ofsted inspections include judgements on the quality of use of new technologies in each subject, so we can also examine whether this positive relationship between ICT and achievement holds true for subject use.

Figure 1.8 shows the average results for those schools judged to make good use of ICT in the core subjects at Key Stage 3 compared to those who do not.

Attainment targets set out the knowledge, skills and understanding that pupils of different abilities and maturities are expected to have by the end of Key Stage 3.

They consist of eight level descriptions of increasing difficulty, and a description of exceptional performance above level 8. Each level description describes the type and range of performance that pupils working at that level should characteristically demonstrate. The level descriptions provide the basis for making judgements about pupils' performance at the end of Key Stage 3.

The majority of pupils are expected to work at levels 2 to 7 in Key Stage 3 and attain level 5 or 6 at the end of the key stage. Figure 1.8, and several others in this report, looks at those pupils attaining Level 5.

Schools that make good use of ICT within a subject at Key Stage 3 tend to achieve better results than those who do not. The importance of good use of ICT is fairly equal across all three subject areas.

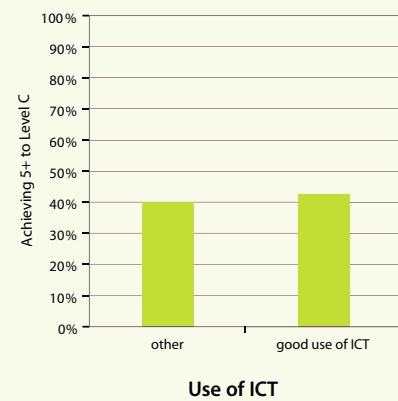
Figure 1.9 shows the average results for those schools judged to make good use of ICT in all subjects at GCSE level compared to those who do not.

Schools that make good use of ICT in GCSE studies also achieve slightly better results, but the difference is less marked than for Key Stage 3.

If we focus in on schools where there are also good ICT resources, these learning gains become even more marked.

('ICT resources' refers to the extent to which a school's ICT resources are capable of enabling it to deliver the ICT curriculum, as judged by Ofsted.)

Fig 1.9 ICT use in subjects and GCSE results



ICT learning opportunities and pupil achievement

Fig 1.10 Key Stage 3 - use of ICT in schools with good ICT resources

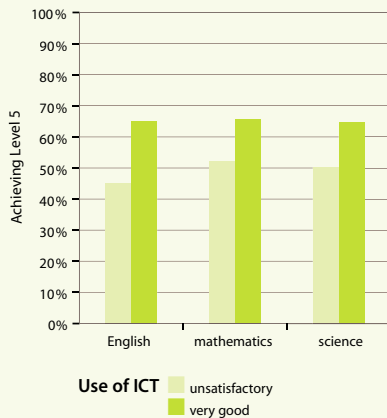


Figure 1.10 shows Key Stage 3 results for schools with good ICT resources. Average numbers achieving Level 5 are compared between schools judged to make very good use of new technology to support the curriculum and those judged to make unsatisfactory use.

Secondary schools with good ICT resources that use them well achieve better results than those schools with similar resources that are used less effectively. The importance of very good ICT use is approximately the same for mathematics and science, with a slightly larger impact for English.

A similar positive relationship is also seen at GCSE, as shown in Figure 1.11.

Finally in this section, Figure 1.12 shows the relationship between the good use of ICT in zero, one, two and three subject areas as judged by inspectors and Key Stage 3 results.

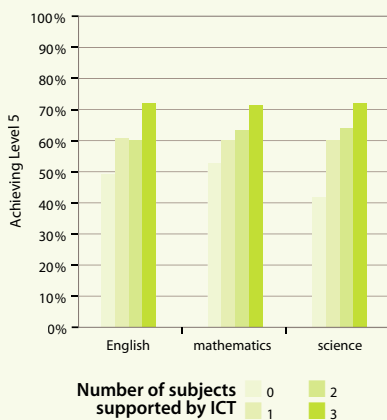
This reveals a marked and consistent rise in the average standards for all subjects as the number of subjects with the good use of ICT increases from zero to three, in English, mathematics and science.

The increases are similar across all three subject areas.

Fig 1.11 GCSE - use of ICT in schools with good ICT resources



Fig 1.12 Number of subjects supported by the good use of ICT and Key Stage 3 results



Conclusions

As has been shown, for each core subject at Key Stage 3 and at GCSE level as a whole there is a positive relationship between better ICT learning opportunities and higher pupil achievement. There is also a positive association between the number of subjects supported by good use of ICT, and results at Key Stage 3 and at GCSE.

The findings relating to ICT and subjects in secondary schools correspond with the findings from the study of primary schools for the same period. Whereas at primary level, positive relationships could be attributed in part to the impact of the same teacher, in the same classroom, teaching ICT, English, mathematics and science, this is clearly not the case at secondary level. The findings might therefore suggest that where secondary school pupils have good ICT learning opportunities, they are able to apply and develop their ICT capability in subject specific work, and this in turn can have a positive impact on their achievements in other areas. They might also suggest, however, that schools that are generally effective both achieve highly and make good use of ICT.

As with previous reports, the analysis is based on statistical association and so cannot prove a particular causality (that is, whether one factor causes or helps to cause another factor). However, it does give further credibility to the conclusion that the impact of ICT is dependent on how it is used in the classroom.

Having established the importance of good ICT learning opportunities and the relationship to pupil achievement, the following sections of the report examine the factors that have been identified in previous reports. In particular, this report looks at the extent to which these factors support the provision of good ICT learning opportunities and whether it is the case that together they are related to pupil achievement.

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Section 2 – ICT resources and ICT learning opportunities

ICT resources and ICT learning opportunities

Fig 2.1 ICT resources as judged by Ofsted

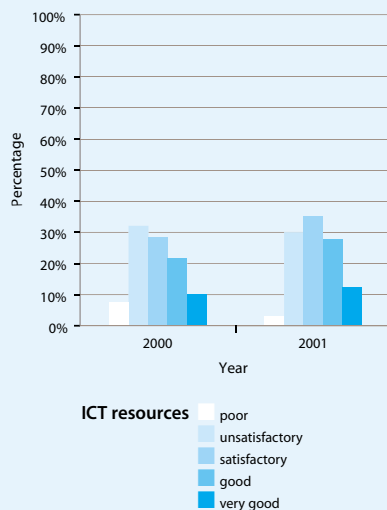
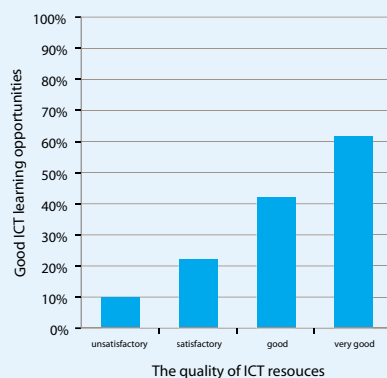


Fig 2.2 ICT resources and ICT learning opportunities



This section of the report looks at ICT resources and the extent to which this factor supports the provision of good ICT learning opportunities.

The variation in ICT resources

'ICT resources' refers to the extent to which the resources in a school are sufficient to meet the requirements of delivering the ICT curriculum, as judged by Ofsted. These resources include the quantity and quality of ICT hardware, software, and data sources such as CD-ROMs, but also books and supporting materials.

Figure 2.1 shows the overall distribution of Ofsted judgements on the quality of ICT resources in secondary schools. The quality of ICT resources varies between secondary schools. Some improvements are apparent with more schools having good or very good ICT resources, and less with unsatisfactory or worse resources over a two-year period of comparison. However, there is still much to be done in improving the ICT resources in secondary schools. During the period covered by this report, however, ICT resources were only just beginning to have an impact on secondary schools, as revealed in the ImpaCT2 study, and it is likely that more schools will achieve higher grades in subsequent years.

ICT resources and ICT learning opportunities

Figure 2.2 then shows the relationship between the adequacy of ICT resources and good ICT learning opportunities.

As the graph indicates, good ICT resources must be present for a secondary school to offer good ICT learning opportunities to pupils. However, good ICT resources alone will not guarantee good ICT learning opportunities.

ICT resources and ICT learning opportunities

Fig 2.3 ICT learning opportunities and achievement in English, mathematics and science at Key Stage 3 and at GCSE with good or better ICT resources

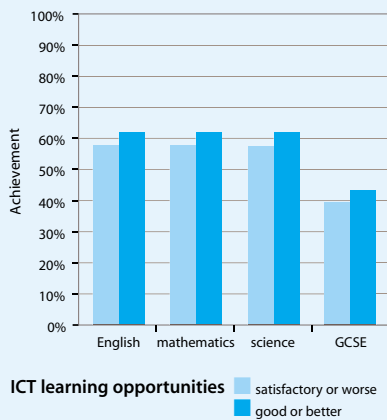
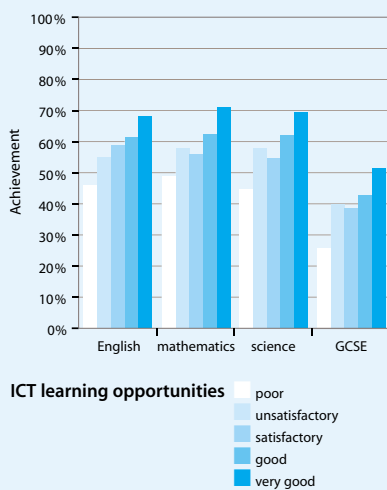


Fig 2.4a ICT learning opportunities and achievement with good or better ICT resources



ICT resources, ICT learning opportunities and pupil achievement

Figure 2.3 shows the relationship between ICT learning opportunities and pupil achievement in schools where the ICT resources are good or better.

The scale on the left-hand side of the graph represents the percentage of pupils achieving five or more level C passes or above at Key Stage 3 or the equivalent at GCSE. The height of the coloured bars represents the level of achievement for each judgement of the quality of ICT learning opportunities (satisfactory or worse; good or better) in each subject and at GCSE.

As can be seen, in each case pupil achievement is higher where ICT learning opportunities are good or better.

It is also possible to examine this relationship between good ICT learning opportunities and pupil achievement in more detail by identifying the level of pupil achievement which relates to each quality of ICT learning opportunity.

Figure 2.4 shows the relationship between ICT resources, the quality of ICT learning opportunities and pupil achievement.

The scale on the left-hand side of the graphs again represents the percentage of pupils achieving five or more level C passes or above at Key Stage 3 or the equivalent at GCSE. The height of the coloured bars represents the level of achievement for each judgement of the quality of ICT learning opportunities.

As is shown in Figure 2.4a, there is generally a positive relationship between better ICT learning opportunities and higher achievement where ICT resources in a school are good or better.

For example, in schools in which ICT resources are good or better and where there are very good ICT learning opportunities, over 71 per cent of pupils achieve five or more level C passes or above in mathematics at Key Stage 3, compared to fewer than 50 per cent of pupils where resources are good but ICT learning opportunities are poor.

There is still a positive relationship between better ICT learning opportunities in the classroom and higher achievement by pupils even in cases where ICT resources are satisfactory or worse, as shown in **Figure 2.4b**.

(Unsurprisingly, there are no instances where very good ICT learning opportunities co-exist with satisfactory or worse ICT resources).

But clearly, without sufficient ICT resources at their disposal, teachers will be hampered in their efforts to create good ICT learning opportunities for their pupils.

ICT resources and ICT development

Pupils' ICT skills are an important outcome of ICT use in schools. ICT attainment, pupils' intellectual and creative effort, and their general interest and enthusiasm are three key factors in general ICT skills development.

Figure 2.5 shows the relationship between these three positive factors and the quality of ICT resources in school. ICT development is higher when the standard of ICT resource is higher.

Conclusions

Pupil achievement is higher where ICT learning opportunities are good or better, supported by good ICT resources. Of course, the presence of ICT resources in a school does not automatically have an impact on achievement. The key factor is whether ICT is used effectively in teaching and learning, and in particular whether pupils have good quality opportunities to learn with ICT. So next we will look at a range of other factors which have, in previous analyses, been proven to support the provision of good ICT learning opportunities, starting with school leadership.

Fig 2.4b ICT learning opportunities and achievement with satisfactory or worse ICT resources

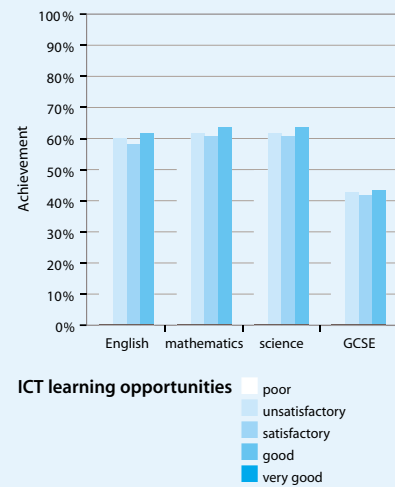
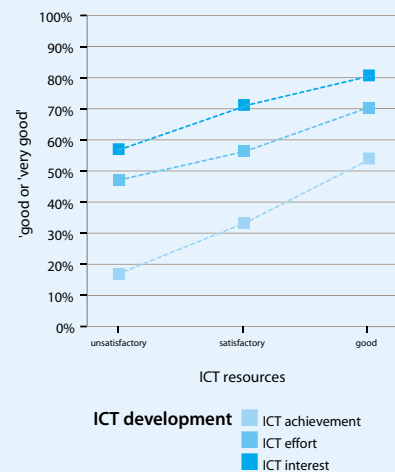


Fig 2.5 ICT resources and ICT development



School leadership and ICT learning opportunities

Fig 3.1 School leadership grades as judged by Ofsted

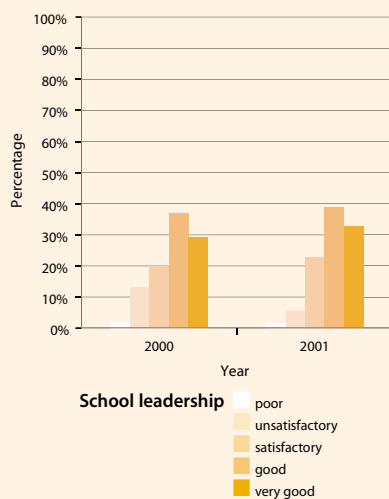


Fig 3.2 School leadership and good ICT learning opportunities

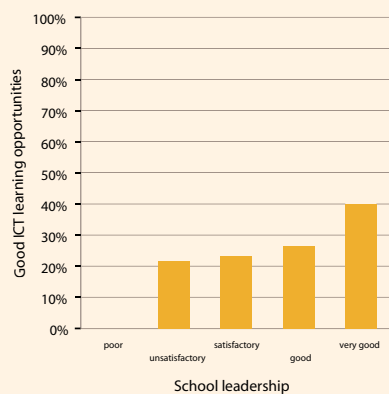
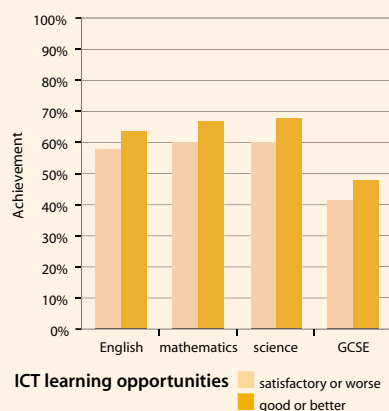


Fig 3.3 ICT learning opportunities and achievement in English, mathematics and science at Key Stage 3 and at GCSE with good or better school leadership



'School leadership' refers to the quality of the leadership provided by the headteacher and other key staff in a school. Ofsted inspectors judge the extent to which a clear direction has been provided for the work and development of the school, in particular in promoting high standards and effective teaching and learning. This includes how effectively the school monitors and evaluates its performance, diagnoses its strengths and weaknesses, and takes effective action to secure improvements.

The variation in school leadership

Figure 3.1 shows the distribution of grades given for overall school leadership. When comparing results for 2000 and 2001 a positive shift can be seen with more schools scoring good or very good, and fewer schools scoring unsatisfactory or worse for their general leadership.

School leadership and ICT learning opportunities

The analysis of the quality of school leadership against good ICT learning opportunities is shown in Figure 3.2. For a secondary school to offer good ICT learning opportunities, good school leadership by the headteacher and key staff is important, but appears to have less of an impact than ICT resources (as shown in Figure 2.2).

School leadership, ICT learning opportunities and pupil achievement

Figure 3.3 shows the relationship between ICT learning opportunities and pupil achievement in schools where the quality of school leadership is judged to be good or better.

As with ICT resources, in each case pupil achievement is higher where ICT learning opportunities are good or better.

Once again, we can examine the relationship between good ICT learning opportunities and pupil achievement in more detail by identifying the level of pupil achievement which relates to each quality of ICT learning opportunity.

Section 3 – School leadership and ICT learning opportunities

Fig 3.4a ICT learning opportunities and achievement with good or better school leadership

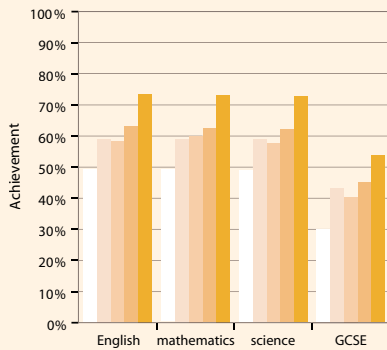
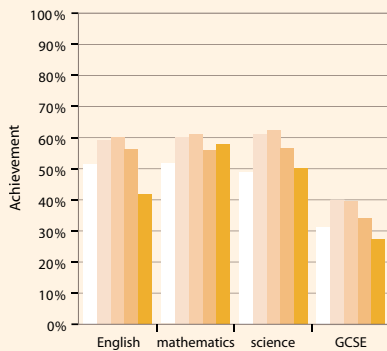


Fig 3.4b ICT learning opportunities and achievement with satisfactory or worse school leadership



ICT learning opportunities

- poor
- unsatisfactory
- satisfactory
- good
- very good

Figure 3.4 shows the relationship between quality of school leadership, ICT learning opportunities and pupil achievement.

Figure 3.4a shows schools in which the quality of school leadership has been judged to be good or better. In such schools, the better the ICT learning opportunities the higher the achievement of pupils in each of the three core subjects of English, mathematics and science at Key Stage 3 and at GCSE level. This is particularly the case where the ICT learning opportunities are good and very good.

For example, in schools in which leadership is good or better and where there are very good ICT learning opportunities, over 73 per cent of pupils achieve five or more level C passes or above in science at Key Stage 3, compared to fewer than 50 per cent of pupils where leadership is good but ICT learning opportunities are poor.

Notice however that there is a slight dip in achievement when we move from unsatisfactory to satisfactory ICT learning opportunities. This might be explained by the challenges that can be encountered when teachers first try to integrate the greater use of ICT into their classroom practice. After these challenges have been overcome, the positive relationship between the increasing quality of ICT learning opportunities and higher achievement is resumed.

The same positive relationship between better ICT learning opportunities and higher achievement is not found in schools where the quality of leadership is satisfactory or worse, as shown in Figure 3.4b. In other words, good school leadership is a factor that supports the positive relationship between ICT learning opportunities and pupil achievement.

Conclusions

Pupil achievement is higher where ICT learning opportunities are good or better, supported by good school leadership.

Section 4 – ICT leadership and ICT learning opportunities

ICT leadership and ICT learning opportunities

Fig 4.1 ICT leadership grades as judged by Ofsted

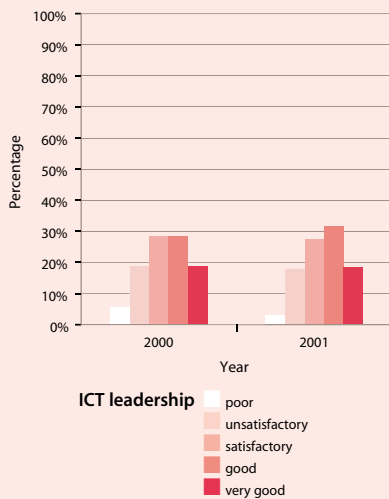


Fig 4.2 ICT leadership and ICT learning opportunities

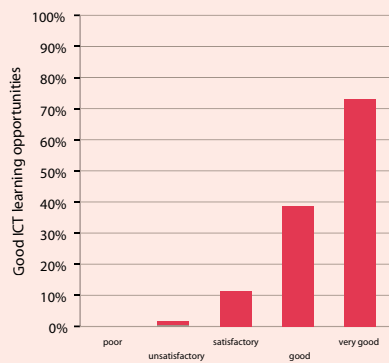
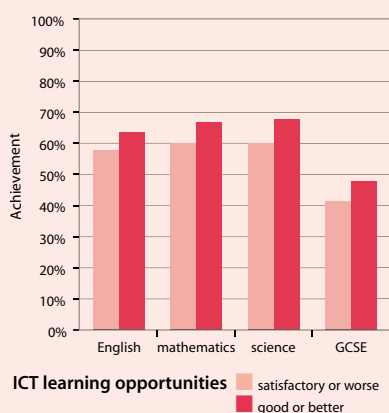


Fig 4.3 ICT learning opportunities and achievement in English, mathematics and science at Key Stage 3 and at GCSE with good or better ICT leadership



'ICT leadership' refers to the quality of the leadership and management of ICT in a school. Although ICT learning opportunities are typically provided by the classroom teacher, the quality of leadership and management of ICT in a school is also crucial to the provision of good ICT learning opportunities.

The variation in ICT leadership

Figure 4.1 shows the distribution of grades given for leadership and management of ICT within secondary schools. When comparing results for 2000 and 2001 a positive shift can be seen with more schools scoring good, and fewer schools scoring unsatisfactory or worse for their ICT leadership.

ICT leadership and ICT learning opportunities

Figure 4.2 shows the distribution of ICT learning opportunities related to ICT leadership. Good ICT leadership is essential for a school to offer good ICT learning opportunities.

Where ICT leadership is unsatisfactory or worse, it is highly unlikely that good ICT learning opportunities will exist.

However, good ICT leadership alone will not guarantee good ICT learning opportunities.

ICT leadership, ICT learning opportunities and pupil achievement

Figure 4.3 shows the relationship between ICT learning opportunities and pupil achievement in schools where ICT leadership is judged as good or better.

Once again, in each case pupil achievement is higher where ICT learning opportunities are good or better.

ICT leadership and ICT learning opportunities

Fig 4.4a ICT learning opportunities and achievement with good or better ICT leadership

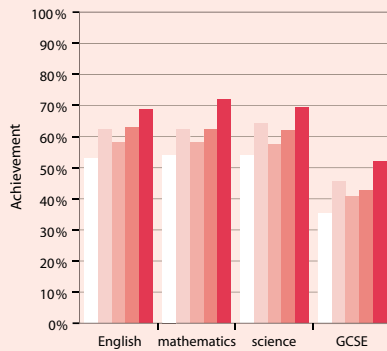
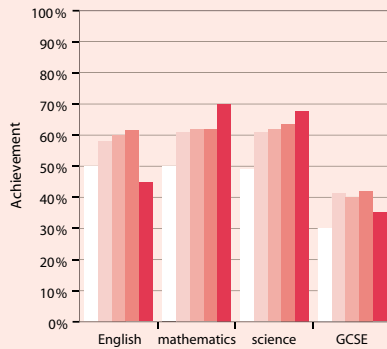


Fig 4.4b ICT learning opportunities and achievement with satisfactory or worse ICT leadership



ICT learning opportunities

- poor
- unsatisfactory
- satisfactory
- good
- very good

Fig 4.5 Strategic use of ICT and ICT development

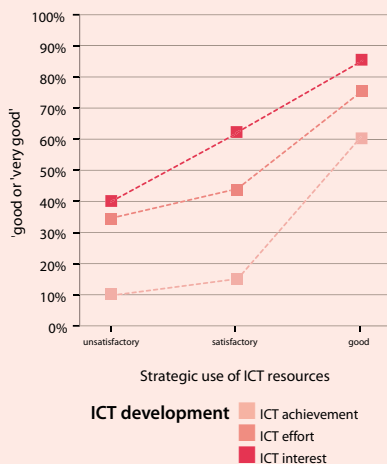


Figure 4.4 shows the relationship between the quality of ICT leadership, ICT learning opportunities and pupil achievement.

As Figure 4.4a shows, where the quality of ICT leadership in schools has been judged to be good or better, as ICT learning opportunities improve there is a trend for pupil achievement to be higher.

This is a particularly positive relationship between very good ICT learning opportunities and higher achievement.

For example, in schools in which ICT leadership is good or better and where there are very good ICT learning opportunities, nearly 70 per cent of pupils achieve five or more level C passes or above in English at Key Stage 3, compared to just 53 per cent of pupils where ICT leadership is good but ICT learning opportunities are poor.

As with ICT resources in schools, where the quality of ICT leadership is satisfactory or worse, there is also a trend for improvements in ICT learning opportunities to be related to higher pupil achievement, as shown in Figure 4.4b.

The one exception to this might appear to be where ICT leadership is satisfactory or worse yet ICT learning opportunities in English are very good; however the sample here is limited to only one school.

Strategic development of ICT in schools

Figure 4.5 shows the relationship of three factors to the strategic development of ICT resources within schools. The strategic use of ICT resources also has an association with ICT development, and is most closely related to ICT effort and interest.

Conclusions

Pupil achievement is higher where ICT learning opportunities are good or better, supported by good ICT leadership.

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Section 5 – Teaching and ICT learning opportunities

Teaching and ICT learning opportunities

Fig 5.1 General teaching grades as judged by Ofsted

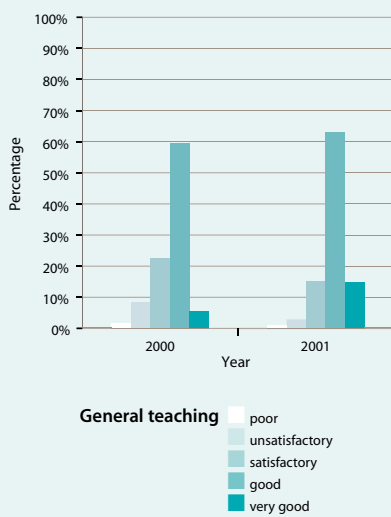
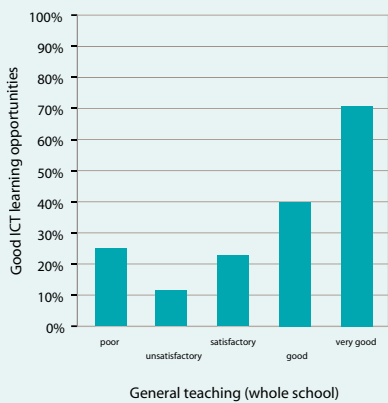


Fig 5.2 General teaching and ICT learning opportunities



'Teaching' refers to the quality of general classroom teaching in a school. Ofsted inspectors observe lessons in order to reach their judgements on teaching, and focus in particular on the structure of the lesson and the teaching methods used, the relevance of the subject matter, and the extent to which the lesson is engaging for the pupils. This is complemented by the depth of understanding pupils show in discussion with the inspectors and an analysis of the quality of the work they do. In other words, the quality of teaching is judged very much on the basis of its impact on learning.

The variation in teaching

Figure 5.1 shows the distribution of grades given for general teaching within secondary schools. As can be seen, it points to an increase in good and very good teaching.

General teaching quality and ICT learning opportunities

Figure 5.2 examines the relationship between general teaching and ICT learning opportunities. Schools with good, or better, general teaching are typically more likely to offer good learning opportunities in ICT.

Teaching and ICT learning opportunities

Fig 5.3 General teaching and teachers' understanding of ICT at Key Stage 3



Fig 5.4 General teaching and teachers' understanding of ICT at GCSE

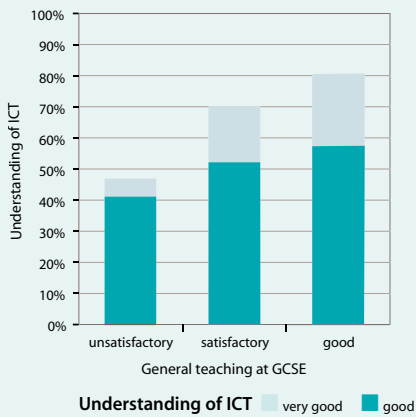
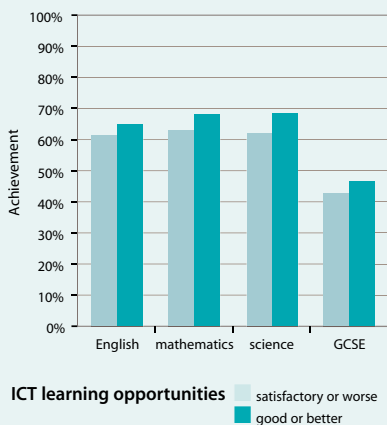


Fig 5.5 ICT learning opportunities and achievement in English, mathematics and science at Key Stage 3 and at GCSE with good or better general teaching



Ofsted inspectors include the use of ICT as part of their consideration of the overall quality of teaching in a school, alongside many other factors.

There is also an association between good teaching and teachers' knowledge and understanding of ICT at both Key Stage 3 and GCSE, as shown in **Figures 5.3 and 5.4** respectively.

There is generally a greater incidence of very good ICT knowledge and understanding when general teaching is good.

Additionally, teachers' knowledge and understanding tends to be slightly higher for those teaching at GCSE level rather than at Key Stage 3, perhaps indicating that more complex and varied applications of ICT are developing at this level.

General teaching quality, ICT learning opportunities and pupil achievement

Figure 5.5 shows the relationship between ICT learning opportunities and pupil achievement in schools where the general quality of teaching is judged to be good or better.

As can be seen, in each case pupil achievement is higher where ICT learning opportunities are good or better.

Figure 5.6 shows the relationship between quality of teaching, ICT learning opportunities and pupil achievement.

As Figure 5.6a shows, where the general quality of teaching in schools has been judged to be good or better, the better the ICT learning opportunities the higher the achievement of pupils in each of the three core subjects of English, mathematics and science at Key Stage 3 and at GCSE level. This is particularly the case where ICT learning opportunities are very good.

For example, in schools in which the general quality of teaching is good or better and where there are very good ICT learning opportunities, over 74 per cent of pupils achieve five or more level C passes or above in mathematics at Key Stage 3 on average, compared to fewer than 55 per cent of pupils where teaching is good but ICT learning opportunities are poor.

As with school leadership, however, there is a very slight dip in achievement when we move from unsatisfactory to satisfactory ICT learning opportunities, but after this the further increase in the quality of ICT learning opportunities is positively related to higher achievement.

The picture is more mixed where the general level of teaching is not judged to be high, as shown in Figure 5.6b. There is still a broad relationship between good ICT learning opportunities and higher achievement, with some exceptions. In mathematics and science at Key Stage 3, very good ICT learning opportunities are related to higher achievement. This does not appear to be the case in English, however the sample of schools where teaching is satisfactory or worse yet ICT learning opportunities are very good is limited to only four schools.

In summary, the better the foundation of good teaching, the stronger the relationship between good ICT learning opportunities and higher achievement.

Fig 5.6a ICT learning opportunities and achievement with good or better general teaching

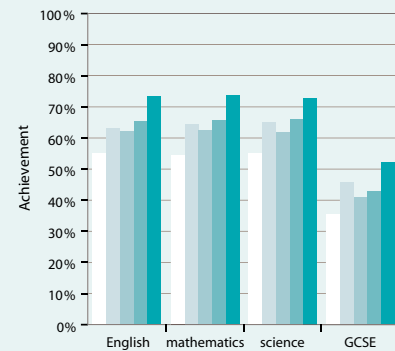
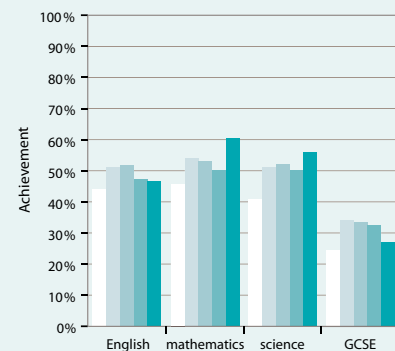


Fig 5.6b ICT learning opportunities and achievement with satisfactory or worse general teaching



ICT learning opportunities

- poor
- unsatisfactory
- satisfactory
- good
- very good

Teaching and ICT learning opportunities

Fig 5.7 Mathematics teaching and ICT in mathematics

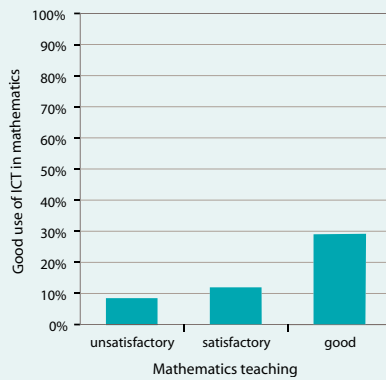
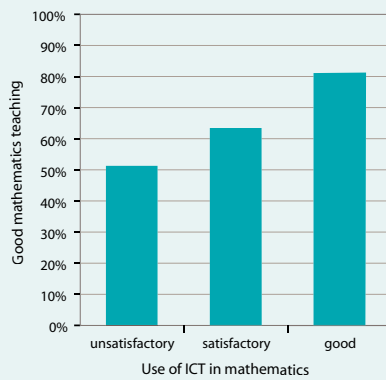


Fig 5.8 ICT in mathematics and mathematics teaching



ICT and teaching in the subject

Using mathematics as an example, good use of ICT in a subject area is related to the quality of subject teaching, as shown in **Figure 5.7**.

Figure 5.8 shows that the reverse relationship also holds true.

Where ICT is used well in mathematics this is generally a good indicator of good mathematics teaching, although there are schools where mathematics teaching is judged to be good, but ICT is not used well.

If comparing the two figures, it can be seen that good mathematics teaching is more common than the good use of ICT in mathematics, and good teaching seems to be essential for good use of ICT in the subject. Whilst the reverse is not true, it may make it more likely.

A similar relationship is also seen for English and science.

Conclusions

Pupil achievement is higher where ICT learning opportunities are good or better, supported by good teaching. Indeed, the better the foundation of good teaching, the stronger the relationship between good ICT learning opportunities and higher achievement.

ICT teaching and ICT learning opportunities

Fig 6.1 ICT teaching grades

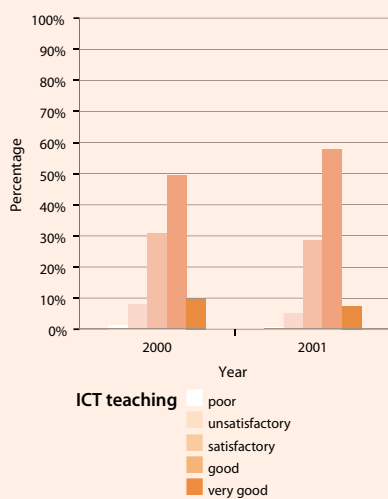
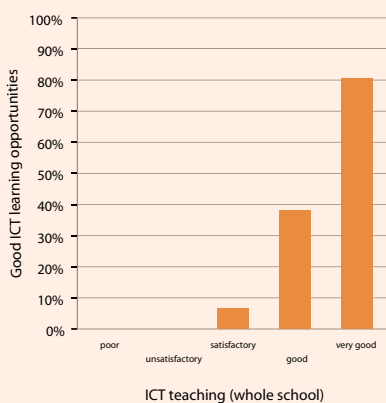


Fig 6.2 ICT teaching and ICT learning opportunities



The last of the factors, 'ICT teaching', refers to the quality of the teaching of ICT in a school. Inspectors judge a range of aspects of the teaching of ICT, including the extent to which teachers' knowledge of ICT enables pupils to develop their skills and understanding, and whether this is supported by teachers' enthusiasm for and awareness of the benefits of ICT use by pupils.

The variation in ICT teaching

Figure 6.1 shows the distribution of grades given for ICT teaching within secondary schools. As with ICT leadership, when comparing results for 2000 and 2001 a positive shift can be seen for ICT teaching with more schools scoring good, and fewer schools scoring satisfactory or worse. However, incidences of very good ICT teaching have decreased over the two year period, which is of concern.

ICT teaching and ICT learning opportunities

Figure 6.2 shows the relationship between ICT teaching and ICT learning opportunities. Good ICT teaching is also essential for a school to offer good ICT learning opportunities. If ICT teaching is less than satisfactory, it is unlikely that good ICT learning opportunities will exist. However, good ICT teaching alone will not guarantee good ICT learning opportunities.

ICT teaching and ICT learning opportunities

Fig 6.3 ICT learning opportunities and achievement in English, mathematics and science at Key Stage 3 and at GCSE with good or better ICT teaching

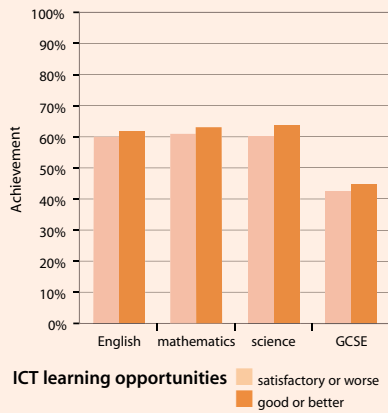


Fig 6.4a ICT learning opportunities and achievement with good or better ICT teaching

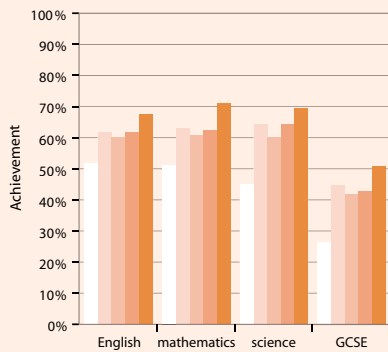
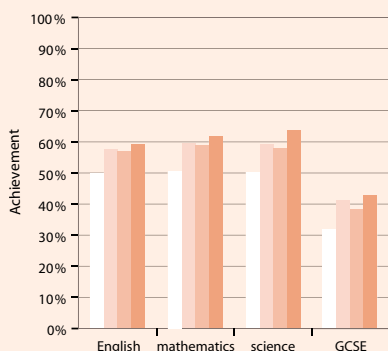


Fig 6.4b ICT learning opportunities and achievement with satisfactory or worse ICT teaching



ICT teaching, ICT learning opportunities and pupil achievement

Figure 6.3 shows the relationship between ICT learning opportunities and pupil achievement in schools where the ICT teaching is good or better.

As with all of the factors examined, in each case pupil achievement is higher where ICT learning opportunities are good or better.

This positive relationship is further confirmed when we look in more detail at the whole range of ICT learning opportunities and pupil achievement as shown in Figure 6.4.

In Figure 6.4a we can again see that when the ICT teaching is good or better, the better the ICT learning opportunities the higher the achievement of pupils. This is particularly the case where the ICT learning opportunities are very good.

For example, in schools in which ICT teaching is good or better and where there are very good ICT learning opportunities, nearly 70 per cent of pupils achieve five or more level C passes or above in science at Key Stage 3, compared to only 45 per cent of pupils where ICT teaching is good but ICT learning opportunities are poor.

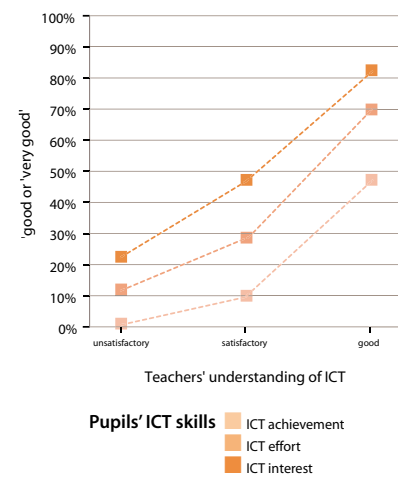
As Figure 6.4b shows, when ICT teaching is satisfactory or worse, it appears that there is still a positive relationship between better ICT learning opportunities and higher achievement. (As might be expected, there are no instances in which ICT teaching is regarded as satisfactory or worse but ICT learning opportunities are judged to be very good).

Teacher understanding of ICT

Figure 6.5 shows the relationship between pupils' ICT skills and the grade awarded by Ofsted for teachers' understanding of ICT. In secondary schools where teachers do not have a very good understanding of ICT, pupils are very unlikely to show good interest, make a good effort or make achievements in ICT.

Where teachers' understanding is good, the ICT development of pupils is much higher.

Fig 6.5 Teachers' understanding of ICT and pupils' ICT skills

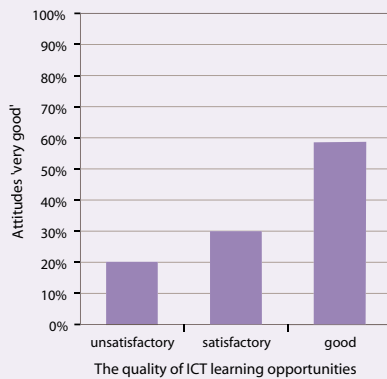


Conclusions

As with all of the factors examined, in each case pupil achievement is higher where ICT learning opportunities are good or better, in this case when supported by good ICT teaching.

Additional positive outcomes

Fig 7.1 ICT learning opportunities and pupil attitudes



While a key focus of this research has been to analyse the relationship between ICT and standards, it is also important to look at other outcomes, in particular pupil attitudes, behaviour and attendance, and parental views of the school. These are important factors in their own right, but also have a secondary link to improved standards. It is clear that pupils who are well motivated, with parents who are supportive of the school, are likely to be more effective learners.

Pupils' attitudes

Ofsted inspectors make a judgement on pupils' overall attitudes to school based on their observations in lessons and of the school generally. Inspectors are asked to consider a range of indicators of pupils' attitudes, for example whether the pupils are keen to come to school, whether they show interest in school life and are involved in the range of activities the school provides.

There is a positive relationship between good ICT learning opportunities and very good pupil attitudes, as shown in **Figure 7.1**.

Any relationship between ICT and pupil attitudes needs to be treated cautiously, however, as there are many other factors which might influence pupil attitudes.

Additional positive outcomes

Fig 7.2 ICT learning opportunities and pupil behaviour

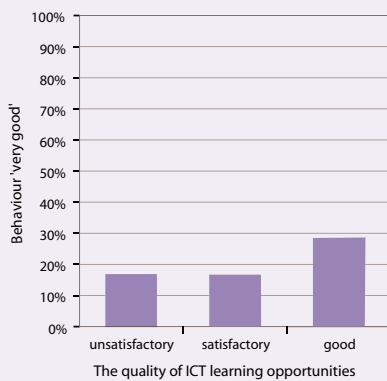


Fig 7.3 ICT learning opportunities and attendance

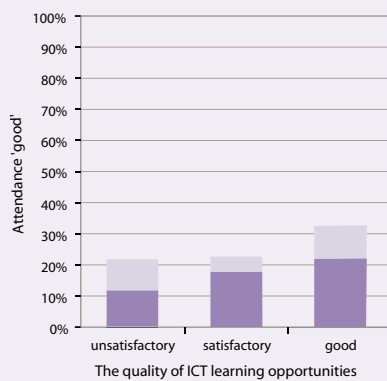
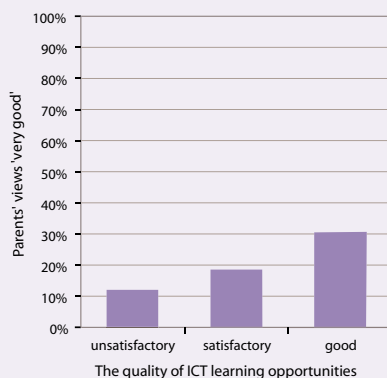


Fig 7.4 ICT learning opportunities and parental views of the school



Pupils' behaviour

Inspectors are also asked to consider whether pupils behave well in lessons and around the school, and whether they are courteous, trustworthy and respectful of the property of others. While there is a positive relationship between the quality and range of ICT learning opportunities in secondary schools and pupil behaviour, as shown in **Figure 7.2**, this is more limited.

As with pupil attitudes, any relationship between ICT and pupil behaviour needs to be treated cautiously as there are many other factors which might influence pupil behaviour.

Attendance

Inspectors draw on data from the school regarding pupil attendance and relate this to the national picture. Where they have concerns, they can check that registers are completed each morning and afternoon, how parents are supported in ensuring the regular attendance of their children, and if there are straightforward procedures for reporting absence.

There is a positive relationship between ICT learning opportunities and attendance, as demonstrated in **Figure 7.3**.

Again, any relationship between ICT and pupil attendance needs to be treated with caution as there are many other factors which might influence attendance levels.

Parental views

Ofsted also makes judgements about parents' views of the school based on their observations and meetings with parents.

Inspectors consider how satisfied parents are with what the school provides and achieves, the extent to which they are provided with good quality information about the school (particularly regarding pupil progress), and how links with parents, including the use of home-school agreements, contribute to pupils' learning at school and at home.

As **Figure 7.4** shows, there is a positive relationship between parental views of the school and the quality and range of ICT learning opportunities, suggesting that the availability of ICT in the schools their children attend is of importance to parents.

As with pupils' attitudes and behaviour, a similar caution needs to be attached to the interpretation of this data as there are numerous other factors which can influence parental views of a school.

Conclusions

The quality of ICT learning opportunities is positively related to the attitudes and behaviour of pupils in secondary schools.

Additionally, analysis has found that the quality of ICT learning opportunities is also related to whether parents have a positive view of the school. Similar conclusions were made in the primary study.

Section 8 – ICT enablers: an overview

ICT enablers: an overview

The five factors examined in the previous sections – ICT resources, school leadership, ICT leadership, general teaching and ICT teaching – have, in previous reports in this series, become known as the 'ICT enablers'. Once, again, this analysis has confirmed that they play a vital role in supporting the effective use of ICT in schools and in particular in ensuring the provision of good ICT learning opportunities. These ICT opportunities are in turn related to higher achievement by pupils.

ICT enablers and ICT learning opportunities

Table 8.1 summarises the results for each of the factors considered in this analysis. It also includes data regarding social grade and the prior attainment of pupils (issues which are considered further in the next section).

Table 8.1 ICT enablers and ICT learning opportunities

Factor	If this factor is 'unsatisfactory', how many schools offer good learning opportunities in ICT?	If this factor is 'very good', how many schools offer good learning opportunities in ICT?	Difference between 'unsatisfactory' and 'very good'
ICT resources	(10%)	(62%)	52%
School leadership	(23%)	40	17%
ICT leadership	(1%)	74%	73%
General teaching	(12%)	(71%)	59%
ICT teaching	0%	(81%)	81%
Social grade	24%	(39%)	15%
High prior attainment	26%	37%*	11%

* This figure represents 'good' prior attainment - there is no value for 'very good' prior attainment.

Figures in brackets are based on a sample of fewer than 50 schools, for example because few schools with unsatisfactory ICT resources offer good ICT learning opportunities.

While school leadership does not appear to have a significant impact in the table above, many other factors such as ICT resources, ICT leadership and general and ICT teaching will be dependent on the general quality of school leadership, and so it remains a key factor. The impact of social grade and high prior attainment is not as marked as for other factors.

Of the seven factors tested therefore, the first five are considered to be important factors in enabling a school to offer good ICT learning opportunities to pupils.

ICT enablers: an overview

Fig 8.1 ICT enablers and ICT learning opportunities

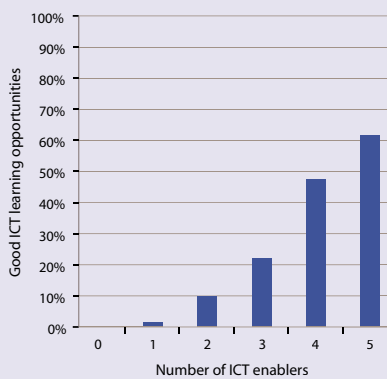


Fig 8.2 Number of ICT enablers in secondary schools

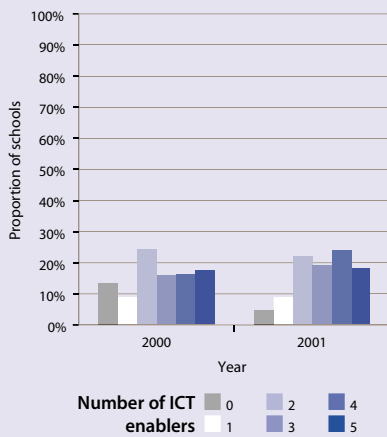
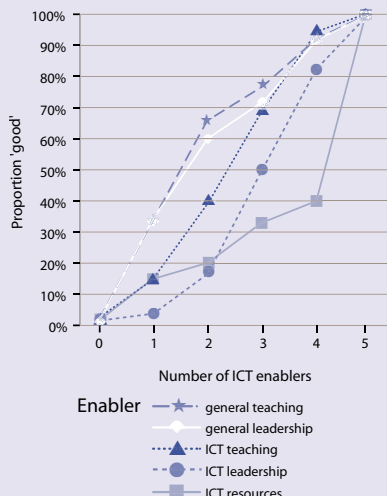


Fig 8.3 Number and type of ICT enablers



The number and type of ICT enablers and ICT learning opportunities

Figure 8.1 shows good ICT learning opportunities against the number of ICT enablers present (that is, when the five factors are judged to be good or better in Ofsted inspections). A positive trend is shown. Good ICT learning opportunities increase significantly as the number of ICT enablers in place increases.

Figure 8.2 shows the distribution of those ICT factors present in secondary schools. Some 19 per cent of secondary schools had all five enabling factors in place, and 43 per cent had four or five. If compared with figures for 2000 a positive trend is shown with more secondary schools having three or more ICT enablers in place than previously.

Figure 8.3 shows a similar relationship, but plots for each of the five groups of schools the percentage of that group with a particular ICT enabler in place. This graph does not show change over time; it represents a snapshot of a number of populations of secondary schools in the year 2001. Of the group of schools with three enablers, for example, 77 per cent have good general teaching, 71 per cent have good general leadership and 68 per cent have good ICT teaching, but only 50 per cent have good ICT leadership and 33 per cent have good ICT resources.

The findings are generally in line with a model of ICT implementation which follows a relatively logical progression, where schools tend to have good general leadership and good general teaching in place before developing their ICT. However, there are some key differences. In the primary study, the development of ICT factors also followed a logical progression with ICT leadership tending to precede ICT teaching followed by ICT resources. This is not the case in the secondary findings, with ICT teaching preceding ICT leadership followed by ICT resources. These findings might suggest that ICT development in secondary schools is led by the enthusiasm for and application of ICT by teachers, which in turn drives the leadership of ICT. To establish if this is truly the case, or whether other factors are present, requires further research outside of the scope of this study.

Despite this, these results do tend to suggest that ICT implementation is relatively methodical, and that ICT resources are not being wasted in secondary schools unable to take significant advantage of them. There are still a significant number of schools that are ready to increase the quality of their ICT resources, supporting the government's policy commitment on spending on infrastructure.

However, as with primary schools, there is a necessary concern for those schools which do not have the base levels of leadership and teaching on which to build.

ICT enablers and pupil achievement

Schools with more ICT enablers in place tend to achieve better results in the core subjects at Key Stage 3, as shown in **Figure 8.4**.

The impact of more ICT enablers is similar across all three subjects.

Figure 8.5 demonstrates that GCSE results are also better in schools with more ICT enablers in place.

Conclusions

This section has identified five factors, or ICT enablers, that are present in the development of good ICT learning opportunities in secondary schools. These were identified from a list of seven school and ICT factors that had the highest association with learning standards overall and together represented a context for the learning process.

The five key factors are: ICT resources, school leadership, ICT leadership, general teaching and ICT teaching.

Two other variables – the socio-economic grade (SEG) applied to the school and the prior attainment of pupils – were not found to be as important.

Each of these five enablers are necessary, but not sufficient in themselves to provide good ICT learning opportunities, although good ICT learning opportunities increase significantly as the number of ICT enablers in place increases.

Some 19 per cent of secondary schools had all five enabling factors in place in 2001, and 43 per cent had four or five. When compared with figures from 2000 a positive trend is revealed, with more secondary schools having three or more ICT enablers in place than previously. The presence of more ICT enablers was found to have a positive relationship with pupil achievement at both Key Stage 3 and GCSE.

Schools with a high number of ICT enablers in place usually had good general leadership and good general teaching, so providing a sound foundation on which to build their ICT capability. In secondary schools ICT teaching tends to precede ICT leadership followed by ICT resources, differing from findings in the primary study. The findings do suggest, however, that ICT resources are not being wasted in those schools that are not yet able to make effective use of them.

Fig 8.4 ICT enablers and Key Stage 3 outcomes

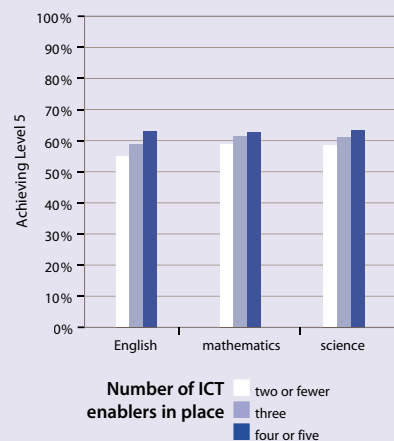
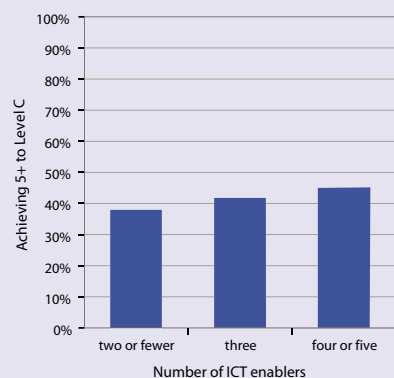


Fig 8.5 ICT enablers and GCSE outcomes



Socio-economic factors

This section examines the evidence relating to the interdependence of socio-economic grade, the use of ICT in schools, and higher pupil achievement.

Schools are placed in socio-economic bands according to the nature of their catchment area. Grade A* is where the highest socio-economic grade is applied, and Grade E* is the lowest grade.

As very few grades A* and E* were applied to schools, in this analysis these were combined with grades A and E. Additionally, as very few schools were awarded grade A for their socio-economic status, this has been combined with grade B in the figures below for ease of comparison.

Fig 9.1 SEG and ICT resources in secondary schools

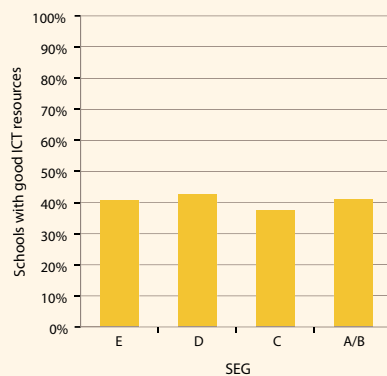
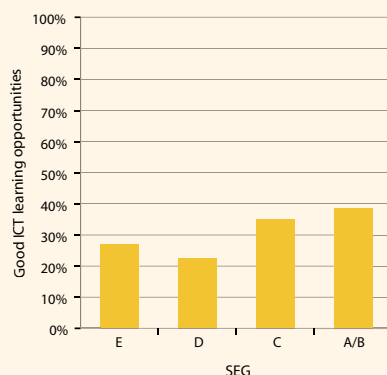


Fig 9.2 SEG and ICT learning opportunities



Social grade and ICT resources

Figure 9.1 shows the distribution of ICT resources across social grades. It is clear that ICT resources are distributed fairly equally between the various grades, and hence better resources are not associated with more privileged circumstances.

Any association between ICT resources and standards is therefore not due to socio-economic circumstances.

Social grade and ICT learning opportunities

Figure 9.2 demonstrates the relationship between socio-economic grade and good ICT learning opportunities.

Higher socio-economic grade is not essential for schools to offer good learning opportunities in ICT, although it does make it more likely.

Socio-economic factors

Fig 9.3 Prior attainment and ICT learning opportunities

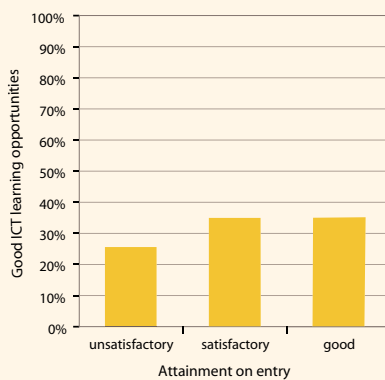


Fig 9.4 SEG and good teaching

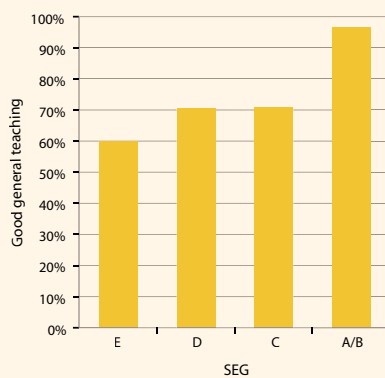
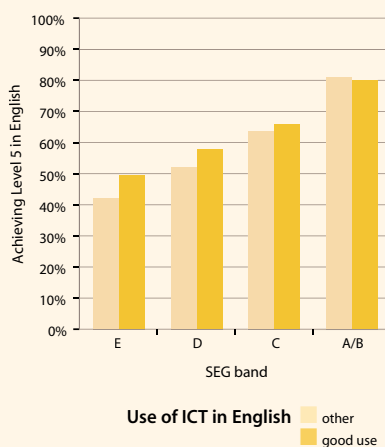


Fig 9.5 Use of ICT in English and English results at Key Stage 3



Attainment on entry and ICT learning opportunities

The grade for prior attainment measures the academic achievements of pupils entering the school. **Figure 9.3** shows the relationship between attainment on entry and good learning opportunities in ICT.

Satisfactory or better prior attainment has an association with a higher incidence of good ICT learning opportunities, but good ICT learning opportunities still exist when attainment on entry is unsatisfactory.

Social grade and teaching

As already demonstrated in **Figure 9.2**, the tendency for ICT learning opportunities to be better in higher socio-economic groups is not because of improved resources, and so other factors must be contributors.

Figure 9.4 shows that general standards of teaching are generally better in higher socio-economic bands, and this may account for some of the differences.

Subject results for different socio-economic grades

Figures 9.5 to 9.7 look at ICT usage in subjects at Key Stage 3. Again the graphs illustrate that those schools in higher socio-economic grades are likely to achieve better results.

However, where a school is categorised as making better use of its ICT resources, those schools in socio-economic grades C, D and E will receive better results than those schools in the same socio-economic grade that do not make good use of their resources.

The same trend is not generally seen for those schools in socio-economic grades A and B.

The same trend is also apparent for GCSE as shown in **Figure 9.8**.

Conclusions

There is no notable difference in ICT resources in schools in different socio-economic circumstances. However, schools in higher social grades are able to offer better ICT learning opportunities, although this may be attributable in part to general standards of teaching which tend to be higher in those schools in higher socio-economic grades.

Satisfactory or better prior attainment has an association with a higher incidence of good ICT learning opportunities, but good ICT learning opportunities still exist when attainment on entry is unsatisfactory.

Fig 9.6 Use of ICT in mathematics and mathematics results at Key Stage 3

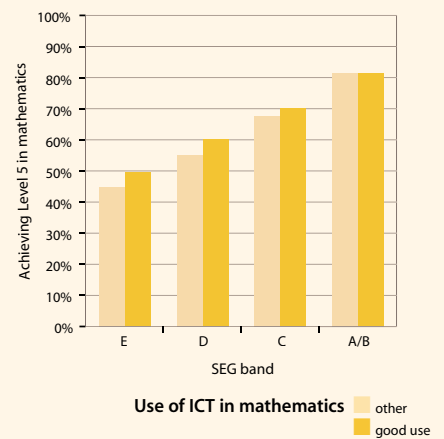


Fig 9.7 Use of ICT in science and science results at Key Stage 3

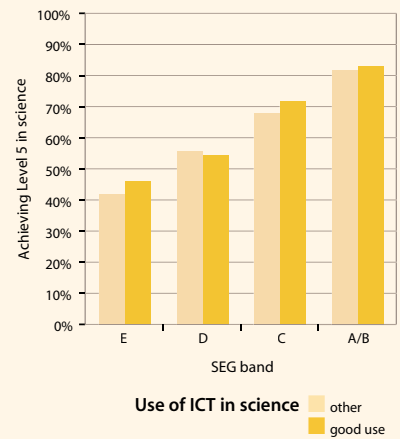
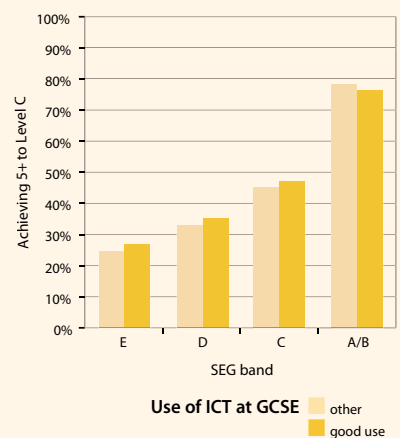


Fig 9.8 Use of ICT in GCSE and GCSE results



Appendices

Appendix 1 - Ofsted framework

Since January 2000, Ofsted have used a new inspection framework. Two forms of inspection are carried out: a 'full' inspection, on the majority of schools, which includes a detailed inspection of ICT features and facilities; and a 'short' inspection which takes much less time and records only the general features of a school, not including ICT. Schools are selected for short inspection on the following criteria:

'Their previous inspections were good, they have good test and examination results compared to national standards, and to similar schools, with positive trends over time.'

The change in the inspection framework has had an impact on:

- the number of schools available as a research sample
- the type of schools included in the research sample.

Impact on the number of schools

A short inspection provides no data on ICT factors and these schools were therefore removed from the analysis, reducing the sample by approximately 28%.

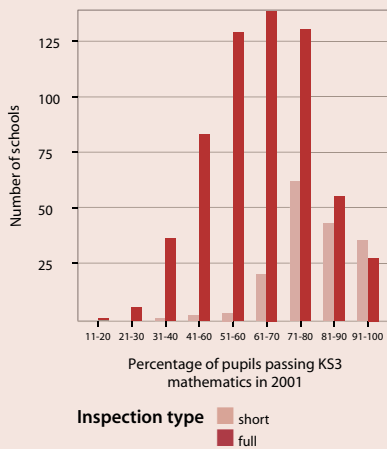
Table A.1

	Secondary*
Total inspected	599
Given full inspection	430
Given short inspection	169

* Please note the sample size for secondary schools differs slightly from those cited in Appendix 2 of the primary study report, 'Primary Schools – ICT and Standards', due to further detailed data analysis as part of the secondary study. The sample sizes cited for primary schools are unchanged.

Appendix 1 - Ofsted framework

Fig A.1 Schools results for Key Stage 3 mathematics in 2001 by inspection type



Impact on the type of schools

The Ofsted criteria for short inspection removed a significant number of successful schools from the sample. As an example, **Figure A.1** shows the effect on the distribution of Key Stage 3 mathematics results.

Additional judgements

Additional judgement criteria are now part of the Ofsted inspection framework, and many of these offer useful perspectives on the ICT features of schools. These are referred to within the body of the text where appropriate.

Appendix 2 - The sample

The data

Data was obtained from Ofsted and QCA on all of the 4,043 schools inspected in the 2000-01 academic year. Of these 2,816 were primary schools with pupils taking Key Stage 2 tests, and 599 were secondary schools covering Key Stages 3 and 4. The remainder were schools such as infant schools and special units which fall outside of the parameters of this research. As explained in Appendix 1, ICT data was not collected for schools given the 'short' Ofsted inspection which does not include ICT judgements, and these are also excluded from the research sample for all ICT analysis.

Ofsted data

The analysis used the grades awarded by Ofsted inspectors to schools inspected in the academic year 2000-01. During an inspection, inspectors record judgements on a large range of measures. Generally, each is judged on a seven-point scale:

- 1 – Excellent
- 2 – Very good
- 3 – Good
- 4 – Satisfactory
- 5 – Unsatisfactory
- 6 – Poor
- 7 – Very poor

Because grades 1 and 7 were rarely awarded, these two grades are amalgamated with the next nearest categories to give five grades, so producing a more valid statistical sample. Due to the sample size available for secondary schools, further amalgamation has been carried out, and this is outlined within the body of the report where applicable.

QCA data

Data was obtained from QCA on the national tests at Key Stages 2 and 3, and GCSE examinations taken in the summer of 2001.

QCA test results were used in two ways:

- The number of pupils reaching national target levels was divided by the total number of pupils taking the test, to give a **percentage pass rate for the school**.
- The number of schools achieving above national standards in each test was divided by the total number of schools, to give a **percentage pass rate above national standards**.

The attainment targets used were:

- Level 4 or above at Key Stage 2
- Level 5 or above at Key Stage 3
- 5 or more GCSEs (grade C or above) at Key Stage 4.

Conclusions

Data was obtained from Ofsted and from QCA on all of the 4,043 schools inspected in the 2000-01 academic year.

Of these 2,816 were primary schools with pupils taking Key Stage 2 tests, and 599 were secondary schools, the rest were schools outside the parameters of this research.

Of schools within the parameters of the research, 2,582 primary schools and 430 secondary schools were given a full inspection, including ICT grades, and these schools therefore form the basis of the current research.

Appendix 3 - Statistical data and correlations

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This report was reviewed by Dr Daniel Muijs, lecturer in Quantitative Research Methods at the Institute of Education of the University of Warwick, who provided this statement: "We agree that the analyses have been properly conducted and reported, and that the findings follow from the data, with the proviso that there are obvious limitations to the use of school level inspection data. We believe that this report provides a good basis for further discussion and research on the effectiveness of ICT use."

A note on line graphs

In this report, where it is necessary to compare several different sets of figures in the same chart, the decision has been made to present this information in the form of a line graph to facilitate clarity and comparison. However, this does not imply that the variables under consideration (Ofsted grades given for various features) represent continuous variation. For this reason broken rather than continuous lines are used.

A note on correlations

Correlation coefficients, relating to every relationship described in this report, are in a separate report available from the research area of the Becta website [<http://www.becta.org.uk/research/>]. All correlations are statistically significant to at least 95% confidence, except those explicitly defined as not significant, by enclosure in brackets, for example (0.03).





www.becta.org.uk/research

This report, and others in the series, may be downloaded in electronic form from the research area of the Becta web site [<http://www.becta.org.uk/research/>].

Other reports on ICT and education are available from Becta in printed form.



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