Craft Design Technology in the Primary School: Let's Keep it Primary*

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What's in a name?

The obvious answer must be that it depends on the name! Take 'Craft Design Technology'. Among teachers this title conjures up a wide range of impressions . . . and prejudices. Now link 'CDT' with primary education — particularly across the Infant years — and you will certainly provoke from primary teachers some interesting responses.

Many teachers will state that they do not know what CDT really means. They will point out, however, that CDT 'sounds' very secondary . . . very male-orientated; that it must be a highly specialist subject that requires extensive, 'hi-tech' resources.

Some teachers will welcome the practical nature of CDT with its emphasis upon learning through direct experience. Yet, they have considerable reservations about their competence to manage the 'teaching' requirements of CDT. Furthermore, they may feel wary of committing themselves and their children to a 'subject' that appears to lack a clear structure and well-marked routes of progression.

Nor surprisingly, there are teachers who have been encouraging CDT-style activities with their children, but who have been completely unaware that they were 'doing' CDT!

The most immediate response to these comments must be that many teachers have difficulty in reconciling their impressions of CDT with everyday experience of primary education.

So where does this semantic investigation lead? Two basic conclusions emerge:

(a) the title 'CDT' must be recognised as a very heavily-charged term that can cause a great deal of confusion and prejudice among teachers — to the disadvantage of children;
(b) there is an urgent need to offer primary teachers a 'working definition' of CDT-style activities as a necessary prelude to promoting primary CDT.

What is CDT?

Most teachers would initially assume that CDT is a subject, or an amalgam of subjects based, for instance, upon craft and science. The essence of CDT, however, does not lie in any specific combination of subjects. CDT is an approach to learning. It represents a commitment to the value for children of learning through genuine problem-solving experience.

CDT in action reflects the general characteristics of any problem-solving activity, eg a realistic situation in which children recognise a need and identify a problem, the application of a range of problem-solving strategies set within a 'team context', and the evaluation of a 'solution'. Yet, CDT introduces a distinctive element into this experience for the children through the intensely practical and 'immediate' nature of the problem and possible solutions: children use simple materials, tools and equipment to produce their solutions. The moving force behind CDT is, however, the conviction that, when sensitively guided by the teacher, problem-solving engages children in highly relevant learning experiences: experiences that have an enabling influence upon the intellectual, practical, personal and social development of children.

There can be little doubt that the principles underlying CDT are in full sympathy with the major aims and objectives of primary education. Yet, the move from principles into practice is not so straightforward. The basic challenge at primary level lies in the promotion of a genuinely primary orientation to CDT-style activities.

This challenge breaks down into at least five basic requirements:

(a) Primary CDT must evolve from a foundation of 'good' primary practice. It cannot, and must not, take root as a secondary transplant. If it is a valid form of problem-solving experience at primary level, it must have direct relevant across the full primary age and ability range — and, in addition, carry no taint of male bias. Consequently, the development of primary CDT should not be allowed to be dominated and moulded by impressions of secondary practice. (This does not deny the urgent need for thorough liaison between primary and secondary CDT).
(b) CDT-style activities must be manageable for the 'generalist' teacher.
(c) The activities themselves must be capable of accomodation within the general-purpose classroom.
(d) CDT-style activities must not be dependent upon specialist or 'hi-tech' resources.
(e) Appropriate INSET provision must be made to help teachers develop greater awareness, confidence and competence in respect of CDT.

These requirements raise complex issues, but this article, however, focuses upon some of those connected with the first four points.

First of all, back to semantics! The term, 'Craft Design Technology', is not particularly teacher-friendly. It lacks primary appeal. This dissatisfaction with 'CDT' is not new. Other titles have been proposed. Probably the most effective alternative is quite simply, 'Designing and Making'.

As a title, 'Designing and Making' has distinct merits:

— It 'sounds' primary. It has no secondary or specialist overtones. It avoids any obvious pressure for 'hi-tech' activities. It is reasonably gender-neutral.
— The leading word, 'Designing', stresses the thinking or problem-solving character of the experience for children. Moreover, it links the 'Making' directly with problem-solving as the means of expressing the solution.
— 'Making' underlines the practical, physical nature of this activity. The simplicty of the term, 'Making', is particularly fortunate since it relates very easily to the resources, activities and general scenario in primary classrooms, from Nursery and Reception through to Top Junior.

From this point onwards, 'Designing and Making' will be used in preference to 'CDT'.

How does this view of Designing and Making fit in with the realities of teaching?

> 'We go to be talked to by unbelievably enthusiastic and terribly articulate specialists, freed from classroom concerns, and let loose on a giant ego-trip. By the experts, for the experts, with little relevance when you attempt to translate their stimulating ideas into the classroom and integrate

them with everything else you're trying to do'.[1]

With classroom reality clearly in mind, two basic guidelines can be recommended for the promotion of Designing and Making:

(a) it cannot be justifiably forced by unimaginative planning or rigid timetabling into a weekly 'slot'; and
(b) it must be set in a context that gives children the opportunity to involve themselves in real-problem solving.

This perspective reinforces the earlier claim that Designing and Making should not stand as a subject, but should be applied as an approach to learning — an approach that can in principle be integrated with most, if not all major aspects of the planned curriculum. In practice, however, projects and topics prove the most fertile and appropriate context for Designing and Making.

Why topics and projects?

Many teachers would offer the following types of comment in support of the general educational value of topics and projects:

— Topics and projects are a means of promoting more realistic and integrated learning experiences for children. They usually involve a direct, 'practical' base of experience for children set within a multi-disciplinary approach to an overall theme.
— The typically broad 'umbrella' themes for topics and projects readily encourage children to contribute their personal interests and insights to the development of themes. This motivational element considerably strengthens the impact of the work upon children's experience and learning.

In terms of Designing and Making, the topic and project setting offers four advantages:

1. The outline themes devised by the teacher usually offer a rich source of starting points for problem-solving through Designing and Making. Of equal importance, however, is the manner in which children's interests and contributions to those themes can readily expose starting points. As a result, the teacher is not continually faced with the need to contrive pre-set problems for Designing and Making. The children-teacher dialogue helps the teacher to avoid the dangers of teacher-imposition and contrivance — dangers that could effectively trivialise Designing and Making.
2. Topics and projects usually involve a strong element of individual and small-group activities. This small-group focus is particularly suited to Designing and Making. It creates a 'team setting' in which problem-solving can develop. A team not only provides a source of inspiration and feasible proposals. It can also undertake real responsibility for the direction and quality of the Designing and Making. In this sense, individual responsibilities can evolve against a background of co-operation and mutual support.

The small-group base greatly facilitates the organisation and management of Designing and Making within a classroom. Under this system, teachers can easily organise Designing and Making as one of the several small-group activities that evolve during the topic or project. (Designing and Making is not restricted to one particular group for the duration of a topic. As the work progresses, new groups will form. Typically these groups will consist of a maximum of six to eight children at any one time). This tactic shifts the focus of

resourcing Designing and Making from the potentially overwhelming demands of an entire class to the much more modest and realisable requirements of a small group. Thus, the small-group organisation typical of topic and project work assists Designing and Making to become a realistic proposition for the classteacher.

3. The organisation of topics and projects is generally quite liberal and flexible in the use of time. This is particularly significant for Designing and Making since problem-solving activities do not readily lend themselves to strict, pre-set allocations of time. In contrast, they require time to be used by the teacher as an 'adjustable' resource to support the continuity of children's work. In this respect, topics and projects form a very appropriate setting for Designing and Making.
4. Topics and projects form part of the programmes of work devised by the majority of classteachers. Therefore, in terms of current practice, the curriculum setting for Designing and Making is already very familiar and well established. The promotion of Designing and Making does not require teachers to introduce a new subject into their schemes of work. What is sought is a subtle shift of emphasis in the nature of the children's experience[2] — a move towards a more child-centred approach, the development of problem-solving and the recognition of the educational value of practical activity. Hopefully, the fact that the introduction of Designing and Making is a matter of integration and consolidation of 'good' practice could contribute to its more widespread adoption by primary teachers.

Making A Start

If topics and projects form the appropriate setting for primary Designing and Making, how can a teacher actually 'start' Designing and Making? There are four preliminary points:

1. It would be wrong to assume that every topic and project should necessarily contain a Designing and Making element. In fact, when one reflects upon the range of planned curricular inputs relevant to topics or projects, one is faced with the obvious need for careful selection and management of inputs in the interests of a well-balanced programme for children throughout their primary years.
2. It is vital to view Designing and Making as a process of problem-solving — not craft! The experience for children of Designing and Making from the initial awareness of a need, through to the production of a refined solution is arguably more important than the product itself.
3. Real problem-solving cannot be conveniently packaged within work-cards or design briefs. Logically there needs to be a problem-context in which children recognise a need before problem-solving can proceed. Typically, work cards and design briefs lead to a highly simplistic and mechanical experience of problem-solving in which both the problem and the solution have been predetermined.
4. It is important for the teacher to clarify her/his intentions underlying the introduction of Designing and Making. It is not sufficient to launch into this type of work in the hope of vague outcomes! This in turn implies that any planning decisions taken by the teacher must be based firmly upon a knowledge of the children concerned, and her/his general aims and objectives over the school year.

There seems to be three distinctive types of teacher-approach to initiating Designing and Making:

(a) The teacher plans in outline a topic or project. From her/his knowledge of the class and the particular topic theme, she/he devises a specific Designing and Making assignment for the topic. For instance, for the general topic of 'Transport', the teacher may decide to set as the assignment 'Designing and make a model land vehicle that is powered by a rubber band'. Since the Designing and Making activity is based upon a clearly stated assignment, the teacher can thoroughly research and resource the activity. This feeling of being in control of the activity makes this approach very acceptable with teachers who are 'new' to Designing and Making.

Beneath this apparent convenience, organisation and control lies the danger of an over-prescriptive view of what problem(s) a given theme will present to children. This approach runs the risk of trivialising the experience of problem-solving for children since it tends to ignore the context for problem-solving and present a semi-formed solution. For this reason, this article includes little reference to topic or project themes and related Designing and Making 'problems'.

(b) As experience and confidence develop, teachers recognise the limited scope for children's problem-solving inherent in the previous approach. Similarly, they appreciate more clearly the range and diversity of problems that topics and projects can generate. Therefore, when planning a topic they tend to forecast a number of problems that could be expected to emerge without narrow prescription or contrivance. This forecast offers a pool of probabilities that helps the teacher to prepare for a potential range of resourcing and organisation requirements. As the topic unfolds, she/he is then able to support a variety of Designing and Making proposals from the children.

For example, in a project on 'Shops', one predictable focus of interest might be the packaging of goods. Another focus of interest could be advertising and the promotion of products. During the topic, some children may elect to design and make carrier bags and cartons for products of their choice. Other children may decide to design and make promotional packaging and wrapping material, adverts or display 'gimmics'. In this case, the teacher would be prepared for these and similar choices as a result of her/his forecast.

This approach is clearly more sophisticated than the former. Its

particular merit is that it encourages a more genuine and comprehensive exerience of problem-solving for children.

(c) The third approach is not so much a matter of planning as an attitude on the part of the teacher. In this case, the teacher may have certain preconceptions about the range of Designing and Making opportunities that a certain theme will present. However, she/he carefully avoids predetermining the nature and outcomes of any Designing and Making. It is a 'wait and see' situation where the teacher tries to capitalise upon the children's responses to the theme.

For instance, in a Maths project on 'Time', some children became very involved in practical 'timing' experiments. They decided to make their own timers for a specific purpose. The teacher did not set or contrive this problem, nor could she forecast that this particular need would arise. It was really a question of the teacher meeting the children's request.

Similarly, work in a school garden 'patch' led to some unsuspected Designing and Making. A Reception class had been planting seedlings. After a time, the plot looked decidedly disorganised and many seedlings were in danger of being trampled. Some of the children noticed this. They also pointed out that they were no longer sure of where the rows of seedlings were, or who had planted each row. They wanted some form of marker system. This need led very naturally to the children investigating the problem, and designing and making their own markers for use in the school garden.

The important feature of these three approaches is not simply their differences, but the progression they represent in a teacher's confidence and understanding. There seems little point in describing and recommending a theoretically ideal approach if it requires an unrealistic level of initial teacher condfidence and experience. The preceding descriptions may act as route markers for teachers to work out their own tactics. The most influential factor

in this process is not a teacher's 'technical' knowledge or expertise. It is a teacher's appreciation of what constitutes problem-solving, and her/his confidence and ability to encourage children in this type of experience.

This comment relates directly to the very common observation from primary teachers that, because they tend to lack a 'technical' background, they feel unable to help children in Designing and Making. In answer to this, I have consistently placed the teacher firmly in the role of managing learning through problem-solving. Teacher-success in Designing and Making does not depend upon technical expertise so much as upon those fundamental professional qualities that apply across the curriculum.

There is a certain amount of craft and technological experience that teachers will come to need to support Designing and Making. Obviously, a measure of teacher intervention and 'teaching' is required. But very often teachers over-estimate this particular requirement. For instance, many teachers express deep concern about teaching craft techniques. Provided the teacher is not trying to force upon primary children secondary techniques, tools and materials, then the craft element is far less demanding than one might initially assume.[3] The same observation holds true for technology since at primary level the focus is upon practical experience and using 'common sense' to make things work.[4] Certainly, experience shows that INSET courses can usually provide this 'technical' input with relative ease.

Many teachers also feel that Designing and Making can only be started after a foundation of thorough craft teaching and techniques has been established. Obviously, craft techniques do need some teaching input if children are to apply them effectively and safely. However, technique teaching is best provided when children appreciate the need for a particular technique. Therefore, in Designing and Making techniques tend to be taught as the need arises through the children's work — not in isolation. This 'needs' approach is highly realistic when one remembers

that at any one point the teacher is concerned with a maximum of 6-8 designers and makers in a group setting.

Resources

Resources were mentioned vaguely during the description of possible approaches to initiating Designing and Making. As with 'craft teaching', the issue of 'resources' is extremely important but capable of producing a false impression of Designing and Making.

Teachers tend to assume that resources for Designing and Making must involve predominantly tools, craft materials and science or technology equipment. Similarly, they assume that these resources must be rather 'specialist' — at the very least, not usually found in primary school.

This impression is quite false. The commonly available range of primary resources like 'found' materials, basic tools and science equipment can support the vast majority of Designing and Making activities. But before giving any details of particular resources, certain more general comments need to be made.

There are two very important resourcing issues that tend to be overlooked and can subsequently hold back the development of Designing and Making throughout a school:

- Designing and Making requires a considerable range of reference-type resources to initiate and support investigation, research and planning. Whether at Reception or Upper Junior level, children need appropriate resources to make informed decisions throughout their problem-solving. Therefore, specific provision must be made for this aspect of resources. A general outline of resources is presented in the Appendix.
- As emphasised above, Designing and Making involves resource-based learning. Consequently, children must be able to access independently the vast majority of the relevant resources. This implies that the school's resources should be organised and managed with this need in mind. Resourcing for Designing and Making cannot be viewed simply as the development of a wide range of resources. It requires a school policy and system to facilitate 'open access' by children to resources not held within classrooms. It also calls for the creation of a highly portable or mobile resource facility that can be used conveniently within each classroom.

A mobile or portable storage system for basic tools, materials and equipment is vital if Designing and Making is to be accommodated efficiently within each classroom. Many schools base their facility around a light-weight, purpose-built carrying case or trolley. Trolleys have the additional advantage of extra carrying capacity for materials and equipment. In addition to mobility of basic constructional resources, trolleys and carrying cases ensure that resources can be organised, presented and cared for in a professional manner. This not only aids the efficient management of resources, but also has an influence upon children's attitudes to the work.

Some schools complement the trolley or carrying case system with a set of very light-weight drop-over tops that instantly covert a table or desk into an attractive activity-area for Designing and Making. As with the constructional resources, these tops can be easily moved from classroom to classroom.

Classroom Management and Organisation

It is a statement of the obvious that Designing and Making activities will often require thoughtful management and organisation of the classroom. Basically, the need for a specific organisation occurs when a Designing and Making group has progressed from initial research and planning to the point when it wants to construct prototypes of solutions and, subsequently, a finalised version of the solution.

At this point the group needs an area that will support a range of 'research and development' and constructional activities. For instance, children may want to construct with card, 'found' objects or wood. They may decide to set up Lego models to test out designs. They may need to experiment with, for example, lighting circuits. In other words, the group needs an activity-area that remains relatively undisturbed by the ebb and flow of classroom life.

One immediate answer might be to let the children work outside the classroom. Apart from general safety conditions, that tactic is educationally unsound. For instance, it segregates Designing and Making from the apparently mainstream classroom activities. It prevents other children in the class from sharing the experiences of a Designing and Making group. It makes sensitive teacher guidance extremely difficult. Finally, it may even discourage or prevent some teachers from attempting to involve Designing and Making in their schemes of work. Despite individual differences, teachers' solutions to this accommodation challenge share the following characteristics:

- The Designing and Making activity-area is set up in a part of the classroom that is outside the major thoroughfares used by children. (It would be unwise, however, to confine Designing and Making within a corner since a corner position can pose problems for long-range teacher supervision).
- The activity-area is formed from ordinary classroom desks or tables — equipped ideally with drop-over tops.
- The area is kept clear of 'obstacles', eg sandwich boxes, sports bags, musical instrument cases, etc.
- There is a high level of natural and artificial lighting in the area.
- The area allows children easy access to resources, eg trolley or carrying case, craft materials or reference-type materials.
- It has display facilities that the children can use as an 'open' folder for the work under development. This feature — involving real, not exhibition work — can be particularly influential since it provides a direct means of sharing information and experience throughout the class.

When one considers the portable or mobile resource facility that underpins this approach, then the temporary re-organisation of a classroom proves very simple and convenient.

Conclusions

The review of classroom management and organisation marks a convenient 'breaking-off' point for this discussion. So what have I tried to achieve?

I set out to sketch in broad outline one model for a curricular starting point for primary Designing and Making, and raised some immediate, practical issues

that influence any attempt to introduce Designing and Making. I have not looked much beyond the opening move of a Designing and Making initiative within a school. For instance, there has been insufficient space to explore issues of more long-term consequence such as:

- progression and continuity with Designing and Making, across the nursery-primary phase and onwards throughout the secondary phase.
- sex stereotyping and bias in Designing and Making.
- professional development needs of teachers in relation to Designing and Making.

I have, in particular, discouraged the packaging of Designing and Making in terms of topic or project themes and 'instant' Designing and Making assignments.

I have, however, presented, one very important and optimistic message: that Designing and Making is very much in sympathy with the aims and objectives of good primary practice, and can be highly relevant in the general education of primary children.

The implication in this message is that it is the particular responsibility of primary teachers, headteachers and advisers to ensure that Designing and Making is firmly and consistently rooted in 'good' primary practice. Undoubtedly, much of the spirit of Designing and Making already exists and flourishes in primary classrooms. The development of Designing and Making requires a sensitive extension and expansion of this 'good' practice. This is a pioneering challenge. Designing and Making offers an exciting dimension to the primary curriculum. We need the conviction and confidence to realise that potential.

References

1. Sandford, P. (1986), 'The hills were alive', TES. 4. 7.
2. Williams, P.H.M. (1985), *Teaching Craft Design and Technology 5-13.* Croom Helm.
3. Williams, P. and Jinks, D. (1985), *Design and Technology 5-12.* (Ch. 7). Falmer Press.
4. DES (1985), *The Curriculum from 5-16.* HMSO para 87.

Appendix: Resources for Designing and Making

The following lists present an outline guide to the range of resources required for Designing and Making. No information has been given concerning recommended suppliers since LEAs usually have their own specific arrangements in this respect.

Reference-Type Resources

Books Magazines Leaflets Brochures
Posters Pictures Slides Filmstrips Videos
Cassettes/Recordings of Radio Programmes
Toys Mechanical Artefacts
Constructional/Technology Kits, eg Lego, Capsela, Meccano, Fischer-technik
Natural and 'found' objects
Constructional Resources

'Found' Materials:

Matchboxes	Cardboard	Plastic
Soft Drink Cans	Boxes and	Bottles &
Cardboard Discs	Tubes	Containers
Wire Coathangers	'45' Records	Coffee-jar lids
Beads	Rubber Bands	String
PVC Tubing	Wood Shavings	
(narrow diameter)	and Sawdust	Fabrics
	Wool	
	Balloons	

Wood

Softwood cut-offs — planed all-round and in a variety of cross-sectional dimensions up to 25mm x 10mm. The most useful size is 10 x 10 mm.
Dowel, eg diameters 3mm and 4.5 mm
Balsa
Jelutong is an ideal wood for young children. It is worth buying one of the special 'primary' packs that a number of the major suppliers offer. These packs are particularly useful since their contents have been adjusted to suit the general requirements of primary Designing and Making. For further information about wood, especially Jelutong, please contact your local CDT Adviser.

Plastics

For most activities, 'found' plastics materials will prove very suitable.

Metal

There is often a need for short strips of thin aluminium (18 or 20 gauge). For safety reasons, tinplate should not be used.

Card

The value of card as a constructional material is easily overlooked because it seems so 'ordinary'. It has, however, many advantages for young children. Therefore, it is worth developing stocks of different thickness, colour and quality of card.

Adhesives

PVA glue and Balsa Cement
Pritt

Fasteners

Sellotape Masking Paper Clips Paper
Drawing Tape Blue-Tak Fasteners
Pins Stapler
To a very limited extent, panel pins, screws, nuts, bolts and washers.

Finishes

The general range of 'finishes' used in Art and Craft activities will be very relevant for Designing and Making.

Tools

Safety Rules
Scissors and Craft Knives
Junior Hacksaws or Mini Hacksaws (with spare blades)
Hammers (Warrington 6oz)
Hand Drill and Twist Drill Set
Small Screwdriver (75 mm)
Electrical Screwdriver
Wire Stripper
Centre Punch
Hole Punch
Clamp-on Vices
Bench-hooks (primary sizes)
Drop-over Table or Desk Tops
Glasspaper (various grades)
Reminder: Tools housed in a carrying case or trolley.

'Technology' Resources

Technology/Constructional Kits — See reference type resources for details.
Electrical Components — general primary science resources such as insulated connecting wire; crocodile clips; batteries; bulbs; bulb holders; switches; electric motors; bells; buzzers.
Mechanical Components — wheels from broken toys; cardboard, plastic or wooden discs; gear wheels and pulleys; propellers; rubber bands.

No Comment

Once a week, we all attempt craft design technology homework. This is an extraordinary performance because the CDT teacher believes parents should conduct the design and building of various complex machines which are then exhibited on open day as children's work. I repress feelings of bitterness as my embarrassed husband struggles to create a machine that will travel three feet (powered by what?) along a string suspended between two poles.

From Homework is Hell, *Education Guardian,* 28.4.87.