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Perceptions of products and applications

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Abstract

Products and Applications is a significant new area of the Design and Technology National Curriculum. It is both significant in the space it takes within the Order and in its appearance in the documentation and debate only during the last couple of years.

Unlike other areas of the Design and Technology curriculum it does not have a clear history nor has its place within the entitlement curriculum been extensively debated. Despite this, national commentators give the impression that it is quite a natural and familiar area for teachers of Design and Technology.

Key to the success of investigative, disassembly and evaluative activities in the classroom, and the acquisition of knowledge and understanding about products and applications, are the attitudes and perceptions of teachers.

This paper explores some of those attitudes and perceptions and raises issues that teachers should be discussing to make products and applications fully integrated into Design and Technology activity in schools.

1 Introduction

The area of Products and Applications is new to the National Curriculum and is likely to pose a number of problems for teachers looking into it for the first time. Surprisingly, however, there would appear to be little consideration of the implications of its inclusion by practising teachers. This may be attributable to the perceptions that some teachers have and the belief that it is not a significantly new area in the Design and Technology curriculum. This paper explores some of those perceptions and raises issues that teachers should be discussing to make products and applications fully integrated into D&T life.

1.1 Revised Order

Investigating, disassembling and evaluating products is one of three types of activity that pupils should be undertaking as a result of the revised Order for Design and Technology. As such it is an extremely important part of the curriculum.

There would appear to be very little debate at present regarding the area of products and applications although within the content of what is written there are some issues which

teachers will need to address before starting to teach the appropriate programmes of study.

Such issues include:

- How do you teach pupils to disassemble products?
- How is progression developed?
- What evaluation criteria might pupils be encouraged to use?
- How does product evaluation fit into existing schemes of work?

The importance that teachers give to this area and the measures they will undertake to deal with the above issues is very dependent on their perception of that particular part of the revised Order.

1.2 Gathering perceptions

The original intention in writing this paper was to research activity related to Products and Applications currently going on in schools. Following an initial investigation involving informal discussions with over a dozen teachers it became clear that there was little currently taking place. More important, however, were the varying perceptions that these teachers had about the emergence and

content of this new area and it was clear that these perceptions would shape how teachers introduced the subject.

A number of teachers asked had not considered what was involved in products and applications and two heads of department at secondary schools that I spoke to early in May had not, at that time, begun consideration of the implementation of any of the revised Order!

Although no conclusions can be drawn without the necessary research base some analysis of the following perceptions is important in trying to understand how this part of the Order might be implemented.

2 Perceptions of the Order

2.1 The emergence of product evaluation can be attributed to industrialists

It is not surprising that such a perception exists as, during 1992, there was considerable concern by, and publicity given to the views of, the Engineering Council and other organisations representing industrialists. This concern is best shown by the number of responses that the Engineering Council gave during the 1992 consultation.

Ninety replies were received (70 per cent), with a further 90 from the Engineering Council which had circulated the form to its members. (DFE (1992) p4)

The effect of these responses is, the author would argue, quite vividly shown in the 1992 proposals with statements such as:

When designing and making pupils should be taught:
to select and develop a marketing strategy for their product which ... - specifies the price of the product taking account of contributory cost factors. (DFE (1992) p40)

Although the above is important it was, however, for reasons of simplification that products became the focus of attention.

The original National Curriculum Order for Technology (DES 1990) stated that pupils

should be involved in the designing and making artefacts, systems and environments. These types of labels on the activities of pupils were felt by many to be unhelpful. It therefore came as little surprise that proposals developed in 1992 included the following statement:

... the boundaries between artefacts systems and environments are imprecise; many outcomes encompass aspects of all three. We propose therefore to remove these unhelpful categories and recommend that pupils should be required to make a manageable range of good quality products. (DFE (1992) para 13, p5)

Simplification was achieved but at some expense to the nature of the subject as the very use of the term product has its own implications.

product ... 2. A thing produced by an action, operation, or natural process: a result, a consequence; spec. that which is produced commercially for sale. (Brown(ed)(1993)vol 2, p 2367)

This, it could be argued, is at odds with the practice of pupils in school where few if any items produced are actually marketed or sold. Use of the term *product* is perhaps a reflection of the agenda of organisations representing industrialists.

2.2 There is no sound educational justification

Unlike other areas of the Design and Technology curriculum such as Systems and Control, the section on Products and Applications is quite new as a grouping of Knowledge and Understanding. It's presence in a packed curriculum must clearly be questioned from the point of view of volume of work to be covered.

In addition, in order for professional educators to justify their work in the classroom, there must be some rationale, in purely educational terms, for every lesson, scheme of work and curriculum. The author would argue, therefore, that, in order for teachers to look at products and applications with pupils, there

must be some educational justification and the fact that it is in the National Curriculum Order as a statement of law is not enough!

Such justification, however, does quite clearly exist as, by looking at the work of others, pupils can learn a lot about:

- how things work;
- how their work relates to the world around them;
- why differences exist between products that do the same thing;
- developing critical judgements;
- improving their observation, discussion, questioning and evaluative skills;
- how needs and opportunities have been met;
- the values associated with products and applications.

All of these can enhance the educational experience of pupils.

2.3 It's what teachers are doing already

A common view heard in discussions at Design and Technology Association conferences, and other meetings with teachers, is that the area of Products and Applications is only putting into words what many teachers have been doing for years. Their inclusion in the National Curriculum Order does not therefore need justification and there is little need to challenge its place within a crowded Design and Technology curriculum.

Although there is work undertaken by pupils in the area of evaluation, it is unlikely that any schools will have gone into the depth advocated by the Order. Certainly all the teachers the author has spoken to since the Order was published have not undertaken disassembly tasks with pupils on a regular basis.

2.4 Disassembly means taking things apart

A common misunderstanding which has had to be corrected by School Curriculum Assessment Association Professional Officers and DATA representatives is that disassembly always involves taking something to pieces. This is not surprising given that the term has appeared for the first time in the curriculum

and the popular understanding of what the very word means:

disassemble 1. v.t. Separate, scatter, disperse 2. v.t. Take (a machine etc.) to pieces, dismantle. 3. v.i. Undergo disassembly; separate into constituent elements. (Brown (ed) 1993 p683, Vol 1)

It is clear, however, that it is the intention of SCAA, that disassembly may be a mental as well as a physical process. During both DATA conferences regarding the revised Order that The author attended, SCAA Professional Officers made it clear that disassembly could involve speculation of what was within products and how they were put together.

Unfortunately this point is not clearly made in the Guidance material provided by SCAA (SCAA 1995) and there is a danger that the taking apart of very complex and potentially dangerous products may take place in schools due to a misinterpretation of the Order.

2.5 It is not a particularly significant part of the Order, will be easy to deliver and not worth considering yet

Although the central part of Design and Technology must be designing and making, the amount of space devoted to investigation, disassembly and evaluation of products indicates that it is a significant part of the Order. This is particularly noticeable in the SCAA guidance material where every area of knowledge and understanding lists possible activities relating to investigation, disassembly and evaluation.

The notion that it will be an easy area to deliver is soon changed when a closer look is taken as to what is involved. At Key Stage 2 for instance:

Pupils should be taught:

- to consider the effectiveness of a product, including the extent to which it meets a clear need, is fit for purpose, and uses resources appropriately. (DFE (1995)p5)

Speculating on the appropriate use of resources, for example, is potentially fraught with problems as it is extremely subjective and dependent on individuals' values system and experience. Enabling pupils to explore their

own opinions with minimal influence of the views of teachers is difficult to facilitate.

Our perceptions .. are not merely limited to our visual or auditory impressions, but also involve considerable interpretation, where many other influences will temper our judgement. These influences may include the limited experiences of our own cultural background, the ever-changing trends of fashion, the influence of advertising and marketing ... (Morrison & Twyford (1994)p140)

There is always a danger that individual preferences and prejudices will be passed on by educators, authors, the media and other individuals in positions of authority or influence, without the recipient questioning the validity of the viewpoint. (Morrison & Twyford (1994)p141)

2.6 Disassembly can be a stand-alone activity

Given its appearance as one of three types of activities within the Order, it is likely that many teachers will see opportunities to engage pupils in disassembly activities at separate times from their main designing and making activities. This, however, is counter to the holistic nature of Design and Technology and makes little sense if pupils are to make use of the knowledge gained from disassembly activities.

... these activities should inform the main D&T activity - Design and Make activities - not just exist in their own right. I have a fear that we shall see the rise of the 'disassembly corner' where pupils use a worksheet to disassemble products, totally unrelated to their main D&T work. Mike Ive (HMI) in SCSST (1995)

3 Students' perceptions

The lack of activity in schools, referred to earlier made it important to use the experience of our second Year BEd students who had undertaken an investigation, disassembly and evaluation exercise with pupils in schools. In particular the experience of 12 students whom had been observed working with Year 2 and Year 5 pupils over a four week period in March and April 1995 were looked at in detail.

The students were given support and time to plan an activity on the investigation, disassembly and evaluation of products, were observed during the activity and wrote a personal evaluation afterwards. Two of these evaluations highlight some important perceptions:

The children investigated the hats and put them into classes. At this point the children began giving me reasons, not only answers. For example, if I asked if a hat would be worn in the rain, they would say 'no because it is not waterproof and it would get soggy'. They knew that this particular hat was made for no protective purpose and would be worn to a wedding, etc. likewise a baseball cap had a large peak to protect the players from the sun.

The evaluation of the products was a very enjoyable activity to do with the children. It did not take them long to begin asking their own questions, like 'how does it work?' and 'I wonder who uses it?'. Also they began to use their senses to find clues, for example, they were not too sure what the pot pourri box was for, but when they smelt it they had a guess. Because we had been looking at levers and linkages they began pointing them out too. Also I found out in the second week in school the children thoroughly enjoyed this activity. One child said to me 'are we playing that game again, Miss?' and when I said no she said, 'it was really good fun'.

3.1 It's fun

One of the most striking things about the activities observed in school was the enthusiasm and enjoyment that pupils showed. This, in itself, is justification for the inclusion of product evaluation in the curriculum as it is through enthusiastic hands on work that pupils become to understand design and technology.

3.2 Unusual products are useful

Students found unusual products of use in the classroom as this quote reflects:

The products I had selected were quite unusual and so they raised a lot of questions and amusement. All the children

were quite inquisitive and observed and touched each of the products thoroughly before answering any of the questions. Approaching it through discussion was a very successful method because the children were learning new vocabulary and they used each other to bounce off ideas and questions.

Looking at unusual products is very important as it ensures that people engage fully in the process of critical evaluation as there is often little to base on previous experience.

Perceptions of unusual or unfamiliar products are based on individuals knowledge, experience and values system. This commonly leads to pre-judging and generalisations.

For example, when five groups of 15-20 second year BEd students were shown a hand-held press for extruding noodles made of brass, they all assumed it was made in Western Europe. When asked what their assumption was based on it became clear that they held the view that accurately machined metallic products are only made in the developed societies of the North. The press, however, had actually been made in India - a country producing many high quality products from metals.

Given the above it will be important for teachers to prepare for discussion about Products and Applications and consider a number of important issues.

4 Conclusion - take care!

Care should be taken when introducing aspects of this new area. In particular, attention needs to be given to attitudes and language.

Adopting appropriate attitudes:

- keep an open mind;
- avoid pre-judging and generalisation;
- draw parallels first and differences later;
- recognise the limits of your knowledge and that of pupils.

The last point is particularly important as there will be many times when only a limited amount of knowledge is available about products being evaluated.

Language and terminology:

- try to be unbiased;
- explain terminology i.e. disassembly;
- consider using the term *appropriate* when looking at work in unfamiliar situations.

Overall several perceptions have been explored and it is clear that there is a need for much discussion to take place prior to teachers undertaking activities in the classroom. Given the usual shortage of time associated with the implementation of curriculum revisions, however, it is likely that teachers will only realise the effects of their perceptions later.

The inclusion of Products and Applications in the National Curriculum should, however, be welcomed as it will allow pupils to explore the important role that design and technology plays in our lives today and increasingly in the future.

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