

There are many factors which appear to be real barriers to girls full involvement in CDT up to public examination level. For example, the subject is seen by many as vocational training for boys; girls and boys have often received very different experiences in the home and in their primary schools; the curriculum in CDT may be biased in favour of boys; and departmental/school organisation may allow girls to respond to these pressures by opting out at a very early stage.

Subject teachers sometimes feel this is simply the way of things and there is nothing they can do to change such an established pattern in society, even if they wanted to. I feel, however, it is of vital importance that CDT teachers *do* confront the problem and act in a positive way to begin involving more and more girls in CDT beyond year 3 in secondary schools. The present situation regarding girls in CDT is a result of history and tradition, but our society has changed and will continue to change. Girls need to study the subject and gain appropriate qualifications for just the same reasons as the boys.

It may be true that considerable time and effort would be needed to confront many of the broader social barriers, but subject teachers can be to the fore in influencing pupils attitudes and degree of interest and enjoyment in craft, design and technology. When in the workshop/studio teaching situation, it is the CDT teacher who controls the teacher/pupil interactions which take place and who also has considerable influence over pupil/pupil interactions. These interactions are not only of a verbal nature but include silent gestures and written/pictorial information received. It is the CDT teacher who is responsible for the workshop atmosphere and environment and is therefore in the strongest possible position to support girls as they work and learn in what has traditionally been regarded as an all male area.

In this situation there is much the teacher can do. Through this brief account of some of my own recent teaching, I hope to show some of the possibilities and problems of changing practice towards positive support for girls in CDT.

A vehicle project was selected for one group of 1st year pupils in order to test the viewpoint that subject content in CDT work may be less important than the teaching method and teacher/pupil as well as pupil/pupil interactions, in terms of equal appeal and support for both girls and boys. Some CDT teachers are of the opinion that girls will only be interested in producing decorative pieces such as jewellery. The point that girls may enjoy such work is not disputed, but to assume this to be the limit of their interest in the subject seems shortsighted and a denial of access to the full spectrum of activities in the subject area. Furthermore, there was a desire to set aside the static non-functional aesthetic type of work which is often employed as an introduction to the subject (and beyond), and to offer both girls and boys the delights and fascination of planning, making and testing something which had a clearly defined function.

# Girls in C.D.T. - Some Teacher Strategies for Mixed Groups

A woodwork room was available and the 18 (9 girls and 9 boys) 11 year olds were timetabled for 80 minutes per week for 9 weeks (in reality, only 7 weeks were available due to other school activities).

The project was introduced as a 'vehicle' which was to be free running and tested by running down a ramp. A design for the chassis was given to pupils. They were all required to construct this standard chassis, using lengths of machine planed 15mm square Jelutong. Dowels were used to make the four joints and a simple jig was used to aid gluing in the bench vice. This rather formal method of teaching involved frequent discussions and demonstrations with the whole group. This highly structured approach in the first 3 weeks was a deliberate attempt to redress the imbalance in pupils' previous experience and to build confidence in those pupils who lacked that essential ingredient. Thus the following hand and machine skills and processes were learned: measuring and marking out, cutting, trimming, drilling, cleaning and finishing, assembling and gluing.

These first 3 weeks seemed a successful way of beginning the vehicle project, in view of the range of previous experiences. One of the obvious differences in reaction from girls and boys, to the work, came after a group demonstration on the use of the two machines, the disc sander and the pillar drill. The vast majority of the boys were eager to use such equipment; they would skip other stages to get their hands on the machines, and then take the longest possible time to perform the machine operation! The reaction of one of the girls - Gail, was quite different. When invited to drill holes for the dowel joint using the pillar drill, she gasped and exclaimed: 'I'm not using that great thing'. One of the boys (seeing his chance to use the machine for a second time!) offered to do it for her. I interjected at this point and declined the offer on Gail's behalf. A more appropriate solution in Gail's real interest seemed to be a repeat of the demonstration for her alone and, if necessary, helping her through the

operation. In fact she needed no assistance after the second demonstration and completed the drilling quite successfully. Initially there had been genuine apprehension on Gail's part, even after allowing for any over reaction as she played to her audience of fellow pupils by behaving in a way she saw as typically feminine.

Part way through the chassis construction period, the group were reminded of their contribution towards the design of the vehicle. They were asked to collect and bring into school any waste product or materials which could be used for wheel or rollers. They then needed to decide how these would be fixed to the chassis, allowing them to turn freely. Furthermore they had to decide upon the nature of the vehicle they wanted to build and produce drawings for the 'bodywork'. Much of this planning work occurred in the form of group discussions, e.g. advantages and disadvantages of 'Wheels' and various methods of fixing. A range of fittings and materials were made available for pupils to examine and experiment with, including a range of wooden dowel rod, mild steel rod, aluminium rod, soft iron wire, various diameters and lengths of bolts with washers and nuts, various gauges and lengths of round-headed screws, and assorted round wire nails and tacks. The group also discussed possible ways of constructing the bodywork before settling to their own sketch designs.

Girls were always fully involved in class discussion work, not because they were always offering information or asking questions, but because they were given ample opportunity to offer comments (a girl would be invited to respond if any girls were indicating a willingness to offer an answer to a question) and were asked specific points, if not. On one occasion the boys were clearly amazed when Lynne accurately explained the differences between a nail and a screw. One boy satisfied himself by shouting out that 'her big brother must have told her' since he did woodwork also. (In fact it was her father!)

Despite efforts to establish an egalitarian environment in the workshop, most girls were noticeably quiet and reserved, at first. Initially they did nothing but concentrate on their work and respond immediately to any request I made of them. Most girls were slow to seek my assistance. There was no communication between girls and boys unless a boy wanted a tool which a girl was using. An example of the non-too-subtle pressure exerted by boys was observed when a boy wanted a hand-drill which a girl was using. His method was not to ask her to pass the tool across when she had finished, but rather to place himself close alongside her, fold his arms and stare at the tool. The girl gave in before completing her drilling and was on the point of handing over the tool when I intervened. There were other examples of boys indicating that they considered a 'boys first' system should operate in the workshop. If a small queue of pupils developed, all wishing to discuss their design sketch proposals with me, boys would frequently expect

me to ignore the girl who was in front of them and deal with their queries. This expectation was indicated by a boy holding up his design sheet in front of the girl and as close as it could be positioned to my nose! When the next person in the queue (i.e. a girl) was seen, the boy would frequently resort to appropriate facial expressions and mumbled complaints about being delayed by a girl. An indirect strategy I employed towards promoting equality was to list pupils' names in my attendance/mark book in alternate girl-boy order. There was no reaction from pupils the first week, but the attendance check at the second meeting brought the following question from Paul: 'Sir, why are the names in your book mixed up instead of boys first and then the girls?' I replied with the question, 'Why should I list boys first?' A lively discussion ensued which almost developed into a battle of abuse between girls and boys; the discussion concluded however, with 'both sides' agreeing that I should really have adopted alphabetical order!

Linda and Lynne often remained in the workshop when the class was dismissed at 3.30 p.m. for 5-10 minutes. They would discuss their ideas for wheels, for example, or explain how they planned to construct the bodywork and seek opinion on this. These two girls were always as quiet as mice during the lesson and rarely contributed to class discussions or volunteered answers to questions. However, when the other pupils had left the workshop, they seemed to change, becoming confident in discussion about their work. I feel that girls are often considered not to have understood a teaching point in CDT lessons when it may simply have been a case of them not wishing to make a mistake in front of the other pupils. Linda and Lynne were working in a subject area with which they were unfamiliar, their confidence has to be encouraged to develop and I felt these brief quiet chats in a totally informal context helped that to happen.

A deadline was set by which time the vehicles had to be ready for testing on a ramp. As the deadline approached there was considerable excitement and feverish activity as final wheels were fixed and adjusted to run freely, or the benefits of streamlined body shapes considered by one or two bright vehicle designers! The session was great fun for all as each pupil placed their vehicle against the stop at the top of the ramp and released it without a push! After one run each, I suggested oiling all wheel/axle bearings before the second attempt. This was done with subsequent variation in performance compared with the marks placed on the floor at the time of each first run. After testing, a discussion about factors influencing performance was held; a number of useful elementary technical points emerged and were fully emphasised.

During the testing a particularly noteworthy incident occurred. When it came her turn for her first run, Barbara refused to test her vehicle saying that it was 'no good'. Despite the use of strong encouragement and persuasion on my part she still refused. It was agreed, therefore, that I would test-

run the vehicle. Upon placing it on the ramp and releasing – the vehicle moved not 1mm!! This caused great laughter from the group and even greater embarrassment for Barbara. I handled the situation by settling the group and then suggesting that I had been foolish not to listen to Barbara since she clearly had a good idea of how the vehicle might perform and invited her to explain why she thought it was not working. With a little help, Barbara was able to explain that the wheels were tipping sideways on the axle and locking onto it, mainly due to the hole in the wheels having been drilled rather too large. Barbara was suitably praised for the sound understanding and explanation and was boosted to the point where she did the second test run herself after oiling. The vehicle ran slowly down the ramp this time.

As the weeks passed there appeared to be a noticeable increase in confidence and voluntary participation on the part of the girls. Many of them actively resisted and opposed the 'put-downs' of the boys; they were no longer the quiet pupils who remained and worked at their bench retreat, but became physically mobile in the workshop (as all but one or two boys had always been) chatting as they went. It became not unusual for the girls themselves to deal (verbally) with any boy who interrupted a discussion between them and the teacher by shouting out or butting in.

Interest and participation might also be gauged in terms of the pupils response to demands made of them. The girls certainly responded far more positively to the request for appropriate 'wheels' to be brought from home. Two girls each brought enough wheels for themselves and spares to equip one other person. Only one girl did not produce wheels of her own. The boys were slower to respond, remembering the need only when they walked into the workshop the following week! Three boys failed to bring wheels.

It was because of pressure from Lynne and Samantha that 'extra time' was made available for any pupil who wished to put in additional time at lunchtime the same day. This pressure was not because these two girls were slow with their work, on the contrary they were progressing well compared with the majority of the boys. They simply enjoyed the work and wanted to do more. Such enthusiasm and interest was a joy to experience. Lynne complained that her Dad would not allow her the use of his garage at home to work on her vehicle, although her brother (two years older) was allowed in!

It is difficult to be objective when assessing the degree of success of one's own teaching. It is true, however, to say that both girls and boys developed real enthusiasm as the work progressed. The rather masculine subject of 'vehicles' seemed to have been found equally acceptable to both sexes and one reason for this may be because of the testing and comparison of function aspect. The part played by pupils in making decisions about their individual vehicles may also be relevant, as may the fact that

they had to seek out and collect parts from outside the school. (Part used jars of marmalade and bottles of tomato sauce in kitchen cupboards without their lids seems a small price to pay!!) If success of individual pupils is judged on the basis of the distance vehicles travelled along the floor after leaving the ramp (a highly doubtful yardstick!) then boys did slightly better than girls as a group. My own assessment of the effort, design skills and the approach to practical constructional skills (another doubtful yardstick!) would suggest the reverse situation. If pupil opinion is considered (perhaps a more valid measure) spontaneous remarks like '... this is miles better than cooking' (Lynne), 'It's been fun' (Barbara) and 'When can we do more of this?' (Michelle) are extremely encouraging.

#### **Girls into Science & Technology (GIST) Project**

Girls into Science and Technology (GIST) is an action research project based at Manchester Polytechnic. Its purpose is to initiate and support school based intervention work aimed at encouraging girls to continue physical science and craft design and technology (CDT) after their third year. A cohort of approximately 2,000 pupils who entered ten co-educational comprehensive schools in Greater Manchester in September 1980 are being followed until they make their option choices in 1983.

GIST is working closely with the teachers on a variety of strategies. It is arranging a programme of visits to schools by women working in scientific and technological jobs who can act as role models for the girls. It is working with teachers to develop and try out curriculum materials which will appeal to girls' interests. It is also working with teachers to examine classroom interaction with girls and boys and suggest ways of making it more egalitarian. Sex stereotyping has been discussed with teachers in a series of workshops and conferences, some schools have arranged special clubs for girls to follow up scientific and craft and design interests away from the sometimes inhibiting presence of boys. As the pupils approach their option choices during their third year, GIST intends to provide extensive careers advice on the implications of their choices.

During the Christmas and Easter terms of their first year at secondary school the pupils involved in the project were given a battery of aptitude and achievement tests, these were designed to assess their knowledge of scientific and technical matters and their attitudes to those subjects before they had much experience of them at school. As well as the subject based tests, pupils were given a sex-stereotyping inventory and some background questionnaires to complete.

The project team welcomes contact from individual teachers of science or CDT. An introductory booklet is available outlining the background and aims of the scheme as is a second booklet giving results and implications of the initial test\*.

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