Resources for Technology Education in Scottish Primary Schools

Abstract
This paper describes a joint initiative by the Scottish Consultative Council on the Curriculum and the Nuffield Foundation to involve Scottish teachers in the development of materials to support technology in Scottish Primary Schools

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Technology in Scottish Schools

Technology Education in Scottish Schools[1] clarified the unique features of technology education as four inter-connected, mutually reliant and supportive aspects as follows.

> '*Technological perspective*
> This means a way of seeing and thinking about the world (past, present and future), of reflecting on the effects of human interaction with the environment and of thinking imaginatively about better ways of doing things.
>
> *Technological confidence*
> In essence, this means being able to live and work confidently and constructively in contemporary society. Technological confidence includes knowing and valuing one's potential for positive action…
>
> *Technological sensitivity*
> This means a caring and responsible disposition, a habit of mind which asks and reflects on questions about social, moral, aesthetic and environmental – as well as technical and economic – aspects of technological activity undertaken by oneself and others in a variety of contexts.
>
> *Technological creativity*
> This includes ability to design and/or make technological products of high quality or to modify existing products by selecting, organising and using available intellectual and material resources. It also means being able to evaluate, analyse, make thoughtful and imaginative decisions, give justification for actions and generally 'get things done'.'(1, pages 8–9)

This framework for technology education received widespread acclaim and support. It has helped to clarify what technology education is and what it seeks to achieve. But there is a significant mismatch between the intentions of technology education as described in the Statement of Position[1] and the achievements of teachers. A recent HMI report[2] notes that "the quality of attainment had some important weaknesses or was unsatisfactory in technology … in over 65% of schools." The same report also commented on significant gaps in the resources for technology education for use in schools.

The Statement of Position[1] described a pedagogical framework for the teaching of technology education. This consisted of:

- Creative Practical Tasks
  Large design and make challenges which pupils are to undertake.
- Proficiency Tasks
  Smaller knowledge, skill and attitudinal development tasks which contribute to pupils developing technological capability.
- Case Study Tasks
  Tasks which explore the broader societal and environmental implications of technological developments.
  (1, pages 11 and 12)

In surveying the work evolving in other countries it became clear that the Nuffield Foundation, through their Design and Technology Curriculum Project[3] were supporting and promoting a similar model of technology education to that being encouraged in Scotland. Specifically the Nuffield Foundation Curriculum project had developed and was promoting the adoption by primary school teachers a three stranded approach to teaching and learning. They use these terms:

- Big Tasks
  Equivalent to Creative Practical Tasks
- Small Tasks
  Equivalent to Proficiency Tasks
- Case Study Tasks

Contact between Scottish CCC and the Nuffield Foundation Design and Technology Curriculum Project has resulted in the development of a joint project which is described below.

Developing appropriate activities

Since late September 1998 teachers in over 20 primary schools have been working with Peter Edwards, the Project Officer, in developing and trialling appropriate activities. The schools are located in six Local Authorities across Scotland. They are Aberdeenshire, Glasgow City, Midlothian, North Lanarkshire, Renfrewshire and the Borders. Schools recruited reflect the socio-economic diversity, urban, suburban and rural locations and school size to be found generally across Scotland.

Teachers developing activities use a planning and reporting tool developed by the Project. This allows for a consistent approach to planning and reporting to be used throughout the project. The project officer provides first hand support. Support is available to project teachers through e-mail, fax and face-to-face

References

1 Scottish CCC (1996) Technology Education in Scottish Schools: A statement of position from the Scottish CCC, Scottish CCC, Dundee, Scotland

2 Her Majesty's Inspectors of Schools (1999) Standards and Quality in Scottish Schools 1995 to 1999, The Scottish Office, Edinburgh, Scotland

3 Details of the Nuffield Framework and the Nuffield Primary Design and technology Project in England and Wales can be obtained by contacting the Project at 28 Bedford Square, London WC1B 3EG, e-mail dbarlex@nuffield foundation.org or viewing the Project website

4 The Scottish Office Education Department (1993) Curriculum and Assessment in Scotland: National Guidelines, Environmental Studies 5-14, Scottish Office Education Department, Edinburgh, Scotland

5 Barlex D. and Mitra J. (1999) 'The Development of a Design and Technology Website for Primary Teachers', IDATER Conference Proceedings, Loughborough, England

6 The Nuffield Foundation Primary Design and Technology website can be found at http://www.nuffieldfound ation.org/PrimaryDandT

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sessions. The process developed includes the following.

- Induction of project school co-ordinators and teaching staff of the volunteer schools.
- Project schools identifying the curriculum focus for their technology education based upon their needs.
- Teachers produce a suggested scheme based upon their understanding of curriculum need, the Statement of Position1 and the Nuffield pedagogical framework[3].
- The project officer providing comment and suggestions to the teacher's outline curriculum plans.
- Teachers and the project officer meeting and undertaking a dialogue to develop curriculum plans into fully workable plans. These developed schemes include consideration of not only what to teach, but how it might be experienced by the pupils.
- Teachers use these fleshed out plans to identify and develop the teaching resources required.
- The teachers also identify the sections of the scheme in which they feel lacking in confidence or competence; this gives rise to the identification of staff development needs.
- Staff development support is provided by the field officer, this can and does take a variety of forms. Some teachers request and receive preparatory in-service training either on content or pedagogy. Others request and receive support during the teaching sessions. This normally takes the form of the teacher and field officer working together in the classroom with the pupils.

A timely resource

The outcomes of this process are evaluated by teaching staff and school co-ordinators. Evidence of what was planned, what actually happened and the teacher's reflections form the basis of what is reported. These reports are providing the tangible, tested evidence on which the script for the materials to be published is being written. The following materials will be produced as a pack for Scottish primary schools.

- A set of 20 creative practical tasks organised into four themes – things we eat, things we wear, things we play with and things that help us. There are tasks suitable for early years (P1–P3), middle years (P4 and P5) and upper years (P6 and P7). These tasks include the proficiency tasks necessary for children to be successful in their designing and making and provide a detailed description of how to teach the tasks on a lesson by lesson basis. They also include a description of how to adapt the task for older and younger children.
- A set of generic proficiency tasks that teach some of the strategies needed for success in technological creativity.
- A set of 12 case study tasks linked to the overall themes of the creative practical tasks.
- A Teacher's Guide describing how to make effective use of the activities in meeting the requirements of the Scottish technology curriculum.

The 5–14 Curriculum and Assessment Programme, National Guidelines[4] places technology education within the context of environmental studies stating:

> "The environment as it is reflected in these guidelines encompasses all social, physical and cultural conditions which influence, or have influenced, the lives of the individual and the community; and which shape, or have been shaped by, the actions, artefacts and institutions of successive generations. At a more immediate level, this definition includes everyday curricular experiences through which the pupils' knowledge of the environment develops." (4, page 1)

These Guidelines are currently being reviewed and the revised version will be published in June 2000. This will coincide with the availability of the Scottish CCC Nuffield Foundation Technology Education Pack for Scottish primary schools.

The dissemination and support strategy will use a variety of sequenced approaches including conferences, networks (both electronic and face-to-face), newsletters, forums, the use of ICT for e-mail, discussion and evidence gathering (a website[5,6] is already in use), the development of national associates who could act as advocates for technology education and the use of the published materials.

For further information about the Scottish CCC Nuffield Foundation Primary Technology Education Pack contact Scottish Technology Education Project (STEP) at Scottish Consultative Council on the Curriculum, Gardyne Road, Broughty Ferry, Dundee, DD5 1NY