

Getting more from a design experience — a challenge to the traditional curriculum

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It is the intention of this article to look at some recent developments in approach to design and technology that have been developed at the Department of Design and Technology at Loughborough. These have centred about two factors in the conventional approach to design in schools, ie:

a. CDT is usually limited to design and make. It does not look further, to the commercial application of design. CDT, and particularly technology is more often than not a 'problem solving circus' with little link with the real world.

b. This situation has partly arisen due to the way an expanding curriculum within a traditional timetable structure has become increasingly fractured. Effective liaison between departments and examples of cross curricula work, particularly in upper schools, is rare. We have built a curriculum of 'little boxes' which is increasingly failing our children in educating them for the real world.

Recognising such factors and generating ideas on how to alleviate them is one thing, actually running an experimental programme to trial ideas is often very difficult. At Loughborough, we have been fortunate to have hosted three, week long residential TVEI courses for students from Bedfordshire. These courses have been a very valuable opportunity, far removed from the normal school environment, to experiment with the points listed above. The most recent, for 56 sixth formers was also interesting in that we were able to trial a new computer simulation designed to be run over a period of time in conjunction with a design brief. We can, therefore point to ideas that have been tried, albeit in an unusual environment, and found to be successful. It is hoped that teachers will find these points of value in developing their own approaches to design and technology.

The week was essentially a 'saturation' experience in that the whole time was spent working to one end, which did not recognise the normal 'boxes' of the curriculum. Because of the saturation effect it was possible to build student involvement and identification with the brief to a far higher level than is normally possible in schools with the frequent interruptions of the timetable. Students began to 'live'

the experience, so gaining far more from it.

Students worked in 'company' teams of 4 in a commercial environment, in that they were competing for the finite resources of a market place. In this way, using techniques which will be elaborated on later, it was possible not only to gain a great deal from the experience but also to evaluate it in commercial terms — ie which companies made the most profit and which went to the wall!

The brief itself invited the teams to look into the area of catering for the new fleets of buses which ply our motorways. The teams had to produce 'airline' type meals. Note that the brief was based around a real world 'opportunity' rather than a more sterile 'egg race' type brief. The teams had the very broad brief of research, development, production and marketing of the packaging, food itself and point of sale material. At the end of the week a 'trade exhibition' was held where each team set up a stall with their work and gave a verbal presentation. After this individuals became 'buyers' for the bus companies with a nominal £1000 to spend. Each stall was manned by one team member as a salesperson, and after 30 minutes or so orders were placed on a value for money basis (not necessarily cheapest).

We can see from the above description that the design experience was taken beyond that normally used in schools and into the world of commerce and the need to 'earn your living'.

Such an approach reduces the artificial barriers that the timetable helps to erect in both students and teachers minds. The 'boxes' of the curriculum are tending to multiply and are all too often providing refuges for teachers who are reluctant to share their experience on a broader, more realistic stage. At the university, running the course under discussion, we were able to ignore all stereotypes of curriculum and timetable.

The use of teams rather than individuals was an essential aspect. These teams were not self chosen peer groups but 'socially engineered' in that they were mixed and consisted of students from different schools. In this way it was possible to maximise the learning potential for group work skills.

This is an important area, in schools we often shy away from group work primarily as it is so difficult to assess, and yet by doing so we reduce the students experience in an essential area. I do not claim to have all the answers to assessing the individuals performance as a part of a group but I believe, nevertheless, we should move forward in offering these experiences to students in addition to 'normal' practices. In this way we are broadening the base of the educational experience, as HMI suggest, in the fields of attitudes and skills together with concepts and knowledge.

An interesting aspect of the group approach was that when demonstrations of various forms were held during the week there were only enough places to allow a maximum of one member from each team. Because of this, delegation was essential, the delegate had responsibility and was tasked to communicate the essential information back to his/her colleagues as efficiently as possible.

Competition was a factor within the brief. This is often an area frowned on in schools, but again I would challenge this. Competition is simply a fact of life, by hiding students away from its effects we are being unrealistic, they need to experience it in a controlled environment and in this respect an experience such as the one under consideration is close to ideal.

One criticism that can be levelled against a saturation experience is that the student has a relatively short attention span, this being one of the main reasons for the school timetable operating as it does. This is a valid point, but if we look at it from a perspective other than the traditional we can see the opportunities the saturation experience offers. The ability to cover a meaningful task, across a broad range of the curriculum, uninterrupted, has been mentioned, indeed I would go further and point out that we can move away from the 'clock watching' of the timetable towards an attitude of 'getting the job done'. We must, however, recognise that attention spans are limited and do vary in individuals. The saturation experience requires planning by both teacher and students, in this respect the setting of internal deadlines (a form of simple critical path analysis)

is most important and can be used to advantage in terms of attention span.

In the TVEI saturation week that we are considering a further aid to attention span and continuity was the use of the computer programme. In running the previous course we had experimented with the use of a simple data base to control the simulation, this was most successful, however we analysed its use and generated a proposal for a far more sophisticated version which was subsequently written by a part time member of staff with a great deal of experience in this area, together with the author. The new programme has several modes:

a. It requires each team to enter data at various times during the experience. The first of these is simply a company name and a password within an hour of starting work. This is done to encourage the team to get to know each other quickly and decide on an image — ie it 'breaks the ice'. The password introduces the concept of security and can lead to discussions on patent laws, industrial espionage etc.

The basic data entered, such as numbers of components, number of materials, material costs etc, operate on a number of sub routines to produce 'levels of complexity' and then estimated production costs, rent, wage costs etc. The 'directors' of the company set their own wages against a scenario painted by staff.

Once the initial ideas are firmed up the company approaches a 'bank manager' and asks for capital. A case has to be made and presented. The bank manager (a member of staff or the real thing) can then allot capital according to merit. Here the team has to face 'authority' figures and prepare effective research and proposals. Good mathematics and communication skills are essential. Many students remarked on the responsibility this placed them under and its value.

By the end of the simulation the companies are ready to decide on profit margins. The final market place

simulation is then held. After this the data on sales is entered into the micro and a printout on company performance is produced. This is the acid test of the simulation.

b. The second feature of the programme allowed students to experiment with figures and produce forecast analyses in the form of figures and graphs, again based on sub routines in the programme. This is most useful, it allows teams to look at, for example, the effects of reducing the complexity of their design or using alternative materials. The programme will also show the effects of various levels of advertising on sales over a period of years together with the true worth of the company as various levels of borrowing are paid off and sales accrue.

c. The third feature is a secret access routine for staff. This allows staff to manipulate figures to increase realism or demonstrate various points. An example of this may be the alteration of the costs of plastics together with a 'BBC newflash' on a sudden rise in the cost of oil. Another example may be a strike in the only factory supplying a particular component.

The new programme was of great value in terms of furthering the realism and atmosphere of the week together with improving staff control. A few developments were found to be necessary, but with a little further work the programme will be in a marketable shape and could be of great value in schools.

Whilst the simulation under discussion ran for a week the programme could be used on far shorter time blocks, for example the design and marketing of paper aeroplanes over an afternoon.

It should be noted that whilst the programme was of great value in running this form of work it is not absolutely necessary. Teachers could experiment with the approaches suggested in this article without such a programme or use a very simple data base as an alternative.

The management of the experience is a most important area. The computer programme was of great benefit but it was used in conjunction with detailed prior planning and regular morning briefings. Here it was possible;

a. to clarify aims and objectives to students (how often do we tell students WHY we are doing these things to them?)

b. to summarise the previous days work and clarify essential administrative points for today's work.

c. to continue to build the 'atmosphere' of the simulation. Considerable enthusiasm and theatre is needed by staff. The atmosphere and work rate were commented on by a number of visitors. By half way through the week the activity was far more intense than normally seen in schools.

The weeks experience was evaluated by questionnaires filled in by school staff supporting the students and by the students themselves. All these replies were, of course, done anonymously and in a way intended to minimise any interaction effects. The results were impressive, the students felt the experience to be of great value and frequently commented on the relevance to themselves compared with the traditional timetabled curriculum.

Against this, of course, we have to consider the fact that such experiences, run in schools, would be far more difficult. This is accepted, however once one accepts that there is something to be gained in such an approach it is a question of experimentation, perhaps at first on a small scale. Experience will rapidly accrue, making further development easier. The support of an understanding head and colleagues is essential but it is the individual teacher's responsibility to sell his ideas to these people, to 'educate' them.

I feel the time has come to take a very radical look at the way we organise our curriculum and teaching time, I agree it looks an impossible task, but notice how many times in the past the 'impossible' has been proved possible.