Lifelines to Design Technology
A reaction to the National Curriculum Working Party Final Report

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We must all appreciate that the 'final orders' for Design Technology will not be issued until consultation results in the Secondary Examination and Assessment Council (SEAC), the Curriculum Council for Wales (CCW) and the National Curriculum Council (NCC) are convinced that the Design Technology curriculum will give pupils the experiences 'to meet the needs of the 21st Century' and will respond to the philosophy and patterns of assessment as pronounced by the Task Group and Assessment and Testing (TGAT). It is hoped that such orders will be forthcoming at the turn of the year.

In the meantime Local Education Authorities (LEAs) and schools will be anxious to begin final planning and preparation for the introduction of Design Technology in September 1990. We must therefore make certain assumptions. Firstly, that there cannot be wholesale changes from that which the Secretaries of State have accepted. Secondly, and more significantly, that the report is not a blueprint and is open to interpretation. Thirdly there are some fundamental points that planners will need to keep uppermost in their minds when making their own preparations for implementation.

Let's set down these fundamental points and then return to the scope for interpretation.

Fundamental Points

- The experiences lead the pupils to Design and Technological Capability

- Technological Capability is the expression, by the pupils, of the interaction of process skills (the Attainment Targets 1-4 describe these), the contexts in which they work (seen to be covering home, school, recreation, community, business and industry), the   · knowledge which serves them, the skills needed, and through their own activities (as described in the Programmes of Study, although this

area of the report is a point that will be returned to later).That the pupils will be 'assessed', through their activities, a minimum of four times during their school life.

- Such required assessment will take place during and by the four key stages (crudely described as ages 7, 11, 14 and 16).

Whilst these points can in themselves be quite complex issues in need of some interpretation, accepting the principle of these fundamentals actually clarify, what needs to be in place as pupil experience for Design and Technology. Pupils will need to follow schemes which enable them to undertake Design and Technology activities as freely as possible. This leads us to the first point for interpretation. The attainment targets (which according to TGAT should be the only focus for assessment) could easily be seen as a linear prescriptive checklist. In order that pupils are allowed to express themselves this constraining approach must be avoided. Each of the pupils will express themselves differently through their activities. This is as true of 'how' they do things as what they do. For planning and assessment purposes, it will be of considerable help to organise structured experiences which not only allow pupils to become familiar with areas of knowledge in contexts, but accentuate important process skills which might be used at any point in activities. For instance in the home context pupils might be asked to investigate 'the cold breakfast as a meal for themselves' and suggest what combination of foods should be eaten to meet certain criteria. The investigation will not be just of the context, but will also be of tastes and preferences, dietary needs, nutritional value, aesthetics influencing taste or even costs and budgets. Therefore whilst much knowledge is gained via the activity the pupil can also be made aware of the value of investigation. This allows pupils to become more advanced in a particular skill which can then serve them as required in the future. Planning

schemesof work so that this, and other skills are returned to at appropriate times through structured activities allows the pupils to become more sophisticated in design process as well as achieving an increase in the breadth and depth of knowledge.

This leads to a second equally important point for interpretation. As set out in the programmes of study, the knowledge that pupils bring to a particular problem (activity) is restrictive. If pupils are to find their own solutions to genuine problems, then it is essential that the pupils have the opportunity to explore knowledge from many sources. The restrictions of a checklist must be lifted. Easier said than done — no. It is important that the pupils are guided · through experiences which lead to an expansion and deepening of knowledge that can be used by them. For instance in schools how is the knowledge to be organised (in subjects, through activities, etc), let's return to the breakfast activity to clarify this point.

If we see the pupils' deepening of knowledge simply as accumulation of facts, then this will not enable pupils to organise new knowledge for use. For instance, pupils may be taken through specific facts about the calorific value of certain breakfast foods. This leads to accumulation of knowledge about foods; however, if we structure the experience so that pupils can see that foods give energy, as does all matter eg. burning fossil fuels for heat, etc, then pupils can file away this concept and use it to organise new experiences of materials. Taking this view enables pupils to have a means of learning. In practical terms, therefore, the Programmes of Study, Materials and Components, Energy, Business and Economic Tools and Equipment, Aesthetics and Systems are the concept areas through which such specific knowledge can be organised. Structure and Mechanisms are expressed in the report a in quite specific way. It would, therefore, be helpful to view these two areas through the general concept of systems.

Design Technology Teaching

This approach allows for usable facts and information not mentioned in the programmes of study to be readily sorted by the pupils, whether they experience such facts during the course of personal research experience or as a result of teacher input.

This leads to another point, that of how pupil Design and Technological capability development can be achieved across several disciplines and the interrelationships that exist. It must be remembered that the pupil activities are the all important means by which such capability is not only expressed but also developed. Let us remember what constitutes D and T capability. Pupils use knowledge (through concept organisers) and skills and develop value judgements through processing all these influencing while 'designing' (as described by AT 1-4).

Some schools may wish to work towards a single identified focus for the development of D and T capability, by abandoning subject organisations. Others, of course, will see that individual subject specialisms must be retained to provide D and T experience in a coordinated form. This too will be possible since the responsibility for deciding on pupil activities can be planned jointly, once a planning strategy for enhancing previous pupil experience is agreed. It must be recognised that every pupil in every activity brings to bear *all* of his or her resources of knowledge and skill, however gained. It is important to note that the activities and therefore the pupil capability (in particular the processes pupils employ) transcend any individual subject specialism.
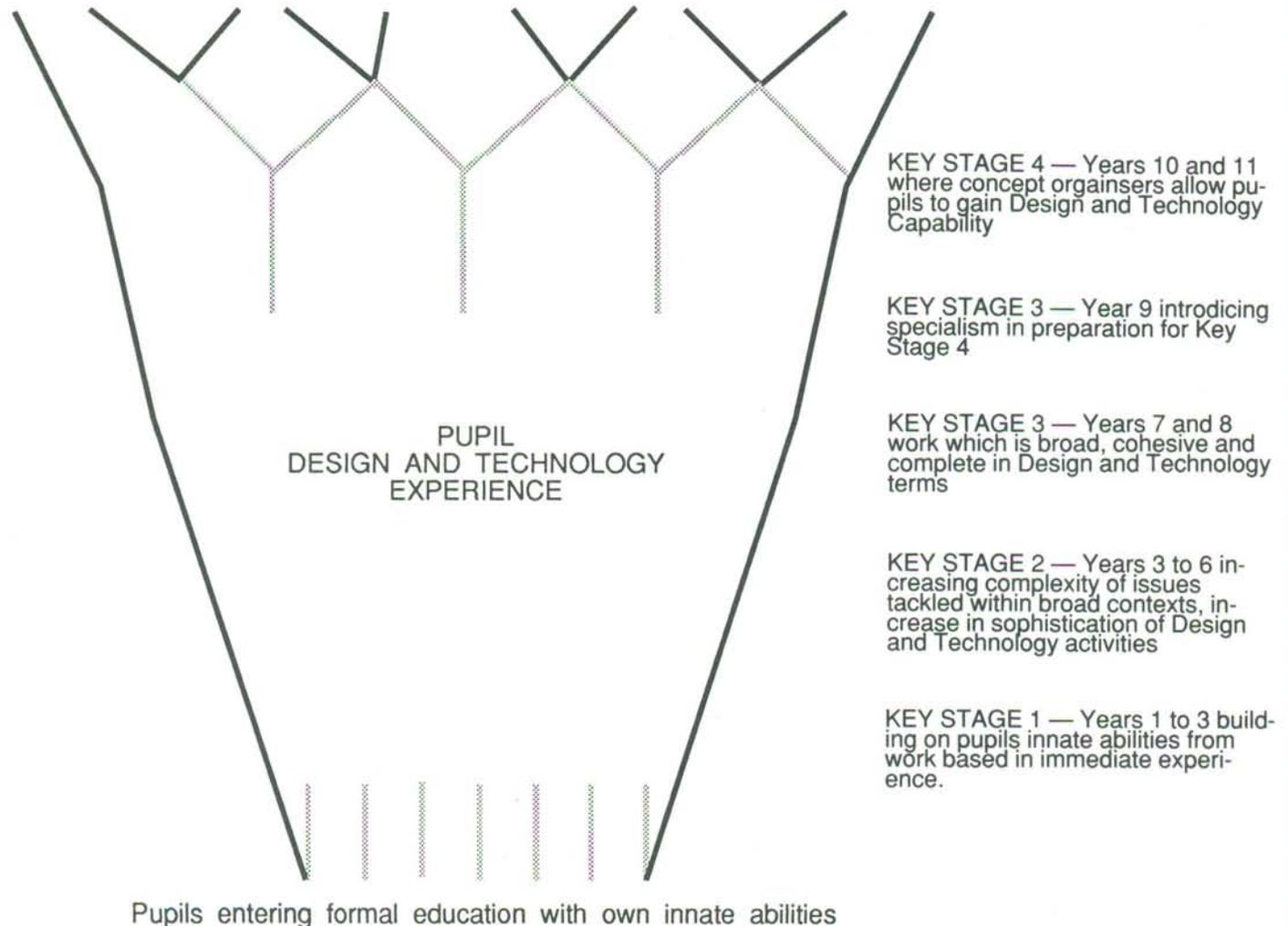
If we stay with this major issue of how D and T should be organised in schools,

before making decisions, we must consider other principles included in the report.

Pupils will come to formal education at the age of 5 with innate capability, for all humans are inherent problem solvers. The education system is taking this natural characteristic in order to develop and broaden it further. Therefore the development of these abilities during Key Stage 1 and 2 (Years 1-6) should be through a broad and varied set of contexts. The characteristic of these contexts is that they relate to the child's immediate experience, progression being achieved through the level of sophistication at which they are studied and in their relationship to the child's broadening experience. The overriding point here, however, is that the pupils will not see these D and T activities as separate from other experiences since

Figure 1

Specialisms in which pupils deepen their knowledge and skill and express themselves in as sophisticated a manner as possible (AT 1-4)

PUPIL DESIGN AND TECHNOLOGY EXPERIENCE

KEY STAGE 4 — Years 10 and 11 where concept orgainsers allow pupils to gain Design and Technology Capability

KEY STAGE 3 — Year 9 introdicing specialism in preparation for Key Stage 4

KEY STAGE 3 — Years 7 and 8 work which is broad, cohesive and complete in Design and Technology terms

KEY STAGE 2 — Years 3 to 6 increasing complexity of issues tackled within broad contexts, increase in sophistication of Design and Technology activities

KEY STAGE 1 — Years 1 to 3 building on pupils innate abilities from work based in immediate experience.

Pupils entering formal education with own innate abilities

primary school should not abandon their holistic approach to the curriculum for the sake of planning expediency. The theme and topic approaches have served pupils well and allowed concepts to be developed. This is not, however, to underestimate the need for training in order to assist primary school teachers, both prospective and practising, to gain for themselves D and T capability coupled with the means by which planning and monitoring can be undertaken.

As far as the implications for the secondary phase of this (Years 7-11) approach, planners should take account of not only the experiences of the pupils but also the organisation in which the D and T experiences have been gained.

Secondary schools, particularly in key stage 3 (Years 7-9) should further develop this notion of broadening the experience of pupils through the activities whilst also ensuring a deepening appreciation of the elements of the process skills. Here D and T experiences should be a fully integrated set of experiences for at least Year 7 and probably 8 as well. This will mean that whilst teachers will retain their subject

affiliations they will be seen (as will the experiences) by the pupils as a team giving a cohesive Design and Technology experience.

With Key Stage 4 in mind, currently that examined through GCSE Year 9 could be seen as an appropriate time to introduce teacher specialisms. However, this is not to say that a well planned and coordinated D and T experience should be replaced with single subject experiences. At present we do not know how it is intended that key stage 4 be assessed. We do know, however, that the pupils should deepen their appreciation of specific areas (these may be subjects, or could be other organisational patterns such as contexts or courses such as Telecommunications, Care of People, etc) during their D and T experiences.

This structure leaves schools with the capacity to determine individual patterns for implementation since variables of expertise, personalities and facilities will determine individual approaches. However, the general principles of pupil Design and Technology activity is upheld as a cohesive and identifiable experience for pupils. Also that the experience

ultimately is constituted by the pupils integrating the process skills with knowledge areas much greater in scope than just the restrictive checklist provided by the Programmes of Study.

It is clear that the non-statutory guidance due to be published after the final orders will address some, and it is hoped all, of the points raised within this article. It is also clear that whatever the guidance and final orders that each school will need to follow such an interpretational approach as has been taken here in order to satisfy the criteria of providing the best possible cohesive and progressive Design and Technology experience.

Pupils should be taken from the general to the specific, allowing them to increase their own abilities in the handling of Design and Technology activities which are constantly developing in their degree of sophistication.

- Nottingham Poly staff can offer in-service as well as initial teacher training courses which concentrate on the practical implications of this essential interpretation.