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Who are the clients in school based design and technology projects?

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Abstract

Young children are often highly motivated by design and technological tasks and very often the motivation springs from their desire to achieve a particular purpose - to design and make a house for their teddy, a hideaway for themselves and their friends, something to keep special treasures in. This purpose is often related directly to a particular client. However, there are other driving forces that keep a child engaged in activity. This paper explores the interaction between the different motivational and other factors that lie behind the development of design and technology projects in schools, focusing on younger children.

The purpose of the paper is twofold. First, it aims to explore the nature and importance of clients in d&t activity. Second it aims to tease out some critical dimensions in supporting children to take ownership of tasks and engage with them to the point that their own development is maximised.

Purpose and motivation

Design and technological activity has increasingly come to be seen as a fundamental human activity which is characterised by a desire to change or improve some aspect of the made world. (eg DES/WO 1988¹, Kimbell et. al. 1991²) In this context it is an activity we all engage in to a greater or lesser extent based both on our ability to see something that needs attending to and our belief in ourselves as capable of taking it on. At a professional level, this activity is sometimes driven by an innovation that has potential for making an improvement - a solution looking for a problem. More often however, the activity is driven by the needs of a client, presented to the design and technologist and left for them to develop ideas for a product or system that will address the needs. In schools, activities in many ways bear more resemblance to this latter position - children are rarely left to operate as and when they feel is appropriate as design and technologists - teachers take responsibility for planning activities that they believe will support the development of a child's capability. However, while at both the professional and school level the task is externally set, the motivation behind the setting of tasks is fundamentally different: in the professional world the predominant purpose is to achieve a workable new product or system, in school it is to facilitate specific aspects of learning taking place.

Inevitably the school situation carries a variety of tensions ranging from the extent to which the task will be accepted as 'real' and worthwhile by the children to the dimension of learning it aims at developing. At the heart of many of these tensions is the perception by both the teacher and the child

of the purpose of the activity. Purpose can be seen in terms of 'what for' or 'who for' and in further understanding the different and sometimes competing purposes in an activity, the motivational factors and the role of the client become clearer.

Few would disagree that motivation is an important condition for learning. However, the extent to which motivation is dependent on intrinsic or extrinsic factors has been the source of much debate. (eg Downey and Kelly)³ Within this debate intrinsic motivation is often seen as the learner being motivated to discover new information or to solve a problem for his or her own satisfaction and extrinsic motivation as the learner being driven to achieve something in order to receive some externally awarded reward. However, achieving a purpose in design and technological activity cuts across such arguments - the motivation is sparked by something far more fundamental than satisfying a personal interest or acquiring new knowledge, it is marked by an intrinsic desire to achieve a goal for an extrinsic purpose - to use materials and tools to resolve a need. Focus on the importance of intrinsic motivation has increasingly encouraged teachers to work from children's own interests, but interest or curiosity alone can result in a clientless activity and in design and technology this is not enough. Ken Baynes⁴ in referring to the historical development of primary education pinpoints exactly this issue.

"The children encountered the world of objects, they played with and drew and modelled natural things, they handled clay, sand and water (and sometimes even fire), but they were not asked to use their experience to make a world of their own."⁴

This is not to say that exploring their world is not vitally important for young children, but that when such experience is coupled with a child's commitment to a purpose the threshold for learning opens further. Critical in the relationship between purpose and motivation in design and technology is that of the client who can act as the mainspring in an activity, even with very young children. But in any situation there will be a range of issues to be considered and there will almost inevitably be more than one client.

The roles played by different clients

In the professional world design and technologists have a range of clients to satisfy: the consumer, the sponsor, the manufacturer and, to a certain extent, themselves as designer - does their product meet their own criteria for quality, creativity and innovation. Each client has particular demands; the consumer for example wanting a safe product, the manufacturer wanting one that can be produced efficiently, the sponsor wanting to achieve high returns for their investment.

In the school context, establishing projects that place a variety of demands on the child holds potential for creating challenging tasks which present a range of competing issues to be addressed. Very young children identify their own clients in their play activities as they create props or environments to meet imagined needs of toys or fantasy characters.⁵ In these situations it seems somewhat artificial to analyse the range of clients involved, but in fact what is often easy to identify is that the consumer (maybe the fantasy character) is an important factor. Possibly equal to this is the needs of the 'designer' themselves, as the child takes satisfaction in their own creative achievements. In such activities there is unlikely to be a 'sponsor' - the very nature of the activity is such that it is completely child instigated.⁵ In the school situation the teacher very often takes the role of 'sponsor', so what is important is that clients created or imposed by the teacher can be accepted by the children as fitting in to their own priorities and consequently attracting the child's commitment to the client and ownership of the task.

There are many driving forces keeping children engaged in design and technological activities: their desire to please the teacher, learn something new, use new or novel tools and materials, demonstrate something they know how to do. The wise teacher will capitalise on these when planning activities. But possibly one of the most critical factors in the way teachers structure activities relates to what they themselves see as the purpose. This purpose is inevitably linked to learning, but often there is a

split in the priorities: some seeing the critical aspect relating to the process the children are learning to effectively deploy, some to the specific knowledge or skills that can be attained. These two standpoints have consequences for the role clients can play in activities: the former standpoint stereotypically seeing understanding the needs of the client as an important part of the process, the latter stereotypically using the client as a vehicle to make the attainment of new knowledge or skill more palatable.

Focusing on children's work

A useful way of exploring and illuminating the issues identified above is to look at classroom activities. To this purpose I will outline three class projects and from these draw out issues that impact on the role of the client, motivation and learning.

A home for a spider

Very young children can be immensely motivated by design and technological activities. Indeed their willingness to embed a design and technological purpose into an imaginary context and then pursue it as if 'for real' appears to give them a positive predisposition for involvement in and learning through such activities. (Stables 1992⁶) This was exactly the case with a group of Year 1 children who were designing and making a home for a toy spider. The task was set by their teacher and was part of work within a more general topic on homes. The children had decided as a group that certain factors would be important - that the home should keep the spider warm and dry, be big enough to live in and shouldn't blow away in the wind.

The spider was the explicit client, very much in the role of consumer. The children identified with the spider to the point that for the girls it was a girl called Sally and to the boys it was a boy - Sammy. They used the spider throughout as a reference, identifying through both imagination and their own experience what its needs might be. They kept their explicit criteria at the front of their minds, but implicitly they all identified further criteria relating more to the personal needs of the spider, adding playground slides, fish bowls, TV sets and pictures for the walls. Both the teacher and myself (I was present throughout the activity), also featured in their decision making, but in fact our influence as clients appeared to be minimal. A more important client was themselves, partly in their roles as designers and partly as they emerged as consumers - using their homes as props in their own play. This was particularly obvious with the one 5 year old in the group who played with his home and the spider

literally the second he decided it was finished.

For this group the explicit client played a critical role, both in providing motivation and a reference point for their decision making. Because the spider existed only as a toy the children utilised their imaginations to identify its needs. However, this also allowed them to bend the needs in any way that suited them should, for example, the task in hand become too difficult. In fact only one of the children overtly used this strategy and for the most part the children were challenged both in terms of developing ideas and in learning new knowledge and skills as they relentlessly pursued their tasks. Testing their homes related directly to the needs identified at the outset: to see if they were waterproof and if they would blow away in the wind. They also hypothesised about whether the homes would keep the spider warm and why they thought this would be and checked whether the spider could get in and out of the doors. There was also an element of testing relating to their implicit criteria, for example did Sammy spider enjoy playing on his slide?

Throughout the activity there were a range of motivating factors other than the client and perhaps one worth noting is that of using tools and materials that were novel to them. This was particularly evident in the case of the 5 year old who used a junior hacksaw, bench hook, dowel and low melt temperature glue gun for the first time - to make a ladder for the spider to get to the top of his slide. Having used these resources for this task he then went on to make lamp posts for the outside, employing similar techniques.

Making a Spanish galleon

A rather different project was carried out by a group of year 6 children to make a Spanish galleon. This task was also instigated by the teacher and once again was set in the broader context of topic work - in this case the Tudors and Stuarts and the Spanish Armada. On the face of it this task was about creating a model of a Spanish Galleon and at one level was a technical problem solving activity. For both the boys and girls this in itself provided implicit motivation. The girls, for example, spent a long time working out a system for the pulleys for the sail. The boys spent a long time creating a framework for the hull and then cladding it. In achieving these things the children were learning about using tools and materials and making things work and this was both challenging and motivating for them.

However, to them the task was more than just technical problem solving - their clients were the

sailors and these provided a reference for decision making. When choosing a material for the sails they decide on thin plastic because it would be strong enough to survive the wind in the English Channel and at the same time not too heavy for the sailors to operate. Debate about the spacing of the knotting for the rigging related to whether or not the sailors would be able to climb it. When deciding on the size a gate in the railings, one of them was quick to point out that it wouldn't be just sailors that have to pass through, but barrels of wine as well!

Interestingly the context can unwittingly slip into the modern day. When deciding on a colour to paint the lifeboat "bright orange" is the immediate suggestion, modified quickly to "bright fluorescent orange". When asked why this colour was chosen, one of the girls explained that this was because it was a life boat and a life boat will need to be seen in the sea. Whether fluorescent orange paint was available at the time of the Spanish Armada wasn't questioned, it was as if she had transposed the activity into the context of her own life. The boat was finally painted orange and yellow and the explanation given was that it was colourful, that they liked the colours. Their reasoning was slipping away from the purposes of the client and towards their own desires. They were very pleased with the finished lifeboat and reacted to their own achievements on a very personal level. As with the spider homes the concept of client is operating at different levels: as well as the sailors the children have also become clients. In a way they are making the galleon for themselves.

When the children tested their galleon, this related overtly to finding out whether they had succeeded in their technical problem solving - would the galleon float, would the tiller steer the ship and would the sails catch the wind? Demonstrating success to themselves the teacher and other children in the class was seen as important. So for these children, while the sailors provided a useful reference point, the lack of reality resulted in any issues relating to the sailors being handled somewhat superficially. A more major focus was creating a realistic model and taking on a challenge set by their teacher. And in doing so, the children learned a great deal both about the processes of collaborating and designing and about using tools and materials and making things work.

A greeting card

A very different project again was one that was carried out by a group of year 2 children who were designing greeting cards. In this instance the clients were very real and one child chose to make it for her

parents. Interestingly she demonstrated the importance of a child addressing her own needs as designer - while she was happy to work within the constraints suggested by her teacher, she was adamant about rejecting any of the teacher's ideas. Like many professional design and technologists she was keen to accept the task, but determined to bring her own stamp of individuality and creativity to her work. Her actual design was for a card shaped like a bowl of flowers. Each flower was made as a separate item and then fastened to the main card with a split pin paper fastener - she wanted each flower to rotate. However, having done this she became concerned about the potential danger of the backs of the split pins that were left exposed to catch someone's finger. In this project the clients were real people and the child met the challenge on that level - real people can cut their fingers. So she set about resolving the situation - covering the backs in a way that didn't prevent the flowers rotating.

The value of making the roles of the clients explicit

In all three activities 'clients' have had an impact on both motivation and on the criticality of the decision making. The more explicitly the clients have been identified, the greater the range of issues that have been dealt with, contrasting interestingly with the range of issues addressed in a traditional pre National Curriculum skills focused project. To a greater or lesser extent the needs of the consumer, the sponsor and the designer themselves have been considered. Silent amongst this however has been the client in the role of manufacturer - as the children have taken on this role themselves and in doing so a critical dimension of learning has been addressed: that of actually making things work. Interestingly the only client that is explicitly identified at the outset is that of the consumer, begging the question that if the other roles emerge implicitly, how much more effective would it be if the roles (and consequently

the needs) were identified, discussed and addressed more explicitly. Opening out the different roles and needs may throw into sharp relief greater understanding of the range of issues to be addressed and the potential for learning embedded within them. In particular clearly identifying the different roles may enable the child to address the needs of different clients more effectively and within this their own needs in the role of the designer.

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