Two further articles in our series on primary science in different countries look at what is happening in Ireland

Learning how to use a fret saw safely

Primary science in Northern Ireland

PETER MCALISTER LOOKS AT HOW PRIMARY SCIENCE AND TECHNOLOGY ARE CHANGING

Since 1990 the science curriculum in Northern Ireland has gone through three major changes. In the beginning, fifteen attainment targets were introduced to an unsuspecting and largely unprepared teaching population: these were eventually reduced to five in 1993 and then to the present two in 1996. Unlike in England, technology has never stood as an entity independent of the science content. So the current Northern Ireland primary science and technology curriculum merges the two subjects into one programme of study, divided into two attainment targets: *Investigating and making in science and technology* (AT1) and *Knowledge and understanding of science and technology* (AT2). Ideally, work in the former should follow from study of the latter. The programmes of study must also promote the development of 'cross-curricular themes', common to other curricular areas, defined as: *Information technology*, *Health education*, *Education for mutual understanding* (EMU) and *Cultural heritage*.

Education for mutual understanding is a key constituent of the Northern Ireland curriculum. It was devised to encourage the two main communities to become aware of each other's culture and traditions and promote mutual tolerance, understanding and respect. In the context of science and technology, pupils should:

have opportunities to develop an understanding of themselves and others by exploring similarities and differences between themselves and other children and developing a sense of their own individuality.

Linking science to technology

The integration of technology into the programme is popular with Northern Irish teachers. It helps them deal with a subject area often viewed as difficult to teach because of large class sizes, problems with resourcing and teacher confidence and competences, all of which might have been exacerbated if technology had been given individual subject status.

Individual schools organise and merge the two elements in a variety of inventive ways, usually in bursts of practical activity lasting at least 90 minutes. In my own work in P5–P7 classrooms (8–11 year-olds), I promote and demonstrate the use of glue guns, fret saws, bench hooks, junior hacksaws and a variety of components including wood, straws, motors and wheels, all through team-teaching. Initial teacher concern about the wisdom of using such a collection of potential health and safety risks is overcome by the realisation, through observation and eventual participation, of the educational benefits the children gain from their efforts. There is also a pre-practical input with the class on

The children get down to work at their workstations

issues of health and safety and a demonstration of how to use the tools properly.

Classroom management considerations are also important. The children are assigned to one of four work stations, each containing a fret saw, glue gun and cotton gloves.

Bench hooks and hacksaws are distributed liberally throughout the rest of the room to relieve pressure on the main work areas. Three non-negotiable rules are also stressed, which, if transgressed, result in immediate dismissal from the 'workshop':

- work quietly and safely;
- work at your own workstation;
- stop when you are told to.

I have yet to exercise the power vested in me to 'sack' someone!

P5 children construct a balloon buggy, propelled by a balloon attached to an empty pen tube. In P6, they are exhorted to design and make a land yacht, again with wind as the energy source. This ties in with the curriculum history theme for this year group, 'The Vikings', as research into Viking art and symbols becomes an essential part of the design process.

In their last year, P7, children are challenged to complete a switch-operated buggy that incorporates a circuit and two pulley wheels in its propulsion unit. This three-year progression ensures that the participants also develop and hone important literacy and numeracy skills, including procedural and recount writing and measuring in centimetres and millimetres with increasing competence and accuracy. The practical context in which these skills are developed has meaning for those involved. The learning that takes place is considerably more embedded than if, for example, individuals were merely asked to measure a line in a maths book.

The impact of transfer tests

Of the three science and technology curriculum building-blocks (skills, knowledge and technology), knowledge is perhaps the most developed. This is reflected in the Education and Training Inspectorate (NI) observations that '*more specific guidance for teachers on the implementation of AT1 and more opportunities for practical work and oral discussion are required*' (ETI, 2003: 23). This comment is a reflection of the fact that the majority of P6 and P7 pupils are being prepared to sit the secondary transfer procedure tests (11+). Science, unlike maths and English, is not formally assessed at the end of each key stage in Northern Ireland, but the subject makes up almost one third of the transfer test paper. Children's achievements in the two one-hour tests will therefore influence their post-primary education opportunities; hence schools place great importance on the tests.

Many of the test questions on science require the children to have a sound knowledge of content, as it is seen as difficult to ascertain the extent of their skills development and technological abilities via two written papers. Exam pressure therefore skews the teaching of science in P6 and early P7 towards rote learning and practice-test-completion teaching strategies, which tend to displace the more practical approaches with pencil-and-paper exercises.

Attempts are now being made to include references to the process skills in the test questions. For example, children are asked to indicate, usually by multiple-choice selections, the variables required to ensure that a described activity is a 'fair test'. This does not, however, change the prevailing situation that mainly theoretical rather than practical science is being taught in a majority of classrooms in the penultimate primary year. An increasing number of parents are opting their children out of the test and at the time of writing it is due to be discontinued after 2008.

P6 children design and make land yachts

Future developments

We are now preparing for a revised curriculum that will merge science and technology into a new subject area called *The world around us*, the other building blocks of which are geography and history. The three strands at each of the two key stages are:

KS1: Me and my home, My school, My environment

KS2: The way we live, Movement, Our world.

The purpose of the changes is to reduce the content element of the statutory requirements to allow more time for teachers to concentrate on development of process skills. The reduction in content is intended to give teachers more opportunities to:

Select from within the content those aspects which they consider meet the needs of the children.

Follow their own interests and the interests of the children.

Integrate curriculum areas and make links across the curriculum. (CCEA, 2004: 19)

Primary science and technology has thus made considerable advances in the last 15 years in Northern Ireland. Whatever changes are achieved, the progress gained must be consolidated and the quality of science learning and teaching further enhanced to interest, enthuse and inspire a new generation of children.

Acknowledgement

The photographs were taken at a team-teaching session in a primary 6 class in St Mark's Primary School, Twinbrook, Dunmurry, nr Belfast.

References

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The future of primary science teaching in the Republic of Ireland

Children absorbed in their investigation at science club

RACHAEL GRANT DESCRIBES RECENT CHANGES AND PROVIDES ONE TEACHER'S VIEW ON THE WAY THEY ARE BEING TAKEN UP IN SCHOOLS

The new science curriculum in Ireland is promoting a more scientific culture in the primary phase. For many years, science teaching in the Republic of Ireland at primary level was little more than a comprehension exercise. However, with the introduction of the new curriculum in 1998, science education has changed radically, becoming a more investigative and structured subject. Whilst there are still weaknesses in primary science education in Ireland, such as the need for a more comprehensive resource base in all schools and for teachers to feel more confident in their planning and teaching, the future looks promising.