

Technology in the primary school: the contribution of a cultural framework

This article focuses on the importance of a context for design and technology activity. It offers:

- a working definition of technology
- training for the practice of technology education
- the development of the project
- evaluation of the project
- some conclusions.

Bob Seberry

*Homerton College,
Cambridge*

In an article in the TES (20 October 1995) Richard Kimbell reminds us that "in primary schools, design and technology has made a ... recent appearance and in many schools did not exist before mandatory stipulations of the National Curriculum in 1990". He explores and explains some of the discontinuities between technology teaching in primary and in secondary schools, suggesting that technology teaching is very different at different key stages and is shaped more by assumptions about what children will be capable of learning at different ages than by the nature of the subject itself. So, for instance, technology at Key Stage 1 is characterised by an exclusively 'cultural' emphasis; Key Stage 2 is characterised by a 'problem solving' approach, and Key Stage 3 by a 'disciplinary' approach which emphasises knowledge and skills.

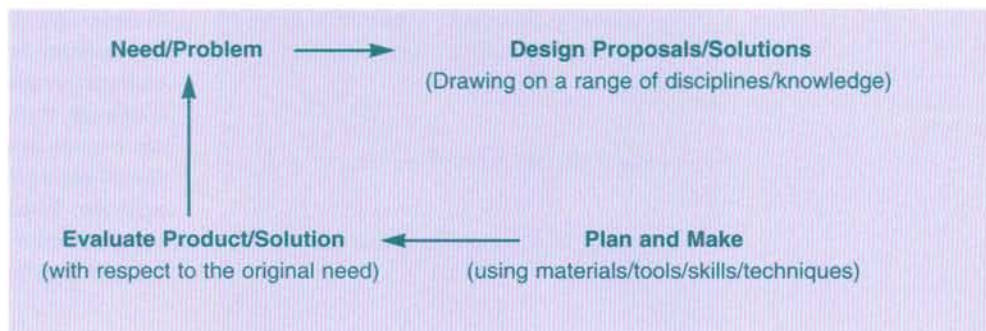
My own experience as a primary school technology tutor is that primary school teachers and students training to teach in primary schools are often uncertain about the nature of technology which some still associate vaguely with 'electronic equipment' and the frameworks of applied science. From a primary school perspective, I recognise Richard Kimbell's analysis of the discontinuities and have tried, in our own courses, to ensure that a more holistic conception of technology is introduced to student teachers and their primary teacher colleagues.

Technology: a 'working description'

For teachers and student teachers for whom technology represents a new and daunting challenge, it is important to communicate a clear sense of what technology is about and also to build confidence through practical activities. To this end I offer a straightforward 'working description' and opportunities for 'hands on' experience.

My working description of technology emphasises three key aspects:

- i) It is about meeting needs and/or solving practical problems.
 - ii) It is about people.
(Technology is an essentially human activity; as such it has an important subjective dimension. The 'needs' of different people may be effectively met in different ways and different 'problems' will have different 'acceptable' solutions depending on such things as the resources available, different people's way of viewing the world, their beliefs and values, etc.)
 - iii) It is about a process for devising an effective response to a perceived need – a strategy for working on and creating a solution to a given problem.
- (This process usually entails:
- a) a clear definition of the need or problem;
 - b) a design proposal in response to the need or problem;
 - c) an identification of a plan or sequence of practical steps for translating that design into reality;
 - d) the construction of an artefact or system;
 - e) a critical evaluation of the outcome in the light of the original need and in the light of any other practical and social conditions that might influence judgement).



The nature of technology education

The above 'working description' of the key components of technology may usefully be reformulated schematically to provide a paradigm for Technology education.

The diagram above represents the technology process in the form of a cycle which incorporates designing, making and evaluating. The process may draw upon and use knowledge and skills from a wide range of disciplines: language, maths., science etc. In some respects at least this is a pragmatic approach to delineating the nature of both technology and technology education. The great pedagogical value of this delineation lies in the fact that it is easy to communicate to both teacher trainees and practising teachers alike and furnishes them with a clear framework for planning teaching strategies and pupil activities aimed at developing children's learning and capability in technology attitudes, knowledge and skills.

Based on this view of technology the practice of technology education may be considered to be aimed at:

- i) developing children's confidence and competence in the attitudes, knowledge and skills involved in the different stages/parts of the technology cycle/process:
- ii) developing awareness, knowledge and understanding of the technology cycle/process as a whole.

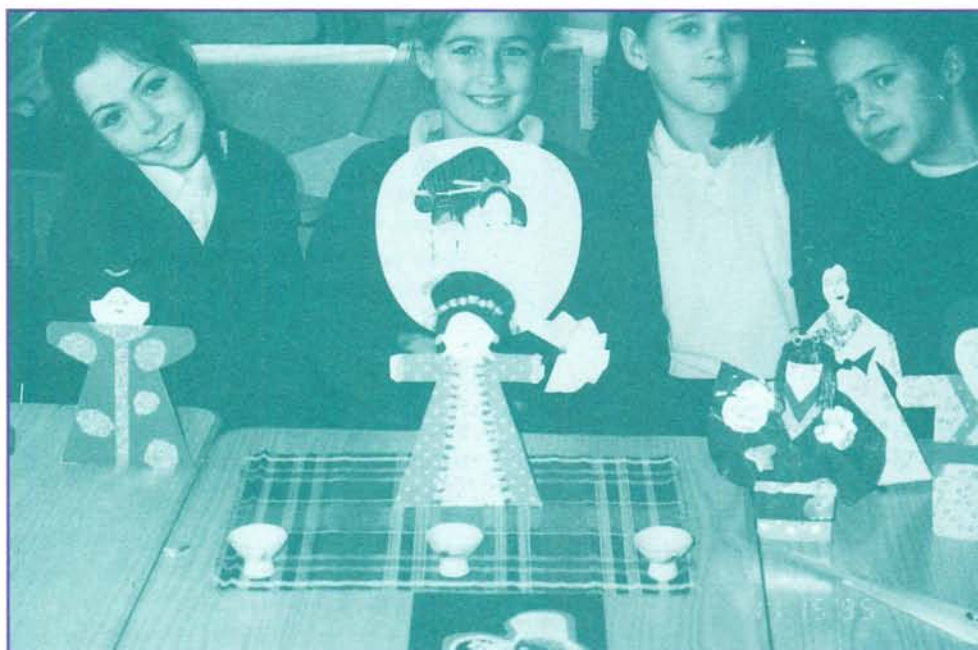
Training for the practice of technology education

Student teachers and primary teacher colleagues, at the start of our 'introducing

technology' course, carry out two complementary practical activities which build insight and confidence in the practice of technology education. The first focuses on one of the stages in the technology model. For example, the activity might involve a skill/techniques exercise corresponding to the making stage in the model. They might be asked to put five strips of card together in different ways in order to 'produce' 'up and down' and 'back and forwards' movements (useful in the construction of a number of different artefacts). The second activity entails working through the sequence of stages in relation to a simple task. For example, they might be asked to design, make and evaluate a 'pop-up' greetings card involving the mechanism learned in the first activity. While these tasks help students and teachers to understand the fundamental framework in which technology operates, undoubtedly their limitation is that the concept of need is underplayed: the task is 'given' and the principle of need is not demonstrated in any realistic and personalised way.

The importance of context

The use of a cultural context can go some way to helping communicate the driving force of 'need' – and it provides an important dimension of realism to work in technology. This in turn promotes better motivation for the course participants, whether teachers, student teachers, or pupils. Once a particular culture has been introduced it can sustain enthusiasm across technology sessions from week to week and help build a sense of coherence and continuity for the work. There is a basic appeal to curiosity: Why are particular artefacts made or systems developed in particular circumstances? What resources were selected and what resources were



Tina, Marie, Sue and Pat (Year 3, St Lawrence's Primary School, Cambridge) design and make dolls of Japanese women

available? Why were artefacts or systems developed in the way in which they were? What kinds of people were they who thought about things and did things in this way? Do the artefacts and systems reflect only a basic practical need or is there any evidence of belief systems and aesthetic values in the design and decoration? These questions may sound daunting but, as the curriculum constructed with the support of Jerome Bruner shows, primary school children are well able to tackle these issues at their own level. This curriculum – called *Man: a Course of Study* – focused on an Eskimo group whose culture was clearly dependent on a technology of snow and stone, skin and bone. By examining the conditions of the terrain, the migration through the seasons, the food sources available in different settings, the climate and belief systems, it is possible to see how 'need' in particular circumstances leads to practical and imaginative use of resources to cater for minimal survival in often severe conditions.

The Japanese context

The Eskimo culture is a distant culture, accessible only through film. More often, I choose to focus instead on the Japanese culture, largely because we have a number of Japanese students and visitors in the area and it has been possible therefore to build up a good collection of resources that students, teachers and pupils can see and

handle. In order to introduce something of the Japanese culture we have used a video tape showing Japanese festivals, ceremonies (the tea ceremony, for instance) and a wedding ceremony. The video tape also shows traditions (for instance, that of Noh drama) and features Japanese music. Japanese people are available at the session to answer questions either about the content of the video tape or about the exhibition of Japanese artefacts which provides a backdrop for the sessions. The display, importantly, includes artefacts made from a variety of materials (including kites, dolls, fans greeting cards, tatami mats, pottery, toys and garments e.g. a kimono). The second session provides a brief introduction to Japanese language (numbers, characters and calligraphy..). The students and teachers are usually very interested in looking at traditional Japanese motifs and seeing where and how those motifs are used on artefacts and what they might symbolise.

In subsequent sessions, students and teachers are introduced to a range of simple tools, techniques and skills appropriate to the different materials used in the different artefacts in the exhibition, and they then have to design and make a characteristically Japanese artefact using the resources available. The Japanese helpers, the video material and the display items serve as a source of design ideas. On completing their



Carp and girl in kimono doll made by Rachel (8)

artefact students and teachers are invited critically to evaluate their own product and performance.

The resources we make available – and the artefacts, often constructed – are these:

Paper and card

Bookmark, mask, lantern, kite, banner
(tools used: scissors, hole-punch, craft knife)

Wood

Kite, Banner, Sliding Panel (Shoji), folding screen
(tools used: saw, bench hook, file etc.)

Clay

Masks, tea bowls, family crest
(tools used: cheese wire and simple shaping tools)

Textiles

Banner, Happi Coat, Kimono/Yukata
(tools used; needle, fabric cutting scissors and pinking shears)

The course is structured not only to suggest something of the process of design in relation to need but also provides opportunities for language development and for enhanced cross-cultural understanding.

Additional opportunities for these broader aims to be realised are found in the next stage of the course which is an invitation to make a set of puppets based on a Japanese folk tale and to present the story as a puppet show. Students and teachers work in small groups, each selecting a simple story and producing puppets who will enact their story. The final presentations are recorded with a video camera and the playback is used as a means of evaluating not only the work itself but also the potential of this activity for work in the classroom with primary school pupils. Participants discuss what adaptations to the tasks, process and presentation might be needed in order to achieve work of similar quality in the primary school.

The final stage is for students and teachers to prepare a mini-technology topic for small groups of three or four children with whom they work in a series of afternoon sessions in one or more local schools. The conditions are that they introduce young people to the basic stages and purposes of technology, and that they plan their work with reference to the National Curriculum for Technology. They identify Japanese folk tales or festivals as a framework for the activity, they identify a range of activities that different groups might work on, and they suggest ways of monitoring and recording pupils' achievements. The activity must also culminate in some kind of presentation or display where children not involved in the activity from different years in the school can understand something of what the target pupils have achieved.

The development of the project

In the initial workshop sessions the course members' learning of cultural knowledge of Japanese culture and designing and making skills was greatly facilitated by the participation of Japanese people. Informal interchange and discussion between them and the teachers and students helped in general to inform, motivate and sustain their interest from one workshop to the next. Their work reached a high standard especially in relation to skills-based tasks such as these:

- i) drawing appropriate Japanese symbols and characters on paper and card panels used to design and make traditional style lanterns and fans.
- ii) making bowls in clay for use in the 'tea ceremony' and firing them in the traditional 'raku' (wood fire) fashion.

In a similar way, in the school based sessions the pupils were engaged and their interest was sustained by the cultural context of the work: video material was used to give examples of Japanese folk tales being told and also festivals and puppet theatre. Teachers and trainee teachers worked with small groups (3/4) of children preparing them for design work by teaching them simple Japanese symbols and calligraphic characters. Following this the children were set the task of designing and making culturally 'authentic' fans, masks and screens using paper and card.

In the final phase of the project the children were shown how to make puppet bodies from paper, card and textiles and puppet heads using 'modroc' – a bandage type material impregnated with plaster of Paris. The children (Year 6) heard a traditional Japanese story and were given task of designing and making a set of puppets to be used in a presentation of the story to a group of younger children (Years 1 and 2). The very attractive set of puppets, in Japanese dress, included both glove and rod puppets. These were used enthusiastically by their creators who presented a very lively show to an enthralled audience of 5 and 6 year olds.



Benefits – course members

Course members were very clear about the benefits of this experience. At the end of the school based sessions the course tutor, the class teachers and the student teachers had a debriefing session during which all gave their reactions to the experience.

- Student teachers thought it was an excellent and informative experience to work with a small group (3/4) on clear and engaging tasks.

Learning basic Kanji characters

Trainee teachers
James and Sarah
practise design skills
using paper and card
by making a Sumo
wrestler



- They said it gave them confidence to develop technology based activities.
- They liked working with the same small group each week so that they could see their competence and understanding develop.
- They also said that it was easy to work out what materials they would need to make the artefact when working with small numbers of children.
- But they thought it would not be so easy to do this with a whole class of pupils (an anxiety echoed by teachers).
- They also commented that using craft knives scissors , hot glue guns, pieces of fabric, paint, PVA, modroc etc. on a carpeted floor with forty people in a room that is built for under thirty would present problems!

Some conclusions

Overall, the interest and motivation of teachers, trainee students and pupils was captured and held by working on a task set in a novel context, where the culturally different traditions and customs were communicated by the stories, through video and through personal accounts of the Japanese visitors. In particular the learning of technology skills and construction techniques is greatly facilitated by this approach to teaching technology because it helps to give more meaning and sense to what is being learned.

However, this approach to teaching technology requires careful planning and a considerable investment of time, both in the planning stage and during the teaching/learning phases of the work. Time is need for collecting and choosing suitably informative and interesting resources such as photographs, posters, video materials and examples of ethnic artefacts such as fans, masks, lanterns. In the classroom phase it is important to leave time for setting the cultural scene/context, practising

Benefits – pupils

- Class teachers thought their pupils gained a better awareness of safety and the basic 'making skills' (such as the use of a saw) through working in small groups, each with an adult (i.e. student teacher) present.
- They felt that all pupils – even those with poor motor skills – managed to design and make a good model which was strong, well finished and of which the children could justifiably feel proud.

designing skills (sketching and making annotated drawings) acquiring/practising making skills/techniques, e.g. sawing. Where student teachers neglected any of these points then their pupils responded less well to the tasks they were given and produced artefacts of an inferior quality. The sense of ownership and pride in the artefact made was an important factor for all who engaged in the technology activities, irrespective of whether they were teachers student teachers or pupils. Having a 'real' purpose for the artefacts made was also important. Thus the designing and making of the puppets was given impetus by the pupils' awareness that they were to be used in the presentation of a puppet show in a school assembly for younger children.

References

Kimbell, R (1995) 'Uncertain crossing', *Times Educational Supplement*, October 20

Resources

Tredidgo, J (1991) 'Japan – A resource Pack for Primary Teachers' (Teachers' guide, photographs, pupil activities etc. Publisher: The Japan Festival Education Trust. Price: £9.50)

Videos

The videos used in the project reported in this article are listed below. These are available on free loan from the Japan Information and Cultural Centre, Embassy of Japan, 101-104 Piccadilly, London W1 9FN, TEL 0171-4919634. The JICC catalogue reference numbers are given in brackets after the video title.

Fairy Tales (F1)

Toy making in Japan (B10)

Kimono and the Japanese (B15)

A Calendar of Children's Events (C1)

The Classic Theatres (C10)

Fine Ceramics (F10)

'Buraku style' puppet made by class teacher on INSET technology course linked to Japanese culture

