

Taking ideas on a journey called designing: a model for explaining design drawing to young children

Abstract

In many ways this paper represents the next stage in my understanding of the way in which we use a medium such as drawing to support the mental process which we call 'designing'. At the Millennium Conference in April 2000 I was just beginning to feel confident enough in the way I see things to say so in public. A year on, the model has become crystallised, simplified and has been tried out on real children. I can now say with confidence 'It works for me'. I am now at the point of wanting to explain it to others and ask 'Would this work for you? Would you give it a try and tell me if it does?'

Applying Lakoff and Johnson's ideas in *Metaphors We Live By* (1980) to the activity of design, I have developed a metaphor to explain the process of using drawing for designing which will make sense to young children. When children begin to realise that drawing can be more than a container for their ideas, but can also be a process by which they can go on a design journey, with it and through it, they begin to use drawing to extend and develop ideas and understand the potential of drawing as a design tool.

The paper details my observations of children designing, which led me to adopt the model and describes my research into making the process of designing explicit by using this metaphor with young children.

Since 1996 I have been investigating the extent to which young children can be taught to use drawing as a design tool. Prior to the introduction of the National Curriculum, almost all research into young children's drawings focused on drawings as finished products, for example the work of Kellogg (1959), Freeman (1980) and, more recently, Matthews (1999). Infant and younger junior children had never been asked to draw what they were planning to make and so no one knew whether they could, although the assumptions were that they would, presumably there being no evidence to the contrary. The idea that the use of drawing for designing would be a good thing appeared in print soon afterwards. For example:

The ability of children to develop their ideas through drawing needs to be developed throughout the curriculum from an early age – so that 'drawing an idea' becomes second nature. (Weston, 1991: 96)

However, many researchers found that the ability of young children (Year 2 being frequently studied) to produce drawings which

functioned as designs, rather than as finished products, was hard to find.

For example, Ritchie (1995) observed them putting in sky and grass around simple designs, suggesting that they had forgotten the purpose of the activity. Or perhaps they did not understand the concept of designing by drawing?

Garvey and Quinlan (1998), discussing evaluation, show examples that are single-draw items. There is no development of ideas across a sheet of paper, with multiple ideas, some more fully formed than others and which appear to be moving towards a design solution.

Regarding the early puppet-making of young children, Kress (1997) observes that:

...when the representation 'comes off the page', it enters another world. It shifts from the world of contemplation in to the world of action... While it is on the page I can do 'mental things' with it. It is a mental object, distanced from me, accessible by sight and imagination if I move into the [world of] the page. When it is off the page, I can do physical things with it. It has become a real object, accessible by feel and touch as well as by sight. (p.27)

In recording their ideas in a drawing before they begin to make the object, we are asking children to manipulate not just the mental object but its objective representation. The child is adept at manipulating mental objects and making snap decisions about the form of an object as they are making it. In drawing their ideas, we are asking them to objectify and record each snap-shot, each idea. This requires a level of control over the stream of mental images, which also involves speed of generation, which is parallel to writing. When we write, we slow down the stream of inner speech, sequence it and hold on to part-formed thoughts until the previous thoughts are recorded. When using drawing for designing, a whole stream of ideas needs to be tumbled onto the paper in exactly the same way.

Not surprisingly, the young child produces one quick sketch to gain the teacher's nod of assent so they can go and engage with the materials and put their real ideas to the test.

Part of the problem is the transience of children's play. They do not make permanent functional objects as play-props. Their willingness to pretend form, function and material properties in the pursuit of imaginative action mitigates against their engagement with problem solutions which

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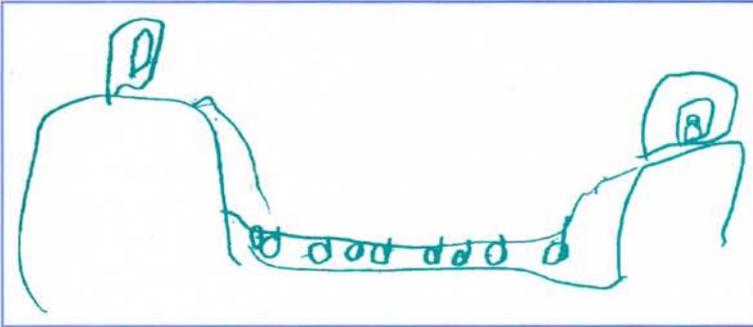


Figure 1: N's drawing. It is a solution to 'Frosty the snowman needs to get his shopping from the shop on the next hill. There is a lake in the valley and he would melt if he falls in.'

involve grappling with the limitations of these factors. But it is here that the need for recording ideas is most acute. The children need to realise that they cannot consider all the relevant factors at once and that to do a good job they need to have jotted down some ideas so that they can evaluate them and make informed decisions about what would be the best way forward. This is asking a lot of a young mind.

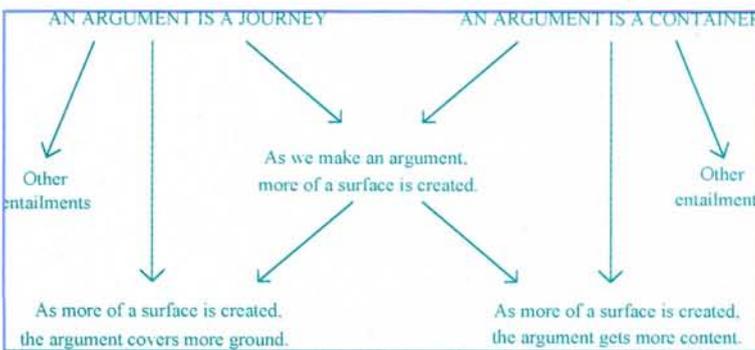
So, how do I, the teacher, explain the role of drawing to a 6/7 year old so that they can use it to improve their designing? How can I convince young children that pausing for thought and planning is the best plan? Is it impossible or is it all in the teaching?

The role of metaphor in designing

Breakthrough began to come for me when I realised that a drawing is an analogy for the real thing.

Terminology is difficult here. The words 'analogy' and 'metaphor' are usually applied to figures of speech and language use. Gentner (1982) opened up the use of the terms by asking 'Are scientific analogies metaphors?' (1982) to which her paper supplied the affirmative. Kekule's benzene rings, Rutherford's picturing of the atom as a miniature solar system, and many more, can all be seen as ways in which we build a new picture of the world in terms we understand already. Even the words we use: 'current' and 'flow' for electrical activity, or 'blackhole' for super-gravitational singularity, for example, come, not from the way these things really

Figure 2: Lakoff and Johnson's model for metaphorical entailments: 90.



are, but from attempting to explain, by analogy, the unknown in terms of the known.

Strictly speaking, design drawing is a metonym, because we use it in place of the real thing in the same way as we shout 'Come on, Number 5' when we mean the person wearing shirt number 5. When we make a drawing of something we are planning, we discuss it as if it were the real thing. For example, this conversation between two Year 2 boys:

C: (prodding N's paper): What you could do is ... like ... have that and then that there.

N: Yeah. And then ... (moving his pencil about in the air over the paper)

C: And, and... (waving his pencil over N's paper in the same way, indicating what N. should draw) And then that bit....

N's drawing is a place-marker for his ideas, which C. can understand as representing a solution to a design problem. He can read it as such a solution and add ideas of his own to it. He does not want to draw on N's paper (not sure if that is allowed, perhaps) but confirming the rightness of N's own next idea, which he then draws.

The drawing is occupying a space between design idea and design production. The boys are using the drawing to advance their ideas towards a solution in exactly the same way as adults do. Interestingly, they do not use precise language to explain their meaning to each other. The words are meaningless without the actions. N's drawing is conveying sufficient meaning for C. to understand N's ideas and make suggestions.

The container/journey metaphor

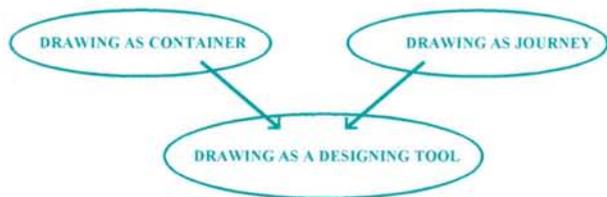
In their book *Metaphors We Live By* (1980), Lakoff and Johnson posit that our entire understanding of the world is built on metaphor. Metaphor is everywhere and informs and creates our understanding of the world – physical, social and intellectual. If we use the metaphor ARGUMENT IS WAR, then, hopefully, we are not talking about academic debate. But we might find ourselves DEFENDING OUR POSITION or RALLYING OUR THOUGHTS.

But how does this apply to designing? It came in one of those 'Aha' moments which writers on the subject of insight try to define, about three months after I read Lakoff and Johnson's book. In order to explain how new concepts are built by the interaction of old metaphors, they produced the following diagram:

This model can be generalised to include all process/product words, e.g. trust, work, plan, design, etc.

These are mostly action or process verbs, with their related noun. The word 'design' fits neatly into the pattern. 'To design' is a process that is a creative and intellectual journey which we undertake. 'The design' is the thing that contains our thoughts and plans. Drawing for designing also fits the pattern. When we use drawing for designing we take our thoughts, along with our pencil, on a journey and produce 'a drawing' which is then the container for those ideas. We can then evaluate our ideas as expressed in that drawing and go on the next stage of the journey.

This can then be simplified to:



It is this double metaphorical use of drawing that young children have yet to grasp. They see a drawing as a container for their representation of reality (be it past, present or future). What they have yet to understand is that this container can be taken on a journey and changed and modified on the way. They may fill the paper with more and more content, but they have not covered more ground. The drawing has not travelled any distance; it has remained the same idea as when they first put pencil to paper.

It is when children begin to realise that drawing is not just a product, but can also be a process and that they can go on an intellectual journey with it and through it, that they begin to use it for developing ideas and, therefore, as a genuine design tool. They are then using the drawing product as part of an interactive drawing process in which each successive drawing is another staging post along the journey towards solving the design problem.

Examples in practice

Figure 3 shows J's design drawing for Frosty the snowman. She has produced two ideas: sending baskets along and aerial ropeway and building a bridge. Her little captions in the snowmen's speech bubbles 'This looks nice', 'I'll make a bridge' and 'I've got it' suggest a real engagement with the problem. When she made her model, she combined both ideas. She made two pillars from rolled newspaper but then strung a ropeway between them and made a little basket with a pizza inside.

As well as using the drawings as containers for her ideas, her ideas travelled across both drawings and on into making her model.

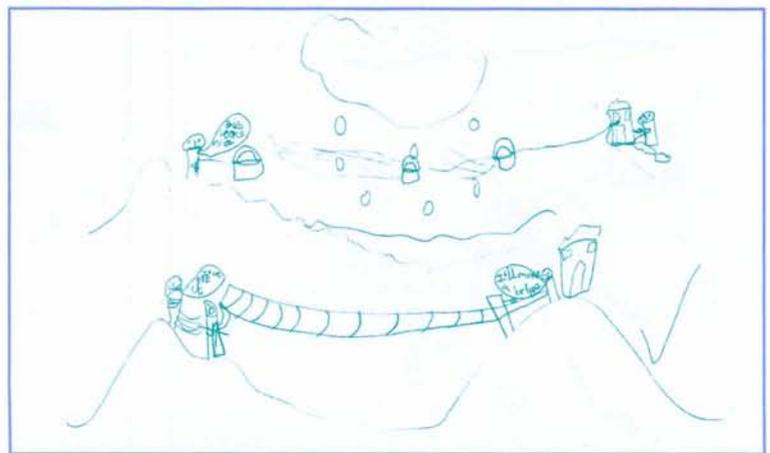
A few weeks after the Frosty project I made the container/journey metaphor explicit to this Year 2 class.

I showed them examples of narrative and design genre drawings and asked them to spot the differences. They could see the differences but could not articulate it. I explained how the 'pictures' contained the ideas these children had about how the house (or whatever) looked in their imagination but that the 'planning drawings' explored ideas about things that the children wanted to make. The 'picture' was a finished product but the 'plans' were just the start of the process. I then drew the container/journey metaphor diagram on the flip chart and explained how it applied to the design drawings. I was trying hard to believe that they were looking thoughtful rather than blank.

The activity *Flat Stan* is one that I have done more times than I could count. It a series of three design and technology lessons based on the book *Flat Stanley* by Jeff Brown. In the first lesson the children are asked to make a model of Flat Stanley with appropriate clothing and luggage to fit in an A5 envelope. This is followed by *Round Stan* (apologies to Jeff Brown) in which the storyline involves Stan and a balloon and then *DIY Stan* in which the children devise their own adventure.

The results were exciting and considerably better than I have had previously, even from many Year 3 children. What was impressive was the range of techniques they adopted to develop their ideas, without being specifically told to do so. They applied techniques that had been used or discussed in relation to other projects conducted over the previous months.

Figure 3: Ideas on a journey; J. Year 2.



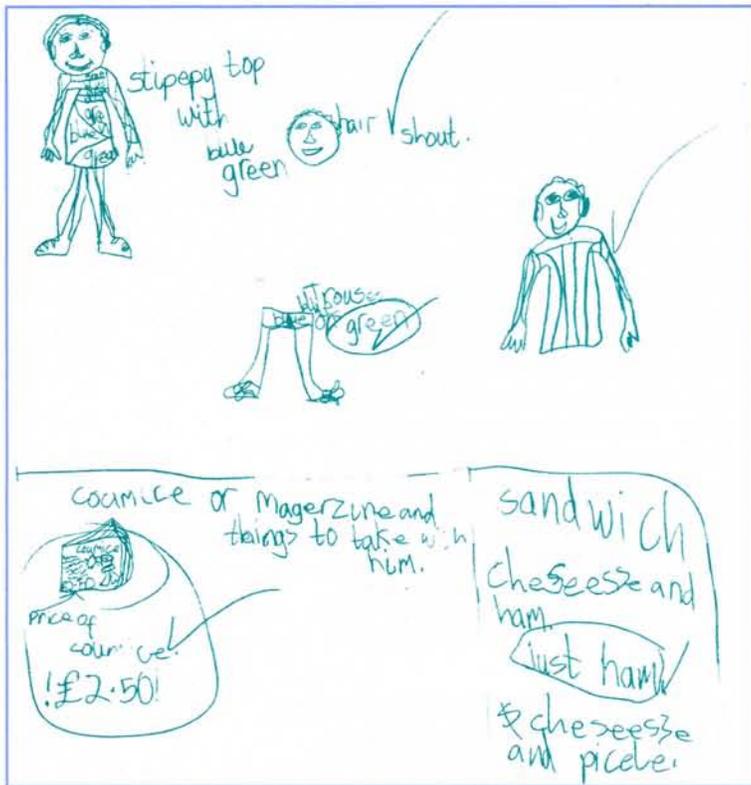
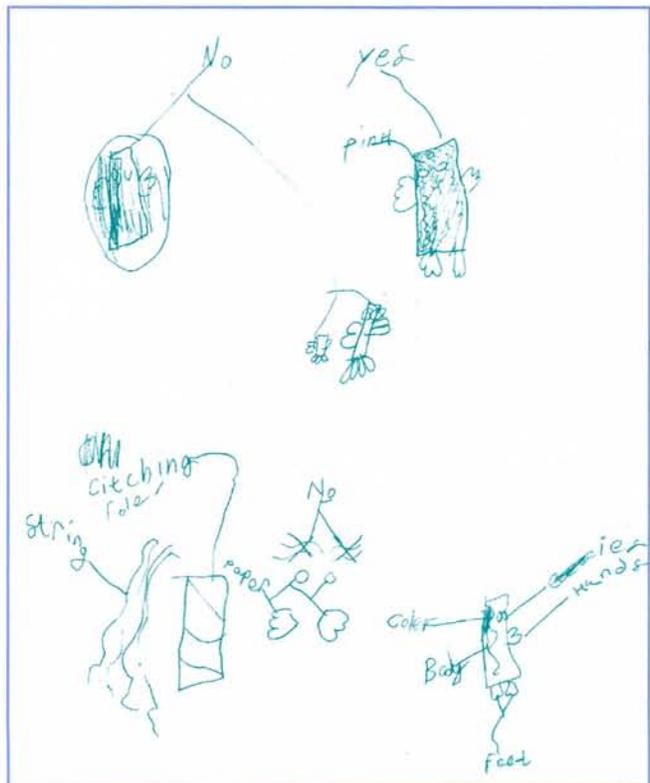


Figure 4: J.'s planning drawing for Flat Stan.

Figure 5a and 5b: M.'s plans for Flat Stan and Round Stan.



These included:

- collaboration, discussing their drawings and swapping ideas
- brainstorming, recording a large number of varied ideas
- drawing profile as well as front view of the model to be made
- exploded diagram to show how parts will fit together
- re-drawing just the parts they wanted to experiment with
- using captions, labelling, writing a list, instructions
- drawing the model as it will look when made from the materials available

In summary

The two boys quoted earlier were using their drawing as a discussion document for modelling ideas. J. used words and drawings interactively to record her design thoughts. M.'s drawings show him using drawing to record ideas, make decisions, work out construction techniques and to help himself envisage his ideas as if made with the materials provided.

The only difference in the way I presented the Flat Stan lesson to any of my many previous presentations across the 5-9 age range was in the explanation. Showing the children

examples of the way drawing could be used to contain and develop ideas and explaining designing as a journey recorded in a series of drawings had enabled them to access the genre.

There have been two aspects to the improvements made in these Year 2 children's drawings this term. Understanding what makes a drawing into a good 'container' for design ideas (labelling, expanded diagrams, etc.) and appreciating that design is a journey and that each drawing on the paper represents a point along that journey, which records the progress of the designer's thoughts, which can be reviewed, changed, developed and incorporated into new ideas.

If Lakoff and Johnson (1980) are right, that our understanding is built by metaphorical connections with existing knowledge, then picking the right metaphors is of the essence of good teaching. I have found one that seems to be working for me and class 2R.

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- Details of the Flat Stan lessons and the way they were used to convey the container/journey metaphor can be found on the Kent NGfL web site.