Research for Teachers

Ways forward with ICT

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Do you want to know more about how teachers have used ICT in their teaching and in developing learning?
For this TLA research summary we selected, appraised and summarised a study which teachers might find useful as they get to grips with information and communication technology (ICT) across the curriculum. The questions we have devised bring out the particular aspects of the study that we think are most valuable for teachers.
The study is:
Moseley, David, Steve Higgins et al (Newcastle University) and Lynn Newton (CEM Centre, Durham University).
Ways forward with ICT: effective pedagogy using information and communications technology for literacy and numeracy in primary schools. University of Newcastle: 1999.

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Overview

Why is the issue important?
An understanding of how technology can be integrated into subject teaching in ways that will raise attainment will increase teachers' capacity to make informed choices about when, when not and how to use ICT in their teaching.

What did the research show?
Both 'highly effective' teachers and those identified as 'averagely effective' showed substantial gains in pupil attainment in relevant standardised tests of numeracy and literacy over the life of the project. In numeracy, the overall average improvement was 2.8 months progress per month while for literacy it was 5.1 months per month. The researchers did not attribute these gains solely to the use of ICT, but they concluded that carefully planned and thought-through activities, supported by clear and explicit learning

How was this achieved?

To harness ICT effectively teachers had to:

- identify clearly how ICT would be used to meet specific objectives (such as using apostrophes or working out decimal places) within literacy or numeracy to improve pupils' attainment
- ensure that pupils had adequate ICT skills so that the lesson could then focus upon those subject specific objectives
- identify specific learning intentions and relate these in detail to the ICT activities
- identify an explicit and planned match between the identified purpose of the ICT activities and learning outcomes, for example, by using ICT to demonstrate or model learning by a teacher or a pupil.

How was the research designed to be trustworthy?
The main project focused on teachers in 250 classes in Reception, Year 2 and Year 4 from schools in Gloucestershire, Lancashire, the West Midlands and the North East. The researchers collected and analysed a variety of both quantitative and qualitative data, including survey, observation, interview, and pupil attainment data. Twenty case studies provided detailed information about the teaching and learning processes.

What are the implications?
The study showed the importance of:

- relating ICT to learning objectives in the particular subject. For example, ICT can be used to introduce new information and ideas
- pupils applying existing ICT skills to new subject learning rather than learning both new ICT skills and new subject knowledge simultaneously
- supporting colleagues to improve their ICT skills and finding out what would motivate them to develop their ICT skills
- finding out what colleagues think limits their use of ICT (for example, having limited technical support or lack of support in identifying and using appropriate software) and sharing ideas on how to overcome these barriers to ICT use
- improving access to ICT for both teachers and pupils, for example, by helping and encouraging teachers and pupils to use home computers to develop their ICT skills and/or support teaching and learning.

What do the case studies illustrate?
The case studies show, for example, how teachers:

- enabled their pupils to improve their writing skills by exploiting the provisionality of ICT and exploring alternative ways of refining their work
- took advantage of the interactivity, speed and automatic functions of ICT, enabling pupils to concentrate on thinking about and interpreting their results
- used ICT as a catalyst in teaching new and difficult concepts, such as the omissive apostrophe.

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Study

What did the project set out to do?

The project - based on a large-scale study and a series of further small-scale, in-depth, classroom-based development studies - aimed to help teachers raise pupils' achievements by increasing their capacity to make informed choices about when, when not and how to use ICT in their teaching, and to help them understand the

implications of using this technology.

The study provides vivid and detailed examples of how teachers' use of ICT helped raise standards. It will be most useful to teachers in Key Stages 1 and 2 but parts of it are likely to be relevant to teachers in Key Stage 3 with concerns about their pupils' literacy or numeracy.

Summary of main messages

Pupils made significant gains in standardised tests in 14 out of 16 development classes, where teachers set out to improve teaching and learning through the use of ICT, with careful and explicit planning and support.

To harness ICT effectively teachers had to:

- identify clearly how ICT would be used to meet specific objectives (such as using apostrophes or working out decimal places) within literacy or numeracy to improve pupils' attainment
- ensure that pupils had adequate ICT skills so that the lesson could then focus upon those subject specific objectives
- identify specific learning intentions and relate these in detail to the ICT activities
- identify an explicit and planned match between the identified purpose of the ICT activities and learning outcomes, eg, by using ICT to demonstrate or model learning by a teacher or a pupil.

Who was involved in the research?

The University of Newcastle was commissioned by the TTA in 1997 to undertake research into effective classroom teaching and learning, using Information and Communications Technology (ICT) in primary schools.

The main project focused on teachers in 250 classes in Reception, Year 2 and Year 4 from schools in Gloucestershire, Lancashire, the West Midlands and the North East.

The 20 primary schools that took part in individual development projects ranged from a large inner-city school, where 70 per cent of pupils received free school meals and entry standards were below average, to a church-aided village school, where entry standards were high and many of the pupils had access to a computer at home.

What teaching and learning questions might this help you tackle?

The report includes case studies of how teachers in individual schools undertook development work in extending their choices about the effective use of ICT for specific teaching objectives. All these examples contain detailed descriptions of the strategies adopted by the teachers and of the ways in which pupils responded to them. They also show how the different functions of ICT have different teaching and learning benefits.

For example, one year 4 teacher used an e-Mate connected to a pressure mat to involve pupils in physical activities that required measuring time in seconds to two decimal places and a Reception teacher used a painting program to develop children's counting skills. These two case studies are summarised below.

Other individual development projects we have summarised involved:

- Improving reading and spelling with speech feedback in Year 2
- Teaching the correct use of omissive apostrophes in Year 4 using multimedia software
- Developing story-writing skills with Year 2 pupils using ICT
- Supporting number skills in a Year 4/5 classroom.

These are summarised at the end of this document.

How did ICT help with teaching? Numeracy examples

A Year 4 teacher used an e-Mate connected to a pressure mat to generate time in seconds to two decimal places.

This took advantage of the interactivity and the speed and automatic functions of ICT.

The children could take measurements simply and with much greater accuracy than with a stop-watch, and without the need for calculations. This allowed them to concentrate on thinking about and interpreting results. Two different types of activities were timed, eg, 'how long can I stay in the air?' and 'how fast can I run from point a to point b in the playground?'. This required the pupils to interpret what was the 'best' time in each case and to use decimals in a specific context to achieve this. The teacher was surprised by what happened:

'The activity with the e-Mate stimulated their interest to learn and understand beyond my expectations. I would never in my wildest dreams have thought they would cope with this.'

She found that certain children succeeded much more in activities using ICT than they had in previous activities, relative to their peers. This led the teacher to rethink her approach so that she now used whole class sessions not only to review pupils' work, but also to identify and focus pupils on areas to develop in the next lesson.

The children practised the following aspects of counting (identified in an initial assessment), by stamping a variety of pictures on to the screen:

- using their counting vocabulary
- using more systematic counting strategies
- recognising and using numerals.

This approach complemented other number activities in class.

The pupils made use of the speed and automatic functions incorporated into the painting program to create pictures quickly, and to reinforce numerals and number names. The teacher used the provisional nature of the information stored, ie, the provisionality of ICT, to develop teaching resources using the children's counting pictures. The children had a sense of purpose and audience for their work and the teacher could make explicit links between activities, develop connections and further the pupils' understanding. The children used a PC in the classroom to continue their activities and develop the skills needed for mouse control. The teacher demonstrated pupils' work to the class and produced slide shows linked to counting rhymes such as 'Ten green bottles' using the PC.

How was this research designed? Does this design make it credible for teachers?

Individual teachers always have to interpret research findings for their own context because teaching is so complex. It's hard to be sure that any given outcome is the direct result of a specific activity. That said, this study uses a good mix of methods and types of data to create a rounded picture; it follows and sets out the impact on learning rigorously without making over-claims and it helps individual teachers form their own views through the case studies. So the GTC feels it pays proper attention to many of the issues likely to make research credible to teachers.

Teachers and their classes were chosen through survey data and class performance data. Survey data were used to identify the relative intensity of teachers' use of ICT and performance data were used as a measure of teacher effectiveness. A series of progressively smaller and smaller samples was used to do increasingly in-depth qualitative work. The comprehensiveness of the research design and the multi-layering within it ensured credibility. (Teachers interested in the details of the research design should refer to the full report). At the

heart of the data analysis is detailed, grounded work in classrooms with teachers and pupils.

What else did the study discover? What did pupils learn?

In the development projects both 'highly effective' teachers and those identified as 'averagely effective' were able to show substantial gains in pupil attainment in numeracy and literacy over the life of the project using relevant standardised tests.

These gains indicated that teachers could help pupils to raise levels of attainment when:

- they used ICT to support their teaching in numeracy and literacy; and
- they had clear objectives for each subject.

In numeracy, the overall average improvement was 2.8 months progress per month while for literacy it was 5.1 months per month. While the authors do not attribute these gains solely to the use of ICT, they conclude that carefully planned and thought-through activities, supported by clear and explicit learning objectives, can play a crucial part in improving pupils' literacy and numeracy attainment.

How did teachers vary in their approaches to ICT use?

The relationships between a sub-sample of the teachers' thinking, their observed behaviour and the related pupil outcomes were investigated by the project team and details are included in an appendix to the full report. To simplify a complex series of data analyses, we present the following conclusions.

Teachers who favoured ICT were likely to:

- have well-developed ICT skills
- see ICT as an important tool for learning and instruction
- value collaborative working, enquiry and decision making by pupils.

Teachers who had reservations about using ICT were likely to:

- exercise a high degree of direction
- prefer pupils to work alone.

To use ICT more effectively these teachers would probably need to:

- cultivate a more positive attitude to ICT by developing their own ICT skills
- be persuaded that ICT-supported activities can help pupils acquire subject knowledge; some might be attracted by the direct instruction
- offered by an integrated learning system (ILS), while others might prefer to use a generic tool such as Textease, which can be used for word processing but which has wider possibilities which can be gradually explored.

(Teachers interested in integrated learning systems should refer to the *UK ILS Evaluations Final Report*, Becta, 1998).

Was there something particular about teachers' attitudes and ideas about teaching that made a difference?

The study probed the thinking and subject knowledge of 32 teachers involved in intense classroom observation prior to the development projects. Unsurprisingly, given the complexity of teaching and learning, no single aspect of teachers' thinking emerged as being directly linked to 'value-added' pupil learning gains. However, a reliable indicator of effective teaching in both numeracy and literacy did emerge. When teachers preferred subject-based to topic-based teaching and more active learning in their pupils, and frequently used examples and counter-examples (giving an example of an incorrect solution as well as a correct solution and explaining why one was correct and the other incorrect), their pupils were more likely to make exceptional progress.

What was necessary to make the developments work for the teachers and pupils?

In addition to the factors already mentioned, the research evidence indicated that teachers' use of ICT was more effective when they:

- made sure that the starting points for developing the use of ICT built on the particular teacher's preferred teaching style and approach (see story writing in Y2 case study)
- ensured that pupils and teachers had adequate access to the necessary equipment and were able to use it as intensively as the activity required (see decimal case study)
- used explanations effectively, eg, by using examples and counter-examples in explanations to pupils, modelling and demonstrating work to groups or the whole class and using the pupils to model and demonstrate what they had learnt (see apostrophes case study)
- had access to effective technical back-up and support to overcome difficulties with equipment (eg, printers on networks) and sufficient resources (including computer consumables such as ink cartridges) to complete the task.

How did the use of ICT influence the teaching and learning process?

Although the development projects were very different, the teachers and pupils in the schools all found that their teaching and learning had been influenced by the use of ICT.

- In almost all cases, the teachers developed their own ICT skills, which increased their confidence and made it easier for them to decide when and how to use ICT effectively in their teaching. Some tackled the technical and operational constraints of working with limited resources more positively than they had before their involvement with the project. (See counting in Reception case study)
- ICT work motivated the pupils, and developed their collaborative learning skills so that the teachers could plan activities involving the pupils working together effectively. (See story writing in Y2 case study)
- Raised expectations of pupils led teachers to use ICT as part of their strategy for teaching more challenging aspects of literacy and numeracy, eg, omissive apostrophes and decimals to two places. (See apostrophes case study and decimals to two places)
- Teachers were able to provide more appropriate and interesting practice and consolidation material for pupils at different levels of ability. (See number skills in Y4/5 case study).

Successful outcomes from using ICT were not limited to pupils' attainment. Teachers also gained insights into their own practice and the subject being taught, eg, the teacher using ICT to teach the omissive apostrophe discovered how complex the teaching of this topic really was and explained her previous difficulties in teaching that subject. The approach she took helped her to appreciate the children's difficulties, and enabled her to use that knowledge to improve their understanding - perhaps because the use of ICT made her break down the issue into its component logical parts.

What do we think this study shows us?

Although a study like this can demonstrate relationships between observed teaching strategies and pupil attainment, you will know as a teacher that they are not necessarily causal links. Other factors, reflecting the complexity of your teaching, such as how you interpret pupils' responses, your own subject knowledge, the classroom climate and pupils' ICT skills, will also affect the outcome.

Professional development and training in ICT has the potential to support development in specific subject areas, but initiatives to promote the effective use of ICT must take account of individual teachers' thinking and existing practice to find suitable 'hotspots' for development. Using ICT to support teacher development means trying out new things within a teacher's pedagogic 'comfort zone.' This enables the teacher to concentrate on teaching the use of ICT by building on his or her strengths.

What types of support were necessary?

Support from the development team was particularly valued by teachers when it provided:

- information about appropriate software for the subject-specific objectives
- prompt and uncritical technical support
- software (and support for teachers in using it) that had a positive impact on their attitudes and confidence
- equipment that increased access for pupils (eg, four laptops were provided by the university in one school)
- software for teachers to practise at home.

What types of planning were necessary?

The report also identified a number of issues or questions that schools need to consider in their planning. They ranged from planning how to identify effectively new resources that increase teacher choice, to finding ways of supporting teachers in transferring their existing teaching skills into areas where ICT would be a strength. A particular planning issue for individual teachers was the need to assess pupils' ICT skills and plan to develop these to the point where class time could be focused upon the subject rather than the technology.

This issue of assessing and developing pupils' ICT skills was one of the most significant themes across the proejcts.

It is always important to be cautious about generalising from individual classroombased projects, including these. But because the individual development projects stand on the shoulders of larger scale data, it is possible to draw out a number of practical issues from across the projects. One particularly strong common theme was making sure teachers and pupils had the ICT skills they needed to ensure that time within subject lessons could be focused on the subject rather than on building ICT skills. Some of the project schools were able to achieve this by teachers separating group teaching of ICT, eg, on a computer cluster in school or by visiting a cluster. Providing teachers with software to practise using at home similarly supported teachers' ICT skills development. Other vital issues were availability and reliability of equipment, and access to equipment. It is also worth noting that the active support of the headteacher had a positive impact on the development of the individual classroom-based projects.

Does the report have anything else to offer?

Our summary of this study does not include some useful 'extras' contained in the appendices. Teachers will find a list of key references to research and publications about ICT and pedagogy, together with a commentary on the literature. Be prepared to be disappointed however: the authors report that very few studies are able to identify pupils' learning gain - and they found none at all linking teacher development and pupil attainment data. They also found that the focus of lots of the larger scale research does not relate closely to the topics selected as important by teachers. There is also a brief review of the research on effective pedagogy, with a list of key references and, for the hardy, a range of statistical data about measurable relationships between teachers' thinking and observed classroom behaviour.

What are the implications of the study?

Teachers seeking to improve the way they use ICT for teaching and learning may wish to consider the following implications:

- the use of ICT seemed to be most effective when it related to learning objectives in the relevant subject. Would you find it helpful to use ICT to introduce new information and ideas or to reinforce and consolidate learning?
- the researchers found that it was important for pupils to use their existing ICT skills and apply them to new subject learning rather than learning both new ICT skills and new subject knowledge simultaneously. Would you find it useful to work with colleagues to share approaches for assessing pupils' ICT skills and ways of developing differentiated activities to help you match pupils' ICT skills with subject learning activities better?

Leaders may wish to consider the following implications.

The study found that teachers who were able to use ICT effectively for teaching and learning had the following common characteristics:

- good ICT skills
- saw ICT as an important tool for teaching and learning
- preferred subject based to topic-based teaching
- used examples and counter-examples to illustrate correct and incorrect answers; and
- valued collaborative working, enquiry and decision making by pupil.

Could you do more to support teachers in your school to improve their ICT skills and find out what would motivate them to develop their ICT skills? (Practitioners wanting to find out more about what enables teachers to make use of ICT may find it helpful to read a recent report by BECTA - see further reading).

Could you do more to find out about what teachers in your school think limits their use of ICT (such as having limited technical support or lack of support in identifying and using appropriate software). Have some of your teachers found ways round these barriers that could be shared? (Practitioners wanting to find out more about barriers to teachers' use of ICT may find it helpful to read a recent report by BECTA - see further reading).

To what extent could access to ICT for teachers and pupils be improved in your school? For example, are there ways in which your school might help and encourage teachers and pupils to use home computers to develop their ICT skills and/or support teaching and learning?

Case studies

A number of case studies illustrating key aspects of this research are available in the case study section.

Your feedback

Have you found this study to be useful? Have you used any aspect of this research in your own classroom teaching practice? We would like to hear your feedback on this study. To share your views with us email: research@gtce.org.uk

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Case studies

We have summarised six of the case studies as examples below. Six to ten page versions of the all the case studies are available in the report from Newcastle University or in a pack from the TTA.

The functions of ICT, exemplified through the case studies (and in italics in the summaries presented here), are part of the New Opportunities Fund Outcomes for ICT training for serving teachers.

Developing counting skills in Reception using ICT

A Reception class teacher used a painting program (Kid Pix/Brøderbund Software), to develop the children's c ounting skills in a newly installed computer suite.

The children practised aspects of counting (identified in an initial assessment), such as:

- using their counting vocabulary
- using more systematic counting strategies

- recognising and using numerals
- by stamping a variety of pictures on to the screen.

This approach complemented other number activities in class.

The pupils made use of the speed and automatic functions incorporated into the painting program to create pictures quickly, and to reinforce numerals and number names. The teacher used the provisional nature of the information stored, ie, the provisionality of ICT, to develop teaching resources using the children's counting pictures. The children had a sense of purpose and audience for their work and the teacher could make explicit links between activities, develop connections and further the pupils' understanding. The children used a PC in the classroom to continue their activities and develop the skills needed for mouse control. The teacher demonstrated pupils' work to the class and produced slide shows linked to counting rhymes such as 'Ten green bottles' using the PC.

Developing story-writing skills with Year 2 pupils using ICT

A Year 2 teacher used ICT to develop story-writing skills with her pupils.

She had developed her own ICT skills with the help of the ICT co-ordinator and by working with the children in school, and she valued ICT for record keeping, planning and classroom management. This teacher was reflective, analytical about her practice, and keen to find new ways to improve her teaching. She chose a project to improve the collaborative story writing skills of her pupils who were achieving well above average in English and ICT. The children worked in small, mixed ability groups and used the capacity and range offered by a painting program (Kid Pix/Brøderbund Software) to make a slide show to tell a story, linking the s lides with sounds, spoken text and transitions. The children then used an integrated package (ClarisWorks/Claris Corporation) to redraft their text and write more sustained stories, developing narrative structure or characterisation. The teacher showed each group how to exploit the provisionality of ICT and explore alternative ways of refining their work, eg, by using adjectives and descriptive language, before the completed work was printed and made into booklets. The teacher felt that using the painting software had stimulated the children's imaginations, and having the ICT skills to produce a picture had left them free to develop their writing.

'I think it developed their actual writing skills. It gave them much more of a purpose and it motivated them to keep going and to improve and refine their story.' The teacher also appreciated that she didn't need to use overly sophisticated software to use ICT effectively in her teaching.

Developing understanding of decimals in Year 4 using portable ICT equipment

A Year 4 teacher used an e-Mate connected to a pressure mat to generate time in seconds to two decimal places.

This took advantage of the interactivity and the speed and automatic functions of ICT. The children could take measurements simply and with much greater accuracy than with a stop-watch, and without the need for calculations. This allowed them to concentrate on thinking about and interpreting results. Two different types of activities were timed, eg, 'how long can I stay in the air?' and 'how fast can I run from a to b in the playground?' This required the pupils to interpret what was the 'best' time in each case and to use decimals in a specific context to achieve this. The teacher was surprised by what happened:

'The activity with the e-Mate stimulated their interest to learn and understand beyond my expectations. I would never in my wildest dreams have thought they would cope with this.'

She found that certain children succeeded much more in activities using ICT than they had in previous

activities, relative to their peers. This led the teacher to rethink her approach so that she then used whole class sessions not only to review pupils' work, but also to identify and focus pupils on areas to develop in the next lesson.

(Teachers may be interested to know that this case study was used by the National Numeracy Strategy in their pack *Using ICT to support mathematics in primary schools*, to exemplify effective use of ICT.)

Improving reading and spelling with speech feedback in Year 2

A Year 2 teacher used Clicker (Crick Software) with Microsoft Talking First Word to support pupils' reading and writing skills.

Pupils learnt the necessary skills at off-site computer clusters. They drafted writing at the computer with the support of customised word grids, which provided structure. The speech feedback function supported pupils in re-reading their work for sense and punctuation.

The capacity and range of ICT allowed text and images to be combined easily and presented on screen in a variety of printed formats or exported to a word processor. The provisionality of the text allowed the children to redraft and improve their writing, and the teacher to print out word lists and Cloze passages, for group activities. The speech feedback facility and the computer's ability to 'read' children's writing were effective interactive features.

Supporting number skills in a Year4/5 classroom

The aim of this study was to provide support for a teacher who was experiencing some frustration in her use of ICT. As mathematics co-ordinator the teacher had identified constraints in the commercial scheme being used throughout the school. She saw that ICT had the potential to help with these difficulties and to provide extension and reinforcement activities to aid differentiation. The teacher used programs from the Shropshire mathematics disk (supplied by the project), such as *Number Grids* and *Number Snake* to supplement activities planned to develop pupils' mathematical skills in the areas of calculation and recall of multiplication facts.

The problem of having access to a single computer was addressed by providing more regular opportunities for consolidation for a small group of pupils and at the same time ensuring more equal access for the rest of the class. Standardised tests demonstrated that a target group of nine children had showed an overall mean gain of five months progress in less than three months, (ranging from progress in line with age, to progress of 15 months).

The teacher felt that:

- a planned and structured set of ICT activities had played a part in improving the test results for these children
- she had been able to provide more appropriate practice materials for pupils at different levels of mathematical development
- she was able to adopt a more positive approach to tackling some technical and operational constraints she faced with limited resources and a mixed-age class
- ICT could provide an alternative form of presentation that made practice and consolidation more interesting for herself and the children
- the children liked using ICT because of the immediacy of its responses and its interactive possibilities.

'The children have to be active on their own. They can look at what is happening on the computer, discuss between themselves, make decisions, and get on. It also gives me the chance to ask them questions... .'

Teaching the correct use of omissive apostrophes in Year 4 using multimedia

A Year 4 teacher used ICT as a catalyst in teaching the use of omissive apostrophes (where an apostrophe is used to show that a letter or letters have been omitted from a word, eg, didn't, it's).

She got the children to create a multimedia presentation to teach other pupils about the correct use of apostrophes, with the aim of developing their own awareness and understanding.

Using HyperStudio, the teacher, limited to two computers, organised activities away from the computer, such as word level work, distinguishing use of the apostrophe, and sentence level work, identifying patterns where apostrophes were used, as well as organising a 'character' competition, using colour schemes and layout.

'Asking the children, rather than telling them 'that is the rule', 'it always does this', is more powerful. Asking them, in groups, to find the rules and report back in a plenary session is a good way to get them to focus on a particular aspect.'

The pupils made use of the speed and automatic functions of the program to control the presentation, display text and create animation. The provisionality allowed them to make changes with ease. The sense of audience and the involvement of all pupils ensured that they were highly motivated. The real value for the teacher, however, was that her approach made her realise how complex the teaching of apostrophes was and explained her previous difficulties in teaching this aspect. It helped her appreciate the children's difficulties and use that knowledge to improve their understanding.

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Further reading

What else might I enjoy reading?

Williams, D., Wilson, K., Richardson, A., Tuson, J. and Coles, L. (1998) Teachers' ICT Skills and Knowledge Needs: Final Report to SOEID. Exeter: Learning Matters Ltd.

Wood, D., (1998) The UK ILS Evaluations Final Report. Coventry: Becta.

Where can I find out more online?

BECTA
www.becta.org.uk/
Includes a review of the research literature on barriers to the uptake of ICT by teachers and another review on the factors that enable teachers to make successful use of ICT.

PIPS Project
www.pipsproject.org/renderpage.asp?LinkID=22210000
PIPS (Performance Indicators in Primary Schools) is an information system that tracks a number of aspects of schooling as pupils move through the Primary sector.

TRIPS: ICT Research digests
www.standards.dfes.gov.uk/research/themes/ict/

Ways forward with ICT
www.leeds.ac.uk/educol/documents/00001369.htm

Resources

National Strategies: ICT
http://nationalstrategies.standards.dcsf.gov.uk/secondary/ict
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Appraisal

Robustness

The research aims and questions are well defined, unambiguous and clearly stated at the outset. The study is aimed at providing evidence about what constitutes effective pedagogy using ICT and has been has built systematically on the existing literature base. There are references to the literature throughout the text, and the report includes a review of pedagogy and attainment, and effective pedagogy, in the appendices. The methods have been designed to answer the research questions but, as the authors point out, the outcomes and effects observed are complex. They make it clear that the improvement in test results achieved across the project overall do not prove that ICT was the direct cause. However they do suggest that ICT has the potential to raise levels of attainment. Teachers were involved in small-scale in-depth development projects on which part of the larger work was based. Tests were conducted in each case and observations were carried out systematically. Statistical analysis was valid.

Relevance

There are still relatively few studies of what works well in using ICT in literacy and numeracy teaching and many teachers are struggling to integrate the technology into their subject teaching. This study offers ideas and suggestions that have the potential to interest other teachers at this time. Although the research was conducted with groups of pupils in Reception, Year 2 and Year 4, both the strategies used in the classrooms and, particularly, the broader findings from the project as a whole, have the potential to interest teachers with pupils in other phases and age ranges.

The researchers used both quantitative and qualitative data, from survey, observation and interview, plus pupil attainment data. The range and nature of the data (for example, observing classroom behaviours, interviews with teachers about their practice, pupil test results) are in themselves of relevance to teachers who may be seeking ways of collecting evidence for improving or developing their practice. The review of the literature may also be useful to such teachers.

The study was conducted in four geographical regions and the sample included a wide variety of primary schools, encompassing a similar variety of socio-economic groups, making it accessible to teachers wishing to tackle some of the strategies in their own classrooms.

Headline figures from the statistical analysis of the data are presented within the text, with complex details and analyses provided in appendices.

Applicability

There was a clear focus on pedagogy throughout this study. The 20 case studies provided detailed information about the teaching and learning process in authentic classrooms, in particular types of schools. There was evidence of learning gain with examples to illustrate both the strategies used and the pupils' responses. This

style of presentation increases the potential for helping teachers understand and build on their existing knowledge, beliefs and strategies. There is a section devoted to exploring the relationships between teachers' thinking and their practice, which may interest teachers from all phases of education and all subjects.

Writing

The report is written in a relatively lively way and the authors have decoded such jargon or acronyms they have used. The findings have been clearly identified and presented.

As a whole the report is clearly laid out and the format is relatively easy to follow. Different sections are well sign-posted. There is a summary at the beginning of the report and each section begins with aims and ends with a summary. Headings and sub-headings are used to good effect and help maintain the focus of each section.

The case studies are also available as separate summaries in a pack, published from the Teacher Training Agency (TTA), making them convenient for teachers to use.

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