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Design and technology in the primary classroom - a way forward

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DESIGN AND TECHNOLOGY IN THE PRIMARY CLASSROOM - A WAY FORWARD

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Introduction

For the purpose of this paper, the term "Technology" refers to both Design and Technology capability and Information Technology capability, as outlined in the National Curriculum document.

With the arrival of each new National Curriculum document, schools, in many cases, have used this as a starting point to review and revise existing schemes of work. For example, mapping exercises have taken place to consider coverage of the content of the documents, which has led to an increase in staff awareness, understanding and confidence of the content of the National Curriculum documents. However, with the arrival of the Technology document, the initial starting point may need to be different. Few schools have a policy statement which reflects the nature of Design and Technology capability, and it could be argued, therefore, that the staff will need to gain an understanding of its nature and an overview of the document before being able to identify opportunities for the development of Design and Technology within their school. While there is a range of topics and issues that needs to be introduced and discussed, there are certainly four that should be highlighted: the development of design and technology capability as a way of thinking rather than as a subject with a fixed content; the involvement of many curricular areas including English, Mathematics and Science while drawing on C.D.T., Home Economics, Information Technology, Art, Business studies and Humanities; the assessment through the four attainment targets relating to the holistic nature of Technology; and the unpredictability of the outcomes at the beginning of an activity. An example to illustrate the last point occurred when children involved in a project to improve their local environment decided to site a mosque or a sports centre on a derelict piece of ground. The student, who had been planning the topic, had thought that a playground would have been a very popular choice and had been prepared for ideas that included work on mechanisms and structures.

Past experience

It is important, both for pupils and staff, to start from the experiences already taking place within the school. Tasks in which the children are involved in areas such as Art, Design, Science, Mathematics and Craft could possibly be amongst those that are identified. All that may be necessary to change them into Design and Technology tasks is a change of emphasis or approach. Teachers can identify the main processes involved in a design and technology activity and ensure that these have been included. The exclusion of the children from identifying their own needs and opportunities, for example, is one common omission in Technological activities. The following model may help teachers in their planning and execution of design and technology tasks or activities with their children.

RESOURCE

Knowledge
Skills
Attitudes
Values

CONTEXT

Home
School
Recreation
Community
Business &
Industry

DESIGN AND TECHNOLOGY CAPABILITY

OUTCOME

Artefact
Environment
System

PROCESS

Identify needs and opportunities
Generate a design proposal
Plan and make
Evaluate

A broad and balanced curriculum

The experience and information that will be gained from pupil/teacher involvement in individual tasks, activities or projects should help teachers to gain a greater understanding of Design and Technology. This could then lead teachers on to collaborate as a whole staff to develop a broad and balanced curriculum for design and technology capability. It has already been stressed in other National Curriculum documentation that a whole school approach is very important, and Technology is no exception. Planning will need to take account of the coverage of programmes of study, the opportunities to assess attainment targets one to five and the variety of contexts and outcomes in addition to knowledge, skills, attitudes and values needed to ensure breadth and balance.

Schemes of work

Schools will then have to decide how to plan to meet this long term aim and produce schemes of work which will provide details of the work which is to be carried out with the children. Two possible starting points can be identified: using the programmes of study, (favoured by the N.C.C.); and using topics or themes. There are advantages and disadvantages to both approaches and staff will have to decide which is the better for them. If the programmes of study are used it should be easy to ensure that they are adequately covered but it could mean that staff are starting with the unfamiliar and are not building on their own and their pupils' past experience. Moreover, it may lead to rather contrived activities, which are not set in appropriate contexts, in order to cover parts that have been missed. From the Inset in which I have been involved, the preferred method has clearly been to start from the latter starting point. While this may lead to gaps in the coverage of the programmes of study, the careful choice of topics or themes can prevent this occurring. The advantages are numerous; many schools have already identified a cycle of topics to enable them to cover Science, Mathematics and English in a balanced way and Technology could be included in these; teachers would then be starting from the familiar and building on their own and their pupils past experience; while a bank of resources may already exist to help with the development of a particular topic.

Whichever approach is adopted, the programmes of study will need to be covered. It would seem quite possible to achieve this each year but it will be a decision that each school has to make. The programmes of study could be grouped in different ways to enable teachers to plan more easily. The non-statutory guidance suggests three ways: grouping by the four headings in the documents; grouping according to knowledge and skills; and grouping based on the four attainment targets. This last method, in particular, may lead to activities being directed to certain attainment targets and not allow children to be involved in the holistic process of Technology. A fourth way could be to group the programmes of study under three headings relating to the probability of coverage in each Design and Technology activity; those statements that will be covered in almost any activity; those that will be covered in most activities and those that will be covered in some activities. This method would highlight the statements that are most likely to be omitted from activities, mainly due to their specific nature. These would include statements relating to energy, mechanisms, structure, forces and the issues relating to the production and marketing of goods. This latter grouping of the programmes of study is one which I have trialled during Inset and has proved both realistic and relevant to the needs of the teachers concerned. Not only does it provide teachers with the basis for a planning sheet which identifies the areas that need to be covered but it provides a record of the main areas that have been covered in general terms by the class and those areas that still need to be covered.

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Classroom management

Many of the management issues which are associated with the curriculum area of Technology are similar to those in other areas of the curriculum. Organising the space to enable children to move around, ensuring resources are easily accessible, and creating a safe, hygienic and creative environment in which the children can work effectively are certainly common to any practical activity. In addition, it is hoped that most Design and Technology activities will involve children in a collaborative group work situation. Children may well start by working on their own but be involved in discussion with their peers or their teacher. From this they may move on to work in pairs or small groups but still produce individual solutions, before being able to work collaboratively, sharing out tasks to produce a whole group solution. Decisions will also need to be made in relation to the timetabling of the task itself; the involvement of a group, two or three groups or the whole class at any one time will depend on such factors as availability of resources, teacher support and the nature of the task.

Resources

With the publication of the document came an avalanche of tool kits and equipment which, it was claimed, were necessary for the implementation of Technology. It is certainly essential for schools to have a range of tools, but the purchase of expensive tool boards with the equipment for the traditional area of C.D.T. is not; a plastic carry-all container with a handle may prove just as useful. Moreover the tools can be stored safely in these instead of resting precariously on a board, ready to drop off at the slightest touch. Moreover it should be remembered that tools should be included for cookery, textiles, clay work, drawing and painting. It is often assumed that schools already have these items or that teachers can bring them in from home. Unless children are provided with good quality tools for these areas the quality of work may well suffer. With any equipment or tools, it is important to ensure that they are accessible and stored safely.

Much of the published support material for teachers to date may only serve to confuse rather than to clarify and to provide a source for useful ideas. Many books focus on the 'design and make' element of design and technology activity and omit references to evaluation and to the identification of needs and opportunities. While some books may provide a useful background for the development of certain skills through mini-tasks, the holistic nature of design and technology is usually missing. As schools become more adequately equipped with hardware such as tape recorders and computers so their use in design and technology will become more realistic. Indeed, in the programmes of study for Keystage 2, an example is given of the use of the video camera and the ability of children to produce a storyboard before they themselves make a video. By involving the children in a range of activities, the integration of all types of computer programmes will follow naturally. Data handling programmes may be used for survey work: word processing programmes may be used for writing a slogan or a poster; graphics programmes could be used to produce a plan or greetings card; while control and simulation programmes may be used in the creation of games or toys.

Assessment and record keeping

With the amount of paper work that is being generated at the present time, it is particularly important that written records are kept to a minimum. However, it is equally important that records do not become a series of grids, which, when filled in, give little indication as to the real nature of the work that has been covered or the positive achievement of the child. Reference has already been made to different types of planning sheets and these could form the basis for recording, in general terms, the parts of the programmes of study that have been covered by the various activities. In addition, more detailed information may be recorded about the work which has not been covered by individual children to enable the teacher to address such omissions.

Recording the children's achievements in design and technology may be approached in different ways: grids could be made which relate to the five Technology attainment targets and boxes could be shaded, ticked or filled in with various symbols to indicate what the children have successfully completed. Alternatively, a profile could be constructed, based on the five Technology attainment targets, which the teacher and/or the child would complete during and after the activity. This would form a positive record of achievement in Technology and could be kept by the child as he/she moved throughout the

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keystages. (It would be important to include attainment target five in the profile as information technology forms a part of design and technology capability but it should be remembered that attainment target five should also be assessed in other areas of the curriculum.)

Opportunities should be made to record both formative and summative assessments, drawn from at least three main sources of evidence: teacher observation; concrete evidence in terms of artefacts, systems or environments; and peer observations made, for example, in an evaluation or group practical session. Recording these observations in a notebook or diary as the evidence becomes apparent has been trialled successfully by many teachers, during practical Science sessions and it would seem that this system could be transferred and used for design and technology. However, it could be argued that while teachers should always continue to assess their pupils, at the present time it is more important to ensure that the children are actively engaged in design and technology activities.

Equal opportunities for all

As in any area of the curriculum, teachers are aware that these matters must be considered and debated in depth and not just written into a school policy as a "bolt-on" statement. It is important, for example, for teachers to look for opportunities to develop Design and Technology activities that are not rooted in a white European setting. It is equally important that while developing these activities there is not a hidden agenda which would suggest a condescending attitude to "Third World Technology".

When considering gender issues, it may become apparent that in fact all children have not experienced equal opportunities before entering school and therefore the balance needs to be redressed. Girls have often had more experiences related to making value judgements concerned with the home, shopping and "people-care", whilst boys may have more experience of skills associated with making and evaluating artefacts. It will be important therefore to ensure that at times, girls, for example, have the opportunity to work with construction kits while boys are engaged in activities related, for example, to creating environments.

Those with special needs will also need to be considered: the "gifted" child should be able to develop his/her potential, if involved in an open-ended approach; a physically handicapped child should not be disadvantaged as a peer or adult is allowed to help him/her at the making stage; while those with mild, specific or severe learning difficulties now have an entitlement to be given the opportunity to take part in activities which are set in a realistic and relevant context for them. While it is not possible in this paper to give extended detail of examples of work already going on in Special schools, nationally there is very positive feed-back to the idea of a curriculum for all with many support groups being set up to give support and encouragement to new curriculum initiatives.

Conclusion

While this paper is not intended to provide the solution for implementing design and technology into the Primary curriculum, it is hoped that it will provide a framework within which to work. Decoding and demystifying the document will, it is believed, provide a way forward-a way which primary schools have to go along this September.

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