

This article describes:

- the context for design and technology in a special school for children with a variety of disabilities
- a design and technology project with children with severe learning difficulties.

Introduction – the school and its organisation

Fairfields School is a special school catering for pupils with physical disabilities between the ages of two and eleven. There are currently 59 pupils on roll and over 75% of the pupils have severe or moderate learning difficulties. Most pupils have additional difficulties, which are present as profound and complex disabilities, and have statements of special educational needs. However, a few of nursery age are still in the process of being assessed.

The school is organised into two departments – early years, catering for pupils between two years and reception and the primary department, catering for some reception pupils and those at Key Stages 1 and 2. Within each department are a number of classes into which the pupils are placed on the basis of age and curricular need. This results in classes of parallel ages providing curricula which centre on either a modified mainstream curriculum or a foundation curriculum. Recent curriculum development work has documented the whole school curriculum as being significantly different from that found in a mainstream primary school, and it is made up of four interacting strands:

a) The Foundation Curriculum. This focuses on the acquisition of skills and knowledge ranging from the earliest sensory learning (visual, auditory and tactile awareness) to the areas of fine and gross motor communication, social and personal independence, creative activities, play and cognition.

b) The National Curriculum and RE. All pupils of an appropriate age are entitled to access to relevant National Curriculum programmes of study. The statements of

pupils with learning difficulties acknowledge that they may work outside their age-related key stage.

c) The Experiential Curriculum. This strand of the curriculum aims to provide pupils with a wide range of appropriate, stimulating situations, linked to the nine areas of experience. (The curriculum 5-16 HMI). This strand often focuses on the process involved in learning and learning outcomes in terms of skill, knowledge or attitudes are not pre-specified.

d) Personal, Social and Health Education (PSHE). This is viewed as a separate strand in order to acknowledge its importance in Fairfields' curriculum and to emphasise the extended content area over that specified in national documentation.

The balance of the strands present in each pupil's total curriculum varies to meet the individual's needs. Thus, the curriculum of a nine-year-old, with physical but minimal learning difficulties, would be largely made up of strands b and d, while a three-year-old with profound and multiple learning difficulties would participate in a curriculum focused on strands a, c and d.

Thus it can be seen that the place of Design and Technology has been identified as one of the nine National Curriculum areas that have to be studied, and pupils of appropriate age have access to it through either acquisition of skills, knowledge and attitudes or experiential learning as appropriate, as part of a balanced and relevant curriculum.

The project

Collaborative planning

The collaborative planning process occurred in several stages, some of which are part of normal practice in the school and other activities which are a direct result of this assignment.

Stage 1:

The school has identified a two-year rolling topic plan, with coverage of programmes of study from science, geography, history, art

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and PSHE outlined for each half term's topic.

Stage 2:

Prior to the beginning of the half-term, Key Stage 1 and 2 teachers meet to examine coverage and progression between the classes and to share experiences and brainstorm ideas.

Stage 3:

The classroom team (teacher/s and where possible nursery nurse/s) then meets to form a topic scheme of work for each class. In this instance there was discussion between the classroom teams of the two groups involved to outline the programmes of study from design and technology that the pupils needed to cover and to suggest focused tasks and assignments that would give the pupils appropriate experiences and develop skills and knowledge outlined in the programmes of study.

Stage 4:

There followed several short informal discussions between the other teacher involved and myself, during which we made decisions about teaching styles, materials to be offered, assessment procedures and designed a simple pupil evaluation sheet (based on those shown in Blueprints for Technology). Activity plans were completed by the teacher and teaching, spanning several sessions, was then undertaken. This was followed by short informal evaluatory discussions focused on both the activities and the process of the assignment, between the adults involved.

Teaching and learning

Chosen group

Three older pupils were chosen from the nursery/reception aged children, a group consisting of 10-12 pupils and staffed by two teachers and two nursery nurses. However the design and technology task was delivered by the writer on her own. The pupils all had some degree of expressive language (signed and speech) and were working at least at a three word level for receptive language. It was felt that these pupils would be ready to benefit from the opportunity to make some considered judgements and develop skills in joining and

fixing. Many of the other pupils in the group needed further experience in making and communicating simple choices, experiencing and experimenting with a variety of materials and developing early fine motor skills. Differentiation of task was used to give them these experiences and will not be considered here.

Curriculum coverage

As was previously outlined collaborative planning led to the identification of learning objectives and topic related activities based on the needs of the pupils. It was decided that an initial emphasis would be placed on *designing and making skills*, with some inclusion of *knowledge and understanding of materials and components*.

Thus, more specifically, the activities were designed to introduce or develop the following capabilities from the programmes of study of the National Curriculum.

Designing skills:

- 3a) draw on their own experience to help generate ideas
- b) clarify their own ideas through discussion
- c) develop their ideas through shaping, assembling and rearranging materials and components.
- e) make suggestions about how to proceed
- f) consider their design ideas as these develop and identify strengths and weaknesses.

Making skills:

- 4a) select materials, tools and techniques
- c) assemble, join and combine materials and components
- e) make suggestions about how to proceed
- f) evaluate products as they develop, identifying strengths and weaknesses.

Knowledge and understanding:

- 5b) make structures able to withstand greater load
- c) to investigate and disassemble simple products in order to learn how they function.

It was envisaged that the work would comprise a number of activities:

- activities in which pupils were given the opportunity to investigate, disassemble and evaluate simple products
- focused practical tasks to develop particular skills
- a structured assignment in which pupils design and make a product

It was also planned to give pupils the opportunity to

- work with a narrow range of materials
- apply skills, knowledge and understanding from the programmes of study of other subjects in the National Curriculum (and other areas of the Fairfield's Curriculum)

Cross-curricular links

Design and technology is traditionally linked with the other National Curriculum subjects of science, art and maths. For pupils with physical disabilities and varying degrees of associated learning difficulties, design and technology provides a valuable vehicle for acquiring, generalising and maintaining skills, knowledge and attitudes from other areas of the Fairfield's curriculum. Those which are facilitated through this particular assignment are noted at the planning stage on the activity plans. Thus in this instance examples of the major cross-curricular links which were fostered were:

Fine Motor (Foundation Curriculum)

To develop hand function patterns, used in conjunction with self monitored (or minimal prompts) good sitting position

- to use two hands actively together to complete task
- to develop ability to pronate and supinate the wrist
- to develop ability to use and control the amount of pressure/strength when using whole hand, finger/thumb in opposition, isolation of individual digits.

Communication (Foundation Curriculum)

- to develop an expressive and receptive vocabulary (at a 1-3 word level) relating to joining and combining techniques
- to interact verbally/non verbally with peers

- to use expressive language (sign, speech, symbols) to communicate opinions and ideas

If the differentiation for children with more severe learning difficulties had been included in the activity planning earlier cross curricular links would have been apparent (eg visual attention, placement and grasp and release skills).

Activity planning

It was decided by the teachers involved that in view of the pupils' needs, limited experiences and learning difficulties the tasks chosen would be relatively simple yet allow for the wide degree of differentiation needed. The topic for the early years department and Key Stage 1 classes was Toys and school level schemes of work had identified a number of programmes of study from various subjects that needed to be covered. It had also been decided to hold a Teddy Bears' Picnic both as part of the topic and to raise funds for Comic Relief.

Bearing in mind these factors and those of curriculum coverage in design and technology outlined above it was decided that the construction of a *bag for teddy to take an apple to the picnic* would be the focus of the assignment opportunity.

Thus activity planning for the group was undertaken by the teacher. The planning was recorded in activity plans, an example of which is seen in Figure 1.

Content of project

Focused task

The content of this was focused on the making skills of *assembling, joining and combining*. Much of the teaching in this group is based on child or adult led play and exploration and as part of this a small area was created to which the children could have access during the day which would provide opportunities to assemble and join a range of materials similar to those that would be on offer during the assignment. These were chosen to be familiar materials, as some of the methods of joining were new to the pupils. Some of the materials were chosen to be able to complete a successful assignment while others were chosen

Figure 1

Activity plan: Design and Technology
Topic: Toys/Teddy Bears

Date
Teacher: SCA

Aims and teaching points

- To encourage pupils to look at a collection of artefacts and express opinions on

- a) function
- b) like best

Joining techniques

- To test bag and see if it meets criteria

- ie — hold an apple
- ie — Ted can carry it

2) Others to carry on with 3 bears work)

1) Group — Sam, Sean, Terry

a) explain task ie to make a bag for this (show) teddy to carry his apple to the picnic.

Talk about the properties of the bag —

- ie needs to be big enough for apple
- not too big for teddy
- strong enough for apple
- Ted be able to hold it

2) Look at a variety of bags for size

strength

joining

pattern

handles

take apart

3) Use the available materials to make and

test a bag

4) Complete evaluation sheets

Materials

hole punch precut paper — various sizes

scissors precut handles

glue string

sellotape

stapler

Curriculum focus

Technological (early D&T)

To make and communicate decision

To select materials for a task

To look at a range of articles and say what's good about them — eg handles

What they wish to do and how to proceed

to assemble, join and combine materials

developing appropriate skills.

To evaluate the 'fitness for job' at a basic level.

Other areas of curriculum coverage

Fine motor (Foundation)

To develop fine motor and hand function

— cutting

— shaking, pressure application, whole hand

isolated finger, opposition

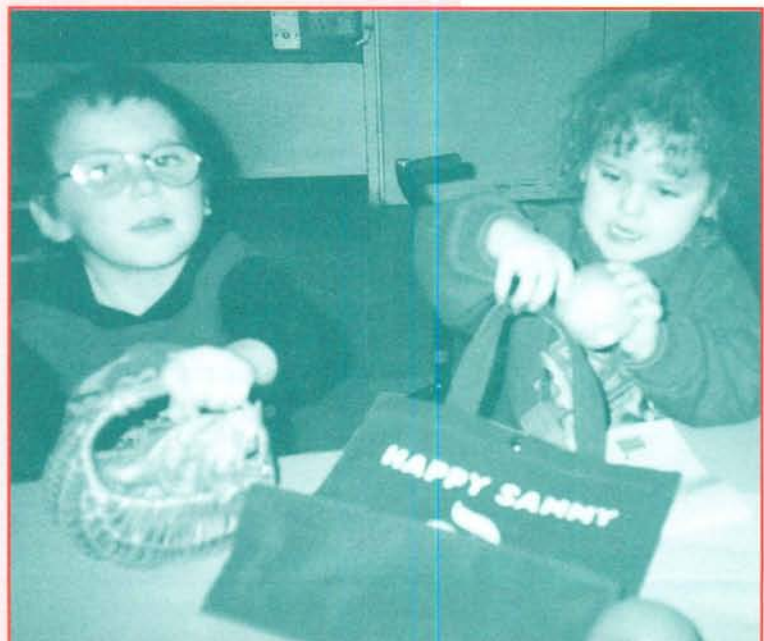
Communication (Foundation)

To express opinions

To interact verbally and/or non verbally with peers

To develop vocabulary expressive and receptive relating to joining

Sammy Jo was able to evaluate her bag with help from the teacher



because they would fail (hopefully fairly obviously). Thus plastic sheeting, sugar paper, tissue paper, string, tissues, large holed paper, very thick card was available. Methods of joining included school glue, glue sticks, sellotape, blue tac, string, stapler.

The staff in the classroom had discussed the task and were aware of the objectives of the activity. They were available to support the children's explorations, provide appropriate language and show them appropriate ways to use the equipment. They also monitored health and safety aspects of the activity. The staff also made working observations of the pupils' experiences and achievements in the pupils' individual achievement files. The writer ensured that all the pupils involved in the group had spent time at this activity table and had experienced and been offered opportunities to learn how to use the methods of fixing. This activity table was available for a day and a half before the assignment was introduced. Each of the three pupils involved was observed to spend quite long periods of time here, visiting the table several times, both with and without adult support and intervention.

Investigation and assignment

These two activities were combined in a session for which an hour and ten minutes was budgeted, although it was acknowledged that actual duration would be dictated by the pupils' attention, interest and progress.

The assignment was introduced by reminding the children that we were all going to a teddy bears' picnic the following day and that we would be taking the food we made in class. We would also be taking our teddy bears who would want food too. A particular set of similar sized bears was introduced and the children were told that they wanted to take apples to the picnic but that they needed help to make a bag to carry them in.

The children were then introduced to a selection of produced and teacher made bags. Teacher made bags were used to supplement the original collection to

illustrate the fact and areas in which some bags fail to meet criteria, eg size, strength, inadequate construction. The children were encouraged to disassemble some of the bags, particularly the teacher made bags, and points of construction and joining were pointed out by the teacher.

The children were then allowed to choose from a limited range of materials and equipment found on the table. The materials were pre-cut to allow pupils to focus on fixing and joining, although it was ensured that a variety of sizes were available for pupils to make decisions about. Teachers questioning initially open and becoming more closed was used to help pupils clarify their ideas and to identify ways to proceed both at the start and throughout the task.

The amount of guidance and intervention offered was governed by pupil needs and pupils were encouraged to observe their peers' constructions, to ask questions and for help and generally to interact with each other. Safety issues were reinforced throughout the session.

Once each child was satisfied that they had completed the bag they were asked to help the teddy to carry his apple in it and test out the bags. Teacher questioning was again used to help pupils make judgements about the success of their product.

After a short break the pupils were then helped to complete an evaluation sheet relating to task and product. The following day the children took teddies, bags and food for the teddy bears picnic.

Assessment and recording

Assessment and learning play an integral part in the teaching and learning continuum. They occur in several forms during this assignment and provide teachers (and pupils) with evidence of progress, achievement and areas of need.

Formative assessment based on unstructured observation occurred in the focused tasks in both groups. In group 1 all staff involved made descriptive and analytical notes in pupils' individual files on

Figure 2

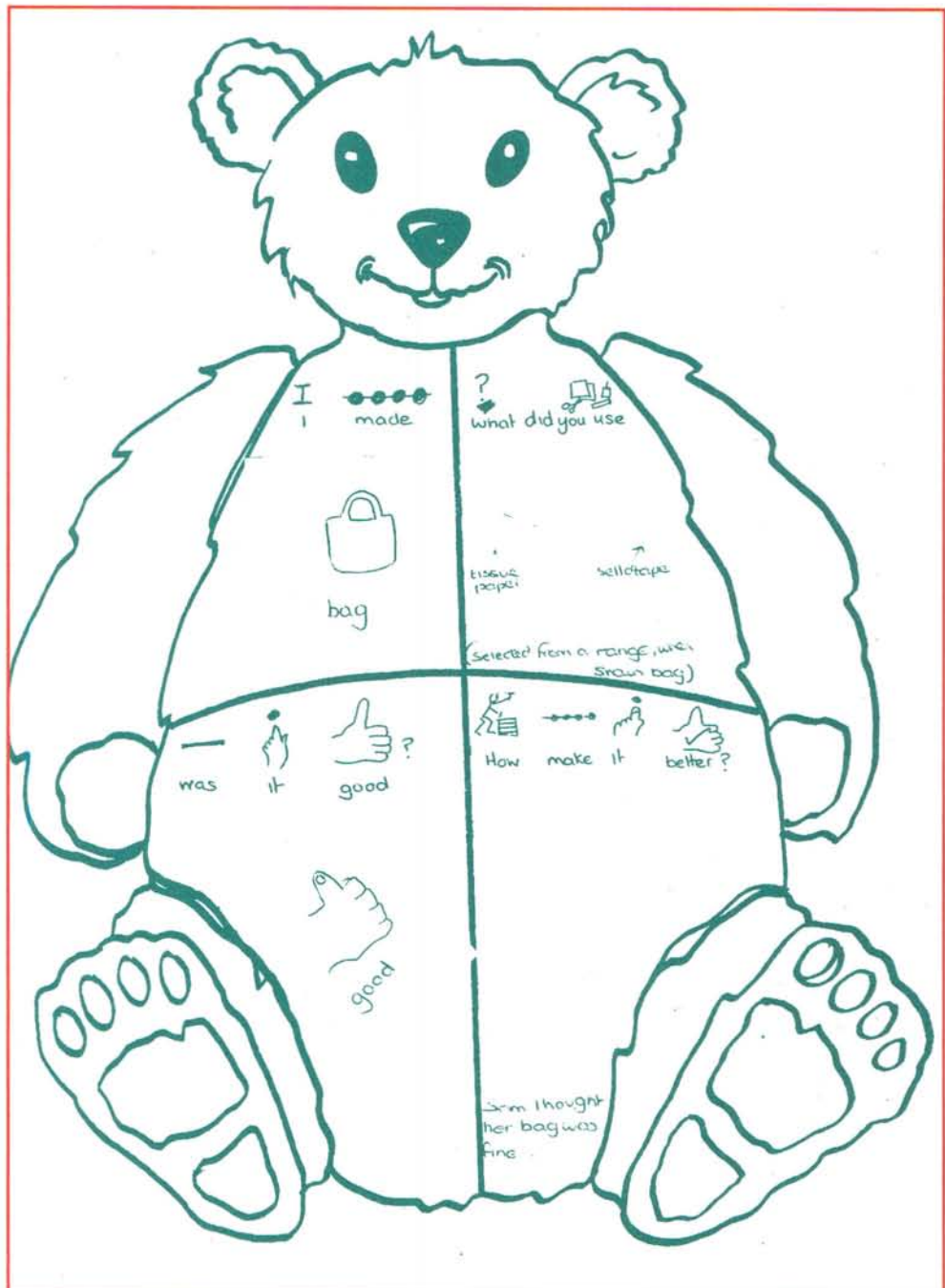
Activity	Date
Individual Focus	Individual Evaluation and Observation
<p><i>Sam:</i> To look at a variety of bags and see if they're too big/small for apple too big/small for teddy strong enough for apple</p>	<p>a) Yes (after Terry) said a bag too small b) not done c) not really — also did say that bag was bad cause apple fell out — chose tissue paper — after watching Terry and demonstration folded it in half and chose sellotape to fix — I showed her how to use and then she just about managed to use it Absolutely thrilled with finished product and also with looking at a variety of bags was able to say her bag worked</p>
<p>To select materials (Encourage her to say why she's chosen them)</p>	
<p>To choose and use a method of joining after demonstration</p>	
<p>To test bag with apple and say if it 'works' (see over)</p>	
<p><i>Sean:</i> As Sam</p>	<p><i>Sean</i> Very keen to test different bags — didn't want to consider the tiny bag or the one with open edges. Got upset when red bag taken away Chose large sugar paper, stapler managed to use stapler when I place it on paper, didn't know which sides to staple Chose sellotape for handle, but consistently tried to stick it upside down very pleased with finished bag — and did say it worked</p>
<p><i>Terry:</i> As Sam</p>	<p><i>Terry</i> Great! Testing out bags, spontaneously said "that's no good it's too small", "falls out of this — no good" After seeing me take a bag apart he spontaneously folded his paper in two. Asked to use stapler and once shown was able to use it (when it wasn't being temperamental) showed knowledge of fasten 2 sides. Needed prompting to put on a handle and I positioned stapler for this task (Didn't have vocab for glue, stapler, handle)</p>

pupil use of language and ability to handle materials and use joining techniques. Pupils interaction was also noted. This information was used to inform the individual focus for each pupil which forms part of the activity plan shown in figure 1. In turn, an evaluation of both the investigation and assignment and pupils achievements occurred on the activity plan. Information on individual pupils which took the form of their achievements relating to specific, teacher specified objectives and other pertinent observations contributes to the formation of half termly

individual topic evaluation which are shared with parents (see figure 2). Photographic and material evidence was also collected for this purpose. Where pupils were of National Curriculum age in the primary department, skills acquisition and experience of various areas are recorded on NARA forms.

Pupil self-assessment is an area valued by the teachers involved, but found difficult to develop in practice. To assist pupils to reflect and indeed remember their work a simple pupil evaluation sheet, based on

Figure 3



those outlined in Gadd and Morton (1992) (see figure 3). These were modified for individual pupils' use, both to act as 'aide memoire' and to record findings.

Teaching and learning evaluations

The meeting of individual priorities was variable and details can be seen in the evaluation and observation column of the activity plan (figure 1). The majority of pupils showed an understanding of the task involved. All the pupils showed a great interest in examining and filling the collection of bags, although they needed a great deal of teacher guidance to focus upon pertinent aspects to the assignment. One of the pupils was able to comment spontaneously on the appropriateness of the bags for the task. eg "it's too small, it's no good" and "fall out of this — no good!" The other children needed various levels of adult guidance in the form of exaggerated demonstrations illustrating the inappropriateness of the bags or highly structured questioning. For one pupil in particular, it was extremely difficult to elicit the communication of his own ideas as questions needed to be closed and he tended only to repeat key phrases.

Pupils were not able to tell the teacher how they expected to proceed, but only to describe what they were doing. With fairly open questioning and demonstrations from the teacher, two pupils were able to complete the bags from materials on offer, demonstrating an ability to improve the skills involved in joining materials throughout the session. None of the pupils, however, appeared to have maintained skills that observations and records suggested they had gained during the focused task sessions. The third pupil needed much greater guidance, both physical and verbal, to use joining techniques of stapling and sellotape, needing more experience in a focused task setting. He was however highly motivated by the task. The children all produced a bag that would hold an apple (for a little while at least- two of the bags broke while en route to the teddy bears picnic.) The children tested their bag when it was suggested by the teacher and all said that they 'worked' and were 'good'. The children could not see a need to modify any aspect of the product.

A short break was allowed between completion of the task and filling in the pupil self evaluation forms. This was structured to allow for the attentional difficulties of some of the pupils. The pupils found the later sections of this form particularly difficult and I also found it very difficult to assist them without answering the questions for them.

Evaluation of teaching methodology

This short evaluation of the pupils' achievements also contributes to evaluation of the teaching methodology. It suggested primarily that much more time needs to be given to allow pupils to develop the very basic making skills in many different settings to ensure generalisation and maintenance. The practice table set up in the class worked well at maintaining interest, and in introducing or improving basic skills (this is suggested by observations recorded in individual pupil files) largely because all staff in the classroom team were aware of the areas of focus, but it is likely to need supplementing with more repeated and structured sessions.

The assignment appeared to be highly motivating for the pupils involved. It worked in a small group situation, where a high degree of teacher attention could be given and attentional difficulties of individual pupils could be taken into account. The children need more experience of perceiving and finding solutions to problems and communication skills need to be developed in this as in other curriculum areas. However, augmentative methods of communication such as the use of symbols to provide meta memory strategies and aid expressive communication need to be further developed specifically in this subject area to enhance access.