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Craft Design and Technology in Primary Schools

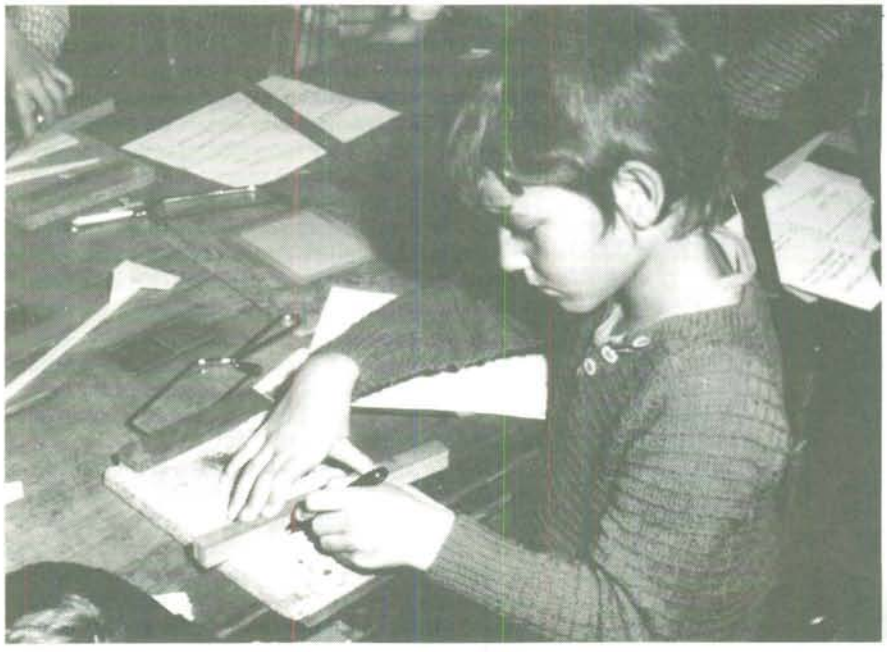
Craft, Design and Technology, with its problem-solving base is now well established in secondary schools and the recent DES statement on the organisation and content of the 5-16 curriculum has clearly set the Government's seal of approval on this aspect of the secondary curriculum.

However, it is important to note that the document also places a strong emphasis on children making an early start in CDT type experiences by providing them right from the infant stage of the primary phase of education.

The mere existence, let alone the far-reaching implications of such a statement may surprise both traditionally minded secondary CDT teachers — *'Young kids can't handle tools, let alone design'*, and some primary teachers for whom *'science'* and *'using tools and materials'* have frightening connotations. Despite reactions of this kind, there are at least two crucial issues which must be faced when seriously considering this question.

Firstly, our pupils, whatever their age, are growing up in a very sophisticated and highly technologically orientated society which has already and will increasingly bear heavily upon their future in terms of both career and leisure. For this reason we must begin to prepare them at least to cope with and hopefully to exercise some measure of control over their environment. Such preparation cannot begin at too early an age nor be implemented too soon. Secondly, numerous reports have expressed concern over the rather passive nature of the educational system. Many primary headteachers and their staffs are actively seeking ways of developing a more meaningful and practical curriculum, reference the DES *'Primary Survey'*, 1978, the DES *'Education 5-9 Survey'* of 1982 and the DES *'Science in Primary Schools'* discussion paper, 1983.

Below:
Only a few basic tools and very simple craft skills are required for primary C.D.T. activities.



The Standing Conference for Schools Science and Technology is actively supporting national conferences in Primary Science and Technology and the Design Council, with Department of Trade and Industry funding, is now becoming involved in primary school Design based work.

CDT type activities have a positive role to play in meeting major curricular demands at primary just as much as at secondary level, but the essential difference betwen the two is not one of principle but of delivery. We should not seek to see CDT on the primary school timetable. That in any case would be rejected for a variety of very sound reasons. Instead, experience over a number of years in this Authority suggests that CDT activities should be built into the Topic area of the primary school curriculum. By this means the essential practical problem solving core of CDT philosophy and practice, together with its technological and constructional components, can both infect and affect what happens in primary topic work. Indeed, in varying ways and to varying degrees it can affect the other major areas of primary school activity too.

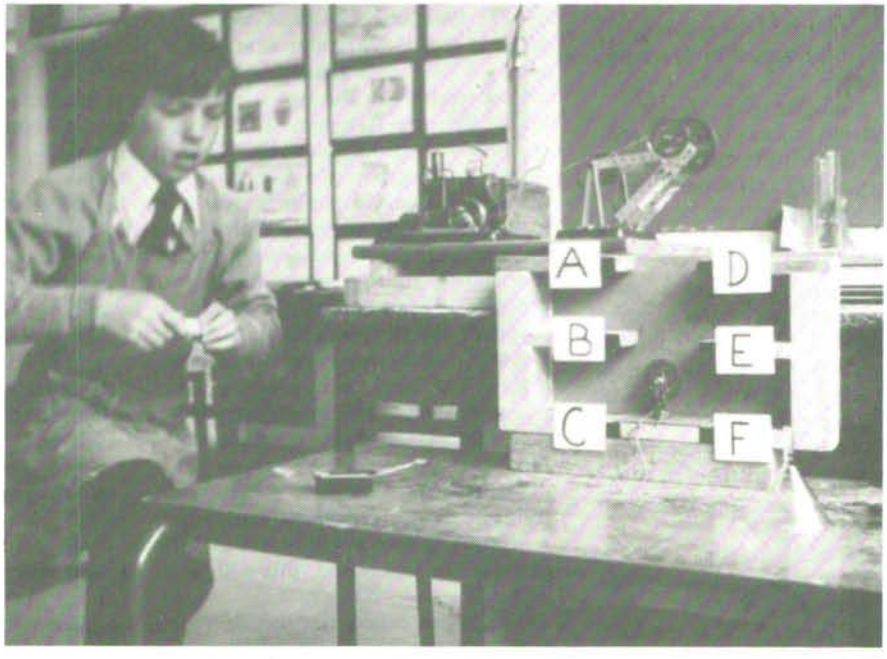
Quite a few minds are presently being exercised in trying to find a universally acceptable title for such a primary school version of CDT. Being process and not content based, this will prove somewhat difficult!

Classroom experience has demonstrated quite clearly that mathemtical experience, as provided by CDT activities, offers opportunities for realistic application of mathematical concepts too often lacking in the traditional approach. Much has been written on the need to help young children towards an awareness of basic science concepts and scientific method. Too often attempts to introduce elements of science into the primary curriculum have failed at least in part because of the somewhat abstract nature of the purposes of the experimental procedures and experiments provided. Greater excitement, increased motivation and involvement have been evidenced where such scientific concepts and methods have been introduced to young children through the medium of attempting to solve real physical problems through CDT, rather than to obtain satisfactory *'results'* to set experiments. Pupils' language and communication skills in general are stimulated and purposefully practised because of the need for communication brought about by involvement in CDT activity. Vocabulary is extended, small group discussion enhanced, accurate reporting and instruction-writing and reading become essential in the reality of the CDT situation as perceived by the boys and girls involved. Small group work which often appears on the primary programme, but is much less often practised in reality, becomes effective when pupils

Top left:
Experimenting with a D.I.Y. shoe-box 'Dark Room' to discover which colours are most easily seen at night. An extension of the bicycle topic.

Middle left:
A model lift system — and it works.

Bottom left:
Small group activity — right from the investigational stage.



work in team approaches to CDT type problems. Here the contributions of several pupils are needed to complete the task satisfactorily. Again small group work of this nature provides valuable opportunities and stimulus for consultative and constructive talk as well as the more obvious collective effort needed to produce a practical 'made' solution to the problem in hand. Thus social education and personal development go hand in hand with the development of intellectual and physical skills.

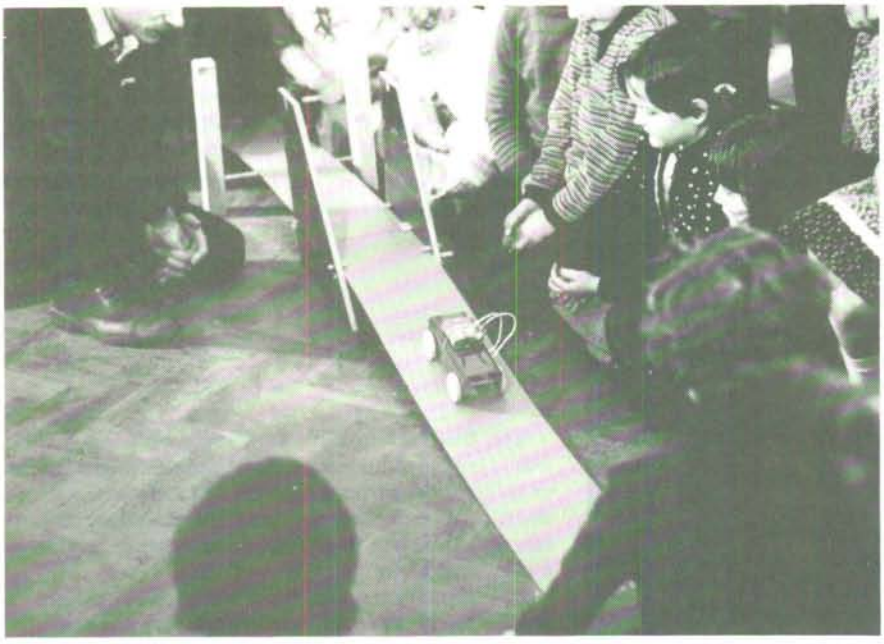
Traditionally in junior departments of many primary schools, boys crafts have been conceived and practised as different from girls crafts. We need to get rid of such historical hangovers which have denied opportunities of the kind described above to generations of girls. In reality, where no differentiation between the sexes is made by the teacher, none is found by the pupils. The Equal Opportunities Commission document *'Equal Opportunities in Craft Design and Technology'* 1983, puts foreward a most cogent argument on this point, and indeed experience of this approach in a large number of Coventry primary schools reinforces the case.

One unlooked for bonus which has emerged over the three or four years during which the Coventry LEA has been so involved, has been the considerable interest engendered in their parents by boys and girls who enthuse about the CDT type activities and experiences which they receive in primary schools. This has resulted in a measure of parental assistance and involvement, all of which helps to bring school and home into a closer liaison.

Another form of positive liaison is that which develops between involved primary teachers and neighbouring secondary CDT teachers who are able to provide much needed support, both professionally and practically. Sharing a common philosophy leads to a greater awareness of the educational opportunities as well as the problems which exist for teachers and pupils on both sides of the primary/secondary interface, whether the age of transfer is at 10, 11 or 12 years of age. So much for theory and intention, but what about the practice? It would be unrealistic to suggest that there are no difficulties and problems which need to be overcome before an educational change of this magnitude can take place nationwide.

From the outset, the introduction and development of CDT type activities in any primary school will call for careful consideration and subsequent action in relation to some or all of the following factors:

1. Most primary school teachers are untrained and inexperienced in the educational or personal use of tools and craft skills associated with manipulating wood, plastics, light-gauge metal, concrete etc; practical problem-solving techniques, using the linear design process; relevant aspects of physical sciences; visual communication skills and in whole

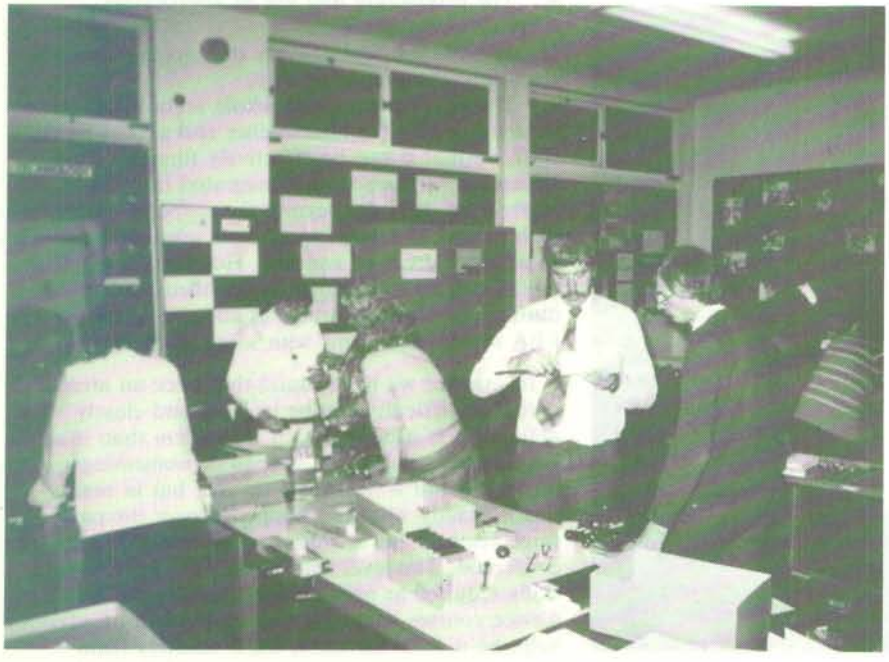


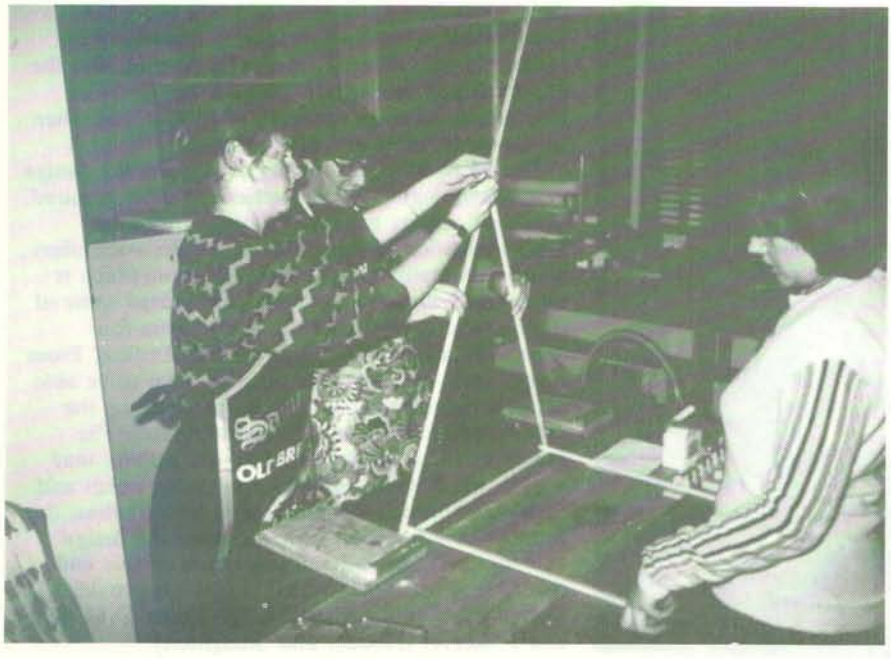
Top left:
The real *test. Will it climb the hill?*
Middle left:
Practical work? — No problem!
Bottom left:
No sex discrimination here. Lady teachers engaged in deep discussion of a practical design problem during an in-service courge.

class management of a number of different practical activities associated with the above.
2. Most primary schools lack the tools, materials, equipment and adequate classroom and storage space to engage fully in this kind of practical activity.
3. The development of a positive relationship between CDT type activities and the other major areas of the primary curriculum, the structuring and sequencing of experiences to provide these links.
4. The production and use of appropriate curriculum materials.
5. The content and delivery of associated micro-electronic/computing activity.
6. The development of a whole school policy and strategy, led by the headteacher and agreed by the staff, so that it can be effectively financed, structured, organised and integrated into the curriculum. It is far beyond the scope of an article such as this to atempt to provide adequate answers to all these areas of concern. However, it may be useful at least to comment upon them and to outline some of the strategies adopted in my own LEA to come to terms with some of them.

In practice we have found that once an area of potential difficulty can be isolated and clearly defined, it is usually less of a problem than it at first appears and one is able to do something positive about it. A truism maybe, but in reality this is exactly what has happened over the past three years so far as this curriculum development is concerned. The level and indeed the range of tool skills required at primary level is minimal. Short in-service courses backed up by some form of advisory help, be it from advisors, CDT teachers from neighbouring secondary schools and informed parents, will quickly reduce concerns about developing sound practices and safe procedures. Once initial nervousness has been dispelled with respect to the teachers' own basic craft ability, the emphasis can be moved to the methodology of helping primary age pupils to learn how and when to use tools safely and appropriately.

The DES/APU document *'Understanding Design and Technology'* 1981, classifies the skills required in design activity as, Investigation: Invention: Implementation: Evaluation. A simpler vocabulary, which admittedly is not so accurate but which is more easily digested by pupils and indeed some of their teachers, might substitute for these four words. Problem; Planning; Making; Testing. From a very early age boys and girls do seem to be able to relate to this simple logic in approaching the solving of problems of a practical nature. The reality of the cognitive and physical activity may well be much more complex than these words and their relationships would suggest. Nevertheless, they do provide a book on which to hang the design activity coat. An in-depth discussion of this and related areas of professional concern is provided in *Design Education for the Middle Years,* D.M. Shaw and J. Reeve. (Hodder and Stoughton).





Top left:
Who says that girls can't make things?
Middle left:
Primary teachers involved in practical problem solving and simulations of their pupil's situation.
Bottom left:
More in-service work. A real structures problem to solve using only canes, string and polythene sheet.

The BBC Schools TV Series *'Up and Down the Hill',* indicates how these four aspects might appear in terms of classroom activity and here again a short in-service programme readily enables primary teachers to relate their own good practice to this CDT *'shorthand'*.

Few primary teachers have themselves pursued studies in the sciences, particularly the physical sciences, beyond the minimum that their own schooling dictated. Many will therefore express reservations as to their own ability to deal with even the few basic scientific concepts and methods which are essential at this level. The key issue here is concerned with providing an introduction to scientific method eg the fair test, observation and logical reasoning. Many scientific concepts are most easily internalised through practical involvement in their application. This applies to teachers and pupils alike. E.g. basic concepts associated with electrical conductivity and electrical circuits are more fully and easily appreciated by finding out which materials are conductors and by assembling electrical components into simple working circuits. Primary school art has historically been concerned with personal expression. However, visual language as a means of communication and clarification of ideas, while commonplace in everyday life and in industry, needs rather more attention at primary level than it has received in the past. Again, whatever their stage of development, in Piagetian or any other terms, children of primary age can express concepts by visual means as well as by using written forms of expression and usually far more eloquently. The essential drawing skills and conventions are easily and rapidly assimilated and thus the picture or diagram becomes at once a thinking tool, a means of directing the construction of a system or artefact and a focus of discussion in group projects. How to produce order and progress from potential chaos is no new problem for any primary teacher. Concerns over *'Giles-like'* situations arising in the pursuit of practically based classroom activities can be allayed. Group work ordered so that the teacher can concentrate much of his/her attention on the tooling activities of one group of not more than eight pupils, is not difficult to arrange. The best way to appreciate this is to observe good practice in action, but discussion and planning as part of an appropriate in-service provision does lead to a considerable reduction both in bottle-necks and cut fingers!

The question of provision of appropriate tools, materials and so on, is one which should be discussed with LEA advisory staff who are in a position to offer specific guidance. An indication of the range of basic tools which might be useful in this situation is given in *An Introduction to Craft, Design and Technology in the Primary Curriculum,*'6obtainable from Elm Bank Teachers' Centre, Mile Lane, Coventry, price £1.00 post and package inclusive'). Sufficient to say that old tools brought in or loaned should not be used, as this

would leave both the teacher and the Authority wide open to criticism in the event of any untoward accident. E.g. a loose hammer head flying off, or an accident caused by a pupil trying to use a saw which is too large for a primary child to handle correctly. A policy needs to be established on how even the very limited range of tools involved, are to be stored, issued, used and maintained and here again expert advice should be sought. However, solutions are not difficult to provide.

It was stated earlier that primary CDT should *not* be considered as a discrete subject at this stage. Primary teachers by the nature and ethos of their work, automatically relate one form of curricular activity with another, this coming to fruition in topic work. To this end CDT activities can be seen as an integral part of such work not only for their practical problem-solving content but also for the very important element of personal development which such experiences provide. Just as in primary mathematics, the experiences provided and content covered have to be structured and sequenced, so it is with the provision of CDT experiences. However, one is not seeking a linear step by step development in any aspect of this work. The progression is much more organic in nature, such that experiences relate in ways which are not always sequential. This makes planning, record keeping and evaluation rather more difficult but certainly not impossible. (See Chapter 6, *'Design Education for the Middle Years'*, Shaw and Reeve).

In the long term the best curriculum materials are those produced by teachers working together to meet the needs of their own pupils. Whilst at present little material has been published specifically aimed at primary CDT, much other material is very relevant. E.g. Schools Council *'Science 5 to 13'*. Careful sifting of such existing materials will highlight many opportunities or starting points. Where more help appears to be needed is in the relationships between curricular content and the practical expriences children undergo right from the infant stage to post 11 years of age.

Primary micro-electronics and computing are still largely undeveloped and much of what has been carried out so far has been concerned with developing simple computer keyboard skills in language and number work. The advent of appropriate constructional kits like *'Technical Lego'*, and the introduction of computer controllable vehicles such as the *'Turtle'* will provide a positive link betwen micro-electronics and the computer on the one hand and the constructional, physically functional aspects of primary CDT on the other.

The key to success or failure of the development of CDT activities in our primary schools is firmly in the hands of the primary school headteacher. It is the headteacher's policvy on this as on other curriculum matters which in his or her role as *'gatekeeper'*, will either expedite or effectively preclude any such development. For this reason my own authority has paid particular attention to this fundamentally important factor through the provision of an in-service programme aimed at headteachers and senior staff which is integrated into the Authority's overall in-service policy on the development and management of the curriculum.

Additional money from Central Government is to be provided to bolster research and development in Primary Science, But even in primary science, emphasis is shifting towards the application of concepts rather than concentrating on the concepts themselves. This is a healthy development and one which should be well received by the CDT fraternity. Collaboration in place of competition between the agencies of curriculum change is to be whole-heartedly welcomed.

Primary CDT is still in its infancy. Existing research and developmental work have already begun the task of defining its philosophy and its purposes. Through the medium of topic work, a practical methodology is emerging. What is needed now is a ready and universal agreement on the role of primary CDT activity, an awareness that it cannot and should not be static, that its ordering will require an organic and not a linear structure, but above all, a general awareness that 'primary CDT' — 'practical problem solving' — call it what you will, is *NOT* a subject, but a way of tackling a large part of the primary curriculum, a way of learning which is at once exciting and demanding, questioning and undoubtedly vastly rewarding — for pupil and teacher alike.

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