# The 'Third Way': teaching ICT capability

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## Introduction

One Monday last month I attended a conference on 'Innovative uses of ICT'. The speakers were teachers demonstrating 'good practice' in the use of ICT in their subject areas. They all used phrases such as "ICT is just a tool", "the point of ICT is to help the pupils learn geography/science/maths better". On the Wednesday of the same week I attended a parents evening at my elder daughter's school and spoke with the IT teacher. He told me that the course at her school focussed on skills because "without skills you cannot do anything" and "you can think about how to apply the skills once you have learnt them". He then proceeded to list the 'skills' that he believed the pupils had learnt – giving examples such as spreadsheets, databases, word processing and desk-top publishing.

These two experiences - in the same week - encapsulate the two kinds of aims commonly offered for the teaching of IT in schools. Is IT ('just') a tool or it is it a set of skills? Much discussion takes place as to which of these it is or should be. I want to argue that is and should be neither – that the dichotomy posed is a false one. There is a 'third way' in which the purpose of teaching IT is to develop our pupils' IT *capability*. This is the way that lies at the heart of the English national curriculum for IT, although not at the heart of most classroom practice. The first purpose of this paper is to illustrate, by means of a number of classroom examples, what this third way.

The second purpose of this paper is to argue for a model of curriculum innovation. The idea of IT capability is not new, it was introduced in the National Curriculum over 10 years ago. And yet it has still not permeated to most classrooms – for example in his most recent report[1], the Chief Inspector of Schools noted that "In only one-third and one-quarter of schools at Key Stages 3 and 4 respectively do pupils make good progress in information technology." Why is this so? I would argue that a crucial reason is that the National Curriculum was a 'top-down' innovation. Unlike the curriculum innovations of the period 1960-80 it was not constructed *by* or *with* teachers but was something 'handed' down *to* them. Further, it is couched in general and abstract terms which do not obviously match on to the existing skills-based curriculum used by most teachers. In essence I would argue that a national scale innovation has not been implemented because of the absence of classroom-scale innovations. This problem is further compounded by the fact that those good examples of pedagogy which *do* exist are not easily available to all teachers. For example there is no national equivalent of the Association for Science Education[2] whose publications and meetings provide an excellent forum for the dissemination of innovations in science education. Neither has there been any sustained scheme of suitable in-service training courses to help teachers come to terms with the innovation. As the Chief Inspector of schools further notes in the same report,
"Carefully targeted, high quality in-service training is urgently needed if pupils are to gain real benefit across the curriculum from the rapid expansion of information and communications technology in schools."

## What is meant by capability?

The introduction to the most recent version of the English national curriculum[3] for information and communication technology states:

"Information and Communication Technology (ICT) prepares pupils to participate in a rapidly changing world in which work and other activities are increasingly transformed by access to varied and developing technology. Pupils use ICT tools to find, explore, analyse, exchange and present information responsibly, creatively and with discrimination. They learn how to employ ICT to enable rapid access to ideas and experiences from a wide range of people, communities and cultures. Increased capability in the use of ICT promotes initiative and independent learning, with pupils being able to make informed judgements about when and where to use ICT to best effect, and to consider its implications for home and work both now and in the future."

In the national curriculum, the idea of capability, as the development of attributes concerned with the use of IT skills, is 'fleshed out' under four headings or 'strands':

- Finding things out
- Developing ideas and making things happen
- Exchanging and sharing information
- Reviewing, modifying and evaluating work as it progresses

In the remainder of this talk I want to explore the meaning of capability in one of these areas, 'exchanging and sharing'.

## The capability to exchange and share information

In order effectively to exchange information with someone, one needs to do at least three things:

1 Decide what it is that one wishes to communicate to whom
2 Select what the appropriate form of communication is for that message and audience and implement it
3 Evaluate the effectiveness of the chosen form of communication

This process is complicated by the fact that one can communicate

- many things – e.g. facts, concepts, procedures, an imagination, feelings
- to many potential audiences – e.g. peers, (potential) employers, groups of the public, friends, family, yourself
- for many purposes – e.g. to inform, to entertain, to share, to sell, to persuade, or just for fun.

Even this very incomplete list indicates the richness of the variety of ways in which one can communicate with another. Children's progress is measured by comparing their performance against a series of 'Attainment Targets'[4] The aspects of the attainments targets relevant to this strand of the national curriculum are listed below in table 1. (The average pupil is expected to be at level 2 at age 7, level 4 at age 11 and level5/6 at age 14.)

| *Level* | *Level Descriptors of pupil performance* |
|---|---|
| 1 | They use ICT to work with text, images and sound to help them share their ideas. |
| 2 | They use ICT to help them generate amend and record their work and share their ideas in different forms, including text, tables, images and sound. |
| 3 | They use ICT to generate, organise and present their work. They share and exchange their ideas with others. |
| 4 | They use ICT to present information in different forms and show they are aware of the intended audience and the need for quality in their presentations. They exchange information and ideas with others in a variety of ways, including using e-mail. |
| 5 | They use ICT to .structure, refine and present information in different forms and. styles for specific purposes and. audiences. They exchange information and ideas with others in a variety of ways including using e-mail. |
| 6 | They present their ideas in a variety of ways and show a clear sense of audience. |
| 7 | Pupils independently select appropriate information sources and ICT tools for specific tasks, taking into account ease of use and suitability. |
| 8 | Pupils independently select appropriate information sources and ICT tools for specific tasks, taking into account ease of use and suitability. |
| EP | They document systems for others to use. |

(EP = exceptional performance)
Table 1: level descriptors for Exchanging and sharing

Looking at this list it can be seen that progress within this strand of the National Curriculum can be understood as children developing an increasing understanding, competence and autonomy in selecting, implementing and reviewing IT-related forms of communication to an increasing range of audiences and for a wider range of purposes. In this view, technical aspects are important – but only as giving the pupils a wider range of IT tools to use. The conceptual development is in the ability to choose and deploy these tools effectively. It might be noticed that this is the same argument quoted above by the teachers of other subjects, since in this way of thinking techniques are tools which allow the development of IT concepts to be expressed. It can also be seen that, as written, the level descriptors

are not directly useable as a set of criteria again which to judge a piece of work. What for examples counts as 'using IT to present work' (level 3)? How many (and which) 'different forms' are needed before a teacher can say that a pupil has achieved level 4? What is needed is a well-disseminated substantial body of exemplification materials - classroom products annotated to indicate how and why they do (or do not) indicate performance at a given level.

### *Children communicating*

An excellent example of a pupil conveying information about a process comes from Ambleside[5] primary school. In it a nine year old pupil, Bethan has constructed a web-page[6] to tell the reader clearly and concisely how he used animated gifs to illustrate the scientific concept of retention of vision. The story he has to tell is clearly written with well-selected illustrations and, since it is web-based it also has the benefit of 'authenticity' using the web to tell the story of how to use a web-tool.

From the same school come examples where web-pages have been used to convey factual information and beliefs. Peter, a child in Year 6 (10-11year old) has constructed a page[7] which not only contains pictures of a robot he has built, but also an annotated downloadable video[8] of it in action. Barnaby, a child in Year 4 (8-9 years old) has scanned and then edited an image of the countryside. By linking an idyllic picture[9] to an edited one showing a valley covered in rubbish, pylons and an hotel, he very powerfully conveys his view on the possible desecration of the countryside.

Abstract imaginative stories can also be communicated. One of my students, Sy Hussain[10], worked with pupils in Year 8 (13-14 years old) to produce imaginative presentations[11]. They used a graphics package to add digital images of themselves to other artwork and then animated these to tell an amusing story using PowerPoint. The story is told on one slide using PowerPoint's built-in animation tools.

All these examples clearly demonstrate pupils presenting "their ideas in a variety of ways" for "specific purposes" and with a "clear sense of audience".

Finally, one test of how well you have communicated and idea is to see how someone else interprets your message. Pupils at Ambleside school combined with those at Edleston school[12], to produce an innovative illustration of this. The pupils at each school exchanged descriptions of characters they had drawn with pupils at the other school via e-mail. They then drew pictures of the characters whose descriptions they had received and, again via e-mail, compared them with the pictures drawn by the original writers. The teachers have posted these on a web-site[13] where as one moves the mouse over a thumbnail of the original picture, that drawn by the pupils in the second school can be seen. Clicking on an image takes you to a page containing both pictures and the text used to describe the original. In this example, one can see words, pictures and a variety of forms of electronic communication combined to produce not only a superb activity where pupils "exchange information and ideas with others in a variety of ways including using e-mail." but also one with a built-in evaluation of the effectiveness of the communication.

### *Children evaluating communications.*

There is much benefit to be gained from pupils critically evaluating both their own work and that of others. I will give just three examples, one each of pupils evaluating commercial work, the work of other pupils and work they have produced themselves. Each was used by one of my students.

Ricka Carnegie[14], worked with a group of 15-16 year old pupils to evaluate commercial video clips designed to sell cars. They critically examined who they thought the video was aimed at illustrated their argument by inserting stills from the videos into their word-processed accounts, which also contained the complete video so that the reader could see whether representative clips had been chosen. The skills required to insert the video clips were no more advanced than those required to insert pictures, but the results of this imaginative use of ICT was to allow the pupils to present their arguments much more clearly and forcefully than they otherwise could have done.

In the second example, a class of 13-14 year old pupils had spent some time working with Sahera Khan[15] to produce PowerPoint presentations on earthquakes. The final lesson in the sequence was one where each pair of students gave their presentation to the rest of the class. Each child was given a pro-forma on which to evaluate the presentations of the other groups. After all the presentations had been

given, the class as a whole then discussed what they had seen. This lesson illustrates two important points:

1 the evaluations provided important information about the capability of the evaluator. For example, a number of the pupils complimented some of the presentations because they had 'a lot of information' – i.e. they contained a lot of text. Yet putting a lot of text on the slides used in a presentation is rarely the best way to make a point. Seeing these comments on the evaluations gave the teacher information about which pupils still needed further work to develop this aspect of their capability.

2 in the discussion, a number of pupils with 'special educational needs' made important contributions. These were pupils who had great difficulty in reading and writing yet they were given an alternative mode by which they could demonstrate and improve their capability.

In the final example, Elizabeth Doyle[16], spent some lessons with her class of 14 year old pupils constructing menus for a restaurant. There was a clear focus here on thinking about how best to reach an intended audience. However, the production of the menu was not the end of the task. There then followed a lesson where the pupils (in small groups) had to evaluate their products using a prepared pro-forma[17], and think how they might be improved to meet the perceived need. Importantly, this lesson was conducted in a room with *no* computers – they were not needed and yet it is abundantly clear that in this lesson the pupils were being strongly encouraged to develop their IT capability. This should be contrasted with the attitude of many IT teachers in the UK that pupils should be 'on the machines' all the time and that homework cannot be set because 'pupils do not have computers at home'.

These final two examples also demonstrate how important aspects of IT capability can, and should, be developed without all the pupils working on computers all the time.

## Conclusion

In this paper I have given a number of examples which have been used to help children develop capability in one area, and through these I hope to have made the meaning of 'IT capability' more concrete. I believe that this approach resolves the false dichotomy between 'IT skills' and IT as a tool' and develops in children an understanding of the ways in which IT is used in the world of which they are a part, thereby helping them to be more effective in that world.

These examples show that one *can* teach for the development of capability. However they remain isolated examples. Ten years after the National Curriculum innovation only a minority of schools in the UK teach IT in this way. A central reason for this is no systematic attempt made to relate the innovation to teachers' existing classroom practice – or to try and transform that practice by means of systemic, example-led in-service training. As a result it has not impinged on that practice. The generality of this situation needs stressing. The current state of IT teaching is a *systemic* problem – it is not one that is the fault of individual teachers.

On an more encouraging note, the examples show that the change to the 'third way' is not dependent on lavishly equipped computer rooms or expensive software, neither is it on the prior acquisition of highly developed technical skills in the children – and that an emphasis on the development of the latter alone can impede the development of the 'big ideas'. For example an emphasis on 'showing what you can do' when building a web-page can lead to one that is full of inappropriate pictures, animated .gifs and JavaScript which, by vastly increasing download times, can make the page unusable by an intended audience. By 'cluttering' a page they can also confuse or hide the message it is designed to give. Examples such as this reinforce the point that skills on their own are of no practical use, they must be accompanied, and developed in conjunction with, an understanding of when, where and how to use them. (i.e. capability).

This degree of independence of the development of capability from hardware resources and existing skills means that, certainly in the UK, there is no practical reason why IT teaching cannot be focussed on the development of capability. However, one crucial pre-requisite for this change is the explication of a 'Pedagogy of IT' – the translation of the abstract generalisations found in the National Curriculum into practical, concrete examples of pedagogy-in-practice – and that will necessitate curriculum innovators working *with* teachers to develop these examples rather than dictating *to* them.

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## A note on terminology

The English national curriculum now uses the term 'information and communications technology' or ICT, for what used to be known in England – and still is in virtually the rest of the world – as 'information technology' or IT. There is much debate in England, some of it theological in character, as to the precise difference between the two terms. In this paper, unless I am quoting or referring to a source which uses 'ICT', I shall use only the term 'IT'

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## References

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All on-line references last accessed 20th May 2000

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