Martin Grant
Chelsea College

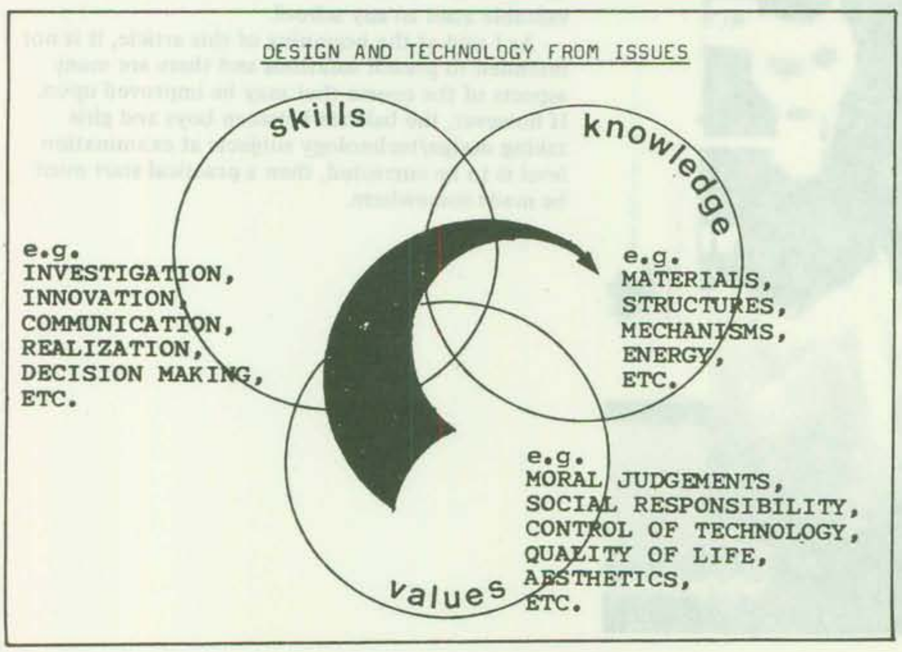
Nick Givens
Stantonbury Campus

A Sense of Purpose: Approaching CDT through Social Issues

In an earlier issue of the journal one of us (Grant, 1982) outlined an approach to the CDT curriculum which the Gate (Girls and Technology Education) project believes to offer the best hope of demonstrating the relevance of a design and technology education to the majority of girls who currently reject the subject area at the earliest opportunity. It was argued that too little attention is given to the values component of the design process (i.e. the questions of ethics, moral judgements, social implications and technology policies that underlie all technological decision-making in the real world) and research evidence was quoted which indicates that many girls (for whatever reason) would be more likely to continue their study in this subject area if these questions and issues were seen to be given the same importance as the technical solutions to design problems.

In this article we describe the planning and implimentation of one particular design project aimed at testing the feasibility of this approach – the setting of technological problems in a social context. From the outset we rejected the treatment of social issues as being separate from designing and making activities, just as we are wary of the current move in science education to deal with science related social issues by offering an additional course, such as Science and Society and SISCON (Science in a Social Context) to 4th, 5th and 6th formers. Although they are a step in the right direction we believe that such 'science and technology awareness' courses fail to alter the practice, and consequently the image, of mainstream science and technology courses in school. In contrast, the approach advocated by the GATE project attempts to integrate questions of value judgement with the process skills and knowledge content of technological activity. (See Fig.1) By raising social issues the values component is allowed to influence the selection and definition of design problems, the proposed solutions and the nature of evaluation.

The issue which we raised was that of safety and accident prevention in children's playgrounds and the target group consisted of four teaching groups of twenty first-year students in one of the twin schools of Stantonbury Campus, Milton Keynes. Here a team of two technology teachers are developing a coherent course through from induction at twelve years to certification at sixteen years, with the first two years being a foundation course for all and the second two being part of the option scheme in design studies. Our first task was to gather together relevant information and teaching materials which would help pupils establish the issue through reading and discussion. Local newspapers provided one source of reported playground accidents and a 'Which' magazine report on playground equipment made useful background



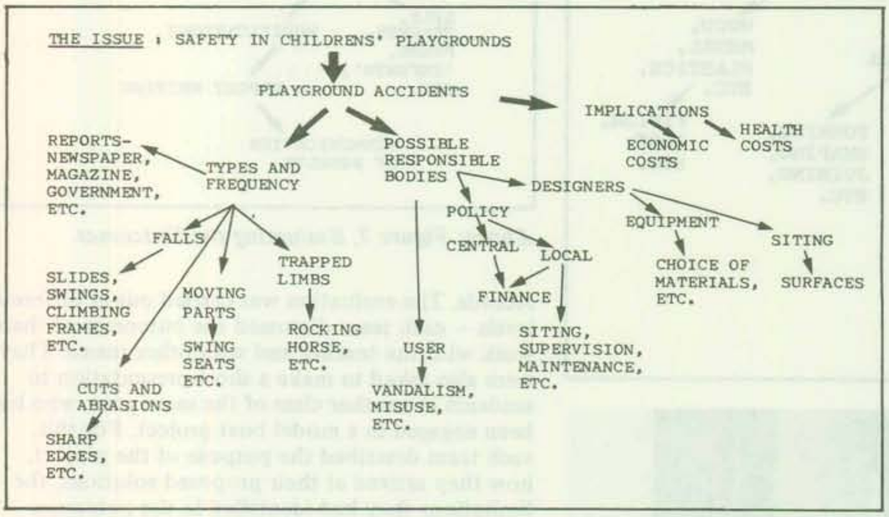
Right: Figure 1. Using the values component as a starting point for design and technological projects.
Above: Figure 2. Newspaper articles are often useful in raising issues with pupils.

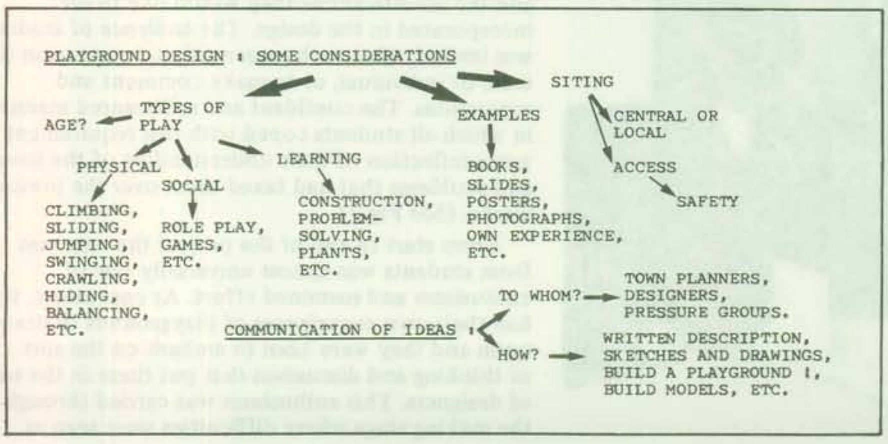
reading and gave valuable statistics on the extent and nature of playground accidents in Britain. Government reports, articles in the architectural press, and community studies teaching material provided additional sources of information. Using these materials, we were able to plan a structured introductory discussion with the students. We were also able to draw up a simple 'fact sheet' with questions which required students to interpret accident data in the form of bar graphs, etc. To begin the discussion students were given newspaper cuttings, such as the one illustrated in Figure 2, and asked to comment. We then used a series of open-ended questions designed to lead the discussion through the network of items that we considered might have an important bearing on the central issues. This network (or relevance tree) is shown in Figure 3.

In practice we found that students covered all of the areas that we had identified with little prompting. Indeed many were able to use their own recent experiences as examples of types of accidents and their probable causes. The session ended with students being firmly of the opinion that not all

Below: Figure 3. Establishing the Issue.

Bottom: Figure 4. Defining Problems.



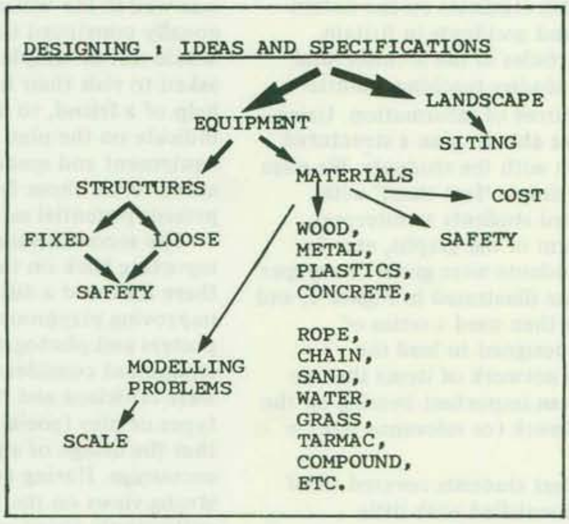


was well in the world of playground design but equally convinced that the resolution of this issue would not be simple. For homework they were asked to visit their local playground and, with the help of a friend, to draw a plan of the site and indicate on the plan the position and type of play equipment and special play areas. They were also asked to list those features that they thought might present potential safety hazards.

The second session began with the students reporting back on their homework findings and there followed a discussion on possible ways of improving playground safety. At this point slides, posters and photographs of playgrounds and play equipment considered to be 'good' and 'poor' were criticised and this led them to consider the types of play (social, physical, cognitive, etc.) that the design of a playground ought to allow and encourage. Having established that the students had strong views on the issue and that they were enthusiastic about exploring their ideas further, the question of 'so what?' arose – who would listen to their views and what was the best method of communicating those views? They identified town planners and a pressure group called 'Fair Play for Children' as the target groups for their ideas and, after considering and rejecting letter writing, sketches and plans alone and the construction of a full size playground (!), opted to built scale models of playgrounds with working models of equipment. These would then be photographed and sent to the groups considered to be directly concerned with playground design. The structure of this session is represented by the network in Figure 4. Before the session ended, a question of organisation arose – should each student work individually on their own proposals, should the class work together as one large team or should small team groups be formed? After considering the advantages and disadvantages of each, they elected to organise themselves into groups of four. Their homework task was to read a second background sheet (containing details of safety standards such as the maximum legal height for slides, and 'banned' equipment such as the rocking horse and witch's hat' and answer questions.

During the third session students worked in small groups (as anticipated, girls and boys formed themselves into separate teams), developing their ideas and drawing up plans for each proposal. In contrast to previous sessions the teacher moved from group to group, asking questions about safety, choice of materials, cost etc., and generally ensuring that the ideas being proposed were not too ambitious and that they could be completed in the time allocated for the project. The session ended (See Fig.5) with each team member electing to draw up a working drawing for a particular section of the playground or piece of equipment in preparation for the following week.

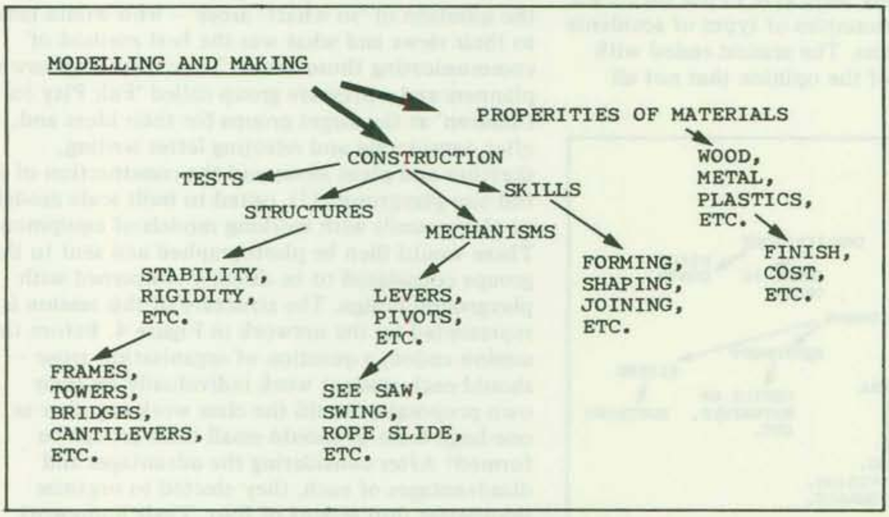
The following seven weeks were devoted to the construction and testing of the models. Throughout

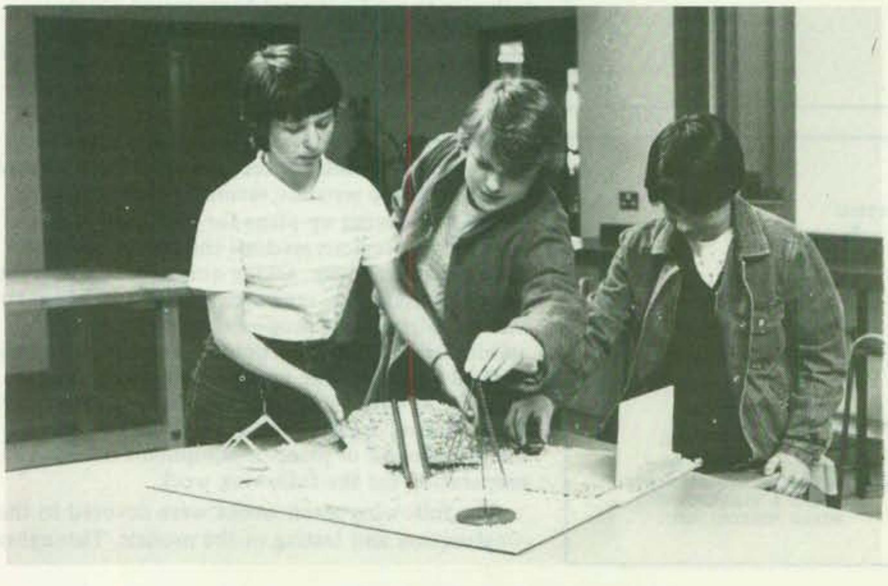


Right: Figure 5. Proposing Solutions.

Below: Figure 6. Realising Proposals.

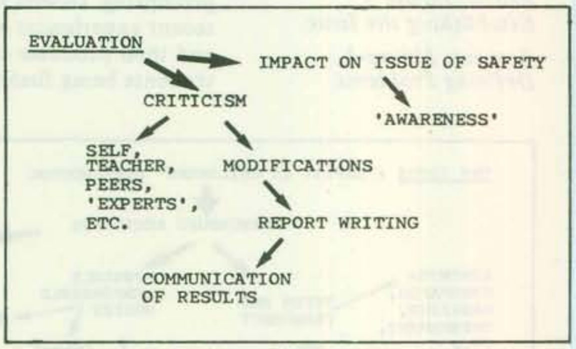
Bottom: Girls particularly welcomed the opportunity to work in co-operative teams.





this period numerous problems were identified which required the teams to be brought together. The first occasion when this was necessary arose out of the need to decide on a common scale for the models – pupils were given a short lesson on simple mathematical scaling, basic ergonomics and on the limitations of modelling. On several other occasions throughout this stage the teacher was able to give class demonstrations of construction techniques – but only as the need arose. The teams were also regularly brought together to review progress, share ideas and discuss basic concepts related to materials, structures and mechanisms. During this stage also, many of the original proposals were modified and simplified. (See Fig.6)

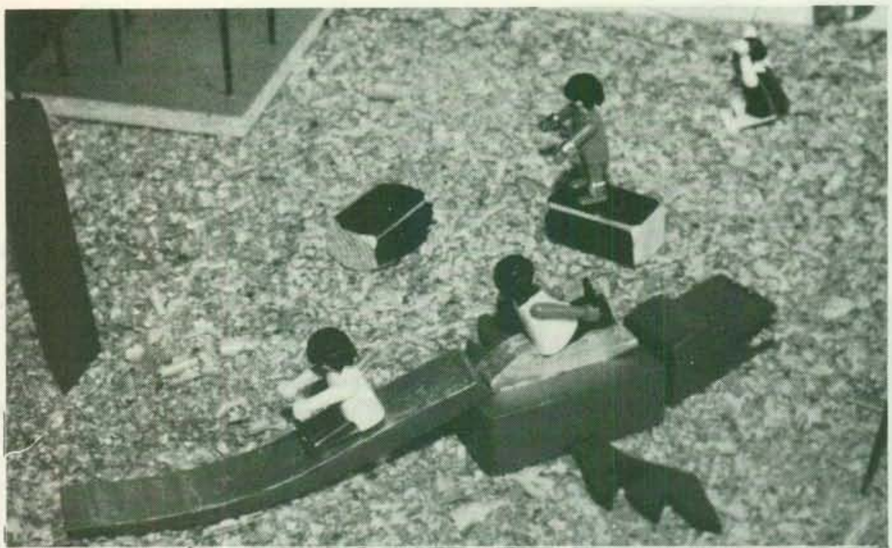
The final sessions of the project were concerned with a thorough evaluation of the students' work and the completion of written and graphical



Above: Figure 7. Evaluating the Outcomes.

records. The evaluation was carried out at different levels – each team discussed the outcomes of their work with the teacher and with other teams. They were also asked to make a short presentation to students in another class of the same year, who had been engaged in a model boat project. For this, each team described the purpose of the project, how they arrived at their proposed solutions, the limitations they had identified in the outcomes and the modifications they would like to see incorporated in the design. The audience of students was invited, after each presentation, to question the team or individual, or to make comment and suggestions. The confident and self-assured manner in which all students coped with this requirement was a reflection of their understanding of the issues and problems that had taxed them over the previous weeks. (See Fig.7)

From start to end of the project the response from students was almost universally one of enthusiasm and sustained effort. As consumers, they had their own experiences of playgrounds to draw upon and they were keen to embark on the sort or thinking and discussion that put them in the role of designers. This enthusiasm was carried through to the making stage where difficulties were seen as



opportunities to learn new skills. Despite the inevitable setbacks experienced by some individuals there was little negative reaction. The completed practical work was in most cases of a very high standard, (some examples of the completed work are shown in the accompanying photographs) with the level of achievement being no different for boys and girls and with some previously disinterested students achieving well. We now intend to repeat the project, with some modifications, with the current first year in the near future. On the first run we experienced two major organisational problems. Firstly, the sheer diversity of materials required and the open-ended nature of the design problems identified by the students led, on occasions, to an organisational nightmare for one teacher with twenty students. This time round we intend to converge the issue on to the safety aspects of two or three pieces of playground apparatus and to upgrade the research component of the exercise by making a more detailed study of some existing designs. Experiments will be suggested which will allow students to discover the effects of changing certain variables. Examples would include (i) the effect on amplitude of swing movement of altering the length of the supporting chains on a swing, (ii) the effect on frame strength and stability of varying the A frame angle in a swing or slide frame, and (iii) the impact absorbing properties of different swing-seat materials. Secondly, in order to overcome the problem of finding storage space for a number of bulky, landscaped baseboards, we are now experimenting with the design of a single contoured baseboard upon which each student team can overlay a fabric covering suitably coloured to indicate areas of grass, tarmac, sand, water, etc.

It is not easy to measure the long term educational value or impact on attitudes resulting from one project carried out over one term. However, as teachers we were sufficiently encouraged by the experience to plan further projects that approached design problems through social issues. We are convinced that the students made real gains in their understanding of materials, mechanisms, structures and aesthetics and that they were given the opportunity to develop skills of investigation, data-analysis, communication, invention, construction and evaluation. In addition we believe that through this project, and others that adopt a similar approach, girls and boys will develop an awareness that design and technological activity has limitations, that the selection of design problems and the emergence of particular technological solutions are the result of value judgements made by interested parties, and that technology has social, moral, political and economic dimensions as well as a purely technical one. We would hope that this awareness will encourage students to see technological decision-making as an activity that all citizens can participate in, whether they be 'experts' or lay people. In other words, we see the approach to teaching design and technology through social issues as a way of developing

technological awareness, understanding and capability as a single unified process. This holistic view of design and technology serves another purpose – it presents an image of the subject area as being concerned as much, if not more, with people rather than with abstract, isolated inventions. It demonstrates, in a way that no lecture, film or careers talk can, that technology can serve real life, socially-useful purposes. Unfortunately, the public image of technology – as presented in television programmes such as 'Tomorrow's World' and news items that herald 'the latest breakthrough' in space technology or whatever – and perhaps also in our own teaching – i more often than not, one of 'gadget gee-wizzery' alone. It may well be that many girls who currently reject the design and technology subjects in school do so partly because of that public image and its apparent neglect of the human condition. Our hope is that the approach outlined by the example discussed here will help to change that image by broadening the educational objectives of the subject and demonstrating the relevance of the subject content to the needs, interests and concerns of all young people growing up and living in a technological society.

References

Grant, M. (1982), 'Starting Points', *Studies in Design Education, Craft and Technology,* Vol.15, No.1.

Martin Grant is Schoolteacher Fellow for the GATE project, Centre for Science and Mathematics Education, Chelsea College University of London.
Nick Givens teaches technology at Brindley Hall, Stantonbury Campus, Milton Keynes.