Technical Drawing Courses in Secondary Schools

A new HMI discussion paper, based on visits to 75 schools offers important new suggestions on how technical drawing courses may relate more effectively to the new approaches in Craft Design and Technology. We reprint, with permission, some of the points that have arisen in the paper.

There are indications that some teachers of drawing office based courses are concerned to relate technical drawing to the experience of the pupils both inside and outside the school and in particular to the practical work they may undertake in CDT. However, much of the content of technical drawing courses stems from aspects of geometrical and engineering or building drawing. The evidence from this study suggets that the content needs to be widened and teaching styles modified. The starting point lies in developing a unified and closely related approach to drawing office and workshop activities. No single mode of graphic communication is likely to be adequate for the expression of ideas. For example, when designing a handle for a tool it may be more appropriate to convey details of forms, sizes and finish by way of a three dimensional model.

Modelling, model making, freehand and mechanical drawing methods are therefore essential if pupils are to represent their design ideas fully. The development of these skills should be part of the general objectives of any drawing office based course. If technical graphics courses of this kind are to justify their position in the curriculum, they must aim to develop and use a wider range of design communication skills than at present. Courses should embrace all forms of two dimensional and three dimensional modelling and assist in the development of graphicacy, alongside literacy and numeracy, as a principal form of expression and communication.

As a checklist of basic requirements schools should structure courses to help pupils to:

1. use technical graphics and models to initiate, develop and then communicate their ideas to others;
2. prepare freehand sketches and working drawings using appropriate media and techniques of illustration;
3. decide when three-dimensional models serve a useful purpose in designing and be able to make such models simply and rapidly:
4. understand and interpret drawings prepared by others including freehand sketches, simple plans, diagrams and circuits, and formal working drawings;
5. use correctly the common conventions and symbols used in technical graphics;
6. select the most appropriate form of drawing for the tasks in hand;
7. understand the geometry required for the solution of a problem;
8. translate from visual into written, oral and numerical forms of communication so that ideas may be more easily extended or explained. Conversely, be able to accept an idea expressed in language or number but which may be more usefully represented in visual form;
9. understand the value of graphics in everyday life;
10. understand the importance of communication techniques during all stages of industrial manufacture.

To achieve this, pupils are likely to need access to a wider range of facilities and equipment for drawing and model making; some re-arrangement of furniture in the drawing offices or workshops may be desirable. Pupils need appropriate learning resources such as books, magazines, catalogues, photographs, drawings, slides, components, mechanisms, natural objects and samples of materials of different sizes and sections. They will also need a range of materials for modelling ideas including constructional kits for work involving mechanisms and components for work in electronics and pneumatics, some of which may already be available in CDT departments.

Such a development is in line with the recommendations of the Joint Council for the examination of this subject area within the framework of a common system of examining at 16-plus. The Council recommends three examinations in the CDT area:

1. CDT: — Design and Realisation;
2. CDT: — Technology;
3. CDT: — Design and Communication.

The first two would be workshop-based courses which include drawing as part of designing and making whereas the third would be taught in a drawing office. Design communication is seen as a specialist course within CDT and will therefore have the principal aim and objectives of that subject. All will share the fundamental principles of CDT but in the case of Design and Communication the emphasis will be on two-dimensional and three-dimensional modelling, detailing and communicating rather than making, testing and evaluating. The proposal offers an opportunity for schools to reconsider their current courses and to think in terms of a five year programme of design and communication, the last two of which would be examined by way of set papers and self determined course work. This would remove many of the present constraints affecting course design and so allow teachers the freedom to develop work which is relevant to their general school aims and to the needs of their surrounding industries. Furthermore it would encourage a closer working liaison with colleges of FE when extending the 16-plus programmes for courses of a pre-vocational nature such as those within the TBE1 scheme and those leading to the award of the Certificate of Pre-Vocational Education (CPVE) at 17-plus. The content studied and learning styles experienced on such courses will be expected to qualify a student for exemption from certain parts of Level 1 of the Technical Education Council (TEC) courses offered later in FE. Changes of this kind would bring added responsibilities for teachers and local industry would need to be informed of the changes taking place in schools so that the aims of new courses are understood.