

# Design and Technology throughout the school curriculum\*

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*Design Dimension*

To look at two different points about the nature of design and designing will help to sort out its role within the school curriculum.

The first view is that design is such a specialist activity that it is undertaken only by those people who have been highly trained, for example architects, planners and product designers. Consequently it has been, until now, taught in the main only in the secondary school up to examination level possibly leading on to higher education. The second view point is that design is an activity that everyone engages in, almost every day of their lives. For example everyone chooses to wear particular clothes, create a home environment and to furnish it in their own way. This is a common-sense approach to design and design activity. The ability to design and understand design is rather like language ability — something that everyone possesses at least to some degree and like language ability it can be developed through education.

These two view points are not in conflict, neither is incorrect. What links the two is the role that education can play in developing design awareness, understanding and ability at all levels from small children in the infant school through the secondary school and then to degree level, if appropriate. Design is, therefore, both a specialist professional activity and an everyday one.

Learning through design and technology in school enables pupils to appreciate the made world, the environments in which they live and work, the products they know about and use and the many communication systems that exist. It is

vital that young people are equipped to take part in public design decisions about the environment in which they live, about the buildings, the landscape and the systems which operate within them as well as the products they will buy and use.

An education in and through design and technology must have as its main focus a concern for the future and the changes involved. Pupils will need to consider:

Why are things the way things are?  
How did they come to be like this?  
What might they be like in the future?

Thinking about these questions involves speculation, the creation of new and different possibilities weighed up against a changing world. Speculation about new and different possibilities weighed up against a changing world. Speculation means the picturing of ideas in the mind's eye, that is, 'imaging', and then communicating those images and ideas to others in a form that can be comprehended and discussed. In doing this, sketches, plans, diagrams, scale models, mock-ups, specifications and prototypes become useful tools to aid specification and help in the 'modelling' process. 'Modelling' is the activity of re-arranging, altering and modifying ideas and images either in the mind or externally. It is sometimes difficult to do this without using tangible materials. Thus a map or plan becomes useful in the planning of buildings on a site where representations of the buildings, roads and trees can be made and re-positioned or removed to create different effects and different consequences. Different models will do different things and this needs to be included as part of the curriculum. Pupils will need to understand that models and modelling skills can be used to clarify, to test out ideas, to explain possibilities, to present information, to appraise possible outcomes, to handle information and data, to illustrate the shape, form or size, to outline systems and procedures, to compare and contrast, as well as for producing prototype models or models in miniature of existing artifacts and environments or model

making to show the physical appearance of future proposals.

Design work involves pupils in real issues, in different, sometimes conflicting, values and beliefs. It is important that pupils recognise and value cultural and personal diversity and so the opportunity design work gives for pupils to debate, to compromise and reconcile differing views and values is immense. For example, environmental design work will reveal many pressures including economic, social, technical, and political ones. Finding the best balance between these pressures is a valuing activity which pupils have to engage in before making proposals and showing a range of possibilities and outcomes.

The ability to 'image', to 'speculate' and to use 'modelling' techniques are three components essential to design and technology activity. These must be developed in conjunction with the skills which are needed in other curriculum areas too. Pupils will need to research, to analyze information and materials, to take decisions and act upon them. These skills along with language and numerical skills are important as part of communication. The technical and manual skills which are necessary are required through the design activity and these aid the communication of proposals, ideas, show possibilities and also give rise to discussion and debate.

The Design Dimension Project team has always found it useful to have a working definition of design and designing which along with a set of basic assumptions has been a touchstone against which to assess progress and developments.

The Design Dimension Project definition of design is:

**Design** is the configuration of environments, products and communications.

**Designing** is the conception, resolution and realisation of future configurations of environments, products and communications.

\* The source of this article is a paper written by Ken Baynes and Roger Standen at the beginning of the Design Dimension Project.

The original material has been extended and developed by Anita Cormac. It is used to support courses run by the Design Dimension Educational Trust at the Centre at Dean Clough, Halifax.



It is helpful to 'unpack' the two definitions a little more and this can be done by adding further definitions.

Configuration is the arrangement of parts or elements, the shape or form of something ...

This word has been used in the definition in preference to 'form' because form has a variety of meanings and the dictionary definition above relates well to what needs to be said in relation to design.

For example, if the 'designer' is a town planner working on proposals for the location of a new city, or perhaps a couple working out the layout of their new kitchen, these people are all wrestling with difficulties and opportunities of creating the best possible arrangement of parts or elements, the best possible shape or form to achieve what they set out to do.

Design and designing need to be combined in education. Design' to indicate the qualities that result from *having been designed* and designing to indicate the activity of *engaging in design*. The distinction is between the physical form that designs take in the outside world and the human ideas, values and actions that are used to determine or create these qualities. Any educational design activity will need to embrace both these perspectives.

These definitions are helpful in clarifying the interaction between design, technology and manufacture. Design cannot be separated from technology because it is through design that technological outcomes are brought into being and it is through technology that design allows the creation of new products, environments and communications. This interaction between design, technology and manufacture means that these cannot be taught as separate components in the curriculum. Design therefore must be cross curricular and it must build upon, extend and develop many different skills from other curriculum areas but always in a purposeful way.

The set of basic assumptions which have guided the work of the Design Dimension Project help to clarify the nature of design and designing still further. They also indicate the contribution that a range of school subjects can make to design education and the developing design and technology curriculum.

These are that:

1. Design awareness and design ability are fundamental capacities of all

human beings. They can be developed by education.

2. The primary aim of design in general education is to develop everybody's design awareness so they can:
  - Enjoy with understanding and insight the made world of places, products and images.
  - Take part in the personal and public design decisions that affect their lives and the life of the community.
  - Design and criticise design at their own level for their own material and spiritual needs.
  - Bring an understanding of design into their work.
3. The secondary aim of design in general education is to provide the seed bed from which will come the range of future professional designers — planners; architects; technologists; engineers, industrial, fashion and graphic designers.
4. Design awareness implies an understanding both of how the environment was shaped — 'why things are the way they are' and how it can be shaped in the future — 'how things might be'.
5. Design is about values and valuing, it is concerned with the question 'how do you want to live?' Education in design must, therefore, highlight the significance of values and respect their cultural and personal diversity.
6. Design is about compromise and reconciliation. The made environment shows the influence of many different pressures; economic, social, technical, aesthetic, moral, political. Finding the best balance between them is itself a valuing activity in which design has to propose the most inclusive and potentially enhancing of a range of possibilities. It is up to education to give a direct experience of this work of debate, compromise and reconciliation.
7. Design studies will seek to develop those human skills that are fundamental to design awareness and design ability. It is typical of design that it depends on coherent and purposeful interaction between perceptual, analytical, propositional, communicatory, technical and manual skills. These will need to be developed in harmony.
8. In addition to language and number, the development and communication

of design concepts depends on 'imaging'. This is the human ability to make and use sketches, drawings, diagrams, plans, scale models, mock-ups, prototypes and the like to represent, shape and evaluate what is and what might be. Design studies will foster people's skill in using these media for thought and action.

Design and Technology cannot be taught in a didactic manner, so it does need to be taught in a more flexible way. It must be taught as a methodology, a way of thinking and working which means that much thought has to be given to the contribution that a range of subject areas can make to design. It is the teachers who are key to this process of identification and application.

Because of the cross-curricular nature of design and technology education it needs to involve teachers working in teams. This means creating and organising a structure for the management of design and technology work and, for the effective organisation particularly in the planning and implementation stages which are crucial to its success.

The implications for most teachers are immense, getting to grips with the notion that design can play such a vital part in children's education, with design taught as a methodology, a way of thinking and working, means, for most, a radical shift in practice. Working in a cross curricular way needs careful planning and organisation if it is to work successfully and pupils are derive maximum benefit. Teachers need to consider how best to use the teaching and learning areas, to devise assessment and evaluation procedures and to maximise all the resources available to them.

Even after all this, the vexing question always remains:

How do we successfully introduce, organise and develop Design and Technology in our school curriculum?

The introduction of Design and Technology into the curriculum of any school obviously needs careful thought and preparation. It creates opportunities and problems in that it does require a high degree of skill in both managing people and managing the organisation itself.

This section looks at some of the ways in which schools can effectively manage the introduction of Design and Technology throughout the curriculum. It can only be a suggested general framework because every school is different and it will need



to be adapted to suit particular situations and needs.

### Managing the curriculum — a framework for action

Any curriculum initiative will not take off and be successful unless teachers are able to meet and plan together.

What is offered here is a suggested framework for the management of a group of teachers intending to plan, introduce and implement a new area of the curriculum, that of Technology.

Whilst acknowledging that aspects of Technology are at present being taught in primary and secondary schools it is nevertheless vital that what is already established should be carefully reviewed in the light of the Technology National Curriculum requirements and recommendations and where necessary amended.

Technology teaching requires a cross-curricular and team approach and ultimately a whole school approach. It has added implications for resourcing, for timetable changes and for different teaching and learning styles and strategies.

It is possible to identify some key factors which contribute to the success or failure of a new curriculum initiative. The factors outlined here are not the only ones and it is important to add to them in the light of individual experience.

### What will help to make it work?

*Some key points towards the introduction of Technology*

- **A small start**  
Perhaps not all the staff who will eventually be teaching technology need be involved at first. A small success at the beginning is worth far more than any failure.
- **Knowing about Design and Technology**  
All the staff involved, including the Headteacher and the management team, *must* understand what *design* is and the ways it can be identified and developed in the curriculum. They must also understand the nature of technology and its special relationship with design. Here the definitions and basic assumptions could be useful starting points for discussion.
- **Forming a management structure**  
Ensure that there is a 'Champion' for design and technology in the senior management team and consciously aim to include them in a planning

group. Form a planning group of teachers with the specific intention of planning and implementing design and technology.

The Headteacher has a key role in supporting that group, actively encouraging the development of its work and monitoring the progress.

- **Record keeping**  
All the meetings should be documented, the group will need to work towards producing a document about design and technology which is useful to the *whole* of the school staff. At first it can be a rolling programme to be modified and amended. Later it can become guidelines, stating aims, ways of working, organisation, assessment and evaluation procedures including exemplars where appropriate and, in particular, identify cross-curricular aspects. Creating case studies can be a very useful way of explaining developments.
- **Effective communications**  
Right from the start a good communication system should be set up to keep other teachers informed as well as parents and the governing body.
- **Managed resources**  
The term 'resources' is here interpreted in the widest sense to include the learning environment, the artifacts, books, equipment available, specific materials, and also the *teacher* who is the most important resource.

It is vital to carefully manage resources particularly if additional finance has been provided. Curriculum-led purchase of materials is a key feature in forward planning rather than basing a curriculum on the already purchased materials.

### In short for a school to manage Design and Technology it needs:

- A group of committed teachers to form a planning group — a *Core Group*.
- A key member of the senior management team to support developments and to work with the planning group of teaching staff.
- An effective communications system.
- A Headteacher who is the lynch pin, a whole-hearted enthusiastic supporter who actively encourages

the development of work and manages its progress.

This suggested framework is not intended for any particular school and it will not suit everyone or every situation. A school may use a combination of the suggestions or none of them perhaps preferring to devise a different model of their own.

### Managing the Core Group

#### *Limiting the size of the Core Group*

The Core Group must be a manageable size and be composed of the teachers directly involved in implementation of Technology.

Very large groups are difficult to monitor and control. If there are other staff, not directly involved, but nevertheless interested and who wish to attend it must be on the understanding that they are there as *observers*.

### Deciding on The Core Group Members — *who should be included?*

Members of this group will as already stated, automatically include all those directly involved in delivery. If possible try *not* to include any teacher known to be an agitator, vehemently opposed to new or different ideas. The 'seen it — done it all before and I *know* it won't work' person is not an asset to such a group at this stage. Aim for consistency in attendance. Regular attendance of all members is essential for continuity and development and substitutes should not be used.

### Leading The Core Group

The leader of the Core Group need not necessarily come from the senior management team but it is helpful to choose someone who has enough status and expertise to command respect of the planning group members and is someone able to make things happen. Support for the leader from senior management is vital.

It is the leader who should draft the agenda, be responsible for sharing out tasks and keep all staff well-informed of progress. The leader should arrange suitable places for meetings and with a realistic agenda ensure that they finish within the allocated time span.

### Defining The Core Group's tasks

The aims must be clear at the outset. These aims will probably have to be redefined as the group's work progresses. Good record-keeping is crucial because it not only shows how much has been achieved by the group but serves to



indicate what needs to be achieved both in the short and long term.

### **The role of the Headteacher and senior management team**

It requires the Headteacher to attend some of the Core Group's planning meetings without dominating the discussion or interrupting to ask questions about aspects of the work already documented from previous sessions. On the same basis, the group must not place the Headteacher in a tight corner by making demands and asking for instant decisions relating to the discussions.

It should be the senior management representative's responsibility to keep the Headteacher well-informed, the report-back should be an accurate reflection of the proceedings. It is helpful if the Headteacher acts swiftly in considering the groups proposals, recommendations and actions. This indicates an active interest, involvement and commitment to monitoring the group's progress.

### **Core Group Relationships**

Establishing good relations within the group is very important. Friction and disinterest can be a problem unless the group is carefully managed and well-led. All members must be able to state their views, air concerns and feel able to report back openly. A leader who encourages a lively stimulating discussion inviting as many of the members as feasible to participate is more likely to avoid the 'lip service' statements at the meetings and then the 'car park cars' afterwards.

### **Communications**

All members of the school staff will need to know what is happening and what is being planned. Perceived secrecy causes suspicion. Parents and Governors can only help if they know what is going on. Arrange a slot at various meetings to explain developments and show proposals encouraging different members of the Core Group to be responsible for communicating the group's progress to date.

### **Responding to INSET needs**

At some stage the planning group is bound to need some advice or assistance or someone else's expertise. Representatives should be sent to relevant INSET either provided by the LEA or by other agencies. A planned programme should be arranged.

### **Implementation**

It is vital not to disband the Core Group when the planned work is underway. Those teachers who are carrying out the work are likely to be the ones with the most expertise and can help teachers with less experience.

The support and security that the group offers to the 'old hands' is just as important as the passing on of experience to teachers with less experience of teaching technology.

The group can be a useful focus for feedback sessions, evaluation for extending planning well into the future.

### **Information about Design Dimension Educational Trust**

The Design Dimension Educational Trust has been established to extend development and disseminate the work of the Design Dimension Project. The Trust

is the independent body which operates the Design Dimension Project. It is based at Dean Clough in Halifax, West Yorkshire. Dean Clough, formerly Crossley Carpet mills is now a centre for industrial and artistic enterprise supporting a variety of cultural activities and events. It is here that the Design Dimension Team provides an educational training programme for teachers and pupils.

The DATE Project (Design and Technology Education Project) is a joint venture between the Design Museum, the Educational Broadcasting Services Trust and the Design Dimension Educational Trust with subscribing LEA's to create and produce training materials and a curriculum developed supported INSET programme for Design and Technology.

Advisory teams primary and secondary from the participating LEA's which at present include Birmingham, Calderdale, London Borough of Newham and Wiltshire have been pooling their expertise to produce the training materials for key stages 1, 2 and 3. The materials aim to help schools to create a management structure within which effective planning and delivery can take place and an effective design and technology course be implemented.

### **Notes on the authors**

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## FROM TD TO TECHNOLOGY

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D&C coursework of this type could start from any of these topics mentioned. It might therefore be concentrated simply on packaging, on display or commence with a study of product design as illustrated here. It could just as easily begin with the need for a new 'system' or the design of an 'environment'. Which

ever of these is chosen, I am sure it could similarly be extended to encompass the requirements of the NC. Other subject disciplines could be involved in the development of a truly cross curricular project. But, perhaps more importantly, the children will have experienced a meaningful technological activity. I am, therefore, convinced that an integrated or

extended Design and Communication project offers a model for the teaching of National Curriculum Technology and it should be an important element in any CDT department's current development strategy.