ICT at key stage 3

The impact of ICT on pupils' learning at key stage 3 in secondary schools

July 2014

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⅄ nursery schools and settings that are maintained by, or receive funding from, local authorities;
⅄ primary schools;
⅄ secondary schools;
⅄ special schools;
⅄ pupil referral units;
⅄ independent schools;
⅄ further education;
⅄ independent specialist colleges;
⅄ adult community learning;
⅄ local authority education services for children and young people;
⅄ teacher education and training;
⅄ Welsh for adults;
⅄ work-based learning; and
⅄ learning in the justice sector.

Estyn also:

⅄ provides advice on quality and standards in education and training in Wales to the National Assembly for Wales and others; and
⅄ makes public good practice based on inspection evidence.

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Introduction

This report is the second to be produced in response to a request for advice from the Welsh Government in the Minister's annual remit letter to Estyn for 2012-2013. This report focuses on the impact of information and communication technology (ICT) on pupils' learning in key stage 3 in secondary schools. The first report, published in July 2013, focused on the impact of ICT on pupils' learning in primary schools. Both these reports build on two earlier reports:

- 'Review of information and communications technology (ICT) provision in schools and its impact on raising standards' (Estyn, 2003); and
- 'An evaluation of the impact of the Better Schools fund on provision for ICT in schools' (Estyn, 2007).

The report evaluates standards in the National Curriculum subject of information and communication technology (ICT) and considers the impact of ICT as a key skill on pupils' learning across the curriculum at key stage 3 in secondary schools in Wales.

The report also considers the impact of ICT on developing pupils' literacy and numeracy skills. The report contains case studies of best practice and draws on the evidence noted in Appendix 1.

The report is intended for the Welsh Government, local authority and regional consortia officers, headteachers and teachers. Others with an interest in the use of ICT in education will find it useful.

Background

Pupils generally develop their initial ICT skills in discrete ICT lessons. However, to be fully competent and proficient, pupils need to have enough opportunities to consolidate and apply these skills in other subjects and contexts.

Curriculum guidance

The Welsh Government has published two key guidance documents to support the development of pupils' ICT skills.

'Information and communication technology in the National Curriculum for Wales Order' (Welsh Government, 2008) relates to ICT as a subject. These subject orders identify two areas of skills that pupils should be given opportunities to experience: "find and analyse information' and 'create and communicate information". In addition, "pupils should be taught how to use ICT comfortably, safely and responsibly".

The 'Non-statutory Skills Framework for 3 to 19-year-olds in Wales' (Welsh Government, 2008) relates to the use of ICT skills across the curriculum. It provides guidance on developing continuity and progression across the curriculum and

between key stages in the skills of thinking, communication, ICT and number. The ICT section of the Skills Framework has two strands that closely reflect the two strands of the National Curriculum subject orders for ICT. These are: "finding and developing information and ideas" and "creating and presenting information and ideas". A summary of the main requirements for ICT in key stage 3 in the National Curriculum and in the Skills Framework is contained in Appendix 3.

In addition to these two key documents, National Curriculum subject orders for subjects other than ICT identify further opportunities for pupils to use ICT, where appropriate. Often these opportunities require specific ICT skills, such as using computer-aided design software in design and technology or composition software in music.

Main findings

ICT as a subject

Standards

1   Standards in ICT as a subject are good or better in around half of the schools visited for this survey. In key stage 3 teacher assessments, ICT has been the best performing non-core subject for the last five years. However, this level of performance is not reflected in the findings of inspectors when they visited the survey schools. Neither is it reflected in GCSE and A level results.

2   Pupils' skills in using ICT for researching and presenting information are good in most schools. Where standards are adequate or worse pupils do not develop the full range of ICT skills that they should to a high enough standard, especially in creating databases and modelling. They also rely too much on the teacher for help.

Teaching

3   The quality of teaching ICT as a subject is good or better in half the lessons observed. Where teaching is strong, teachers use their subject knowledge well to develop pupils' knowledge and application of ICT in all aspects of the subject. They enthuse and motivate pupils effectively and keep them focused and on-task. As a result pupils become confident, independent learners.

4   In a half of lessons observed where teaching is no better than adequate, teachers do not consider pupils' prior knowledge well enough and do not challenge pupils sufficiently. In these lessons, pupils rely too much on teachers for support and teachers do not make sure that pupils make progress by building on prior knowledge and skills.

Planning, provision and assessment

5   The quality of planning, provision and assessment for ICT as a subject is good or better in half the schools visited. Where planning is good, schemes of work ensure

full coverage of the statutory requirements for the subject at the appropriate level, and this is fully implemented. In other schools these statutory requirements are not covered suitably. Very few secondary schools liaise effectively with their feeder primary schools to ensure continuity and progression in ICT from key stage 2 to key stage 3.

6   Where assessment is good, schools use the information well to plan next steps in learning and teachers also involve pupils successfully in self- assessing their work. This has a good impact on standards. Although nearly all schools standardise assessments within the school, only a very few have the arrangements to moderate assessment externally.

7   The reliability and validity of teacher assessment in ICT at the end of key stage 3 are doubtful. This is often due to assessments being overgenerous, compounded by a lack of external verification.

Leadership and management

8   Around half of middle leaders succeed in raising standards in ICT as a subject by setting high expectations for teaching. They ensure that teachers co-operate to produce effective schemes of work and stimulating resources. They monitor colleagues' work rigorously to ensure all staff adhere to the scheme of work. They implement effective assessment and tracking procedures.

9   Nearly a third of schools do not have a suitable ICT improvement plan that sets out clearly how the school will improve standards, provision and prioritise ICT strategies throughout the school.

10   In around half of schools, leaders enrich the ICT curriculum with experiences in computer programming and coding, which go beyond the requirements of the present national curriculum.

11   The National Curriculum for ICT is not fully relevant to the technological needs of today's society or engaging enough for pupils.

12   ICT curriculum time varies significantly from school to school. A minority of schools do not offer the equivalent of a lesson a week in key stage 3 and often this is not enough time for pupils to cover all aspects of the ICT curriculum effectively.

13   ICT departments are generally poor in liaising with other departments and do not provide pupils with relevant contexts across the curriculum to apply the skills they developed in discrete ICT lessons.

14   Staff in around half of the schools surveyed say that the poor quality of the internet connection hinders their ICT work. The level of filtering and blocking of internet sites by local authorities also hinders access unnecessarily in the majority of schools.

15   Most schools are unsure about the level of ICT support arrangements that can be provided by the new regional consortia. Currently, middle leaders and teachers do not have enough access to appropriate professional development, external reviews and regular networking opportunities.

ICT across the curriculum

16 Standards of ICT skills across the curriculum are unsatisfactory in over a half of schools visited and no better than adequate in the remainder. Pupils are not offered enough opportunities to apply the skills learned in discreet ICT lessons in other subjects. Consequently they develop a mindset of choosing not to apply these skills by choice either.

17 The quality of planning and provision for the use of ICT across the curriculum in key stage 3 is unsatisfactory in many schools and no better than adequate in the others. Teachers do not offer pupils enough well-planned opportunities to practise their skills in meaningful contexts across the curriculum.

18 The majority of schools use ICT well as a tool to help raise standards in literacy. Pupils develop effective skim-reading skills as they scan for relevant information and many extract, interpret and present information appropriately. However, pupils often copy information from websites without summarising it in their own words or reorganising it to cover the topic in question. In the worst examples, pupils concentrate more on the layout, design and transition of their presentation slides than the quality and accuracy of the content.

19 ICT has less impact on helping to raise standards in numeracy than in literacy. Few teachers use ICT regularly to support the development of pupils' numeracy skills across the curriculum. Where pupils use ICT well, they produce a variety of graphs, create tables and use databases and spreadsheets effectively in real-life problem-solving.

20 Only a few schools evaluate the impact of ICT on raising standards in literacy or numeracy or as mitigating the effects of disadvantage. Generally schools depend too much on anecdotal evidence rather than measureable outcomes to evaluate impact.

Recommendations

In order to improve standards in ICT in secondary schools at key stage 3:

schools should:

R1 improve the delivery and monitoring of ICT across the curriculum to ensure continuity and progression in pupils' ICT skills;

R2 ensure that each element of the ICT programme of study is taught well across the key stage;

R3 improve the quality of teaching so that pupils develop their ability to work independently and make progress in developing their ICT skills during ICT lessons and in other subjects across the curriculum;

R4 provide relevant and sufficient professional development opportunities for all teachers;

R5   improve the accuracy of teacher assessment;

R6 liaise effectively with their feeder primary schools to ensure continuity in planning the delivery of ICT across key stage 2 and key stage 3 so that pupils do not unnecessarily revisit skills and become disengaged in lessons; and

R7 improve the liaison between the ICT department and other subject departments so that pupils have more contexts in which to apply and develop their skills.

Local authorities and regional consortia should:

R8 ensure that ICT curriculum support is available to all secondary schools;

R9 monitor the standards and provision of ICT as a subject and the effectiveness of its use across the curriculum; and

R10 support schools to improve the accuracy and reliability of teacher assessment.

The Welsh Government should:

R11 implement a relevant statutory framework for ICT from Foundation Phase to post-16 and review the National Curriculum subject orders to reflect current developments in technology; and

R12 assist local authorities and regional consortia to address the technical issues that constrain access to ICT resources in secondary schools.

ICT as a subject

Standards at the end of key stage 3 based on teacher assessment

21   Results at the end of key stage 3 in ICT have improved steadily over the past five years. The percentage of pupils achieving the expected level has improved by over 11 percentage points. In 2013, most pupils achieved the expected level 5 or higher at the end of key stage 3.

22   The percentage of pupils achieving the higher levels 6 and 7 has also improved. In 2013, around half of Year 9 pupils achieved higher than the expected level.

Percentage of boys, girls and pupils achieving level 5+, level 6+ and level 7+ in ICT teacher assessments at key stage 3, 2009-2013
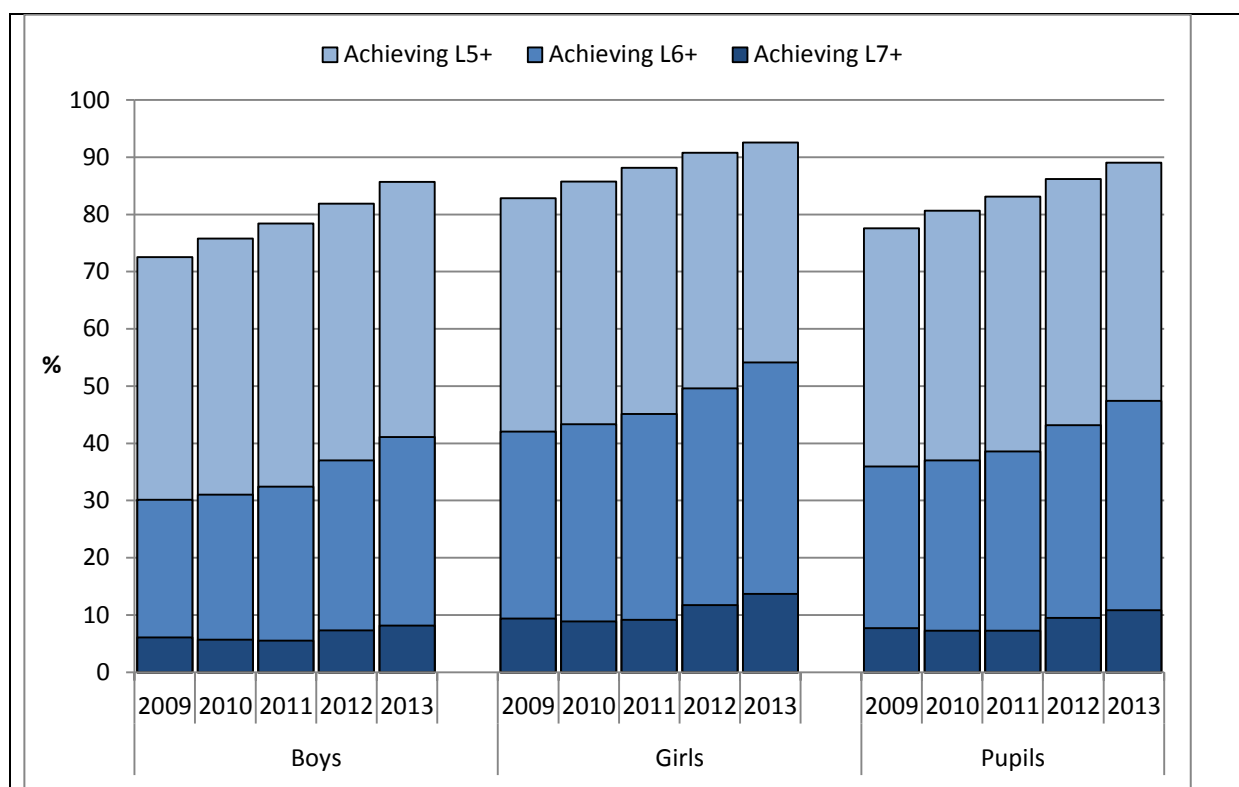
Source: National Data Collection (NDC), Welsh Government[1]

23   The percentages of both boys and girls achieving the expected level 5 or above in ICT have improved. As in all other non-core subjects, a higher percentage of girls than boys achieve the expected level. In ICT, this has been consistently the case for the last five years, although the gap is generally less in ICT than in the majority of other subjects. This could be due to the appeal of the subject to boys and that it is acceptable for boys to do well in ICT.

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[1] http://wales.gov.uk/statistics-and-research/national-curriculum-teacher-assessments-non-core-subjects/?lang=en

24   Over the past five years, the gap between the performance of girls and boys has decreased from 10.2 percentage points in 2009 to 6.9 percentage points in 2013. The performance of boys has improved at a faster rate than that of girls.

25   As a non-core subject, teachers conduct their own assessments of pupils' standards in ICT at the end of Year 9. In many schools assessments are standardised but only in a very few cases are these moderated externally. Generally these assessments tend to be overgenerous and do not match the standards sampled during the lessons in the Estyn survey.

26   The following chart shows the percentage of pupils in Wales achieving the expected levels in the non-core subjects at key stage 3 since 2009.

Percentage of pupils achieving the expected level (level 5) in non-core subjects at key stage 3, 2009-2013
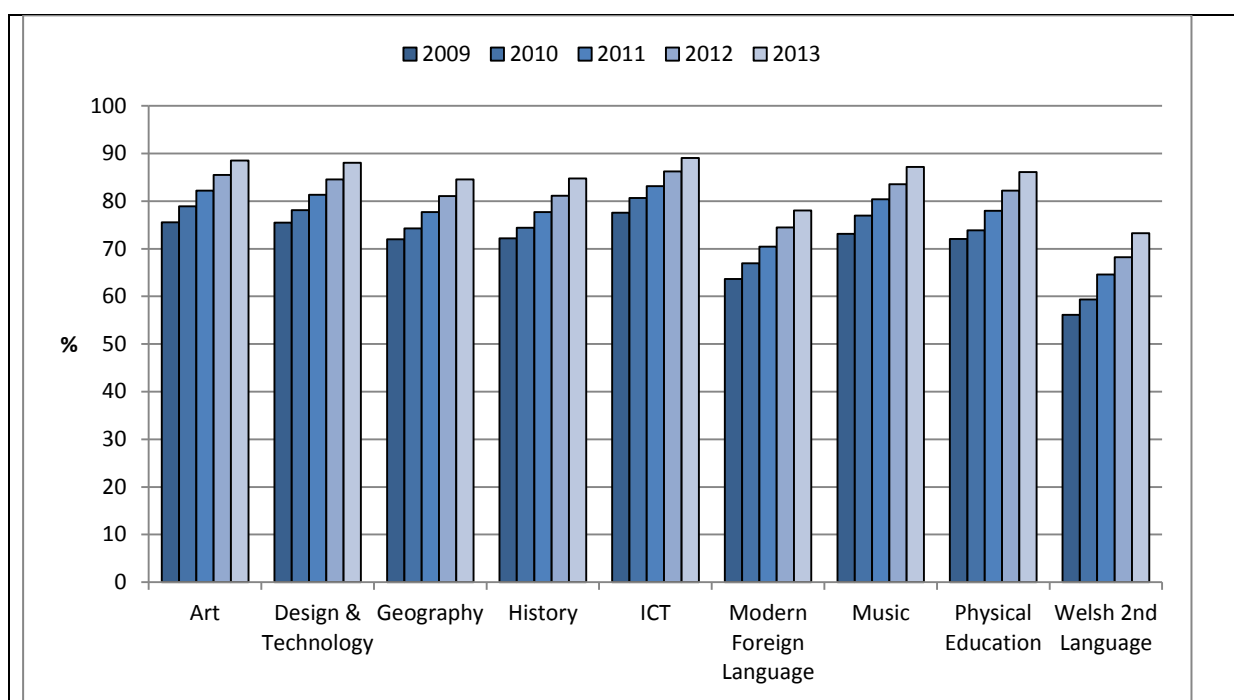
Source: National Data Collection (NDC), Welsh Government[2]

27   ICT was the best performing non-core subject in 2013 and has held this position in each of the last five years.

28   While performance in ICT in teacher assessments at the end of key stage 3 is better than all other non-core subjects, this pattern is not replicated at GCSE in or at Advanced level (A level). In 2013, ICT was placed 17th out of 31 when ranked against other subjects[3] for the percentage of entries (pupils aged 15) achieving an A*-C grade at GCSE[4]. At A level, ICT was the worst performing subject for the percentage of entries (pupils aged 17 only) achieving A*-C[5].

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[2] http://wales.gov.uk/statistics-and-research/national-curriculum-teacher-assessments-non-core-subjects/?lang=en
[3] Not including vocational subjects
[4] http://wales.gov.uk/statistics-and-research/examination-results/?lang=en
[5] Not including vocational subjects

29   Since there is no requirement to assess ICT at the end of key stage 2, this teacher assessment is the first indication of standards in ICT on a national level. As a result, it is not possible to compare standards of pupils at the end of key stage 2 and track their progress to the end of key stage 3 to see whether they make progress.

Standards in lessons and pupils' work

30   In key stage 3, standards in ICT as a subject and progress made by pupils during lessons are good or better in around half of schools visited. This does not reflect the standards reported by teachers in their end of key stage assessment. Inspectors found that pupils' skills in modelling and creating and interrogating databases are not being as developed as their skills in communicating and finding information skills. Pupils also rely too much on support from teachers.

31   In around half the schools, most pupils:

- develop their ICT skills well across each strand of the subject;
- use a wide range of software applications effectively for a variety of purposes;
- demonstrate a sound knowledge of ICT applications;
- answer probing questions confidently, using correct terminology;
- work well independently and in groups; and
- are engaged, interested and enthusiastic about their work.

32   In the remainder of schools, pupils:

- have a narrower range of ICT skills, with modelling and creating databases skills the most underdeveloped;
- rely too much on teachers for help and do not develop their independent skills well enough;
- make too little progress during lessons as they are not focused or motivated enough; and
- lack basic file management skills in a very few schools and do not build upon skills they learnt in primary schools well enough.

Teaching

33   Generally, the quality of teaching in ICT as a subject is good or better in half the lessons observed. In these lessons teachers use their expertise to develop pupils' knowledge and application of ICT well in all aspects of the subject. They plan learning experiences that engage and challenge pupils and the teachers have high expectations of the pupils. Through this pupils extend their understanding.

34   These teachers use a range of teaching methods that enthuse and motivate pupils. They build on pupils' prior knowledge effectively and provide pupils of differing abilities with work that meets their needs well. Where teaching is good, teachers make sure that all pupils are aware of purpose of the lesson and what they need to do in order to improve. As a result of this good teaching, most pupils become confident and independent learners.

35   Where teaching ICT is adequate or worse, in the remaining half of lessons observed, teachers do not make sure that pupils cover the whole range of the ICT curriculum. They do not take enough account of pupils' prior knowledge and skills, especially for pupils in Year 7, which results in unnecessary repetition and disengagement.

36   Generally, these teachers do not engage or motivate pupils. They do not challenge more able pupils well enough and do not develop pupils' thinking or problem-solving skills. As a result, pupils do not make appropriate progress to becoming competent and confident in ICT.

Assessment

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37   Assessment is good or better in over half the schools visited. These schools use both formal [6]assessment and ongoing [7]assessment well during lessons to plan next steps in learning. This has a good impact on standards. Teachers also involve pupils successfully in self-assessing their work. They often use informative displays based on level descriptors broken down to sub levels to assist pupils with this task.

38   A minority of schools involve pupils well in self-assessment, with pupils making effective use of wall displays to help them understand their progress and what they need to do next.

39   Only a minority of schools plan joint run ICT-based projects that support transition for pupils from key stage 2 to key stage 3. Those that do receive valuable information about pupils' ICT capabilities on transition to secondary school and plan relevant work for Year 7 pupils. As a result, pupils are engaged and systematically build upon and develop their ICT capabilities well. This is especially important as very few secondary schools liaise effectively with their feeder primary schools to ensure continuity in the development of ICT between key stage 2 and key stage 3. Generally only a very few secondary schools receive any ICT teacher assessment information from their primary schools.

40   Nearly all schools have a teacher in charge of co-ordinating the assessment of ICT in key stage 3. Many schools assess pupils' work formally every term and a few do so more often. A very few schools assess annually or only at the end of key stage 3, which is not frequent enough and is too late for pupils to work on shortcomings in knowledge and application that they need to improve. .

41   Many schools do not have a full and secure understanding of the criteria for assessment, based on the requirements of the National Curriculum. Although all schools level pupils' work at the end of key stage 3, only just over a half have ICT subject portfolios to assist them with this moderation task. Only a few secondary schools use the Welsh Government's guidance materials on how to level pupils' work for assessing ICT at key stage 3.

42   In their marking of pupils' work, the majority of teachers regularly pay good attention

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[6] Summative assessment
[7] Formative assessment

to identifying strengths and areas that require improvement. However, few teachers check pupils' responses and there is a tendency for pupils to forget the comments. This limits the impact of teachers' comments on pupils' progress.

43   In a very few schools, teachers use ICT innovatively to offer feedback. The following case study illustrates how teachers at Radyr Comprehensive School use specific codes that link to a video clip of the teacher outlining strengths and areas for improvement.

Case study 1 – innovative use of ICT in teacher feedback

Context

Radyr Comprehensive School is an 11 to 18 mixed comprehensive in the north west of Cardiff which provides education for 1,253 learners. Around 6.5% of pupils are entitled to free school meals, which is well below the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	87.2%	95.7%	98.9%	97.6%	100.0%
Achieving level 6+	54.4%	63.0%	79.2%	75.5%	85.6%
Achieving level 7+	0.6%	25.5%	11.8%	27.8%	24.9%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	3	2	1	2	1
Achieving level 6+	2	1	1	2	1
Achieving level 7+	4	1	2	1	1

Strategy

The department uses QR codes and video links to provide personalised feedback to pupils about their strengths, weaknesses and areas for improvement.
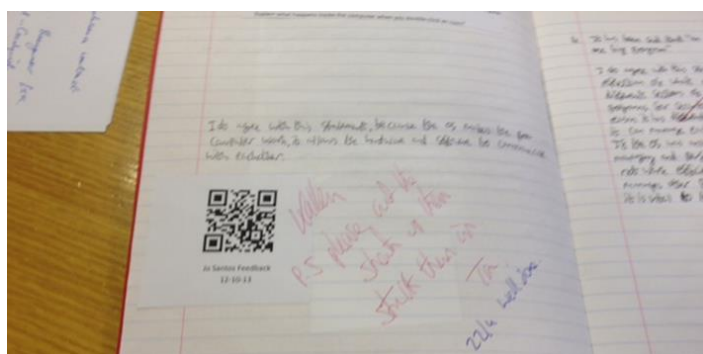
Action

Pupils have both a theory book and an exercise book. Their theory books are used to record information for the examinations. Their exercise books are used to record tasks and activities and capture their ideas and thoughts.

Exercise books receive detailed marking by the teacher, peers and the pupils themselves every three to four weeks or when there is deemed to be sufficient work to mark by the teacher. At the end of each half term, however, teachers carry out detailed assessments of both theory and exercise books and provide individualised video feedback.

This feedback is recorded with a web cam, uploaded to the departmental YouTube site. A URL is generated and used to create a QR code. The QR code is printed, stuck into their books, signed and dated by the teacher.

An example of QR code feedback received is opposite or you can use the URL below.

http://www.youtube. com/watch?v=d1wyamm70Kg&feature=youtu.be
http://www.youtube.com/watch?v=Kb2mVl07uRk&feature=youtu.be

In the first 15 minutes of the next lesson, pupils watch their feedback, complete the associated tasks and respond to the teacher's video comments.

Teachers evaluate strengths and weaknesses, highlight specific improvement targets and set additional tasks where necessary to reinforce the pupil's understanding. These tasks range from a simple paragraph of text to creating complex algorithms to challenge the more able pupils.

A favourite task by pupils of all abilities is to set an assignment for the teacher based on a subject they themselves struggle with. The pupils create a mark scheme and, in turn, mark and grade the work submitted by the teacher. Pupils are told that the teacher will make several mistakes on purpose, some obvious, some not so obvious. If teachers feel that the pupil needs to be really stretched, they will misinterpret the question entirely and therefore more detailed feedback will be needed.

Impact

This innovative strategy captures pupils' interest. Pupils respond to the teacher's assessment positively and make very good progress in specific skills highlighted as needing improvement. Pupils are overwhelmingly positive about the useful feedback and how it helps them to improve their work. The video films also prompt additional class discussion and further peer assessment.

Teachers have recently started emailing the QR codes to parents. The feedback on this has been particularly positive.

As a result of this innovative use of ICT in teacher feedback pupils now know exactly what they need do in order to improve.

Planning and provision

44   The quality of curriculum planning and provision for ICT is good or better in around half the schools visited.

45   Where the curriculum planning and provision is good or better:

- schemes of work cover the statutory requirements for the subject and implement them fully;
- there is clear progression in planning across the key stage;
- work is adapted to meet the needs of all pupils ;
- pupils have weekly or fortnightly lessons every year throughout key stage 3;
- teachers use effective and imaginative tools for learning;
- virtual learning environments are used well to provide pupils with open access to learning materials;
- secondary schools have good links with their feeder primary schools and take pupils' prior knowledge into account when planning work in Year 7; and
- schools enrich the statutory ICT curriculum with computer programming and coding experiences;

46   Where the planning and provision is adequate or worse:

- pupils do not have regular discrete lessons in ICT;
- schools do not base their provision on the statutory subject requirements and as a result pupils experience too narrow a range of ICT skills;
- continuity and progression are not clearly identified in schemes of work; and
- schemes of work are not fully implemented.

47   The majority of schools use ICT to challenge more able and talented pupils. Around half of all schools provide rich opportunities for pupils to extend their logical thinking skills through creating databases and generating formulae for spreadsheets.

48   A minority of schools introduce more able pupils to computer programming and coding skills in order to stretch their minds and develop logical processes beyond the requirements of the current ICT curriculum. Through the use of pupil friendly computer programming languages pupils design, program and test their own games. Through the elements of logic and problem-solving involved in such programming, pupils learn about cause and effect, co-operation, logic and creativity, in addition to programming itself. From the use of icon-based or gaming environments to learn the concept and building of algorithms, students can progress onto what may be considered more 'formal' programming languages.

49   The following case study shows how Mountain Ash Comprehensive School uses ICT to challenge more able pupils.

Case study 2 – using ICT to challenge pupils

Context

Mountain Ash Comprehensive School is an 11 to 18 mixed comprehensive in the heart of the Cynon Valley, which provides education for 871 learners. Around 34.6% of pupils are entitled to free school meals, which is significantly above the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	54.7%	63.9%	85.1%	76.0%	80.9%
Achieving level 6+	16.4%	10.7%	22.7%	20.1%	24.1%
Achieving level 7+	0.0%	0.0%	0.0%	1.9%	0.0%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	4	4	1	3	2
Achieving level 6+	3	4	2	2	3
Achieving level 7+	2	3	2	2	3

Action

After researching into various ways of engaging pupils and gaining the support of parents in an area of high deprivation the school decided on a project that would also stretch all pupils especially the more able pupils. The school worked in close partnership with Communities First to purchase and develop a robotics innovation studio.

The suite contains programmable robotics kits (with age applicability from 7+ to 16 to help with primary school transition projects), programmable robots, and a variety of set tasks, including a maze for the pupils to boost their cognitive ability.

The school has established clubs at key stage 3 that use ICT to promote learning in 'able and talented' pupils, and include the use of the robotics studio. These after school clubs are well attended. The equipment is also used during transition projects with the feeder primary schools.

The equipment has been integrated into schemes of work at key stage 3 throughout the school as part of the science, technology, engineering and mathematics initiative. Through this 'hands-on' experience all pupils benefit at a level appropriate for them.

The science department, for example is illustrating how 'gravity and resistance' impact on objects, in addition to using different sensors for light and temperature. The mathematics department use robots as an approach to demonstrate concepts of speed, distance and time and to explore aspects related to averages. The design and technology department build and programme robots to navigate complex tasks while the geography department build a wind turbine and a solar panel.

Impact

Pupils on the primary transition projects now have a greater understanding of the skills involved in programming as opposed to being purely users of ICT software. This prepares them well for using programming skills at a higher level in key stage 3 and beyond.

More able and talented pupils have become far more confident due to their achievements in ICT and programming. This is evidenced in many areas of the curriculum, particularly when developing higher-level thinking and problem-solving skills. A number of pupils involved in the initial projects have moved on to study computing at A Level, and are now involved in a robotics projects linked via Skype with Japanese universities.

50   A few schools also benefit from co-operating and benefiting from the experience of specialists in the field such as Technocamps [8], who either visit the school or invite pupils to their laboratories.

ICT across the curriculum

Outcomes in school inspections

51   In the current cycle [9] of school inspections, which began in 2010, Estyn does not report on standards in ICT as a subject. However inspectors do report on standards of pupils' ICT skills where they are either particularly good or are underdeveloped to the extent that they have a detrimental effect on their progress in subjects across the curriculum. In the 106 secondary school inspections between September 2010 and July 2013, ICT across the curriculum was noted as being very good in one school and noted as underdeveloped in two schools. In nearly all schools ICT across the curriculum is either good or adequate.

52   This inspection evidence shows that pupils generally use ICT well for presentation and research in subjects across the curriculum. These reports focus on the

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[8] Technocamps is a project that provides free workshops to young people on programming, robotics, game design, app development and much more. It has been designed to nurture and inspire future generations of highly skilled digital enthusiasts, who could make Wales a world leader in the development of new and advanced technologies. http://www.technocamps.com/

[9] The current cycle of inspections started in September 2010.

communicating elements within ICT as inspectors are not expected to judge schools against the non-statutory skills framework. As a result, these reports rarely make reference to developing and modelling information and ideas for specific purposes by processing data using databases and spreadsheets.

53 Standards seen in the 20 secondary schools visited during the remit do not mirror the outcomes of school inspections. This is because the focus of the remit is on how well schools respond to the breadth of ICT requirements within the non-statutory skills framework. As a result of this wider focus we found a significant amount of unsatisfactory standards.

Standards in pupils' work in the use of ICT across the curriculum

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54 Standards in the use of ICT skills across the curriculum are no better than adequate in over a half of schools visited and unsatisfactory in the remainder.

55 Pupils do not generally apply the skills learned in discrete ICT lessons well in other subjects. They do not develop their ICT skills in meaningful contexts. As a result, pupils do not show increasing competence and sophistication in the creative use of software functions. Neither do they show clearly enough an increase in confidence to identify and select independently resources to suit the particular task and purpose.

56 Only a very few pupils use ICT regularly in the core subjects of English and Welsh. The majority of pupils rarely use ICT in mathematics.

57 Pupils use their ICT skills more often in design technology, music and science. Where pupils apply their ICT skills consistently in science they research, model, analyse and present data and information well using an appropriate range of software. Design technology and music are subjects where ICT is used well to develop talented pupils. Within design technology, graphic and design packages enable more able pupils to express themselves and develop their talent while composition packages offer this in music. Often in these subjects it is not the use of more sophisticated software that caters for the need of talented pupils but the more sophisticated use of the same software that their peers also use.

58 Pupils use ICT skills less often in drama and physical education. However, where ICT is used it has an impact on the quality of pupils' performance in these subjects. Pupils in physical education departments can benefit greatly by using mobile technologies to record and critically evaluate their performance in the gym. This allows them to identify strengths and areas that need further work in order to improve their technique.

59   The following case study shows how Ysgol Gyfun Aberaeron uses ICT well to help improve pupils' standards in physical education.

Case study 3 – using ICT to raise standards in physical education

Context

Ysgol Gyfun Aberaeron is an 11 to 18 bilingual mixed comprehensive on the west coast of Wales in Ceredigion, which provides education for 611 learners. Around 10.8% of pupils are entitled to free school meals, which is well below the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	89.9%	92.9%	92.3%	98.2%	97.3%
Achieving level 6+	2.3%	14.3%	26.0%	81.7%	66.7%
Achieving level 7+	0.8%	0.0%	0.0%	0.0%	0.0%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	1	1	2	1	1
Achieving level 6+	4	4	4	1	1
Achieving level 7+	4	4	4	4	4

Action

The physical education department explored ways and opportunities to develop the skills of talented pupils and to raise standards in the different areas of activity. In the past, some pupils (mainly boys) had a negative attitude towards creative activities, such as gymnastics. Activities such as 'head springs' and 'somersaults' can also be dangerous if the technique is incorrect. While many enjoyed activities on equipment such as the horse, they found these tasks challenging. As a result, the standard of work in creative activities was not good enough and talented pupils were not reaching their potential.

Teachers decided to use the technology available to help pupils improve their technique and make activities safer. Tablets were used to record and evaluate pupils' technique and to refine aspects that required improvement. The tablets use a specific software application called an 'app'.

Pupils review their performance and the teacher, pupil or peers comment and provide advice on how to improve. This technology has been seen to work best for closed skills, particularly in gymnastics and in field activities in athletics, such as the high jump.

How does it work?

1   Download the appropriate app on the tablet.
2   Pupils / teacher film pupils understanding activities, e.g. gymnastics/athletics events using the app.

3   Pupils and the teacher watch the clip and give feedback on how to improve. (Using slow motion/mark-making resource).
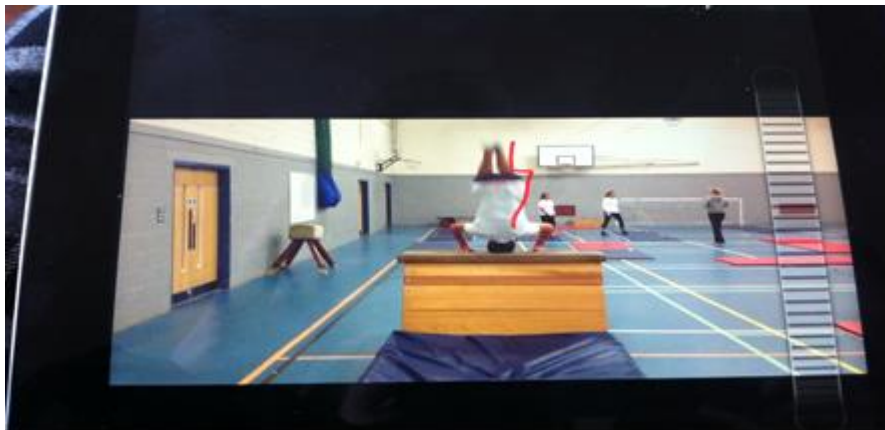
4   Re-film pupils performing to see if there has been an improvement.
5   Use the app to compare two clips to see the improvement. Can be viewed 'screen by screen' or in a combination of both at once.
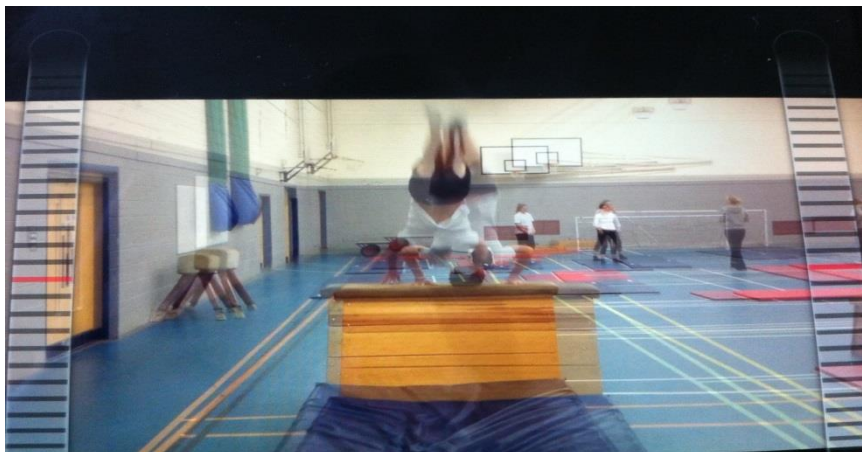
Impact

Teachers have seen clear evidence of improvement in talented pupils' standards in creative activities since using the software. It has also benefited pupils as they develop a more positive attitude towards these activities, and become more confident in undertaking tasks on the equipment.

There has also been a significant increase in the number of pupils who attend extra-curricular gymnastics activities to develop their talent. In the past, only a very few pupils, mainly girls, attended the lunch time gymnastics club. However, more recently, attendance has been excellent, with far more boys attending. Staff feel that the main reason for this is because pupils, through the use of the app, have learnt how to use the equipment correctly, gained confidence and have greater satisfaction from undertaking challenging tasks.

There has been a definite improvement in pupils' performance. In the past, pupils' levels were lower in the creative activities in comparison with their levels in the fitness activities. Last year, for the first time in three years, more pupils attained level 7 in gymnastics than in the fitness activities. The use of ICT to capture a performance visually has contributed significantly to the increase in pupils' motivation and determination to improve.

Pupils enjoy using the app and are excited to see their performance on the screen. Teachers now worry less about injuries because the pupils' technique is better and there is a smaller chance of injury. Since using the app, pupils have a clearer understanding of key principles. They discuss technical aspects more accurately, identify what needs to be improved and suggest how to reach this target.

60   In all schools, pupils' application of presentation skills and word processing skills in order to create and present information and ideas in other subjects is generally adequate or good. This is especially true with regard to word-processing as pupils develop a wider vocabulary. However, in many schools pupils show little progress in applying these skills especially in the use of presentation packages. As a result the quality of work in Year 9 is often no more advanced than that in Year 7.

61   Pupils' application of data handling and modelling skills is less developed in other subjects than their presentation and word processing skills. This is true in many schools.

62   Generally pupils use their ICT skills well to research information on the internet. This is the ICT skill they utilise most frequently in subjects across the curriculum. In many cases they do so responsibly. However sometimes they simply lift information in an undiscriminating way rather than summarising it in their own words. Pupils in most schools show a good awareness of e-safety and understand the dangers of misusing the internet.

The quality of planning and provision for the use of ICT across the curriculum

63   Many schools do not plan effectively for the continuity and progression of ICT skills across the curriculum. As a result, pupils in Year 9 frequently carry out similar work to that in Year 7, especially in presenting information.

64   Only a few schools have mapped out how the ICT element within the non-statutory skills framework should be implemented across all subjects in key stage 3. The majority of teachers are not aware of the ICT element of the skills framework and few plan their ICT opportunities based on the document. A minority of schools do not have a person responsible for the use of ICT across the curriculum.

65   A few schools have carried out an audit of the cross-curricular use of ICT. However, they have not yet used this information to identify and address the gaps in provision. Too often, planning for ICT is carried out within a few departments according to the personal interest of a few specific teachers rather than in a coherent manner. Planning based on this approach lacks rigour and is too ad-hoc.

66   Many secondary schools have their own virtual learning environment and have identified the benefits of using these in order to enhance their provision for pupils. However only in a minority of schools can pupils access their work from home, which shows that the majority of schools have yet to use learning platforms well.

67   The following case study shows how Ysgol Gyfun Cymer Rhondda has used its
      virtual learning environment to improve provision and raise standards

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Case study 4 – how the effective use of virtual learning environments can enhance the curriculum provision, improve partnerships and standards

Context

Ysgol Gyfun Cymer Rhondda is an 11-18 mixed Welsh medium comprehensive school, which provides education for 781 learners. It services the wide catchment area of the Rhondda Valleys. Around 17.4% of pupils are entitled to free school meals, which is close to the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	80.3%	73.2%	74.5%	84.6%	96.7%
Achieving level 6+	32.6%	11.0%	10.9%	42.3%	50.0%
Achieving level 7+	6.8%	0.8%	0.0%	27.6%	17.5%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	2	4	4	3	1
Achieving level 6+	2	4	4	2	1
Achieving level 7+	2	3	4	1	1

Action

A virtual learning environment (VLE) was first introduced in 2010 and initially trialled for one year in the ICT department. During this period, the department provided pupils with video tutorials that helped reinforce pupils' ICT skills and which they could access from home. Following the success of this initiative, other subject departments produced similar educational resources.

Developing VLEs was then given a whole-school focus in the school improvement plan. Appropriate professional development for all staff was a key element in supporting the effective 'roll-out' of the initiative across all subject departments.

By 2012, the school's VLE had become an integral part of improving continuous accessibility to pupils of the teaching and learning resources. Further initiatives were introduced by departments by setting homework tasks on the VLE. The use of the VLE also increased rigour in tracking pupil progress by assessing the work uploaded and giving feedback and individual targets. These were emailed to pupils automatically via the system, allowing immediate feedback.

The VLE also became an integral vehicle for the work of senior leadership team to check on aspects of teaching and learning and leadership.

Recent developments include providing access to the governing body and departmental link governors to departmental documents. This accessibility has allowed governors to be more informed about departmental developments on a termly basis. This enhances the quality of discussions between link governors and middle leaders and encourages a culture of support and challenge.

Impact

The introduction of a virtual learning environment has enhanced curriculum provision at the school significantly since its introduction. Pupils are now able to access the resources used in lessons online for 24 hours each day.

The use made of the VLE by students also helps overcome any barriers associated with learning by:

- allowing pupils to access and catch up with work if they have been absent from school; and
- providing all groups of learners with the opportunity to revisit the work covered in lessons and further their learning and understanding at their own pace.

Partnerships with parents have also been reinforced and have led to improved communication and parental support. Parents are now able to access assessment data, feedback and targets given by their child's teacher. As a result they can play a more active role in helping pupils to improve their attainment.

Attainment levels in ICT at the end of key stage 3 have improved considerably over the duration of this initiative:

	2011	2012	2013
Level 5+	74.5% (Q4)	84.6% (Q3)	96.7% (Q1)
Level 6+	10.9% (Q4)	42.3% (Q2)	50% (Q1)
Level 7+	0% (Q4)	27.6% (Q1)	17.5% (Q1)

Impact of ICT on literacy

68   Many schools use ICT well to support specific literacy interventions for reading and spelling. These interventions are often coupled with specific software or online resources and one-to-one support to help pupils improve their skills. Schools use measurable outcomes such as pupils' reading ages to evaluate the impact of the intervention and to track progress. These schools use baseline assessments of reading or spelling before starting on the intervention and then measure its impact.

69   ICT is used in all schools as a tool to support literacy across the curriculum and the majority use it appropriately. Teachers generally use pupils' enjoyment of using new technologies well to engage them in improving their literacy skills.

70   Pupils in schools that use ICT well to support literacy generally use appropriate websites effectively to gather information on specific tasks. Through this, pupils develop more effective skim-reading skills as they scan for relevant information, and

many extract and interpret information appropriately. However, pupils often copy information from websites without summarising the content, putting it into their own words or reorganising it to fit the topic in question. Pupils in Welsh-medium schools use English-medium websites unthinkingly well and develop purposeful concurrent use of language.

71   All schools use ICT to present information either through word processing or the use of presentation packages. When researching topics, pupils tend to 'copy and paste' from source but when creating from new they are more likely to draft and redraft using ICT.

72   A few pupils are too dependent on computer spellcheckers and this can hinder their recall of correct spellings. In the worst examples, pupils concentrate too much on the layout, design and transition of their presentation slides than the quality and accuracy of the content.

73   The following case study shows how teachers at Ysgol Gyfun Aberaeron use ICT well as one strategy to improve pupils' standards in reading.

Case study 5 – a literacy co-ordinator improving reading and grammar using ICT during registration time

Context

Ysgol Gyfun Aberaeron is an 11 to 18 bilingual mixed comprehensive on the west coast of Wales in Ceredigion, which provides education for 611 learners. Around 10.8% of pupils are entitled to free school meals, which is well below the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	89.9%	92.9%	92.3%	98.2%	97.3%
Achieving level 6+	2.3%	14.3%	26.0%	81.7%	66.7%
Achieving level 7+	0.8%	0.0%	0.0%	0.0%	0.0%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	1	1	2	1	1
Achieving level 6+	4	4	4	1	1
Achieving level 7+	4	4	4	4	4

Action

The standardised reading scores of pupils highlighted a need to improve pupils' literacy skills in key stage 3. A literacy period was established for 20 minutes once a

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week, during registration. During this period, pupils in Years 7, 8 and 9 are taught by their class tutors using 'ready-made lessons'.

'Ready-made lessons' are created for tutors, using software associated with the interactive whiteboards and shared on the school's computer network. Pupils respond to the tasks mostly using miniature whiteboards to answer. Correct answers are shown on the interactive whiteboard and the pupils either assess their own or a partner's work.

The initial periods focused on reading techniques, such as skimming, scanning and summarising, as well as Welsh and English grammar skills. In preparation for last year's tests in May, the periods were used to present similar exercises to those in the tests and in PISA in order to raise the skills and understanding of pupils and staff.

Impact

The literacy co-ordinator prepared materials and class tutors were trained to present 'ready-made lessons', and were upskilled in the reading skills needed by pupils and on how to use ICT to present material in an exciting way.

The key stage 3 pupils were consulted about their opinions on the effectiveness of the initiative. There was an increase from 65% to 75% in the percentage of pupils who stated that they were confident in their literacy skills as a result of the literacy periods.

Pupils now ask for more challenging tasks as their literacy skills have increased. The reading scores of the whole cohort have increased, and there has been a significant increase in Welsh.

At the end of key stage 3 there has been an increase in the level 5+ reading results in Welsh from 88.1% in 2012 to 93.6% in 2013 and in English from 85.3% to 86.5%. The county reading test data for the whole for key stage 3 also shows an improvement in reading scores in both English and Welsh since the introduction of the literacy period:

English reading test	October 2012	October 2013
Under 85	23.1%	19.1%
Between 86 and 94	26.9%	26.2%
Between 95 and 119	44.7%	48.7%
Over 120	5.3%	6%

Welsh reading test	October 2012	October 2013
Under 85	33.9%	20.1%
Between 86 and 94	18.5%	20.6%
Between 95 and 119	47%	58.7%
Over 120	0.6%	0.5%

74   During visits to the survey schools inspectors saw fewer examples of pupils using tablets to create films within curriculum subjects in key stage 3 than in key stage 2.

This is probably because to tablets are more readily available in primary than secondary schools. As a result, pupils in primary schools have more opportunities to develop their story board or script writing, editing and presentational skills.

Impact of ICT on numeracy

75   The majority of schools use ICT well to engage pupils involved in numeracy intervention sessions. Often the specific software programmes used builds on pupils' enjoyment of online games to motivate them. These programmes track pupils' progress throughout their sessions. As baseline assessments are taken before starting on the intervention, progress is measured against the outcomes at the end of the intervention. Generally many pupils make good progress on these intervention programs.

76   ICT is used in many schools as a tool to support numeracy across the curriculum, but only a very narrow range of ICT skills are generally used. A minority of teachers use pupils' enjoyment of using new technologies well to engage them, consolidate their understanding and improve their numeracy skills. However schools generally rely too much on anecdotal evidence to judge the impact of ICT. There is very little evidence of continuity or progression in either their numeracy or ICT skills.

77   In most schools, pupils have regular opportunities to use ICT to produce a variety of graphs. However, they create spreadsheets and databases in only a few subjects. As a result, they are missing out on opportunities to develop logical thought and the application of higher-order number skills. This is especially true for more able and talented pupils.

78   Many teachers do not plan enough opportunities to use ICT to consolidate and extend pupils' numeracy skills. Most pupils do not have suitable opportunities to apply their ICT skills in meaningful contexts using numeracy. Their opportunities to apply their thinking and problem-solving skills using ICT are therefore limited.

79   The following case study shows how teachers at Ysgol Y Creuddyn use ICT well to
      help pupils explain mathematical concepts.

Case study 6 – learners in key stage 3 creating their own video clips to explain mathematical topics

Context

Ysgol Y Creuddyn is a Welsh-medium 11 to 18 mixed comprehensive secondary school situated close to Llandudno, which provides education for 692 pupils. Around 7.2% pupils are entitled to free school meals, which is well below the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	87.5%	91.7%	96.8%	95.6%	98.1%
Achieving level 6+	57.7%	52.9%	40.3%	62.3%	65.1%
Achieving level 7+	18.3%	5.8%	9.7%	16.7%	12.3%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	3	3	2	4	3
Achieving level 6+	2	2	3	3	3
Achieving level 7+	1	3	2	2	3

Action

Tebygolrwydd Sgorio Cic o'r Smotyn

Ysgol Y Creuddyn · 46 videos   103 views
Channel settings

The mathematics department runs a project for pupils in Year 9, whereby different groups are given an opportunity at the end of the year to create a video to put on YouTube. Pupils create a video on a topic that they have studied in mathematics lessons during key stage 3. Examples of the videos that have been created include on the following :

- An investigation into the probability of scoring a penalty in a football match
- How can you cut a round cake into ten equal pieces?
- Using co-ordinates to describe a car journey from school to the local shop
- A demonstration of how to create the perfect milkshake
- Using a locus to decide from where best to send a Welsh Air Ambulance helicopter to an accident site

Impact

Pupils develop communication skills well in ICT as they learn how to use digital video cameras, tablets and other cameras to record the material. Video editing skills are then further developed through using relevant editing software. Once they are completed, the videos are uploaded to the school's YouTube site. The videos are then publicised using the school's Twitter page.

The work allows pupils to investigate a specific mathematical topic in more detail, and to look for a background and context to the work. By presenting through the medium of video, pupils must explain the work clearly to the audience and therefore prove their understanding of the topic in question. Once they have completed the work, pupils can watch the videos in their own time (which consolidates the work), or the teachers can show the video in the class as part of the revision process. To date, the videos (together) have received over 2,500 viewers.

80   A survey of over 230 school council members in the schools visited identifies that science is one of the top three subjects where pupils have opportunities to use ICT skills. In science they often use ICT and numeracy skills to create a variety of graphs for specific purposes. ICT also enables them to model the changing of variables in scientific investigations online. However, they also have limited opportunities to apply the use of creating tables and spreadsheets in real life scenarios.

Leadership and management of ICT

Role of the leaders in monitoring and evaluating standards and provision in the use of ICT within the subject

81   The quality of leadership is good in around half of the ICT departments visited. In these schools, senior and middle leaders have a clear vision for the development of pupils' ICT skills and the raising of standards in ICT. They engage staff, pupils, governors, parents and the community in their vision. These leaders have successfully translated this vision into a comprehensive improvement plan for ICT.

The plans cover a number of years and include clear targets for improvement, monitoring arrangements and appropriate training and resources. The middle leaders ensure that teachers in these schools keep up-to-date with developments in ICT through effective continual professional development courses and implement innovative approaches.

82   In these schools, middle leaders have improvement plans that are closely linked to the outcomes of the ICT department's self-evaluation process. Where self-evaluation of ICT is effective, middle leaders are involved in systematic lesson observations, the scrutiny of pupils' work, talking with learners and the rigorous analysis of pupil tracking data. Through these approaches, they clearly identify strengths and weaknesses in standards and provision.

83   However, nearly a third of schools do not have a suitable ICT improvement plan to improve standards, provision and prioritise ICT strategies in the school. This makes it extremely difficult for the school leadership team and their governing bodies to monitor the impact of investment in new resources and technologies.

84   In around half of schools, middle leaders enrich the key stage 3 curriculum with experiences in computer programming. They do this to extend the scope of the current curriculum which has not been updated to include the crucial skills of learning to program and code.

85   The amount of time devoted to delivering the ICT curriculum varies significantly from school to school. A minority of schools do not offer the equivalent of a lesson a week for three years and often this is not enough time for pupils to cover all aspects of the ICT curriculum. A few schools condense the key stage 3 curriculum into Year 7 and Year 8 and do not base the provision in Year 9 on the National Curriculum. This provision is too narrow and does not enable pupils to develop the full range of ICT skills as laid out in the subject orders.

86   Many middle and senior leaders do not know if they now have an ICT adviser within their local authority. This is because the level of support they receive from local authorities has diminished significantly as school improvement support teams have reduced in number. Three-quarter of schools visited are in local authorities that do not have an ICT adviser.

87   Most school leaders are unclear about the future of ICT support under the new regional consortia arrangements. Due to the uncertainties that remain over the transfer of school improvement services for ICT from local authorities to the regional consortia, they fear a further reduction of access to appropriate professional development, external reviews and regular networking opportunities.

88   Senior leaders in under a half of schools use ICT as a tool to reduce the impact of poverty but only a very few can provide hard evidence of impact other than for specific pupils who are in literacy or numeracy intervention groups.

89   Most schools in the survey equate reducing the impact of poverty on achievement with ensuring that pupils who do not have access to computers at home have dedicated times to access them at school. They also offer after-school clubs that

specifically target these pupils, although this can be difficult in rural areas where pupils depend on infrequent bus services. However, very few schools take account of individual pupils' home circumstances when planning ICT provision or setting homework.

90   The following case study shows how Prestatyn High School has ensured equal opportunities in ICT for all pupils in an attempt to reduce the impact of poverty on educational achievement.

Case study 7 – ensuring equal access to ICT for all pupils

Context

Prestatyn High School is an 11 to 18 mixed secondary school on the North Wales coast, which provides education for 1,731 learners. Around 16.8% of pupils are entitled to free school meals, which is close to the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	79.5%	82.9%	83.4%	95.1%	93.8%
Achieving level 6+	19.5%	28.9%	23.1%	42.5%	30.9%
Achieving level 7+	0.7%	4.6%	2.0%	4.5%	0.3%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	3	2	3	1	1
Achieving level 6+	4	3	3	2	4
Achieving level 7+	4	2	3	3	4

Action

Senior leaders set out the school's vision for ICT that every pupil, regardless of background, has consistent access to technology in and out of the classroom.

Their vision is to:-

- provide computer access for all learners, both in school and at home;
- narrow the achievement gap by ensuring every pupil has the same device and by offering a consistent approach and opportunity for all to benefit and progress;
- provide a personal netbook project affordable for all learners based on a '£1 per week' contribution from parents; and
- improve the literacy of learners, particularly boys' writing.

Although the school had made significant investments in ICT, they realised that they would never be able to provide enough computer rooms to keep up with demand. By inviting parents to contribute a £1 a week to the vision they felt that jointly they could make a difference.

As one of the first schools to introduce a one-to-one computing project for 1,750 learners, the senior leaders were unsure what the pressing issues and potential pitfalls would be. The school initially obtained1,500 netbooks through a managed service provider. These devices were upgraded to meet the needs of the school network and pre-installed with software packages to meet pupils' needs.

A full wireless network was installed within 12 months and sufficient high capacity printers strategically located around the school to allow both pupils and staff print access. The school virtual learning environment ties together both the file system and a method of sending work to pupils and receiving it back from them.

Impact

This project has successfully ensured that every pupil, regardless of background, has consistent access to technology in and out of the classroom. There is no doubt that the project has motivated pupils and parents and has helped the whole school community to embrace the digital age.

The school believes that by enhancing pupils' ICT skills their standards in other subjects will also improve but it is too soon to tell whether this will be the case. However, pupils do show higher levels of engagement and concentration in lessons. Behaviour in classrooms and around the school has also improved. Staff have identified more confident use of ICT in subjects other than ICT, particularly in Year 7 and Year 8.

At present, there is not enough data to link whole cohort improvement directly to the 1 to 1 project. However there is evidence to show how students have raised the standards of individual pieces of work by the use of their netbook. Key stage 3 results have also improved steadily over the duration of the project.

Role of leaders in monitoring and evaluating standards and provision in the use of ICT across the curriculum

91   The quality of planning and provision by middle leaders for the use of ICT across the curriculum in key stage 3 is generally unsatisfactory in many schools and no better than adequate in the remaining schools. As a result, pupils are given insufficient opportunities to practise their skills in meaningful contexts across the curriculum.

92   The liaison between ICT departments and other subject areas is generally poor. Senior leaders do not monitor the role of middle leaders well enough to secure compliance with the requirements of the non-statutory skills framework. The scrutiny of pupils' work in other subjects shows that there is very little consistency across or within schools in how middle leaders plan for the use of ICT in their subjects.

93   Many middle leaders have not mapped out how the ICT element within the non-statutory skills framework should be implemented across all subjects in key stage 3. Many leaders have not made teachers are fully aware of the ICT requirements in this key document. As a result, teachers are left to use what they are comfortable with rather than being trained on what is needed to meet the

requirements of the non-statutory skills framework. In the worst examples, leaders are not aware of this framework themselves. Of those that have conducted a mapping exercise, they have not plugged gaps in continuity and progression of skills. As a result, there is often little difference in what pupils do at the end of key stage 3 compared to what they do in Year 7.

94   Over half of middle leaders do not monitor the use of ICT across the curriculum. These leaders therefore do not know whether the planning is fully implemented or where there are gaps in provision. Neither do they have a sufficient understanding of the quality of standards in ICT across the curriculum. As this monitoring is not being carried out, it is very unlikely that these schools identify appropriate priorities and strategies to improve provision and raise standards in ICT across the curriculum in their school development plans.

95   Many middle leaders do not evaluate the effectiveness of their ICT plans with enough rigour to judge the impact on pupils' ICT or literacy and numeracy skills. In particular, too few carry out a baseline assessment of pupils' ICT skills before implementing a project or initiative to measure its impact.

96   Very few senior leaders in Welsh-medium or bilingual schools take a strategic decision to change the interfaces of key software in MS Windows or Linux to appear in Welsh. Currently, Apple does not offer any of its software or interfaces in Welsh. This can give pupils the impression that the use of Welsh is not relevant within ICT or technology.

97   Few senior leaders have considered how to cater for pupils from feeder primary schools that make frequent use of tablets or laptops. These pupils have been used to working in an environment where the availability of portable technology is the norm. Furthermore, while their teachers in the primary school will have been used to providing ample opportunities for them to use portable technologies in all areas of the curriculum, this is not the case in many secondary school they transfer to. This could have a negative effect on pupils' educational development, which leaders need to consider.

98   The Welsh Government has a clear vision for ICT in schools and has invested significant sums on ICT initiatives for schools since 1998. However, very few senior leaders have successfully shared this with their staff or challenged teachers' perception that the importance of ICT in schools is no longer as strong as in the past. This perception is mainly because teachers now believe it to be less important than literacy and numeracy due to its non-statutory status.

Professional development for staff in ICT departments

99   The quality of professional development for staff in ICT departments in around half of secondary schools is good. Effective middle leaders ensure that all ICT staff have relevant, up-to-date professional development and access to ICT systems that work well. They use the training well to introduce new elements to enrich the curriculum, which are successful in challenging and engaging pupils well. Standards in ICT as a subject are usually good or better in schools where staff have the skills and confidence to deliver all the elements of ICT to pupils of differing abilities in the same class.

100 The following case study shows how The Maelor School has focused on developing teachers' confidence and skills to improve the curriculum through the introduction of computer science and computer programming.

Case study 8 – leaders ensuring staff receive relevant professional development to support effective delivery of computer science

Context

The Maelor School, located in Penley, Wrexham, is an 11 to 18 mixed secondary school, providing education for 801 learners. Around 6.7% of pupils are entitled to free school meals, which is well below the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	94.4%	99.2%	100.0%	100.0%	100.0%
Achieving level 6+	56.8%	81.8%	85.6%	65.2%	68.7%
Achieving level 7+	1.6%	4.1%	20.5%	5.1%	20.1%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	1	1	1	1	1
Achieving level 6+	2	1	1	2	2
Achieving level 7+	3	3	1	4	2

Action

Following recent national ICT reports and the announcement to review ICT as a subject, middle leaders investigated how best to enable ICT teachers to acquire new skills outside their own initial training and expertise. This was mainly to prepare them for the introduction of computing into the school curriculum at key stages 3 and 4, and in the sixth form.

The school contacted Glyndwr University to seek advice and possible support. A training day was organised at the university for secondary school teachers to work alongside university lecturers to learn new basic programming skills and develop confidence in computer science. Two members of staff attended the training session at Glyndwr.

The school has since trialled computer programming in Year 7 with pupils participating in a project using Scratch[10]. This involves pupils learning the very basics of the language, understanding flowcharts, working independently to master new skills and with peers to plan and create projects. Kodu [11]has been installed onto the school network and will be integrated into the key stage 3 curriculum this year.

Impact

Teaching staff in the ICT department are now far more confident in their understanding of computer science and the impact it can have in developing pupils' thinking and problem-solving skills

Observations of pupils creating specific Scratch projects and assessment of their work has indicated that pupils have successfully engaged in the trial and are motivated to continue working on and developing their projects outside directed lesson time. Pupils have showcased their projects during open evenings and demonstrated their new skills confidently to parents and prospective pupils.

101 However, the professional development in ICT for teachers in other departments has been largely ineffective. Leaders have generally failed to ensure that all teachers in other subjects have sufficient confidence in their ICT skills or willingness to use ICT in their lessons. Often, schools spend proportionately less on training than on hardware and software for ICT.

102 As a result of these significant shortcomings, too many pupils do not have sufficient opportunities to apply the skills learnt in their ICT lessons in other subjects and contexts.

Whole school spending on ICT

103 Over the past three years, senior leaders in the schools surveyed have spent significant amounts on hardware. However, just under a third have not invested sufficiently (under £1,000) on staff training in ICT. Schools surveyed plan to spend proportionately less on training than on hardware and software for ICT over the next three years. The lack of importance placed on training probably contributes significantly to the lack of confidence and competence in teachers using the full range of ICT skills across the curriculum.

104 Many schools have invested in buying computers but only a very few schools have a computer available for each pupil in the school, and in a very few schools the poor quality of the computers is such that it actually hinders pupil progress. Senior leaders do not monitor the impact of expenditure on computers on standards and provision well enough.

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[10] Scratch enables pupils to program their own interactive stories, games, and animations. It also allows them to share their creations with others. Scratch helps young people learn to think creatively, reason systematically, and work. Scratch is a project of the Lifelong Kindergarten Group at the MIT Media Lab. It is provided free of charge.

[11] Kodu is a creative construction tool that supports contemporary teaching and higher-order Web 2.0 learning, emphasising links to creative programming and critical thinking.

105 Only in a very few secondary schools do pupils in key stage 3 regularly use portable mobile devices such as tablets[12]. This is in stark contrast to primary schools where around half the schools in our questionnaire survey last year use tablets. Very few middle leaders consider early enough how to plan to meet the needs of pupils who were regular users of tablets in primary schools and find themselves in secondary schools where the use of tablets is less frequent.

106 Just over two-thirds of secondary schools are considering purchasing tablets within the next two years. Tablets have the potential to impact on standards and provision as they can be used anywhere and are not limited to an ICT suite or a fixed location in the classroom. However, very few middle or senior leaders do enough research before deciding on the way forward.

107 Only in a few schools do senior leaders currently allow pupils to bring their personal tablets to school and have appropriate procedures in place for this. The following case study shows how Pen-y-Dre High School prepared for and allowed pupils to bring and use their own devices.

Case study 9 – leaders showing vision in preparing well to allow pupils 'Bring your own device' (BYOD) and adopting the traffic light initiative

Context

Pen-y-Dre, is an 11 to 18 mixed secondary school which provides education for 684 learners situated in the town of Merthyr Tydfil in south Wales. Around 37.1% of pupils are entitled to free school meals, which is significantly above the Welsh average of 17.7% for secondary schools.

Standards in ICT at the end of key stage 3

Percentage of pupils achieving each level in key stage 3 ICT, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	61.2%	29.7%	75.2%	79.3%	73.0%
Achieving level 6+	18.0%	1.4%	21.1%	19.0%	23.5%
Achieving level 7+	0.0%	0.0%	0.0%	0.0%	0.0%

Benchmark summary: quartile attained by school in relation to performance at each level in key stage 3 ICT, by FSM benchmark group, 2009-2013

	2009	2010	2011	2012	2013
Achieving level 5+	2	4	2	2	3
Achieving level 6+	3	4	3	3	3
Achieving level 7+	3	2	2	2	3

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[12] A tablet PC or mobile device is a wireless, portable personal computer with a touch screen interface. The tablet is generally smaller than a notebook computer but larger than a smartphone.

Action

In order to build upon pupils' enthusiasm to use their own mobile devices the school realised it needed to respond appropriately and responsibly. They introduced a 'bring your own device' (BYOD) policy to allow pupils to have access to ICT when not in a traditional ICT suite. There are clear rules as to when mobile devices can be used during lessons:

Red – mobile devices are not permitted during this lesson;
Amber – mobile devices can be used during this lesson but they must stay in learner's bag until the teacher allows their use; and
Green – mobile devices can be brought out and placed on the desk.

Impact

Since introducing the policy, teachers across the curriculum have reported an improvement in classroom management. They report less distraction related to the inappropriate use of personal devices as well as improvement in teaching and learning. Levels of attainment in ICT at key stage 3 have improved with a significant number achieving level 5 or above.

Many pupils and staff have shown greater awareness and interest in the potential of new technologies, for example when pupils are filming their performances during physical education lessons to assess the quality of their work. Similarly pupils also use specific apps on their smart phones linked to electronic chips worn on their trainers, to monitor their heart rate, the distance covered, duration and speed. This policy has proven to be extremely valuable in PE when walking or training, where new technology has previously been difficult to access.

Pupils throughout the key stages report that they are using educational apps increasingly both during and outside lessons. The say that this has helped them to develop their analytical and evaluative skills and improve their literacy and numeracy skills.

eSafety

108 The '*Information and communication technology in the National Curriculum for Wales Order'* (Welsh Government, 2008) sets out a statutory requirement for schools to teach pupils how to use ICT comfortably, safely and responsibly, and to consider the hazards and risks in their activities.

109 Nearly all schools teach the importance of eSafety well and identify these aspects clearly in their schemes of work. Many schools use officers from local police forces who have been trained to share the importance of eSafety with pupils. Over three-quarters of schools discuss the implications of plagiarism with pupils in key stage 3.

110 However, in a very few schools there is insufficient coverage of all aspects of eSafety. A few pupils who took part in our survey stated that they had not received specific lessons or presentations in key stage 3 on cyber-bullying, staying safe online or using the internet responsibly.

Technical issues for school leaders in using ICT

Connectivity

111   Local authorities provide nearly all schools with their internet connection. Although the Welsh Government has pledged £39m to improve broadband and Wi-Fi connectivity, internet connectivity rates still vary significantly across Wales and within authorities. As a result, connectivity speeds hinder' pupils use of ICT in around a half of secondary schools. The potential to transform learning and teaching through this initiative has not yet been fulfilled.

112   While the Welsh Government initiative will allow schools to improve Wi-Fi availability, pupils are not benefiting sufficiently as many schools do not allow pupils to bring their own devices. The Bring Your Own Device approach is not widely accepted or permitted by local authorities.

Filtering

113   All senior and middle leaders recognise the importance of teaching pupils to use the internet safely and responsibly. However, at present the level of filtering and blocking of internet sites by local authorities is a serious constraint on the range of work that can be done in class in the majority of schools. The inability to access content specific websites such as iTunesU and YouTube prevents teachers from providing pupils with relevant information that could help to enthuse and engage them. The filtering of web-conferencing facilities (such as Skype) also seems to be common and prevents pupils from developing video conferencing skills. This can hinder:

- partnership working with feeder primary schools;
- the development of pupils' oracy and listening skills;
- the ability to work with r schools across the world, for example in Comenius and other E-twinning projects;
- the sharing of best practice between schools in professional learning communities; and
- the ability to communicate with teacher training providers to support students on teaching practice.

IP addresses

114   There will probably be a significant increase in the use of portable tablets in schools in the future as more schools either purchase them or allow pupils to bring their own. As a result, there will be an increase in the number of wireless devices that need an IP address[13] in order to link to the computer network. A very few schools are already

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[13]   An IP address is an exclusive number all devices (computers, tablets, printers, routers etc.) use which identifies and allows them the ability to communicate with each other on a computer network. It is the 'address' of a device while online. Without an IP address, servers would not be able to deliver content to the device, because they would not be able to locate it.

on the limit of the range of IP addresses allocated to them by their local authority or other internet providers. As increasing numbers of schools order equipment requiring an IP address, it is clear that extending the range of IPs available to schools will be an issue that needs careful planning.

Appendix 1

Evidence base

Inspectors visited a representative sample of 20 schools and observed lessons across key stage 3 This sample includes schools of different sizes in as wide a range of geographical locations as possible with different socio-economic and linguistic contexts. In these visits, team members:

- observed lessons;
- met members of the school council in each school;
- scrutinised pupils' work in ICT as a subject;
- scrutinised pupils' work in a wide range of other subjects for evidence of ICT work across the curriculum;
- scrutinised planning and assessment documents;
- examined monitoring arrangements; and
- held discussions with teachers and senior managers.

Additional evidence was drawn from:

- online questionnaires completed by 232 members of school councils at the schools visited;
- inspection reports on secondary schools during the current inspection cycle; and
- an analysis of previous research and evaluation reports.

The schools visited as part of this remit were:

Barry Comprehensive School, Vale of Glamorgan
Blackwood Comprehensive School, Caerphilly
Bryn Celynnog Comprehensive School, Rhondda Cynon Taf
Cantonian High School, Cardiff
Cynffig Comprehensive School, Bridgend
Llanwern High School, Newport
Mountain Ash Comprehensive School, Rhondda Cynon Taf
Newbridge Comprehensive School, Caerphilly
Pen-y-dre High School, Merthyr
Prestatyn High School, Denbighshire
Radyr Comprehensive School, Cardiff
The Maelor School, Wrexham
Tonyrefail Comprehensive School, Rhondda Cynon Taf
Ysgol Gyfun Aberaeron, Ceredigion
Ysgol Gyfun Cymer Rhondda, Rhondda Cynon Taf
Ysgol Gyfun Glantaf, Caedydd
Ysgol Gyfun Gymraeg Llangynwyd
Ysgol y Gader, Gwynedd
Ysgol y Creuddyn, Conwy
Ysgol Maes Garmon, Flint

Appendix 2: A summary of national initiatives and policy development

The ICT Self-review framework

The ICT Self-review framework [14] and ICT Mark were introduced in 2007-2008 in Wales to assist schools in identifying, improving and benchmarking the use of ICT in learning, teaching and management of schools. The ICT Mark is an integral part of the self-review framework and provides recognition of a school reaching a level of maturity in their use of ICT. A total of 78 secondary schools in Wales registered to use the self-review framework and around a third of these schools have been awarded the ICT Mark.

The 'Establishment of a Review of Digital Classroom Teaching Task and Finish Group'

The Welsh Government shared its vision where all Welsh schools are able to deliver digitally in the written statement on the 'Establishment of a Review of Digital Classroom Teaching Task and Finish Group', 22 September 2011. This is intrinsically linked to a clear focus on improved performance as stated by the Minister for Education and Skills in his speech 'Teaching Makes a Difference' February 2011.

In a written statement when setting up the 'Review of Digital Classroom Teaching Task and Finish Group' in September 2011, the Minister for Education and Skills emphasised [15] that information and communication technology is a valuable tool, which can enable people to learn effectively.

As a response [16] to the report [17] by the Task and Finish Group the Minister announced:

- the creation of a new National Digital Learning Council to provide expert guidance on the use of digital technology in teaching and learning in Wales;
- the launch of a new bilingual learning platform for Wales, provisionally called Hwb[18], which will provide a platform for learners and teachers to share resources, knowledge and experience across the whole of Wales;

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[14] The **Self-review framework,** now run by the National Association of Advisors for Computers in Education (NAACE), is an online tool to assist schools in identifying, improving and benchmarking the use of ICT in learning, teaching and management of schools. Schools evaluate their progress against a 5-level scale for aspects of development grouped under six major elements. Since its introduction, over 19,500 schools have used it to review and plan their use of technology.

[15] Written Statement by the Welsh Government 'Establishment of a Review of Digital Classroom Teaching Task and Finish Group', 22 September 2011 by Leighton Andrews, Minister for Education and Skills

[16] The Welsh Government's response to the recommendations in the Digital Classroom Teaching Task and Finish Group's report can be found in the Minister's written statement, which was published on 22 June 2012.

[17] 'Find it, make it, use it, share it: learning in digital Wales', published in March 2012

- the creation of a National Digital Collection, which will include a repository for thousands of curriculum and good practice resources for teachers and learners to upload, share and use;
- encouraging the use of iTunes U to showcase the best educational resources and activities in Wales;
- the establishment of Digital Leaders, who will be drawn from the best practitioners using digital technology in Wales;
- additional professional development for teachers and other education staff to support the teaching of computer science and IT, building on the new enthusiasm around the development of products such as the Raspberry Pi [19] and Dot Net Gadgeteer [20] to encourage young people into future studies and careers in computing; and
- the sponsorship of an annual National Digital Event to raise the profile of digital technology in education and of Welsh achievements in this field.

ICT subject review

On 1 October 2012, the Minister for Education and Skills announced a review of assessment and the National Curriculum in Wales. The review aims to streamline and simplify assessment arrangements and consider the National Curriculum core and other foundation subjects at each key stage, to ensure that expectations of content and skills developments are suitably robust.

On 19 November 2012, the Minister, Leighton Andrews AM, chaired a seminar to consider the future of ICT and computer science in schools in Wales. As a result of the seminar the Minister established a steering group [21] to consider the findings from the seminar. These findings include that:

- the existing ICT curriculum in Wales is not fit for purpose;
- digital literacy is the start not the end-point and that learners need to be taught to create as well as to consume;
- ICT in schools needs to be re-branded, re-engineered and made relevant to now and to the future; and
- important skills including creative problem-solving, communication, collaboration, co-operation and commercial awareness should be reflected in the curriculum.

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[18] Hwb is the all Wales Learning Platform provided by Welsh Government aimed at supporting national action in the following areas:
- encouraging, supporting and preparing teachers to operate in a digital environment and to share their digital practice; and
- establishing and developing a system and a national collection for creating, storing and sharing digital resources.

[19] The Raspberry Pi is a low-cost credit-card sized computer that plugs into a TV and a keyboard. It can be used for many of the things that a desktop PC does, such as spreadsheets, word-processing and games. It also plays high-definition video. The Rasperry Pi was developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools.

[20] Microsoft .NET Gadgeteer is a toolkit for building small electronic devices. It allows hobbyists, educators and developers to build and refine prototype electronic devices quickly and easily.

[21] ICT Review Group

In January 2013, the Welsh Government established an independent ICT Steering Group to explore and consider the future of computer science and ICT in schools in Wales. This group was tasked with delivering a report that identified a way forward. The ICT Steering Group's findings were published[22] in September 2013. The headline recommendations are as follows.

- A new subject named Computing must be created to replace ICT from Foundation Phase onwards. This new subject will disaggregate into two main areas: Computer Science and Information Technology.
- Computing must be integrated as the fourth science, served by a mandatory Programme of Study, receiving the same status as the other three Sciences.
- A Statutory Digital Literacy Framework must be implemented to work alongside the Literacy and Numeracy Framework from Foundation Phase through to post-16 education.
- Perceptions of computing education pathways must change to recognise the key roles of computing and technology. The importance and diversity of IT careers must be promoted.
- The revised Computing curriculum must encourage creativity, and allow thematic working and real world problem solving. It must be flexible enough to continually evolve to remain current, adopting an agile approach.
- A range of engaging and academically rigorous pathways and bilingual qualifications for Computing and Digital Literacy must be devised, encouraging interest and deeper learning.
- Engagement and collaboration between education and industry must be an integral part of the curriculum to embed current practices and skills.
- A programme of training and professional development to enable the new Computing curriculum must be accessible to new and existing teachers.
- Pathways for initial teacher training in Computing must be created to encourage the best talent into the profession. All entrants to the profession must have the skills to deliver the Digital Literacy Framework.
- A National Technology Framework must be devised to create an effective technology infrastructure for education. Welsh Government, local authorities and learning providers must be responsible for its effective implementation and strategic development.
- Effective monitoring arrangements must be created for Computing and the Digital Literacy Framework. Estyn must consider relevant changes to the Common Inspection Framework in light of all of these recommendations.
- The National Digital Learning Council will oversee the implementation of these recommendations. Its remit will be expanded to absorb this new governance role, including appropriate expertise and key stakeholders.

Ministers will consider these findings in the context of the wider review of assessment and the National Curriculum in Wales and will respond in due course.

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[22] http://learning.wales.gov.uk/resources/ict-steering-groups-report/?skip=1&lang=en

Faster broadband connectivity for all schools

In January 2013, the First Minister Carwyn Jones announced that all schools will have access to faster broadband connections as a result of £39m from the Welsh Government. This will mean a minimum speed of 100Mbps (megabits per second) for secondary schools and 10Mbps for primary and special schools by 2014. In doing so the First Minister stated:

"We want Wales to be a world leader in digital learning, therefore we need to be able to offer our schools fast, consistent and reliable broadband services."

The development of Hwb

Hwb is the all-Wales learning platform provided by Welsh Government aimed at supporting national action in the following areas:

- encouraging, supporting and preparing teachers to operate in a digital environment and to share their digital practice; and
- establishing and developing a system and a national collection for creating, storing and sharing digital resources.

Hwb will host a national collection of digital resources to support learning and teaching for learners aged three to 19 in Wales. This will be known as the National Digital Repository. The collection will be accessed through multiple channels and will include resources that are:

- created or commissioned by the Welsh Government and/or its agents;
- licensed or bought by the Welsh Government;
- made available by 'trusted sources'; and
- created by teachers and learners.

In addition it will offer:

- consistent treatment of the Intellectual Property Rights for all resources provided to Hwb, with the presumption that Creative Commons Attribution licenses will be applied; and
- new approaches to the use of social networking sites in schools (to be supported with guidance).

Through Hwb, each school in Wales will have the opportunity to have an individual learning platform, tailored to their own school's needs. This additional functionality is referred to as Hwb+.

Hwb + will offer the following functionality:

- an external pubic website;
- Office 365;
- virtual classrooms;
- blogs and wikis;

- forums;
- podcasting;
- lesson plans and tools; and
- learner and teacher spaces

The beta version of Hwb was launched on 12 December 2012. Hwb will be available to all schools in Wales from that date.

Hwb+ (the part of Hwb that requires user authenticated access) will be made available to a representative sample of schools to trial in the first instance. This will ensure that Hwb+ is fit-for-purpose before its roll out to all schools in Wales from February 2013.

An overview of the history behind the definition of ICT

Estyn's report [23] in 2003 defined ICT as "the range of tools and techniques (telecommunications, networking, hardware and software) that supports teaching and learning". In this earlier report, information technology (IT) referred to the National Curriculum subject that deals with the knowledge, understanding and skills that pupils need in order to make effective use of ICT in contexts across the school curriculum.

In the curriculum review that led to the 2008 National Curriculum, the subject information technology (IT) was renamed information and communication technology (ICT). Thus, both the subject and the key skill confusingly shared the same title. This was not the case for English/Welsh and literacy or mathematics and numeracy.

The Schools' ICT Strategy Working Group in its report [24] to the Welsh Government in March 2008 attempted to define ICT capability as follows:

"The ICT capability involves demonstrating skills in the processes of gathering, searching, exploring, analysing, presenting, communicating and sharing information, underpinned by an understanding of key concepts related to the nature of information and of technology. It includes a set of technical competences together with a confidence in learning to use new tools; a disposition to solve problems and enhance results with ICT in unfamiliar contexts; a knowledge of the potential and limitations of familiar tools; an awareness of the opportunities and dangers inherent in the use of ICT; and a willingness to reflect on the use of ICT in the world beyond one's immediate experience."

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[23] A review of information and communication technology provision in schools and its impact on raising standards
[24] Transforming schools with ICT

Appendix 3: A summary of key ICT documents

National Curriculum for Wales Order Programme of Study for ICT

There are two areas under skills that pupils should be given opportunities to experience. These are: 'Find and analyse information'; and 'Create and communicate information'.

Under 'Find and analyse information', pupils should be given opportunities to:

- plan tasks, including consideration of purpose/audience and appropriate resources;
- find relevant information efficiently from a variety of sources for a defined purpose;
- select relevant information and make informed judgements about sources of information;
- produce and use databases to analyse data and follow particular lines of enquiry, e.g. use simple and complex queries (searches/sorts);
- produce and use models and/or simulations to analyse data and test hypotheses, e.g. changing data and formulas in spreadsheets; and
- investigate more complex patterns and relationships in models and/or simulations.

Under 'Create and communicate information', pupils should be given opportunities to:

- create and communicate information in the form of text, images and sound, using a range of ICT hardware and software;
- create and develop a range of presentations, combining a variety of information and media, for specific purposes and audiences, e.g. use higher order functions in a presentation package; and
- share and exchange information safely through electronic means, e.g. collaborative use of e-mail with attachments, virtual learning environments.

In addition, under 'Health, safety and child protection':

- pupils should be taught how to use ICT comfortably, safely and responsibly, and to consider the hazards and risks in their activities. They should be able to follow instructions to minimise risk to themselves and others and understand that disclosing personal details can put themselves and others at risk.

The non-statutory Skills Framework for 3 to 19-year-olds in Wales

The non-statutory Skills Framework for 3 to 19-year-olds in Wales (the Welsh Assembly Government, January 2008) is the basis upon which Estyn inspects the Essential Skill of ICT in schools. This framework sets out six stages of progression in ICT. The six stages of progression in ICT capability are set out in a six-column continuum in the Skills Framework for 3 to 19-year-olds in Wales document. These columns are not titled but cover broad expectations from the beginning of the Foundation Phase to post-16.

Developing ICT across the primary curriculum based on the Skills Framework for 3 to 19-year-olds in Wales (WAG January 2008)

Strand	End of key stage 3	End of key stage 4	Post 16
Finding and developing information and ideas	Find relevant information from a variety of sources using key word and multiple word searches on datafiles and internet sources	Find different types of information from a range of ICT sources, including data files, DVDs, internet, and non-ICT sources, including written notes, lists, diagrams, selecting relevant information	Identify suitable sources of information, search for information using multiple search criteria, and interpret and select what is needed for different purposes
	Develop/model information and ideas for specific purposes by processing data from a variety of sources, checking accuracy and plausibility of information	Develop and refine information, making informed judgements about its plausibility, accuracy and relevance	Derive new information on which to make judgements and draw conclusions
Creating and presenting information and ideas	Create and present information and ideas by combining a variety of different forms of information, including text, images, graphs, music files, with a developing sense of audience for their work	Create and present information and ideas in consistent ways for different purposes by combining information from different sources, matching the needs of the audience	Create and present information and ideas to meet the intended purpose and audience, selecting and using different layouts and techniques for different tasks
	Safely share different forms of information with others in appropriate ways, including the use of e-mail with attachments; virtual learning environments (VLEs)		

Learners' progression in developing ICT is described as you read across the columns from left to right. Progression is cumulative; skills identified in each stage of progression will have been demonstrated – at least at a simple level – by learners before they move to the next stage.

Progression can be seen in terms of the refinement of these skills and by their application to tasks that move from: concrete to abstract; simple to complex; personal to the 'big picture'; familiar to unfamiliar.

Learners progress from needing support to more independent working. They move from listening and interacting with others in a general way to a situation where they choose to work with others as a deliberate strategy for reaching understanding. In these ways they become both independent and interdependent learners.

Glossary/references

Blog	Originally from the word "weblog" or a "web log". In its simplest form it is an online journal or diary.
Benchmark	Compares the performance of one school against others who have similar levels of pupils with free school meals (FSM). FSM is regarded as the main indicator of social deprivation in schools. This allows a comparison of the performance of a school against others who are in the same FSM category, and who might therefore have a similar intake of pupils from deprived backgrounds. A school in benchmark quartile 1 is in the highest performing 25% of schools with similar levels of free school meals to this school. Therefore, the schools attainment levels are higher than many other schools with similar levels of pupils from deprived backgrounds. A school in benchmark quartile 4 is in the lowest performing 25% of schools with similar levels of free school meals to this school. Therefore, the schools attainment levels are lower than many other schools with similar levels of pupils from deprived backgrounds.
Bookmarks	Website addresses that you can save in your browser, in order to get back to them easily
Comenius	School partnerships, usually funded by the British Council, between a school in the UK and at least two other schools in European countries
eTwinning	A scheme enabling schools from the 28 European Countries to collaborate on a range of curriculum projects using ICT
Forum	An internet forum is a discussion area on a website. Here members can post discussions and read and respond to posts by other forum members. A forum can be focused on nearly any subject and a sense of an online community, or virtual community, tends to develop among forum members.
ICT	Information and communication technology
Kbps	Kilobits per second is a measure of data transfer speed
Learning Platform	An integrated collection of online tools and services for teachers, learners, governors, parents or carers and other stakeholders to support and enhance educational delivery and management

Mbps	Megabits per second is a measure of data transfer speed.
Moderation	Moderation occurs at the end of a key stage where a 'best fit' judgement on an individual learner's level of attainment is made.
Office 365	This provides access to familiar Microsoft Office tools, email, conferencing, and IT services from virtually anywhere.
Podcast	The term derives from 'broadcast' and 'pod' from the success of the iPod, as podcasts are often listened to on portable media players. Simply, a podcast is a digital media file that is downloaded directly from the internet. The media files are downloaded onto a computer and then downloaded onto a digital media device like an iPod or other MP3 player. Podcasting lets you automatically receive the latest episode of your chosen radio programme as soon as it is available or access older programmes.
Portable technologies	A generic term for using tablets, mobile phones etc in schools
QR Codes	Simple, scannable images that are a form of barcode. By scanning a QR code using a mobile device, such as a tablet or mobile phone, a variety of information can be accessed. This can be text, links to web-based materials, bookmarks and email addresses.
Standardisation	This involves a process of using samples of the work of the same learner or of different learners to enable teachers to reach agreement on levels of attainment by confirming a shared understanding of the characteristics of a level.
Virtual classroom	Pupils attend a virtual classroom by connecting to the Internet rather than traveling to a physical classroom.
Wiki	A website that allows its users to add, modify, or delete through a web browser
Wireless device	Any kind of communications equipment that does not require a physical wire for relaying information to or from another device

Explanation of words and phrases used to describe our evaluations

nearly all	with very few exceptions
most	90% or more
many	70% or more
a majority	over 60%
half or around a half	close to 50%
a minority	below 40%
few	below 20%
very few	less than 10%

The remit author and survey team

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