

# Helping primary school pupils to understand the relationship between needs, wants and technology

This research might help you ...

- To consider the purposes of the activities in your classroom. If you want pupils to reflect on something you will need to give appropriate time, stimulus and means of response.
- To use reading and discussing stories as a means of enabling pupils to think about things outside their immediate experience.
- To put designing and making activities in a historical context which has personal appeal and involvement.
- To link questions to designing and making activities in a way that enables pupils to develop a wider appreciation of technology.

## Introduction

I have been struck by how many children in primary school see technology in a limited way; limited in fact to their own designing and making in school. Through these activities they had difficulty in grasping a wider view of technology. In this article I describe my attempts to widen their perception of technology.

## Using questions

I interviewed some children in a primary school by asking this question "Do you have any technology at home?" The following answers were typical:

"We've got some at home, because my sister and her friend were making cards and I made an envelope in the shape of an ice cream." – a Year 6 girl

"No, I don't make things at home." – a Year 6 boy

There are, of course, problems with such a naive approach to questioning. Children are not naive and try to give the answers they think the questioner wants. If children see the question in the context of school technology then they will relate their answer to this and the answer will be framed in terms of school technology, i.e. making things.

However, if pupils really do perceive technology as something which is related only to the making they themselves do in school then it is hard to imagine how they will move to a broader understanding and grasp the idea that technology arises from human needs or as Ritchie (1995) states, "more accurately in some situations, wants". Yet the National Curriculum Programmes of Study at both Key Stages 1 and 2 state that children should be taught to "relate the ways things work to ...people's needs" and "consider the effectiveness of a product, including the extent to which it meets a clear need" (SCAA, 1995).

I attempted to use more probing questions to move pupils away from a personal making centred perception towards the ideas of technology in the outside world.

I asked "Why do technologists produce "new" inventions?"

A Year 5 girl responded, "To make it easier for us to do things."

When asked to elaborate, she said, "To cook faster like in a microwave."

A Year 5 boy suggested "They might copy something but try to make it better, faster or cheaper to run."

A Year 6 boy came nearer to the concept of needs and wants when he said, "They make fast cars because people like speed...they like to put their foot down." When asked whether he would want a fast car if he had six children, he responded, "big cars then...or minibuses. They'd make what people want."

The question had triggered further thinking but I find it difficult to believe that this is the extent of the children's potential for technological thinking.

When asked why their parents buy machines and devices for the home, one Year 6 girl answered, "Because they are in the shops and they like buying things."

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Year 3 making railway signals



Another Year 5 boy said, "Because they are advertised on television."

These are intriguing answers and show to some extent that the child is aware that some of the outcomes of technology are produced in response to wants; wants that are generated by a highly sophisticated marketing industry. I felt that this awareness was too tentative to merit further exploration so I tried a completely different approach.

#### The historical perspective

One question which did help the children reflect more upon the relationship between technology and need was framed within an historical perspective – "Do you think they had technology in the old days?" Some of the children's definitions of "the old days" would not have met with parental approval – "They must have had technology in the old days because I've got a picture of my mum when she was young so they must have had cameras." Once it was established that the old days were a bit further back than that, the responses were far more enlightening. A Year 6 boy suggested that "if they didn't have technology in the old days we wouldn't have all the things we have now." Another more specifically suggested that "the Anglo-Saxons had shields and swords...and the cavemen had clubs made from animal bones. They needed them for when they had fights." Although much of the technology the children ascribed to the old days seemed to be in line with their perceptions of history as one gigantic battlefield with all the associated weaponry, some thought of fire as a technological

development. From a Year 5 girl, "They must have been really cold in the caves so they invented fire", and from a Year 5 boy, "They used their brains to think of how to light fires so they really had technology quite a long time ago."

Although about half the children offered a coherent answer to this question, some of the girls emphatically denied that technology was in existence much before they were born. One Year 6 girl said, "Computers and video games and things have only been around for a few years haven't they?" Another said, "Technology is a new thing. My granny doesn't know about technology." These answers may originate from a problem with terminology, which leads to children understanding the word technology only in its modern day sense. This seemed to be the case with one Year 6 boy who, when asked if he thought cavemen had technology, said "Kind of...but I don't think they called it technology."

It is clear that many children find it difficult to make connections between needs, problems and ways of solving these through technology, even when prompted with questions designed to help them access and reflect upon their everyday experiences of technology at home and in their larger social world. It appears that these aspects of technology have to be taught in a specific way. The question is, how?

#### Stories: a powerful medium

The correct use of stories can be a powerful way of conveying a message. Work in the USA using stories as a way of teaching about environmental issues has been shown to be particularly successful (Munroe, 1994). The author of this study attributes the success of stories as a teaching tool to qualities of a story "which make it more interesting... more meaningful and memorable." More significantly, she found that the children were able to relate to the problem-solving aspects of the story, with the interest the children showed in the story correlating with their understanding of how a problem was solved.

The development of technology through history is a fascinating subject, and provides



Year 6 using a spirit level (Egyptians)

a rich background of exciting anecdotal information for teachers. Joan Solomon has developed a series of nine stories based on periods of history which bring technological developments during those periods to life for primary children (Solomon, 1995). These are due to be published for teachers. Each story tells about two children who encounter technology in their own time – Victorian children see the Crystal Palace, the railways and the electric telegraph, Tudor children see the printing press, and Egyptian children see the pyramids.

In each story the children characters take ownership of a piece of new technology and develop it for their own needs. This is paralleled by the classroom activities of the pupils who design and make similar artefacts. In this way the relationship between technology and need is made explicit.

The children whose responses are quoted in this report were used in the trialling of two of the stories. The first, *Geoffrey goes to School* tells about a Tudor boy who was one of the few allowed to attend school. He visits a printing shop with his sister and they see how difficult and tedious it is to produce printed books. From this, they go away and try to print their own names. The children in the Year 5/6 class described here listened to the story, spent about 20 minutes discussing it and then went on to emulate the story's heroes by printing their names. Two

technology lessons were devoted to using lead-free solder to make letters, then printing with them using black acrylic paint. Hearing the story first, then discussing it, and using it as a basis for more work in the topic on Tudors they were working on, helped them to understand how technology in those times fulfilled a growing need for printed material.

Some weeks later the same children heard about Bertha, a child from Anglo-Saxon times whose family were serfs. They continually had to eat stews made from cereal; bread was too difficult to make because of the problems involved in grinding the barley. Then the miller arrived in a nearby village, and with his water mill he was able to grind the cereal into flour, but at a price. The children encounter the dishonesty of the miller as he robs the family of more than a fair share of their grain to pay for the grinding. But the children remain captivated by the water mill, go home and make one. Again the Year 5/6 children listened to the story, saw and felt how difficult it is to grind cereal, and then went on to spend two more technology lessons constructing a water wheel, and finding ways of making it do work for them.

#### Changing perceptions of technology as outcome

In terms of recall, all the children remembered the names of the characters in the story, the plot, and the associated

Year 6 making water wheels



## References

Monroe, M. (1994) 'Environmental success stories: a new method of teaching environmental problem solving', Paper presented to the 7th IOSTE Symposium, Veldhoven, The Netherlands.

Ritchie, R. (1995) *Primary Design and Technology: A process for learning*, London: David Fulton.

SCAA (1995), *The National Curriculum Design and Technology Orders*.

Solomon, J. (1995) *Primary Technology through History Story Booklets*, Oxford University Department of Educational Studies.

technology six months after they undertook the task. Some even remembered the finer detail, such as Geoffrey drinking beer for breakfast and Bertha hating porridge. However, to determine how their perceptions of technology had altered during this period, another interview was carried out eight months after the first, and four months after they had completed both technology tasks.

When asked about their views on technology, all the responses indicated that they had some grasp of how technology is used to produce something "somebody needs". Nearly every answer included the word "need". Year 6 boys produced answers including, "when someone says they need something to do a job, then other people sit down and make it for them", and "it's like thinking that, if I only had something like this then I could do that job so much better ... like needing something which makes things a bit easier." Year 5 and 6 girls were similar in their responses, but in a more domestic context: "My mum says without the microwave she would go mad because we all come in and want to eat at different times...she says she really needs it now and couldn't do without it", and "I suppose it's when they make a new type of material...you know that you make clothes from, and when you wash it, it comes out all creased and messed up...so someone makes an iron because you need it to make the clothes look good again."

When asked again what gives a technologist an idea for a "new invention" most of the answers attributed the idea to someone else's needs: "Someone thinks of something he needs and asks a technologist to make it for them" and "They look in the shops and in books and catalogues and think, I can make that better and when I do everyone will want one." When faced with the question about the old days, all children were emphatic in their assertion that of course there was technology in the old days. They then went on to quote not only the examples of printing and grinding, but drew on other periods of history they had studied, including the Romans and the Vikings, "the Romans built long straight roads, and bridges with water on top of them" and "the Vikings made great long boats."

Although this study involved only 28 children in an early trial of the history stories, it appeared to show that framing technology both in an historical context, and using stories with characters with which the children can relate, helped them to see technology as more than just making things. And although they did "make things" very successfully as a climax to the story, they were able to see these simple but effective artefacts in terms of larger, more powerful technological developments.