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Children talking about designing: how do young children perceive the functions/uses of drawing as part of the design process?

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Abstract

The directive to draw initial ideas on paper is widely used by teachers as a strategy to set children off in thinking about a designing and making task. In spite of much useful guidance from sources such as DATA, NAIDT and others, many teachers still express concern that children, when asked to model their ideas by drawing them, make drawings which do not clearly relate to the product which they subsequently make.

This paper explores and compares the responses of children in two Year 1 classes in different schools. In each class children were offered an initial discussion of the design brief by the teacher, followed by the instruction to draw their first thoughts. The writer observed the children during this phase of the work, and then encouraged them in individual interviews to reflect upon how they thought they would use the drawings that they had made. The children's responses show a clear difference in sophistication of design thinking between the two groups, but also suggest that the function of drawing as a part of design activity is opaque to most children at this stage, and that they may need different approaches to supporting the development of design thinking through 2-D modelling.

Keywords: designing, drawing, Key Stage 1

The process of Design and Technological activity is fundamentally one of bringing into concrete expression a mental image or model of an object or product. As Roberts (1992:33) puts it:

"Central to the act of designing is the capacity to conceptualise and represent ideas aspects of present realities and future possibilities. 'The mind' (we say) makes use of a variety of forms of knowing, and makes transformations between the modes of conceptualisation and representation."

It is common practice in Primary School Design and Technology for teachers to raise the expectation that children will draw an idea in advance of making. Learning to express the internal model in concrete terms, and to represent ideas through drawing is expected as part of development in designing skill (Technology in the National Curriculum, 1995; programmes of study for Key Stages 1 & 2).

However, this is still experienced as a problematic area by many teachers, who perceive discrepancies between children's expression of models on paper and in three dimensions. Anning (1997:231) suggests that

"....it is not surprising that drawing episodes in design and technology activities are problematic. Children are not introduced to the genres of drawing that can help them to develop designerly thinking and behaviours"

In spite of a variety of advice, such as that embodied in the publication from NAAIDT (1997) which suggest a progression in the expression of initial ideas through drawing, some teachers still expect children to engage in a 'designing stage' which is expressed through drawing. These drawings may form the basis of discussion with the teacher as to how the ideas will be realised through a model, but often are simply accepted as a completed 'stage' in a process.

The purpose of this paper is to explore children's understanding of the purpose which drawing may serve in designing processes. Young children fairly readily engage in most activities demanded of them by teachers, whether or not they are clear about the purpose. I will describe and analyse some observations of and interviews with children aged between 5 and 6 years in Year One classes in two schools. I wanted to attempt to clarify whether the children that I observed understood the drawing activity as part of a design process in which they were engaged, and if so, what understandings they were able to express about the way in which making a drawing would aid their development through that process.

The two schools are fairly typical of schools in the Southern counties. Each is situated on the outskirts of a large town, and they draw on similar populations. School A is a Primary school, and School B an Infant school. In each school, I worked with a Year 1 class whose class teacher was deputy head of the school.

The teacher in School A is an experienced Design and Technology specialist. She undertook a 20-day training course in 1987-88, and has been to a variety of LEA-run in-service courses since. She is very enthusiastic about the subject and has been active in promoting it in the school and in supporting colleagues. There is a well-established scheme of work for Design and Technology throughout the school. The school is very well resourced for practical activity of all kinds, and the children are accustomed to working with a range of materials. The task in question was based on the children's story, 'The Lighthouse Keeper's Lunch' (Armitage and Armitage, 1984). The task was to design a method whereby the Lighthouse Keeper could carry a greater load of shopping, and thus go to the shops less often. Focused practical tasks leading up to this design project concentrated on the skills needed for building a simple chassis. This teacher offered the children clear expectations about what they should do, and the task was preceded by a lengthy and detailed class discussion.

In interview, she expressed a clear view of the

place of drawing in design activity: "... to get their purpose quite focused, so that they know where to begin, what they're aiming for". She is aiming "for them to have an idea..... or a picture in their head, what they want the finished article to look like..... [.....] I want them to realise that if they put this idea, this picture they have, down onto a piece of paper, somebody else can then use their idea, so they're clear enough about it" She expressed impatience of advice that suggests that young children should draw after making rather than before, believing that this underestimates the abilities of children in Key Stage 1.

By contrast, the teacher in School B is inexperienced in Design and Technology, although, by default, she holds responsibility for the subject. Recently returned to classroom teaching, she had had no training for this area of the curriculum. She expressed anxiety about this area of work. Design and Technology was not yet well established in the school, and the limited resources that did exist had, at the time of my visits, yet to be organised. There had been no preliminary work to prepare the children for designing and making. The teacher's understanding of drawing in this context was that it is "part of the design process.... the designing". The task was based on the topic of 'Toys' that formed a focus for work in the term. The children had observed and investigated a range of toys, some with moving parts, including soft toys.

I observed and interviewed 22 children in school A, and 16 in school B. In each school, I worked with the children a group at a time, taking a participant observer role. Dialogue was recorded using a small tape recorder, and this was supplemented with field notes, some written at the time and some immediately following the session. In each case my work with the children followed a session in which the whole class was briefed by the class teacher, explaining the purpose of the activity. There was, in each case, a teacher-led question and answer session which allowed the children to suggest possible ideas of making. Each group was asked by the teacher to work with me to plan their ideas and draw their designs. I was introduced as "someone who



the eyes will move because you put
eyes on a slider and cut some lines in the
middle then put the slider through the lines

Figure 1

will help you with your ideas". After the 'design drawing' phase, I interviewed children individually, in order to ascertain to what extent they seemed to understand a purpose for the drawing, and how they would express it. In the quoted passages below, children's words are in plain type, and my questions are italicised.

The children in School A quite clearly were more advanced in their design thinking than the children in School B, as indeed one would expect. They had a clear view of this planning activity as leading to something that they were going to make:

J: I'm going to do lots of plans. Come on,
C: I'm drawing my picture.

They knew what materials were available to them and thought about what they would use. They were all clear about the nature of the problem to be solved - to enable 'Mr Grinling' to carry more shopping on his bike - although they approached it in a range of different ways. Not all, for example, made a drawing to express their ideas. Several wrote lists of materials, and did not draw anything, in spite of the clear expectation set by the teacher. Many also deviated from the intention of the teacher that their solution should be based on using a chassis that they had learned how to make, preferring to explore other ideas:

A-M: *Tell me about your drawing*
I've drawn..... a bike with three baskets

'stead of two; they can put ten loads of ...ummm.... sugars, and flour and milk and bread and butter...

Show me the three baskets

One there... on the side.... and there's one there..... on the front..... Oh! I haven't drawn one! (*takes pencil and adds another basket*) and the third basket is in the middle. One's at the front, one's in the middle and one's at the back.... there's the wheels (*pointing*)..... the seat (*pointing*) Because if he keeps falling over, I would put some wheels on the side..... stabilisers..... one would be here and one would be there (*indicating the two sides of the tape recorder*) One would be in the front, one would be here and one would be there.

Children in School B understood that they were to think of 'something that would move', and connected this with their topic on "Toys", as their teacher had suggested in briefing them. Their drawings reflect this. When shown some techniques of joining that would allow movement, such as the making of slides and tabs from card, or the use of paper fasteners to allow movement around a fixed point, some immediately adopted a technique and produced an idea based upon it (Figure 1), while others adapted their original idea to include the technique they chose to use (Figure 2). The majority of this group, however, seemed to understand the

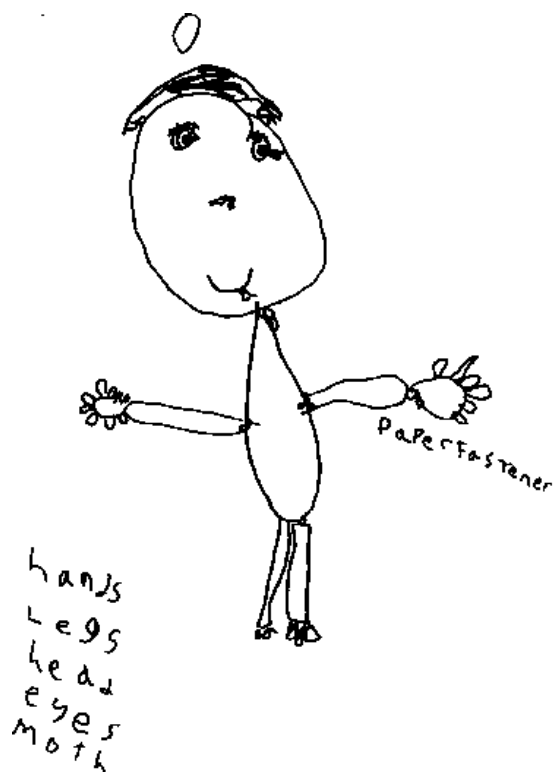


Figure 2

instruction to draw an idea of a toy with movement as a task in itself, unconnected with the intention to make. In some cases, the idea of the 'real-life' object represented by the toy overlaid the original intention:

W: I done a motorway.... that one's trying to take over that car. The one that the car's behind that one, that one's going to take over that one, but it can't because that one's got more speed up than that one, because can just stay on that road because he doesn't want to go on any of these roads..... I should have put some more engines down, shouldn't I?

Which will you make?

That one;..... that's a speedzonic.... and that one's a zonic

Prompting was sometimes successful in reminding them of the task in hand:

W: *What will you use to make your car?*
Plastic? Metal..... no we haven't got any metal..... paper?..... not actually paper, only use cardboard, only need scissors to cut it out.

How will you make the shape?

Cut out the bit you need. Put sellotape

on so it can stay together. Is that cardboard?.... are there any scissors?

Will you use flat cardboard or will you use a box?

Flat cardboard... cut out the shape like this (mimes using scissors) I don't know, I'll have to think how to make some windows

What will you use to make wheels?

Put a round shape - a circle bit of cardboard. Do you know how I know this?

Because my friend's done it before.

Several of the children in this group, however, found it difficult to respond to questioning about their drawing in terms of design intentions:

K: *Tell me about your drawing*

Teddy

Tell me about your teddy

Teddy cuddles me. He comes to bed with me. He plays with me. He plays with my friends, some of them

Which bit of teddy moves?

arms and his legs

How will you fix them so they can move?
with..... fur

He says goodbye when my friends go. He waves his hand

Although the children in school B show some awareness of materials and how they are manipulated, most of them do not seem to 'own' the knowledge in terms of what they might be able to do in the classroom situation.

E: It's a house

Which part of it moves?

The door opens....

What will you use to make it?

Paper.... or bricks..... Bricks

How will you do that, can you tell me?

We..... need a man to do it.

Children from both classes were hazy about their purpose in doing a drawing. Most children in School B made no connection between what they had drawn and an intention to make. Asked about their drawings, they acknowledged that they did not know how the product would be made:

S: *What is it made from?*

..... It's made for playing with.... made with glass and plastic.

Is this a train you could really make?
 Yeah.... I don't know how you make plastic.... I just know it's a kind of materials.... It would be a bit too hard. But I just really copied it from there. I could make something a bit like it.

(This child has in fact done quite a sophisticated observational drawing of one of the toys with moving parts that was offered to the group for investigation.)

In School A, when asked whether this drawing would help with their making, most children - 18 out the 22 - agreed that it would help. One child did not respond to the question, and two said "No", one being unable to explain why not., and one "because paper can't come to life". Asked *how* the drawing would help, six responded by saying that they did not know. Several talked about 'copying' the picture, although further questioning revealed that some of these interpreted 'copying' as drawing the picture again. Most of those who had a clearer idea of the purpose talked in terms of *remembering* their ideas (One child, early in the group discussion, said: 'I don't need to draw it, because I've got a good memory'.):

T: *When you make your trolley, will this picture help you?*

Yes

How will you use it to help you make your trolley?

Guess what. It needs to colour so you can get the colours right

A: *...and when you start to make your trolley, will that help you ?*

I'll copy it

How will that help you to make your trolley?

'Cos it shows you how you wanted to make

it and how..... and you draw it, and when you make it you have to make it exactly the same

Only one child in this group, the last-quoted, was able to articulate the function of the drawing in the terms stated by the teacher.

These findings indicate that children of this age, given some assistance, can begin to develop a clear sense of function in drawing for designing. However, as can be seen from their responses, it requires considerable 'scaffolding' from the teacher or other interested adult. It is impossible to say to what extent my intervention, by asking the children to engage in acts of metacognition in exploring the purpose of the drawing, either helped or hindered this 'scaffolding'. It does, however, suggest that more is needed than a simple instruction to draw an idea prior to making.

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