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## *Design methodology - A framework for progression*

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## DESIGN METHODOLOGY - A FRAMEWORK FOR PROGRESSION

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Although it is a common claim that design and technology has no research base or that there is no evidence to support the value of project work, such assertions are constrained by the subject base and lose the benefit of relevant research in other fields. As a result of the recent Education Reform Act, teachers inevitably need to substantiate the value of project work, which is unequivocally promoted throughout the National Curriculum Proposals for Design and Technology, and identify the progression and continuity inherent in that methodology in order to plan appropriate schemes of work.

The 'process' model which underpins the four attainment targets of the Profile Component: Design and Technology Capability has parallels with the 'process led' science curricula which Robin Millar criticises in his article 'Teaching Science Processes, the pursuit of the impossible',

1. that it is superficial and misleading to portray the method of science in process terms;
  2. that many of the processes have no special association with science, but are general cognitive skills, without ever having been formally instructed;
  3. that there is no evidence that we improve our performance on any of these processes.
- (Robin Millar 1988 Phys. Educ. 23)

The article cautions for what is possible through assessment, and questions what it could mean to talk about progression in relation to observing, classifying, inferring, hypothesising. Whilst the Design and Technology Working Party avoid this issue directly through their recommendations for holistic assessment, the difficulty of establishing progression within AT2 is fundamental to the overall development of capability "to operate effectively and creatively in the made world". It is to the challenge of developing general cognitive skills to support creativity that teachers need to turn to.

At one level, teachers can predict the progression and continuity which takes place through project work and, as good practitioners, plan for it. Introducing, for example, elementary skills needed to research information: how to use an index, find a book through the Dewey classification, use a trade directory, conduct a search through a computer file, etc. At another level, effective action on that research involves higher skills such as discrimination of the information which has been gleaned, processing that information to order it, to be able to generate ideas that lead to a hypothesis or creative solution to a problem.

It is this higher order, the teaching of thinking, where the problem of planning for progression and continuity arises. It involves the limits and other characteristics of the process of knowing, thinking and deciding which precedes the visual imagery. At this seminal stage in the thinking process, ideas are generated which form the crucial steps for all subsequent design decisions.

We, as teachers, are dealing with individuals who have developed, and will continue to develop their consciousness, not through clear absolutes, but in context with other messages. They will form ideas through steps of logical or pragmatic consistency within their individual awareness.

It is generally accepted that knowledge is possibly initiated through patterns. These may be broken or changed by addition, by repetition, by anything that will force us to a new perception. Such changes can rarely be predicted until they have happened. Knowledge at any given moment will be a function of the thresholds of our means of perception. All registering of difference is limited by a threshold. Differences that are slight, or presented too slowly, are not perceivable and therefore are not catalysts for perception. paradoxically, the practical truth, that 'nothing will come from nothing' is contradicted in the field on information technology, where zero, the complete absence of an indicative event, can be a message, in context, which can be meaningful. Since it is the recipient, who creates the context, we are again concerned with the unpredictable, i.e. contextual shaping.

All experience is subjective because our minds make contextually shaped images, which we think we perceive. It is significant that all conscious perception has image characteristics. The processes of perception are inaccessible, we are only conscious of the products, and it is they which are relevant to creative thought. The ability to apply those products of past consciousness is the basis of our transference of knowledge. It therefore seems crucial to developing creativity that the capacity for transference of life's experiences is expanded, thus creating an extended framework for our thought processes.

I wish to propose that the important learning tasks of life follow a continuum, which initially is dominated by subjective experiences, but should require expansion towards a more objective approach, so that critical analysis can be shared and validated by others. This is not to say that subjectivity necessarily decreases (in fact it must increase with expanding consciousness), but rather our capacity to be objective can be modified to adapt to differing situations.

I use as a model a moebius strip (Fig. 1.). The intersection describes this capacity to apply subjectivity or objectivity to a problem for mutual reinforcement.

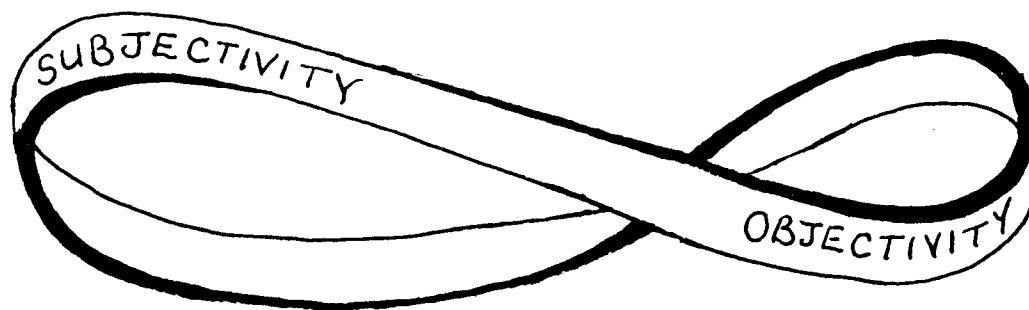


Fig. 1.

I intend the model to be seen as dynamic. Context alters our perception, and capacity to be objective about experiences in life. For example, as an individual I may be highly subjective about music without being objective, whereas other experiences allow me to be highly objective as well as subjective. The intersection along the continuum is variable.

It is possible to support this proposition by citing examples from recent examination assessment schemes in which descriptors have been derived to enable teachers to break down mark clusters for aspects of project work, as illustrated in Fig. 2.

EVALUATION		
self-congratulatory	partly relevant to specification	fully relevant
SUBJECTIVE	—————→	OBJECTIVE

PLANNING		
guesswork	diary or time plan	critical path analysis
SUBJECTIVE	—————→	OBJECTIVE

Fig. 2.

Whilst there has been much condemnation of this mechanistic approach, there is in practice little difference between such mark schemes and the proposed awarding of a level for each Attainment Target. I would suggest that the descriptions for each level follow the same continuum from subjective to objective criteria.

When it comes to generating ideas, the process of applying knowledge involves the creative responses of thinking and deciding. There are well established strategies to help this creative process (Fig. 3.).

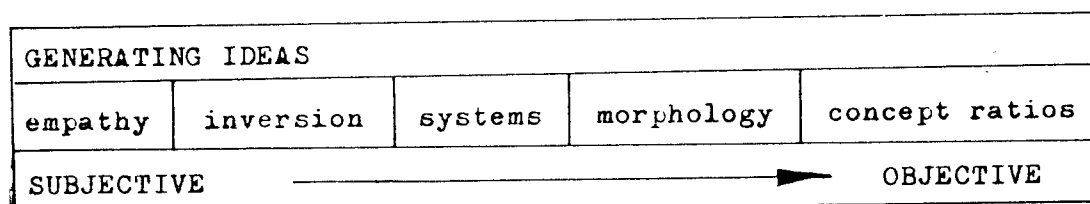


Fig. 3.

It is significant that, whilst empathy as a creativity tool is frequently used in primary education, the other strategies have rarely been exploited in schools. However, it has been fashionable to hijack systems into knowledge content, but often divorced from its usefulness as a design tool.

Fig. 3. should be viewed as an element within the continuum model of Fig. 1. Objectivity and subjectivity are to be used as catalysts for each other. Progression is to promote rational thinking through an expansion of both elements rather than the exclusion of subjectivity through increasing objectivity. The model attempts to build upon subjectivity by promoting a recursive, iterative vehicle for creative thought which is regenerative. Thus it aims to be more fruitful than the classical procedure through logic which imposes the artificiality of developing linked chains of ideas.

De Bono would claim that his CoRT thinking programme involves unnatural and artificial stages, which are, however, necessary to create new habits and redirect attention. Thinking skills have to be personal rather than contextual before they qualify as tools which are transferable to other situations. Similarly, 'design strategies; are useful tools which expand the capacity for transference to which imagery and modelling can be applied. They offer not simply an expansion of the brainstorming proposals of the National Curriculum document, but, more fundamentally, a purpose and structure based upon conceptual development which focuses upon the quality of ideas rather than mere quantity.

Evans and Deehan's review of research and creativity suggests that brainstorming is an overvalued creative strategy. "The evidence seems to indicate - though no doubt the idealistic brainstormer of the old school

would dispute this - that withholding judgement does nothing to enhance creativity. In fact quite the opposite. The more one can determine what criteria a solution should meet in advance of generating ideas about it, the more one uses those criteria to shape ideas in the first place, the better the solution will be."

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