Joining up the pieces

How should **Sustainability** and **ICT** fit into the school **curriculum**?

This edition of The Informed Executive is all about education. Not all *aspects* of education, of course, but two topics that are having a major impact on school teaching and the management of schools and colleges. We spent the first half of the book looking at sustainability in education; how an understanding of the factors which are likely to have an impact on climate change leads to improved building design, lower energy costs and a tangible reduction in carbon emissions,

If you care to read on from this point, the theme changes to Information and Communications Technology, or ICT as everyone refers to it. Attention turns to applying relatively simple software tools to improve the efficient management of schools and colleges before looking at one of the most significant introductions to the computing arena for several years – a low-cost, low-energy chip that potentially opens up a huge window in primary school teaching.

Not content with a trip round the hardware, we check out possible applications that will run right across a school's computing platform, including a new chip, without the software falling over.

Sustainability into the curriculum

Raising young people's level of awareness about sustainability in a structured way is an objective that most teachers would wish to pursue. The subject can obviously be brought into different lessons on an ad hoc basis, but where does sustainability correctly fit into the school curriculum – the tablets of stone that are the 'programming code' in both junior and secondary education?

Similar questions arise around ICT. Clearly, there is merit in helping children understand how a computer works (if only at the block diagram level), or how on earth a satellite navigation system can work out where you are to within a metre of so.

That's valuable background knowledge. But what about ICT as a vehicle for teaching a spectrum of subjects within the school curriculum? What role do – or should - applications like word processing, spreadsheets and presentation software play in the teaching of different age groups?

That word *curriculum* has kept appearing, so we felt it was worth exploring the role of sustainability and ICT with the organisation directly responsible for shaping the school curriculum. That is the Qualifications and Curriculum Authority (QCA), and there is probably no-one better qualified to position our two subjects than Mick Waters, its Director of Curriculum. His personal objective is to develop

Sustainability is still mired in controversy.
Should it be taught within the school curriculum?

Are the **ICT solutions** being rolled out across schools able to support a **balanced curriculum**?

a curriculum that will ". . . inspire and challenge all learners and prepare them for the future".

The timing of our investigation could not be more appropriate as the QCA has just completed its review of the secondary curriculum and is now doing the same with the primary curriculum.

Seven dimensions of learning

Current education thinking, Mr Waters maintains, recognises that schools are addressing seven dimensions of learning in their work, including global sustainability. "There are certain aspects of life in which children from nine through to teen age become interested. These include their own health, social diversity, identity and sustainability.

"These dimensions are also reflected in society as we know it at the moment, and their interest is shared by people right across our country, in all walks of life."

It follows that to reflect fully these concerns, and equip young people to be members of society, it is necessary to construct a curriculum which helps schools to think how a traditional academic subject can address the seven dimensions.

Some subjects lend themselves more readily than others to accommodating sustainability. Waters believes that it is not difficult to bring experimental data on climate change into the teaching of mathematics, for example. "In geography lessons, there is scope for assessing how the world's population has adapted to climatic conditions and the changes in natural resources which result. Other academic subjects may need more careful thought about how to include sustainability, but it can be achieved."

In some situations, the fabric of the school itself feeds a broad swathe of curriculum subjects: there is a growing number of 'sustainable' schools, including the first eco-school that we considered earlier in this edition; an example of how a school had been built from the ground up using sustainable principles and integrating these closely into lesson plans.

Energy data as teaching materials

And we saw how Hertfordshire County Council has started rolling out technology for tracking energy usage in real-time to provide the 'feedstock' for many different kinds of lesson involving sustainability and energy reduction.

Mick Waters offered his own example. "I came across a primary class that had established direct links with a class in Japan. This was helping the youngsters in both countries come to terms with the global challenges facing them. At a practical level, they were sending each other packs of seeds to see what could be planted successfully in the different climates."

At the other end of the school spectrum there is evidence of examination syllabuses containing aspects of sustainability that could be included in coursework and now in examinations. That question of formalising sustainability issues into examination syllabuses raises more fundamental questions, however.

Controversial issues

Climate change is a controversial subject: while global warming is a phenomenon of which there is acceptable evidence, its exact correlation with drivers such as aviation and agriculture and industrial processes has yet to be determined. How we respond to climate change attracts a spectrum of politically-inspired opinions.

Does the QCA executive feel comfortable about bringing contentious issues such as

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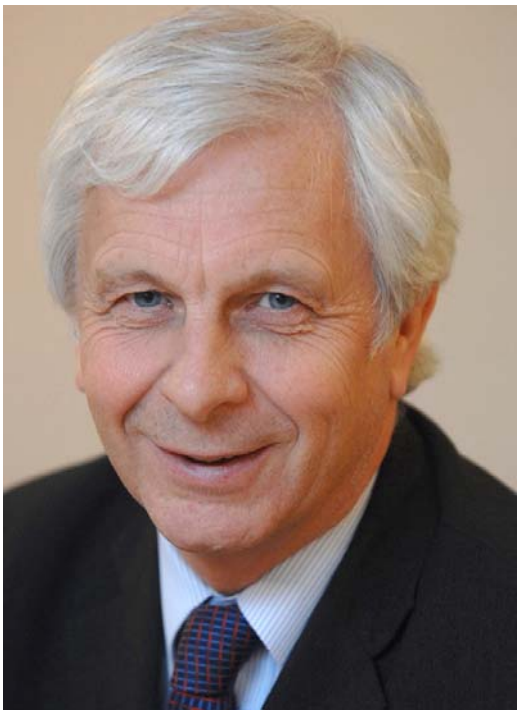

Above: Mick Waters, *Director of Curriculum at the Qualifications & Curriculum Authority* (QCA)

sustainability into something which should be as 'neutral' as the school curriculum? "It is important that the full range of opinions, supported by evidence, are covered so that youngsters can formulate their own views on the subject.

"We need to be able to include all of that material and teach children to differentiate between fact and opinion. They should be in a position to understand what is factually indisputable and become progressively more discerning about different interpretations.

"These critical processes help young people adopt a more balanced outlook and become more responsible citizens as they approach adulthood. The teachers' challenge is to be able to address all of the issues so that a balanced outlook emerges."

Responsibility of teachers

The assumption must be that the children have the faculties to assess the issues and formulate that balanced outlook. The role of teachers in projecting the sustainability 'dimension' across so many different subject areas is therefore critical.

As Mr Waters observed, "They need to know their discipline extensively and be confident about the issues involved. They should not get out of their depth in subjects about which they are not fully versed. Within a school, the challenge for them is to help each other address the issues of relevance and build up a knowledge base to support their teaching."

How far sustainability could be introduced as a formal examination topic is a more complex question. It is a matter for the Examination Boards to introduce such subjects, which move away from the traditional areas and into more inter-disciplinary areas such as health, risk and global sustainability. "I suspect that employers and higher education establishments would have difficulty in working out where the exams fitted in with their requirements. That step would need careful planning, and the only bar is whether it will be accepted. The fact that several universities have developed research agendas in climate change and sustainability would suggest that such a development could prove acceptable. "

Information technology

If sustainability is a nebulous topic for the school curriculum, then our second theme must represent a world of comparative certainty. There has been evidence of information technology in schools since the 1970s, even if it did involve preparing program statements on punched tape to be fed over a low-speed acoustic coupler into a remote university computer.

Modern PCs and laptops play an increasingly important role in junior schools and above, but we are likely to find much smaller,

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low-cost devices appearing right down to the entry class of infant schools.

What role does ICT play at these early stages of development? "ICT is certainly one of the functional abilities that youngsters will need. Children of that age display an amazing facility for handling IT and communications technology."

Involvement with ICT falls into two categories from a curriculum perspective. Clearly, there is the formal subject of ICT which can lead eventually to GCSE and higher qualifications: that is a well-trodden path through the classroom.

But there are more fundamental issues about simply understanding what ICT is all about and how it is used. "We would expect children to be familiar with technologies such as laptops, palm-held devices and internet access, so that they can make ICT a powerful vehicle for studying other subjects."

Office-style applications

Mick Waters believes that the basic toolkit of office-style applications fits in well with the use of computers from the early years upwards. "Children take word processing for granted and use it with ease. By Key Stage 2, spreadsheets are widely used as they provide a vehicle for the data which will be used in many different classroom subjects.

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Avoid over-reliance on ICT

The Director of Curriculum is keen to avoid an over-reliance on ICT, which critics would argue prevents the development of core skills such as mental arithmetic and problem solving. The key is to separate the abstract concepts from the processes and demonstrate that it is essential to master those mathematical skills. "It is all a question of balance. I am very positive about the role of ICT right across the school curriculum but it is important that children do not miss the real world and spend their day looking at screens. They would be missing the chance to see the beauty of the world in which they live."

It is comforting to know that the leader of the team setting the academic agenda has such traditional values.§