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Learning from play: design and technology, imagination and playful thinking

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Abstract
This paper considers what children can learn from play and explores what can be learned from a comparison between play and design and technology (D&T) teaching. Three fundamental functions which are common to children’s play and D&T are discussed: ‘mastery orientation’ and the development of autonomy; ‘decentration’ and the development of flexible thinking and, finally, mediation and the development of forms of representation. The High/Scope approach is described as an example of an early years curriculum which actively supports these functions of play and the relevance of this approach to the teaching of D&T is considered. It is argued that D&T teaching, like play, can help to promote creative, critical and playful thinking by helping children to internalise and develop their imagination. It is also argued that the development of imagination is dependent on learning to use tools of thought and that these tools evolve as they are used in playful, innovative ways.

Becoming social requires learning social conventions and working within their limits. This tension between the desire to invent and explore and the need to share and to work within social conventions permeates all of our social life.¹

Child-centred teachers may concentrate on helping children to develop as individuals and traditional teachers may emphasise the learning of established disciplines but all teachers have to find ways of coping with the tension between established knowledge and creative imagination; the given and the new. It is this tension which fuels cultural evolution:

The very essence of cultural development is in the collision of mature cultural forms of behaviour with the primitive forms that characterise the child’s behaviour.²

Both play and design and technology (D&T) require that children should be allowed to make their own choices and decisions but this can be difficult to accommodate within the increasingly tight planning which many schools have introduced to cope with the demands of the National Curriculum. In reception classes work and play have become increasingly polarised, with little child input in the former and little adult input in the latter³ and there is some danger of a similar division in D&T.

My intention, in this paper, is to consider what children can learn from play but also to explore what can be learned from a comparison between play and D&T teaching. I will be considering three fundamental functions which are common to children’s play and D&T: ‘mastery orientation’⁴ and the development of autonomy; ‘decentration’⁵ and the development of flexible thinking and mediation and the development of forms of representation. I will show how these functions can be supported by a curriculum based on the High/Scope⁶ approach and I will consider the relevance of this approach to the teaching of D&T. I will argue that D&T teaching, like play, can help to promote creative, critical and playful thinking which thrives on the tension between the ideas of individuals and the evolving forms of social conventions.

Autonomy and Mastery

John Holt defined intelligence as ‘not how much we know how to do but how we behave when we don’t know what to do’⁷ and the development of confident resourcefulness appears to depend on opportunities to experience autonomy in managing one’s own activity. Katz⁸ has suggested that children are born with an innate ‘disposition to learn’ which, given appropriate encouragement and
opportunities, will lead them to develop mastery orientation - a positive response to challenges and persistence in the face of set-backs and difficulties\(^4\). Jowett and Sylva\(^9\) have shown, however, how the curriculum in some playgroups can undermine this natural development and encourage what Dweck and Leggett referred to as ‘helplessness’ - passive dependence on extrinsic motivation and readiness to give up when confronted by obstacles\(^4\). Jowett and Sylva observed the behaviour of children who had attended playgroups which provided a ‘see-saw’ curriculum; alternating between free play with little adult involvement and heavily adult directed group activities. They compared these children with graduates of nursery classes where the teachers guided and extended children’s own play with little use of adult domination:

The nursery graduates were far more persistent and less likely to ask for help or give up ... They concentrated better, their play was richer, and they approached adults as resources for learning rather than as sources of aid. Most importantly, they opted for difficult, educational activities when allowed to choose what to do.\(^10\)

Several recent studies of the role of play in children’s learning have adopted a Vygotskian, social constructivist perspective, recognising that ‘free-play’ which is not scaffolded by sensitive adult support is not enough to balance adult dominated activities and keep the development of mastery orientation on course\(^11\). If they are left to get on with playing on their own while adults devote all their attention to work activities, children will soon learn that play is not highly valued.

Kimbell et al have pointed out that the different kinds of D&T teaching activities specified in the new National Curriculum orders\(^12\) have led to schemes in which Design and Make Assignments (DMAs) are seen as ‘independent project work by pupils’ and Focused Practical Tasks (FPTs) are seen as ‘instructional devices for teachers\(^13\). This, they argue, is ‘desperately depressing’ because it fails to recognise that DMAs and FPTs are different points on a continuum of negotiated handover of control:

It would be very dangerous for the future development of Design and Technology if these two categories of tasks were seen as separate and that teachers completely control one and pupils the other. It is the messy middle ground that is critical to pupils’ learning. Through negotiation and discussion with teachers, pupils must progressively learn for themselves the art of deriving sensible and manageable tasks\(^13\).

Both DMAs and FPTs can provide opportunities for children to develop mastery orientation but only if ‘bridges are built from both ends’\(^14\); if pupil autonomy is scaffolded by support and guidance from the teacher and if teaching encourages and acknowledges children’s active involvement. Autonomy is a product of social interaction, it cannot be fully developed by children who are left to their own devices.

Decentration and Generalisation

When they play, children are freed from the ‘functional pressures’ and fear of failure which may constrain real life activity\(^15\). Sutton-Smith suggested that the ‘uselessness’ of play frees children to take risks, recombine elements of their experience in creative ways, explore possibilities and invent new ways of doing things and that this ‘variability training’ promotes flexible and adaptable responses to problems\(^16\). The assimilatory function of play can also help children to ‘decentre’\(^6\); to loosen the grip of their immediate sensory perception. Finding out what can be done with objects, situations and roles by trying them out in different combinations and contexts can enable children to abstract general concepts from their experience of particular exemplars. Using a seashell as a cup may help a child to become more aware of similarities and differences between seashells and cups but the experience will also help the child to develop a slightly more abstract concept of ‘cup’ in which information about particular cups is supplemented by a generalised awareness of ‘cup-ness’.

It may very well be the ability to take leave of the world-as-it-is that provides the space through which new possibilities for thought emerge. Relinquishing the
constraints of convention in order to explore in the mind’s eye the unconventional might provide one of the most important arenas in which creativity itself could be generated.\(^1\)

Baynes has observed that manipulation of objects is ‘a way of having new ideas: it is part of the equipment which supports the imagination’\(^17\). By using objects in playful, creative ways children develop their understanding both of the objects and of the ideas they are used to represent. The looser, more generalised concepts which are developed in this sort of play also enable children to internalise their imagination, reducing the need for concrete props. Knowledge and imagination develop each other as children play.

Davies has pointed out that this interaction between things and ideas is similar to the model proposed by the Assessment of Performance Unit (APU) which represents the designing and making process as an interaction between hand and mind\(^18\). Designers develop their ideas through ‘a dialogue between the internal images and the external models’\(^19\) and just as children’s ability to internalise their imagination is assisted by the modelling of ideas in their play, so designers’ ability to visualise design proposals is increased by experience of modelling ideas in drawings and prototypes:

...the act of expression pushes ideas forward. By the same token, the additional clarity that this throws on the idea enables the originator to think more deeply about it, which further extends the possibilities in the idea.\(^20\)

Mediation and Representation
Describing the development of imagination in Piagetian, constructivist terms, as above, fails to acknowledge the part played by social and cultural factors. Our ability to think and imagine is vastly increased by our ability to use socially evolved structures and disciplines of knowledge; tools of thought which enable us not only to process information but also to free ourselves from ‘what is’ so that we can imagine ‘what might be’. Donaldson has shown how learning to read and write supports the process of ‘disembedding’ thinking\(^21\) but before the ‘vicars of the culture’\(^22\) can induct children into the mysteries of literacy they have to help them to master spoken language. Play can help adults to mediate children’s learning of language by providing a ‘window into the child’s mind’\(^23\) which enables sensitive adults to guess at what the child is thinking and to represent these ideas in words. Jones and Reynolds argue that supporting children’s own attempts to verbalise their play ideas is not enough; adults also need to model the verbal representation of events by themselves ‘telling the story of children’s play’\(^14\). Wasserman\(^24\) recommends building adult-supported representation of play into a cycle of play-debrief-replay so that children can continue to work on the development of ideas which the debriefing has made more accessible to conscious thought and reflection.

Language is just one of many tools of thought that can enhance our ability to imagine and speculate. Archer and Roberts have described the ability to form images ‘in the mind’s eye’ as ‘cognitive modelling’:

Its strength is that light can be shed on intractable problems by transforming them into terms of all sorts of schemata... such as drawings, diagrams, mock-ups, prototypes and of course, where appropriate, language and notation. These externalisations capture and make communicable the concepts modelled.\(^25\)

These ‘schemata’ have to be learned and, like play, they begin as ‘concrete thinking’ outside the head but, also like play, they can then be internalised, enabling ‘the mind’s eye’ to see more and to see more clearly. Imagination may feel intensely personal but it is dependent on tools of thought that can only be learned from others.

High/Scope: one way of helping children to learn from play
The High/Scope approach to early years education provides a useful example of a curriculum which promotes mastery orientation, flexible thinking and the mediation of forms of representation\(^6\). In a High/Scope nursery opportunities for children
to plan their own use of time are balanced by activities which are planned by adults to ensure that children experience a range of ‘key experiences’. Considerably more time is devoted to child initiated activity than to the adult initiated ‘small group times’ and ‘circle times’ but adults have a very important part to play in the children’s ‘work time’ and children are encouraged to take an active role in the other activities which, though adult initiated are not exclusively adult controlled. High/Scope is based on a Piagetian model of cognitive development so ‘active learning’ through direct manipulation of materials is encouraged in small group times as well as in work time but this approach can also accommodate Vygotsky’s ideas about the importance of adults’ mediation of tools of thought such as language, mathematics, logic, drawing etc.

Children are encouraged not only to make their own decisions but also, through adult mediation of the planning and reviewing of their play, to become increasingly aware of their thinking. The plan-do-review cycle of work-time ensures that children are helped to develop their ability to represent their actions in the disembedded ‘there and then’ as well as in the ‘here and now’ of their play with materials and objects:

...children learn to be self-critical, without shame, to set high goals while seeking objective feedback on their plans. There is a deliberate modelling in using language to guide action. There is also encouragement to develop persistence in the face of failure and calm acceptance of errors or misjudgement. Today’s feedback informs tomorrow’s plan.

While planning and reviewing in groups may mean that each child has less individual attention, this is compensated for by the fact that each child can learn from the other children’s efforts to communicate as well as from the modelling and support offered by the adult to each of the children. This group process can be used to promote the celebration of diversity and this can support the development of flexible and creative thinking as each child recognises that if other children can have different ideas it might be possible to have different ideas of one’s own. Linus Pauling is reported to have said that ‘the best way to have a good idea is to have lots of ideas’ and a good way to learn to have lots of ideas is to share ideas with lots of other people.

Lessons for D&T teaching?

Like work-time and small group activities, DMAs and FPTs can be seen as ‘breathing out’ and ‘breathing in’ or as turns in a conversation between children and teacher in which both are actively involved. If children are to develop mastery orientation they need help in their struggle to achieve autonomy. They need to play with new materials, tools and techniques so that they can discover their possibilities for themselves but they do not have to ‘reinvent the wheel’; sensitive adults can scaffold their learning and introduce them to tools of thought which will help them to handle ideas inside their heads.

The flexibility of thinking which ‘active learning’ or play with objects and materials can help to develop can be further advanced in all kinds of D&T activity but it may be particularly well served by Investigation, Disassembly and Evaluation Activities (IDEAs) in which children can be encouraged to play with products in their heads as well as in their hands. Imagining how things could be done differently draws on existing knowledge but it is also an effective way of exploring the ‘hidden intelligence’ of made things; recognising why an alternative possibility was not adopted can help one to understand the thinking behind what was chosen.

Learning to model ideas in play, words and pictures as well as in 3-D helps children to develop ideas but it also introduces them to powerful tools for organising information; tools which can enhance children’s ability to develop and manipulate ideas in their imagination and which continue to evolve as they are used creatively and innovatively.

Play is quickly marginalised in the first years of compulsory education but it need not disappear entirely if children can be helped to develop playful thinking. Playful thinking is characterised by openness to existing ideas,
tools, systems and resources combined with a confident willingness to imagine ways in which things could be done differently, to play with a wide range of alternative possibilities and to model those which seem most promising in forms which open them to scrutiny and comment from others. Design and technology shares with play many of the functions which promote playful thinking and it may prove to be an excellent vehicle for smuggling play beyond Key Stage 1.

References


23 Bennett et al, 1997 (ref 11 above) p.38.


