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This research will help you to:

- think about what curriculum activities are subsumed in the word 'design'
- consider the extent to which these activities also exist in other subjects
- audit your practice against the requirements of the National Curriculum.

Abstract

This paper relates to an investigative strand of a research commission undertaken on behalf of the Design Council. Some interesting issues have emerged from the research that we believe may provide some important clues to our understanding of design activity in the curriculum. These concern: the nature of the activities prescribed in the National Curriculum; how we might classify them for greater clarity; and how we develop a more consistent and shared understanding of them. Designing is about doing, and hence the focus of the research is on the verbs (the doing words) that occur in the National Curriculum Orders. The conundrum raised through the research is that whilst we may be developing a shared design vocabulary, there is reason to believe that we still lack a shared understanding of what this vocabulary means.

Introduction

Goldsmiths was commissioned by the Design Council to investigate the place of design and design activities within the curriculum at Key Stage 3. The aim of the research was to make recommendations that might help to support the development of design both in design related subject areas and across the curriculum as a whole. This article outlines one aspect of this

research, and its implications for design teachers and teachers generally.

Before you read any further, however, there is a task for you to do. Find the table of words and complete the activity described on this sheet (Task 1). The task will take about 10-15 minutes but we believe that you will find it worthwhile! When you have finished please read on.

Part of the research design required us to gain an informed understanding about the design related demands that would be made on pupils by the newly revised National Curriculum Orders. To achieve this we decided firstly to audit the revised Orders (DfE 1995) in terms of the *activities* described through verbs (the ing words [analysing; describing; creating; planning; modelling; prototyping etc.]) that dictate the requirements in the **programmes of study** and the **attainment targets** at Key Stage 3.

These activity verbs were identified as the **key agents** because designing is an activity-based process. The specification of pupil activities in the National Curriculum therefore provides us with an insight both into the range and variety of experiences encountered in the whole curriculum and it also allows us to consider these activity experiences in relation to the nature of design and designing processes.

The activity verbs identified were taken, in the main, from the National Curriculum documents, but, on a very few occasions longer descriptions of particular activities were reduced to single word descriptors. The analysis attempts to be both thorough and accurate, but could not be regarded as exhaustive and comprehensive. It is, however, sufficiently reliable to indicate the

accommodating analysing applying appraising assembling changing checking choosing clarifying
classifying combining communicating comparing compromising considering constructing
controlling creating cutting deciding designing detailing developing devising disassembling
evaluating experiencing explaining exploring finishing fitting focusing forming formulating
gathering generating identifying illustrating imaging implementing improving indicating
interconnecting investigating joining judging knowing labelling listing making manipulating
marking measuring modelling 2D modelling 3D modifying optimising ordering organising
outlining picturing planning practising predicting prioritising processing producing proposing
qualifying rationalising rearranging recognising reconciling reflecting relating selecting shaping
sketching specifying suggesting systemising testing understanding using (86)

Figure 1

Task 1

Name.....

Subject.....

Look at each of the activities below and indicate:

1. In the 'incidence' column below, circle one of the numbers identifying the degree that each activity will feature in your pupils' work. 0 = not at all, through to 3 = a predominant/core feature.
2. When you have done this, write in any other key words that denote significant 'doing' activities in your teaching subject that are missing from the list.
3. In the 'importance' column star the ten activities which you consider to be of the greatest importance in your subject.

Pupil activity	Incidence	Importance	Pupil activity	Incidence	Importance
planning	0 - 1 - 2 - 3		negotiating	0 - 1 - 2 - 3	
evaluating	0 - 1 - 2 - 3		recording	0 - 1 - 2 - 3	
recording	0 - 1 - 2 - 3		criticising	0 - 1 - 2 - 3	
exploring	0 - 1 - 2 - 3		formulating	0 - 1 - 2 - 3	
creating	0 - 1 - 2 - 3		expressing	0 - 1 - 2 - 3	
modelling 2D	0 - 1 - 2 - 3		clarifying	0 - 1 - 2 - 3	
communicating	0 - 1 - 2 - 3		improving	0 - 1 - 2 - 3	
developing	0 - 1 - 2 - 3		researching	0 - 1 - 2 - 3	
generating	0 - 1 - 2 - 3		integrating	0 - 1 - 2 - 3	
compromising	0 - 1 - 2 - 3		writing	0 - 1 - 2 - 3	
connecting	0 - 1 - 2 - 3		sketching	0 - 1 - 2 - 3	
analysing	0 - 1 - 2 - 3		modelling 3D	0 - 1 - 2 - 3	
reviewing	0 - 1 - 2 - 3		coordinating	0 - 1 - 2 - 3	
sequencing	0 - 1 - 2 - 3		making	0 - 1 - 2 - 3	
identifying	0 - 1 - 2 - 3		applying	0 - 1 - 2 - 3	
abstracting	0 - 1 - 2 - 3		transforming	0 - 1 - 2 - 3	
resourcing	0 - 1 - 2 - 3		translating	0 - 1 - 2 - 3	
composing	0 - 1 - 2 - 3		projecting	0 - 1 - 2 - 3	
performing	0 - 1 - 2 - 3		inventing	0 - 1 - 2 - 3	
appraising	0 - 1 - 2 - 3		recognising	0 - 1 - 2 - 3	
investigating	0 - 1 - 2 - 3		categorising	0 - 1 - 2 - 3	
discriminating	0 - 1 - 2 - 3		classifying	0 - 1 - 2 - 3	
valuing	0 - 1 - 2 - 3		utilizing	0 - 1 - 2 - 3	
improvising	0 - 1 - 2 - 3		interpreting	0 - 1 - 2 - 3	
internalising	0 - 1 - 2 - 3		patterning	0 - 1 - 2 - 3	
describing	0 - 1 - 2 - 3		selecting	0 - 1 - 2 - 3	
explaining	0 - 1 - 2 - 3		gathering	0 - 1 - 2 - 3	
predicting	0 - 1 - 2 - 3		responding	0 - 1 - 2 - 3	
prioritising	0 - 1 - 2 - 3		optimising	0 - 1 - 2 - 3	
experimenting	0 - 1 - 2 - 3		imagining	0 - 1 - 2 - 3	
examining	0 - 1 - 2 - 3		modifying	0 - 1 - 2 - 3	
judging	0 - 1 - 2 - 3			0 - 1 - 2 - 3	
reconciling	0 - 1 - 2 - 3			0 - 1 - 2 - 3	
proposing	0 - 1 - 2 - 3			0 - 1 - 2 - 3	

- [illegible]

Once we had identified the bulk of the activities contained within the Orders, it became apparent as we studied them that the nature of some of these activities were related and that they could be categorised or classified together into **families of processes and sub-processes**. For

example, 'ordering', 'selecting', 'judging', and 'comparing' (taken from the list above), are all **evaluative** tasks – they are all concerned with activities in which pupils are required to make judgments of value. Having recognised this we evolved and trialled a form of classification that would enable us to categorise all the activities into specific family groups. From a conceptual perspective this enabled us to examine the National Curriculum in relation to those activities that have a strong association or relationship with **design and designing**, and from this to draw some speculative conclusions about the activity-nature of individual curriculum subjects.

The verbs were classified into five **families**. These are:

- **creative**
e.g. designing, exploring, imaging, proposing, modelling, shaping, planning and optimising
- **expressive**
e.g. explaining, illustrating, labelling, making, outlining, modelling and sketching
- **investigative**
e.g. investigating, modelling, gathering, experiencing and clarifying
- **evaluative**
e.g. analysing, considering, modelling, qualifying, optimising, planning and testing
- **reasoning/thinking**
e.g. recognising, understanding, modelling, accommodating, and controlling

Most of the 284 activities identified were able to be assigned to one of these families, but a significant number have more than one meaning and fit into more than one family. The best example of this is *modelling*: a central and necessary part of design and designing. Modelling can be undertaken, equally, to achieve creative, expressive, investigative, or evaluative goals. It can also be the medium for higher order reasoning/thinking activities that integrate, translate, transform and apply understanding. Equally, other activity verbs also have more than one meaning, for

example, *planning*. Planning can be regarded as belonging to the family of processes concerned with making judgments of value – in other words it is essentially an evaluative activity. Or is it? It can be argued that planning might involve imaginative or speculative processes and prediction and is also, therefore, a *creative* activity. It would seem that it has both a rational and creative potential and this needs to be recognised when describing its nature. Through this work we therefore began to produce a listing of what might be called **compound verbs**.

Having listed and categorised all the verbs in all the subjects, we could look at the patterns of verbs in the different subjects. The subject profiles created by this analysis are interesting in themselves because they give an immediate insight into the spread and nature of pupil activities *within* each subject. They are also valuable in providing a comparison *across* subjects. The data has been converted into bar charts below, providing a profile for each subject. Readers may note that a sixth family has been included for those subjects that address the development of inter-personal skills and character development (although this does not feature large).

The richness or brevity of vocabulary used within each family category gives an immediate feel for the range and depth (and by association, the importance) of the work that the National Curriculum authors attach to the activity aspects of teaching and learning within each subject.

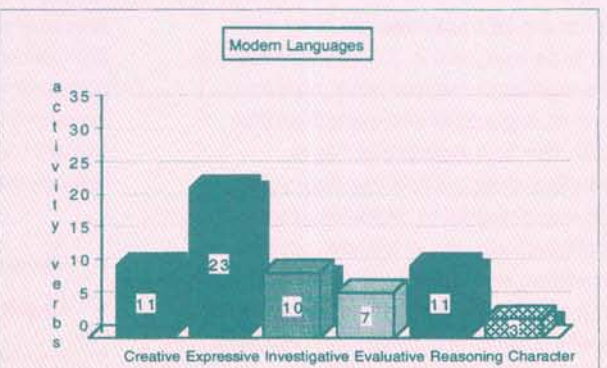
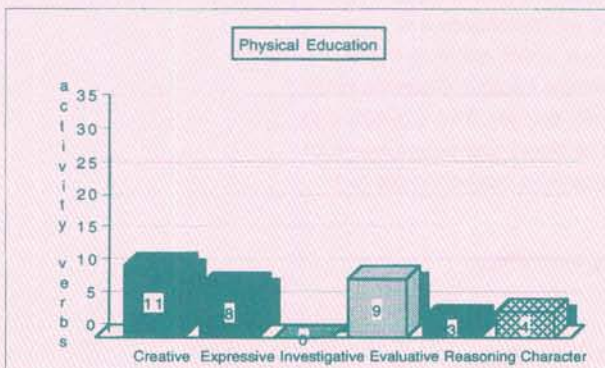
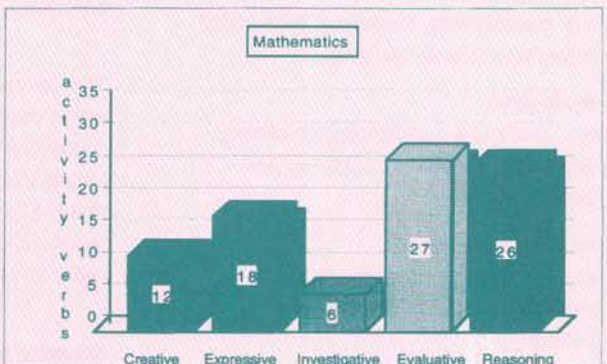
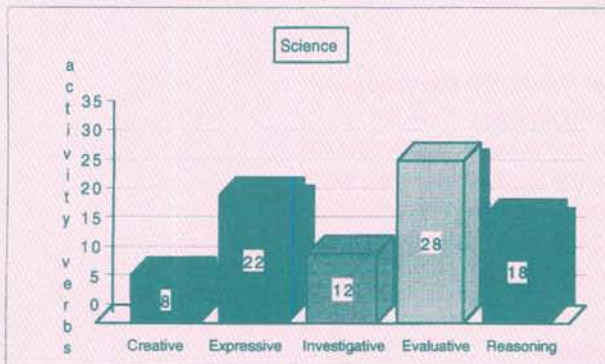
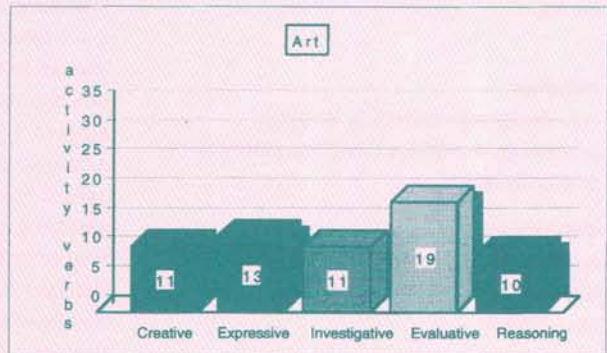
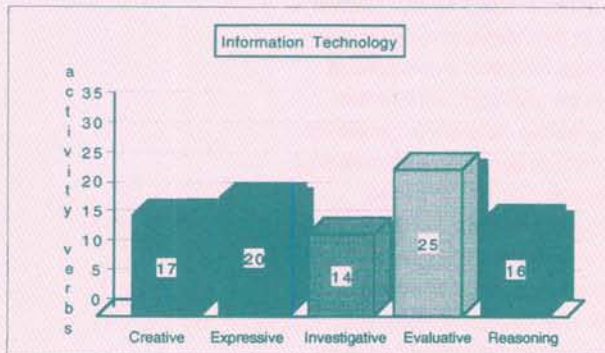
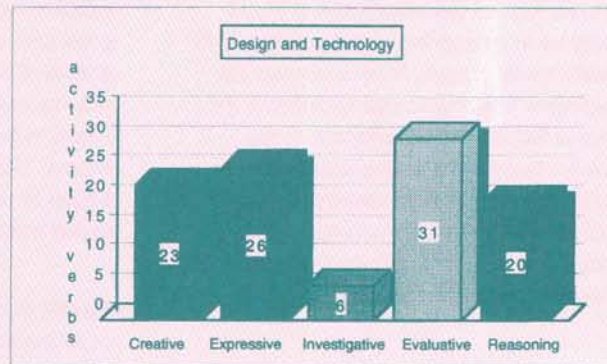
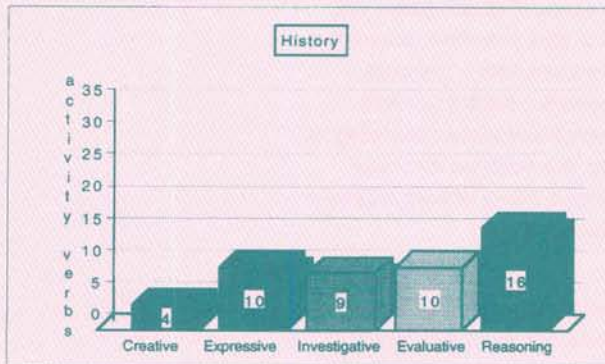
Creative activities

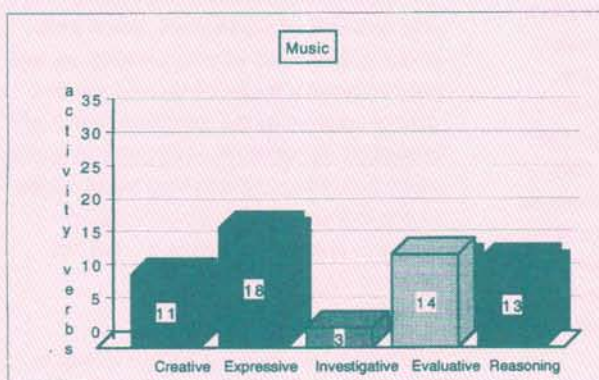
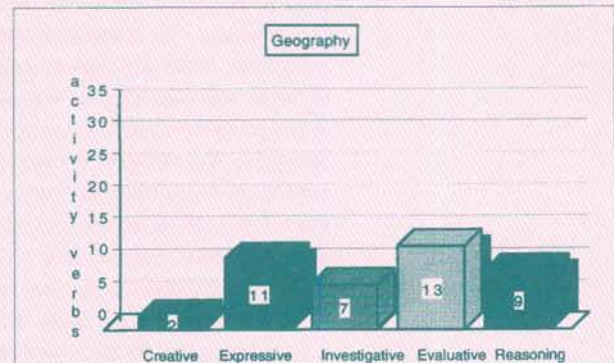
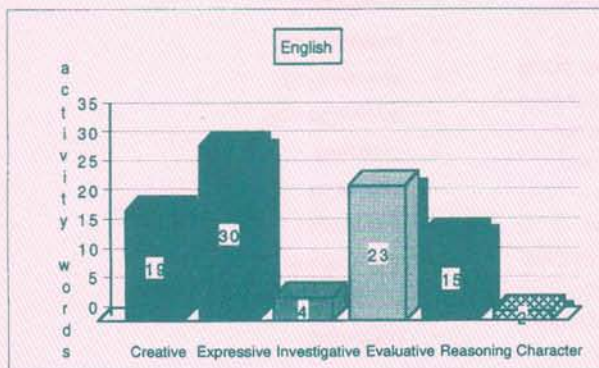
If we consider the *creative* family of processes and sub-processes it is immediately clear which subjects in the curriculum consider creative activities to be important to their subject. The subjects that identify the most broad and varied range of creative behaviours in their curricula are:

- design and technology
- English
- information technology

Subjects that require 11 or 12 creative behaviours are:

National Curriculum subject profiles
(DfE 1995)





- art
- music
- modern languages
- science
- mathematics
- physical education

The subjects that require little creative behaviours are:

- geography (2 creative verbs)
- history (4 creative verbs)

Expressive activities

Within each subject the expressive domain features as an important element of subject activity. It is interesting to note, however, that another strand of our research showed that the richness of expression outlined in the Orders is not reflected in a balanced way by the evidence provided by teachers involved in the research. The principal ways in which pupils are required to work across the curriculum is by *writing*. Only in the design domain is there evidence of a more varied requirement in the use of visual and concrete modelling and communicating media.

Investigative activities

Without doubt this is the most poorly represented area across the whole curriculum. This family of activities compares poorly with the creative family both overall and within most subjects. This raises a number of issues but perhaps the most pertinent are to do with the questions it raises about the learning experience for children at Key Stage 3. Just in terms of the incidence of the words in the Orders, pupils would appear to be unlikely to get much exposure to investigative activities.

Evaluative activities

In stark contrast to investigative activities, evaluative work features large *across* the curriculum. In six subjects it is the most predominant type of activity. In nine subjects it is the most predominant *cognitive* family of activities and it is second only to reasoning/thinking activities in history, and to creative processes in PE.

Reasoning/thinking activities

This family of activities concerns those processes that comprise higher order cognitive functions. Their purpose is often to do with *rational* cognitive synthesis and formulation, but we have included also

Above and opposite: National Curriculum subject profiles (DfE, 1995)

passive concerns within this category for convenience – i.e. memory related capacities. From a design perspective, many of these activities have an important function in the processes that we engage in when designing. But, they do not include – and neither does the National Curriculum – those irrational, spontaneous, impulse driven, emotional factors that have their part in many successful design resolutions. Neither do they include those developments that are achieved through serendipity.

The activity audit of the National Curriculum and the classification of these into families provides us with valuable insight into the range of activities in subjects across the curriculum. This is an important function of the *verbs* that have been identified – they highlight the opportunities and requirements of the curriculum to engage pupils in a rich variety of activities – many of which are at the heart of design and design practice. However, the effectiveness of this intention depends upon how it is valued and translated by teachers into classroom practice.

In order to look at this matter we used the task which you completed at the beginning of this article. We asked teachers to prioritise their responses by indicating the frequency of their use – from 'a lot' down to 'not at all' and then to indicate those activities they thought were the most important to them in their teaching. The data we collected from teachers allowed us to contrast the views of well informed and experienced *design* teachers from a range of schools with data from teachers in *other* subject areas across the curriculum.

What do design teachers do?

The responses from the design teachers were scrutinised and a key list of activities emerged as being used 'a lot' by them in their teaching. The list is as follows and is in descending order of priority; i.e. those at the top of the list were unanimously seen as being used 'a lot' in all classes, whereas those at the bottom were used by a significant majority.

- modelling
- making
- communicating

- evaluating
- researching
- expressing
- investigating
- creating
- planning
- improving
- developing
- exploring
- recording

We were aware, however, that this is only one measure of significance, since what pupils spend 'a lot' of time working on, are not necessarily those things that are the central concern of the discipline. We might recognise, for example, that children spend much time filing and finishing metal edges or planing and polishing wood. Such activities are time consuming – but not necessarily central.

Accordingly we asked a further question: Which of these activities do you think are the **most important** to children's success in their work. What are the really central activities? Again we asked the teachers to prioritise their lists by picking a 'top ten' and a 'top five' list of activities, and these listings provided us with a measure of the importance that these teachers placed on the activities.

Interestingly, a different listing emerges. The shorter **'important'** list of 11 key activities is almost entirely subsumed in the slightly longer list of 13 activities that pupils spend a lot of time doing. The single exception being 'experimenting'. The following list is shown in descending order of priority.

- planning
- evaluating
- modelling
- communicating
- expressing
- experimenting
- researching
- making
- recording
- improving
- creating

However, the most telling differences are in the priority order. Whilst the dominantly practical activities of **modelling** and **making** head the list of things that pupils spend 'a lot' of time doing, it is the more cerebral activities of **planning** and **evaluating** that heads up the list of those things seen as most important to the success of the activity.

This analysis is informative in itself – in what it tells us about the perceived priorities of design teachers, but for the purposes of our study we were seeking information of a wider kind. Essentially our concern was with the extent to which all teachers – design or otherwise – might be using designerly procedures. To what extent, for example, do history teachers at Key Stage 3 use classroom activities that might be thought of as designerly? Accordingly we replicated the questionnaire and asked teachers from every discipline in a case study school within our sample to complete it.

What do non-design teachers do ?

We should bear in mind that we did not ask the teachers about the extent to which they did or did not use design activities. We simply asked them what kinds of activities their children would be engaged upon – again using the 60 word checklist and prioritised on the 4 point scale from 'a lot' to 'not at all'.

The sample of teachers from across the curriculum identified the following ten activities, again shown in priority order of frequency:

- **evaluating**
- **recording**
- **describing**
- **communicating**
- **analysing**
- **investigating**
- **interpreting**
- **improving**
- **explaining**
- **examining**

The most obviously notable feature of this new list is its lack of creativity. Contrasting it to the list from the design teachers we see

most of the creative parts of the list have vanished:

modelling, creating, making,
developing, exploring

Non-design teachers do not perceive the above activities taking up much of their lesson time. In contrast there is an overlap between the lists in relation to the **generic activities** of evaluating, recording, communicating and investigating. However other generic features important to non-design teachers – but which are not so important in design teaching are:

analysing, interpreting, explaining and examining.

This perhaps points to some of the commonalities and inherent differences between differing disciplines and marks up those activities which are more frequent features of teaching and learning in design education. However, as we pointed out earlier, there may well be a difference between what pupils spend 'a lot' of time doing and what the teachers see as 'important' to their success in a project. Accordingly we once again asked the question that invited teachers to place value on the activities. Which of them are most important; which are the 'top ten' and the 'top five'. Again in priority order, these are:

- **planning**
- **exploring**
- **communicating**
- **improving**
- **identifying**
- **creating**
- **recording**
- **experimenting**
- **evaluating**
- **negotiating**
- **expressing**
- **compromising**

The list of 'important' activities immediately raises some interesting issues, since it is remarkably similar to the design teachers' list. Remember that the teachers are picking

If you have completed the task sheets provided with this paper, we would be very grateful if you would photocopy and return them to use to supply further data for analysis. We will report the results in a later edition.

the top ten activities from the same list and with only three exceptions they have picked the same ones.

The differences are in **modelling**, **making** and **researching**, which feature in the design teachers' listing but not in the non-design listing. A further fascinating similarity is that **planning** is seen by **all** teachers as the most important thing for pupils to do. Oddly however the non-design teachers do not see planning as something that their pupils spend much time doing – even though it is very important. By contrast the design teachers see it is important **and** something that pupils spend a lot of time doing.

There is a further point of significance here. The responses of the design teachers indicate the composite importance of **modelling and making** on the one hand and **planning and evaluating** on the other. Whilst the former take up a significant amount of time, the latter are deemed to be of the greatest importance. These two groupings represent what earlier research in Goldsmiths identified as the active and reflective domains of designing which exist in a tight iterative relationship¹. At the heart of capability in design lies this iterative process in which new conceptions of the world are made manifest in any number of forms. The principal reason for this making manifest is that the ideas and the expression of ideas (in concrete form) enables their further development. The idea and the expression of the ideas are mutually dependent.

At this point you might wish to compare the activities you have identified as 'most frequent' along with your 'top ten' most important activities against the above lists.

The next stage of the research required our teachers to take the ten most important activities in their subject and categorise them in relationship to their nature and purpose, i.e. to classify the against the five family headings given below:

- creative
innovative, imaginative, affective

- expressive
communicative, demonstrative
- investigative
enquiring
- evaluative
judgmental
- reasoning and thinking
higher order cognitive or memorising

Now turn to task 2 and categorise the ten activities you think lie at the heart of your subject i.e. your 'top ten' under one or more of these family groupings, according to your understanding of them.

When the teachers in our sample did this, their classifications revealed that there was not a *shared understanding of meaning*. Their responses lacked consistency and so, for example, generating was categorised by different teachers into different family groupings according to their individual understanding about its essence. This suggests that teachers have a somewhat different perception about the nature of activities which are concerned with the development of the imaginative, cognitive, affective and expressive domains. This in turn may illustrate that although we may use the same vocabulary, we do not necessarily share the same understanding.

Within the field of design education there is a strong case for the promotion of shared meaning – particularly of significant concepts. This consistency becomes increasingly important if we are to promote this strand of educational activity across the curriculum. Our research suggests that many of the concepts that lie close to the heart of design are not understood or shared by our colleagues. Even when design teachers are talking about 'design' activities there is evidence that they do not all share the same understanding about the nature of these activities. The further development of design and designing would seem to us to be dependent upon our developing not only a shared vocabulary about design activities but also a shared understanding of their meaning.

1. See for example section two of *The Assessment of Performance in Design and Technology* 1991, Kimbell Stables, Wheeler, Wozniak and Kelly, DES/SEAC.