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# Why draw anyway? The role of drawing in the child's design tool box

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## Abstract

*This paper addresses a series of questions that might well be asked about drawing for designing –*

- *Why draw?*
- *Why model by drawing?*
- *When is drawing appropriate to a design & make task?*
- *Why plan on paper anyway?*
- *What is involved in using drawing as a tool for designing?*
- *Adults do not always draw out what they are going to make, so why should it be seen as important to teach this to children?*
- *To what extent can children utilise their drawings as a tool in pursuit or exercise of the skills of designing?*
- *Is there an essential skill which they need to have mastered in order to do this effectively, and if so, what is it?*

*In order to answer these questions I have applied them to the work of some of our youngest pupils in order to un-pack some assumptions underlying the process of design drawing. However, this is not a paper about Primary School design and technology – it is an exploration of the use of drawing for designing as highlighted by the difficulties encountered by small children.*

Keywords: drawing, sketching and design, cognition, design tools, modelling, designing and learning

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## 1 Why draw for designing?

Drawing can be seen an objectification of an inner image, an interaction between the inner reality of our mind's eye and the outer reality of the environment. It is more than just the product of a process, it is also part of the process. When we look at the role of drawing for designing, we are looking at a process whose interim stages are rarely preserved or valued except by the practitioner as a resource for future ideas. It is possible to request sight of Turner's sketches, for example, which he kept as a personal visual library, but these are not on view to the general public, who see only the finished works hanging in the gallery.

Harrison (1978) quotes the phrase "Letting the tool do the job" from the heritage of industrial hand-tools which could equally be applied to

the use of drawing for designing. Once the mental image is put on paper, the material image begins to do the job, as each objectification becomes the springboard for future ideas. It is like thinking out loud onto paper, clarifying half-formed ideas and working out the practicalities of possibilities. Design drawings are place-markers: they act as an anchor for developing thoughts towards a partially perceived end. They are a journey of discovery as each idea unfolds into a focused externalised record of a blurry inner image.

## 2 Why model by drawing?

Real-world design problems frequently come into the class of "wicked problems" identified by Rittel (and quoted by Buchanan, 1995) as poorly formulated, having multiple clients and decision makers with conflicting values, and

whose ramifications are unclear. By contrast, school design problems frequently do not have the complexity which creates a need to draw – except to show the teacher “the design”.

Raney (1998) quotes the work of Medway into the practice of architects, whose preferred mode of communication always seemed to be drawing and who fitted words around the drawings, often on post-it notes. She discusses the indeterminacy inherent in drawing, (missing lines, multiple contours etc.) which grants a level of perceptual ambiguity which, in turn, allows the mind to play with the drawing and seek out not only alternate readings, but alternative meanings, which are allowed to continue to exist through the ambiguities of form.

Roberts (1992) stresses the importance of seeing modelling in design as “modelling for”, not “modelling of”; an important distinction. Design drawing is “modelling for” – it is a tool to support thinking about future action. To treat drawing as “modelling of” is to place closure on the procedure. Beyond the modelling lies constructing the reality.

### 3 Why plan on paper anyway?

It was assumed that the practices of design professionals were of educational application, and (frequently) regardless of the age of the children. But adults do not always draw out what they are going to make, so why should it be seen as important to teach this to children?

*“Extrapolation downwards”* was a phrase which my previous Headteacher noted in one of the early circulars about the National Curriculum. It was nowhere more true than in the Design and Technology Orders. Had no one heard of Piaget’s assertion that younger children see the world differently from older ones? It was as if the whole body of child development understanding in which we as Infant teachers were grounded had been wiped away with one stroke. The serendipity of playing with materials which became something exciting in small hands had now been swept aside by identifying needs,

generating ideas, recording possible solutions and making mock-ups of them to be evaluated before they fall apart before the next lesson.

Medway (1992) called it the “academicization” of practical activities. The doing is only allowable within the overall context of the communicating, evaluating and other intellectual skills.

Although drawing is part of the design repertoire, it is not a necessary part of something called *“The Design Process”*. Drawing should only be used where appropriate to the task and, if taught, to the age/stage of the children. As Hennessey *et al* (1993) point out, the linear model of the design process which has been promoted via the National Curriculum is not a good model of how people solve problems and its imposition on children in Design and Technology leads to lack of ownership of the task and does not allow for the way different types of problems are solved in real tasks, often by what they call “informal knowledge”. Thus it is hardly surprising that small children are unable to access the methodology of the linear model.

Referring to Dewey’s “The Quest for Certainty” and the division between arts and science, Buchanan (op cit), laments the unhappy position of design as straddling the two, falling between the traditional divide and opening the question of the relationship between determinacy and indeterminacy. “Design Process” diagrams, says Buchanan, are based on a desire for determinacy, and the desire that design be considered as a “science”. Designers, by contrast, work at two levels, the general and the particular, but there is no science of the particular.

Garvey and Quinlan’s (1997) salutary tale of the post-graduate student’s case study of Year 2 designing “Mr.Mole’s light” reveals many of the false premises underlying Infant D&T. The children’s designerly behaviour was not hampered, however, as they saw no connection between the drawing and the model lamp which they subsequently made. They did what most people do in baffling

circumstances: dismissed it. They were unable to consider a range of possibilities at the drawing stage, because they were not modelling a solution to the problem "How will I make a lamp with those materials", but rather "How will I draw a lamp." For a 6 year old, that is sufficient problem to address with pencil and paper.

Howard Gardner (1993) suggests that modern scholastic ways of thinking can be in conflict with more intuitive understandings. He asserts that "scientific" knowledge is quite fragile and readily overridden by more deeply entrenched spontaneous concepts, a "more primitive script", which is resorted to at times of intellectual uncertainty, which suggests that children (and adults) are highly likely to adopt the fallback position of hands-on with the materials unless they see real value in planning ahead on the paper.

Of the two main ways of designing (hands-on or plan-ahead), the former is more characteristic of children, unschooled adults, traditional craftspersons and artists. The latter is the way of industrial practice and National Curriculum Design & Technology. I have characterised these two approaches as "design-as-you-go" and "design-before-you-start". Each has its merits and de-merits as methodology, some of which are as follows –

#### *Design as you go*

##### Advantages –

Immediacy, hands-on, tactile, satisfying to senses, appear to make instant progress towards goal. Can manipulate objects for size, shape, fit, match.

##### Disadvantages –

Eliminates other choices once started. Potentially wasteful of materials. Other approaches may have been better. Disappointment when it doesn't work. Could be expensive if it doesn't work – project could be abandoned. It could end up looking nothing like original intention if the project has to be continued at later date, rather than completed in one session, because what was being made, what was to be used, etc. has been forgotten. Cannot be continued by others.

#### *Design before you start*

##### Advantages –

Takes account of material requirements before cutting into materials and hence costing. Have clear sense of purpose to activity – know where you're going before you start. Less chance of messing things up. Can try several ideas before choosing most appropriate. Can research techniques or appropriateness of materials before starting. All these things reduce possibility of major failure later on. Intellectually satisfying to solve the problem in your head before starting. Can be continued at later date without forgetting what had been decided already. Making can be performed by others.

##### Disadvantages –

Level of cognitive development required to utilise such a technique. Knowledge base required re handling of materials (and their properties), techniques, measurements, calculations, where to look for information not to hand – even knowledge of not having all the information required. Delays the start of the activity, which is the sensually satisfying part of the task. Appears to delay completion of the task – spend time doing nothing. Could end up sticking rigidly to design even though it isn't working. Having solved the problem mentally, is there the incentive to carry it out?

What is needed in practice is a task-appropriate interaction of both.

#### **4 When is drawing appropriate to a design and make task?**

Drawing for designing has two audiences – the self and others.

The need for drawing for self depends on the complexity of the task. If the task can be solved mentally, either because it is relatively straightforward or involves known methods with familiar materials, then no drawing needs to be done. For example, making a skirt for myself requires nothing more than laying a similar sized skirt on the material and cutting it out and sewing it together.

Drawing for others depends on the other person's ability to share meaning with the designer. When I used to make little dresses for my daughter, I would draw them for her: "Do you want puffy sleeves like this? Or straight ones like this?"

Teachers need to consider this in relation to tasks set to children. Constable (1994) observed that "more often than not" children are asked to "draw me one then make it" but that they do not see this drawing as "an essential vehicle for channelling thoughts" which appears to be more of a hindrance to the real task of making. It is this interaction between drawing and thinking which professional adult designers find so easy which is so hard-won for the child.

The problem is not simply – can they do the drawing? But can they model in one medium (drawing) and then make either another model or a product in a different medium which matches, in some essential characteristic, the model in the first medium (the drawing)? Design can only develop as a genuine playing with possibilities once a range of conventions have been learnt and the freedom to play with them has also been learnt.

##### 5. What is involved in using drawing as a tool for designing

Manual skills apart, there appears to be a mental block on the idea of using a drawing as a blueprint for making which is not satisfactorily bridged until around age 8. Before this age most children see a drawing as a product, a picture. It has no bearing on the making task for which they have been told that it is the plan. The potential of the analogy between drawing and making needs to become conscious in order to see that a particular drawing can equate to a possible answer, and only one among many. But little children do not play with their drawing. They do not want to have several tries on one sheet. They want to produce a picture, including what the weather was like behind.

Younger children frequently do not understand that there can be a connection between what they can draw and what they

can make with some other material. They see no analogy between the drawing and the future product. They will conform to the teacher's instructions – make a drawing, make a model – but the drawing does not inform their making unless they are constantly supervised and kept on task. The children may be able to draw, they may be able to see that someone else's drawing is a plan for action, but the joining of the two, the conceptual difficulty, is seeing that *their* drawing could become a blueprint for *their own* actions and can be changed as they think about their *actions* as they *draw*.

The conceptual hurdle to be overcome in order to use drawing for designing involves understanding the analogical nature of the drawing in the design situation, to see drawing as modelling. To use drawing as a design tool involves seeing the drawing as if it were the real object and to be able to image the product through the drawing, evaluate it, re-image, re-draw, re-evaluate and so on, iteratively. It is the messy and interactive nature of design drawing which needs to be conveyed to children.

I have borrowed and adapted Lakoff and Johnson's (1980) metaphors JOURNEY and CONTAINER since to me they can be applied to any process verb with its associated product (see Hope, 2000). Iconic drawing is a container, regardless of complexity. Drawing for design is a journey; one's ideas travel, frequently across several iterations.

Young children see drawing as a one-off recording process, a container for their ideas, not a "modelling for the future" process because they have not grasped the journey metaphor in relation to drawing, which involves the sophistication of seeing first attempts as staging posts towards a final solution rather than as "wrong" and therefore bin-fodder. To use drawing as a design tool, it is the developing idea not the perfection of the drawing that is paramount. This goes against the desire of young children to be able to produce their "best" drawing first go.

To design a complex artefact, one's ideas need to be put into a "container", a means of

objectifying inner thoughts, half-baked ideas and fuzzy images, then taken on a journey. And just like a small child with a Tupperware box of bits and pieces to keep them amused on motorways and aircraft, the contents of the "container" are to be taken out, played and fiddled with for the whole duration of the journey.

Children do not know this about designing. Nobody has told them. We expect them to pick up the idea along the way through our Short Focused Tasks and other practical activities. But how will they extrapolate an abstract process concept from all this activity if they are not told there is one there to find?

### 6 To what extent can children utilise their drawings as a tool for designing?

If a child has not grasped the idea that drawing is symbolic, rather than simply iconic, then they are not ready to use drawing as a design tool. They may be able to produce exciting art-work and even be good at drawing (in the usual representational sense) but until they see that ideas can be developed through drawing, then its use as a designing tool is closed to them.

Design drawing involves a "secondary symbolic manipulation". The primary level of symbolic manipulation is to encode and decode symbols (a word for an object or a drawing of a mental schema). A deeper level of cognition is required to manipulate symbols, to be able to interact with the symbols and enter into dialogue with them to create, not just new symbols, but a new experience of reality.

Children can begin to use drawing as a tool for thought, development and communication when their drawings take on an abstract reality of their own, no longer tied to the particular thought or object that inspired them, but to be changed, used, tampered with, crossed out and obliterated – because they are only way-markers, not the end of the journey.

That involves a lot more than simply learning to draw.

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