The role of group work in the delivery of Design Technology in the National Curriculum

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The Design and Technology report of June 1989[1] mentions group work on a number of occasions eg "To organise teams when working as groups" (PS L4) or "To interact with groups of peers and be sensitive to their views as a way of generating ideas" (PS L7). There are many more references and the NCC Consultation Report[2] also would appear to support group work as it has adopted many of these references.

We will, therefore, be expected to use group work in our teaching, but rather than grudgingly accept this we should appreciate it's potential and use it. My aims, is this article are to look at how we can use group work to:

a support design and technological endeavour

b familiarise children with industrial/commercial modes of working

c offer social educational benefits.

Firstly I will attempt to justify group work using these three areas. I will then consider the key question of how we may assess group work and finally I will make some suggestions as to how the teacher may employ group work.

There is evidence to suggest that groups of people, co-operating together, can produce more and better ideas than the same people working individually. This concept has been variously described, but I shall use the term 'synergy'. Certainly industry has learned this lesson and is increasingly using groups in both design and production. Buchanan[3] notes how 'scientific management' theories which attempt to split every role into a clearly defined description have lead to dissatisfaction and poor production. Group work has shown benefits with high employee involvement and greater flexibility. Flexibility helps production, but also the individual in being able to adapt to rapid technological development. Remember 'continuous change is here to stay'. Peacock[4] the research director of Philips, speaking at the DATER 89 conference further developed these points, stating "I know that team performance is infinitely higher than individual performance". He pointed out how he uses group/teamwork ability as a major factor in selection for research and development posts.

Driskell et al[5] also note that group work performance is often higher than one would expect, referring to it as an "assembly bonus effect" and suggest that the pooling of resources and a better ability to correct errors may be the cause. Readers who have experience of group work such as 'brainstorming' will, however, recognise that this explanation is not satisfactory. In a brainstorming session the presentation of ideas, uncorrected by criticism, generate further ideas in group members. Indeed often 'silly' ideas generate positive ideas in others as often professed by DeBono[6]. The by now increasingly familiar 'NASA' (lost on the moon) simulation is a potent demonstration of an improved problem solving ability by use of groups (Ginifer[7]).

Many teachers use brainstorming techniques within classes. I would also encourage the use of design groups', ie the grouping of 4 or 5 children around a table to work together on a task even if they are to produce individual results. We must break away from the traditional model of the individual child working without sharing thoughts with others.

The second area — familiarisation with industrial/commercial working practice has to some extent been covered above. Industry is increasingly adopting group work, giving groups far more responsibility and eliminating levels of management. Without preaching narrow vocationalism, group work experience is going to help the child when he/she enters adulthood. There are increasing numbers of curricular experiences which offer children such opportunities, often based upon enterprise models eg Denton.[8]

The third benefit of group work — social skills development is perhaps the least obvious. There has been considerable research in America on the use of group work in developing heterogeneous integration of racial/cultural groups. Miller and Davidson-Podgorny[9] in a review of this work are in "little doubt that co-operative interaction improves intergroup (ie racial) relations". Yeoman[10] in a similar review indicates that group work may improve self confidence, independence, social skills and empathy for others. If we turn to academic progress, Bennett and Cass[11] looking at group work with various ability levels consider that high attainers do well whether with high or low attainers but that low achievers can do significantly better in some group work situations.

Moving on we should look at an area of group work that often causes concern — how we can assess children. Clearly if something is important we should attempt to assess ability in it in order to develop the child but also to develop our teaching. The Science National Curriculum report[12] had AT18 "working in groups", but this was dropped by the NCC in the final statutory orders. This is probably due to the difficulty of reliably assessing Statements of Attainment such as "show sensitivity to the needs and limitations of individuals within the group". This is a very real problem, but it can be assessed by direct teacher observation combined with pupil self reporting and the use of profiles and records of achievement (RoAs). Such techniques are very valuable in giving both formative and summative feedback, but clearly do not match up to the reliability required by National Curriculum reporting.

I would respond to this situation in two ways:

a. Even without assessment I will continue to use group work because of the benefits it offers children.

b. We should not fall into the trap of only assessing the easily assessable. RoA's do offer advantages. Much work needs to be done, however, in gaining credibility in the world of work.

Finally I shall turn to the strategies we can employ in using groups. Bennett and Cass[11] in recent work (though not D and T) feel that teachers often have children "working in groups rather than as groups". Such group work is often simply the sharing of desperately short resources but without the potential positive effects of group work, due to teachers allowing only limited discussion and not actively encouraging the interchange of ideas and opinions.

Ghaye[13] stated that "The social and intellectual skills that children need in order to work together in a co-operative egalitarian and supportive manner, need to be taught in a sustained and systematic way". The first point, therefore, is to plan group work into schemes of work. Vary the style of the group, consider size, selection techniques, social, intellectual, cultural mix, the physical arrangement of work bases and the way in which the task is set.

Groups can be selected in many ways, the easiest being peer groups. Such groups can ease communication in early years but fail to introduce a learning tension. By 'socially engineering' a group the teacher can help children to listen to and empathise with those beyond his or her immediate peer group, this broadens social skills and is often the basis for innovative ideas. Such groups need to be selected sensitively, however, putting very diverse types together too soon could be counterproductive.

Levine and Rosso[14] found that there were indication that girls placed singly in groups will tend to conform rather than challenge. Girls should be supported by at least being in pairs. Boys on their own are less likely to simply conform.

Bennett and Cass[11] found that low achievers work better if placed in pairs in a group with one high ability child. Put the other way around a single low achiever will tend to opt out. Again this work indicates that high achievers are not disadvantaged by working with low achievers in this way.

The size of the group can be important. Two is a good starting point at an early age, but it does not have the same scope for discussion and development of ideas. Three's and four's are ideal in my experience. Once we start going higher we find the phenomena of 'social loafing' (Allison and Messick[15]) becoming obvious. Social loafing means simply that some may 'take a ride' rather than contribute. This increases as the group size rises as individuals feel less responsible in a large group — eg soccer crowds.

The physical arrangement of the group work space is important. Eye contact and easy communication by speech and the use of drawings and model between all members is essential and so tables should allow this. Again as group size increases above 5/6 this becomes difficult.

The way in which the teacher introduces the task is also important. The group work aspect should be emphasised. Children should be aware that it is one of the teacher's objectives and that discussion and the sharing of ideas is positively encouraged. Children are often so conditioned to producing their 'own' work that they need easing into group work. Sometimes you may set individual projects which are tackled in groups, ie they work together, sharing ideas but producing what may be quite individual final ideas. On the other hand we should also set team tasks, ie tasks when individuals work on the one project, each contributing in their own way. There is the danger of rigidly delegating tasks, however, and loosing the synergetic effects of group work, so encourage frequent meetings when the work is discussed and co-ordinated.

The allocation of specific roles such as leader, accountant etc has often been a part of enterprise type projects. I would, however, give a warning here. Such specific delegation is a development from the 'scientific management' that Buchanan[3]) feels often leads to lack of flexibility and poor results. My own experience in group work is that the best results usually come from groups which adopt a more 'co-operative' structure in which individuals play a more flexible role. Providing communications are maintained such an approach is superior to rigid delegation.

Competition is a further factor we can introduce to group work. Here children can co-operate within each group and compete against the other groups. This can add a level of motivation which can improve work levels and idea generation still further. Whilst many teachers may be resistant to the idea of overt competition it is a fact of life once children leave school and it is far better that we introduce it in a controlled and supportive environment.

In conclusion it is apparent that we will be required to introduce group work into D and T. There is always the danger that compulsion leads to only a grudging acceptance. In this case we should recognise this as an opportunity to develop the group work that we do and maximise on the potential that this offers children.

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