

In the schema things

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Rosemary Roberts makes sense of children's compulsions. I will always remember Carrie and Paul, children in my first nursery class, in the days before I knew about schemas. The first thing Carrie needed to do when she came to nursery was move the home corner. This was not something she thought about now and then, but every day. She used to gather all her friends to help; and they would transfer every plate, doll and stick of furniture to some far-flung corner. Her friends usually wanted to put the new home corner in the tiny space behind the sofa, or hide it under the table.

In between negotiating with this apparently compulsive "removal" child about other children's right to play in the home corner, I would be attempting to dissuade Paul from leaping off the top of the climbing frame. If he wasn't there, he would be throwing every bean-bag in the nursery on to the roof, or investigating the maximum water-shooting power of the squeeze bottles in the water tray. There was no doubt that Paul had a great time at nursery and was always busy, but I some-times wished that he would choose things to do that caused less chaos.

I knew these children were doing things that were important to them, and so I was reluctant to stop them. In any case, any efforts I made to distract them towards different activities were usually fruitless, or only temporarily successful. Apart from the disruption, I also wished that I could find a way of extending their experiences and their learning, as they seemed to be "stuck" in these particular activities.

Then I learned about schemas (patterns of repeatable behaviour), and my view of children's play and the ways I could provide for it gradually began to change. Now I am convinced that this idea of recognising and accommodating children's patterns of behaviour in our provision is one of the most useful and effective developments in early childhood education.

The work of Chris Athey, Tina Bruce, Cathy Nutbrown (see Further Reading) and others has shown how an awareness of these schemas - described by Piaget - can be used to support and extend teaching and learning. Children from two to five are especially likely to show these patterns in their play; the result is familiar territory to anyone working with young children. Easily identifiable schemas are connection, enveloping, enclosure, rotation, trajectory, transporting.

To give some examples of schemas in play, connecting children enjoy train track and construction sets. Envelopers - and Carrie's friends were an example of this - love making dens and wrapping things up. Rotaters go for circle games. Trajectory children - like Paul - need throwing, jumping and kicking games. And transporters are seldom seen without a shopping bag, buggy or truck of some sort.

Some children seem to be particularly schematic, showing a combination of these patterns in their play. Recently I was watching two boys playing on bikes outside. They had invented a circular track and were happily riding round and round. After a while they attached a trailer to one of the bikes and loaded it up with the toys from the sandpit, before continuing. Protests

from the sandpit crowd were to no avail, nor was a request for the return of the trailer to a previous game. The boys needed to have the trailer connected to the bike, they needed to carry something in it, and they needed to go round and round.

Of course these patterns ebb and flow. Do we all grow out of schemas in the end? When I think about the popularity of football and golf - such trajectory games - I rather doubt it. Wouldn't it boost a very schematic child's self-esteem and learning if his or her primary school took schemas seriously, both in the classroom and in the playground?

And I wonder about the gender implications of it all. Girls are so much more likely to show enclosing and enveloping schemas; strong trajectory schemas seem to be far more often displayed by boys. Taking anatomy into account, perhaps this is hardly surprising. Does this go a little way towards explaining how determined boys and girls sometimes are to play with "boys" and "girls" toys? Is this why it feels like a losing battle to encourage boys to use the home corner (so full of enclosing and enveloping play), and to make sure the often uninterested girls get their fair share of the trajectory bikes?

Clearly there are implications here for behaviour management. When I was trying to manage Paul - before I knew about schemas - I used to say that he must stop jumping and throwing things, and I would suggest alternative activities. But as they were usually not trajectory he showed no interest. If I had thought about offering him "legal" trajectory play (splatter painting, home-made throwing games, the marble run, hammering, water play with pipes and gutters) we might have got on better.

How can we use these ideas to support and extend children's learning? It is possible to think about almost any activity in a pre-school setting in terms of its schematic content, as well as its learning potential. Observing children's schematic behaviour opens up the possibility of matching the most compelling interests of the child with provision for learning. Paul's understanding of sequence was shaky, so involving him in a turn-taking game throwing bean-bags into a row of buckets graded small to large would have been just what we both wanted. Carrie never chose to paint, and I wish I had suggested that her "removal team" would know where to take everything if she made some big arrows, and she could signal "clearing-up time" by making another set in a different colour to point the other way.

Children's schemas are fundamental to them. Knowing about them makes a wonderful basis for discussions with parents - and when parents know about them too, the exchange of information can be seriously useful.

One of the most valuable aspects of working in this way is that it recognises and values children's fundamental interests and needs.

Instead of experiencing frequent disapproval for playing in ways that are natural and important to them, children's self-esteem can grow because they feel understood and accepted. Their self-esteem grows too, in their knowledge of their own progress in coming to terms with those things that interest them most.

Further reading about schemas: * Extending Thought in Young Children, Chris Athey, published by Paul Chapman * Getting to Know You, Tina Bruce. Hodder and Stoughton * Threads of Thinking, Cathy Nutbrown, Paul Chapman * A Nursery Curriculum for the Early Years, edited by Rosemary Roberts, National Primary Centre, Westminster College, Oxford

OX2 9AT * Self-Esteem and Successful Early Learning, Rosemary Roberts, Hodder and Stoughton

Rosemary Roberts is co-director of Peers Early Education Partnership(see page 11).

This book was recommended to me with the words “this will change the way you look at children’s learning forever”. Strong words.

The book is one of the results of the Froebel Early Education Project, which was run by Chris Athey from 1973 to 1978, at the Roehampton Institute of Higher Education, London. Tina Bruce was the appointed teacher. The children came from nearby Wandsworth, from a range of backgrounds. The project’s aims were to:

Observe and analyse, on a daily basis during a two-year teaching programme, children under the age of 5 in order to:

- Identify developments in each child’s thinking
- Describe the development of symbolic representation from early motor and perceptual behaviours
- Identify curriculum content assimilated to developing forms of thought (page 3)

Very wide ranging aims indeed. So how has the author, Chris Athey, approached this in the book? She has divided it into 3 parts: Events influencing the Project; the Findings of the Project and Later Patterns of Thought.

Part 1 is an overview of the political background and government initiatives, with an illuminating Chapter 4 about constructivist pedagogy, Piaget and how this fits with current theories. And here we find the motivation for the Project and the book:

Constructivists are interested in the processes by which children construct their own knowledge (page 43) and there is a great difference between ‘know-how’ and consciousness of ‘know-why’ (page 44).

Part 2 is a highly detailed breakdown of the observations, drawings, actions and dialogue that were observed during the Project. It is prefaced by the observation that in previous research it was content which was more important than form. So Eng’s observation of “jagged teeth” and “stairs” seem to show no correspondence in content – but when the

zig-zag form is considered they are a common representation. The Project concentrated on form, which includes topological space, space notion and representation. As children develop they begin to develop perception (a face must include a mouth before it will elicit a smile, even at 5 months). Children must then use this perception to create their representations in drawings and 3D models.

Using these representations, Athey discusses 5 graphic schema in detail: Lines; Core and Radial; Open and Closed Arcs; Zig Zags and Angles and Quadrilaterals. This also includes discussion on how the same drawing can be re-interpreted i.e. how Eng interpreted the jagged teeth as "aggressive" but the Project team interpreted this as open triangles (zig-zags schema). Each schema is discussed in detail with plenty of examples of how they may progress as the child matures. The most practical part of this is the subsequent analysis of the representations, with the details of form as schemas start to be combined and perfected.

This part of the book concludes with chapter 6 From Action to Thought. This chapter demonstrates how schemas become co-ordinated with each other and develop into systems of thought (page 153). Seven action schema have been considered in great detail, namely: dynamic vertical schema; dynamic back and forth; circular direction and rotation; going over, under or on top of; going round a boundary; enveloping and containing; going through a boundary.

Each has been sub-divided and considered with respect to Motor level (physical action); Symbolic Representation Level (drawing, models); Functional Dependency Relationship (how the schema is used during play, dialogue, early thought); Thought Level (demonstration, usually through dialogue, of how schemas have been used to create original thoughts) and Discussion (explanation of how children have moved through each area resulting in thought). Finally Thought as internalised action is discussed.

This was a truly fascinating chapter as it draws together all the theory and clearly demonstrates how understanding and building on children's schema improves their cognitive functioning.

Part 3 of the book takes us even further on the children's journey, demonstrating how (and examples of which) schema impact on speech, writing and complex concepts, in primary education. For example, levers and pulleys need comprehension of linear movement (dynamic vertical), rotation and going over.

The final chapter explores parental participation and extended experience. This details the learning journey that the parents also undertook during the Project. It is hoped here that this “great source of untapped ability and energy” is used to its full potential in the future. Personally I would have liked some more specific examples of the ways parents were involved and benefited from being a part of this Project, as this could help practitioners to engage more confidently.

Extending Thought in Young Children is a detailed analysis of a complex and long running project. Consequently the book contains plenty of technical language. It is this detail which makes it an excellent reference book. But it does make it a book to be read at several sittings.

There were loads of moments where, as I read a description of a child’s behaviour, the light bulb came on and previously unrelated behaviour suddenly came into focus. I recognised the form of many drawings, plenty examples of which have been illustrated throughout the book. One of the bitter-sweet comparisons is two sets of “draw-a-man” illustrations, one by Project children and one by children matched for age, sex, ethnic background and neighbourhood. The Project children perform significantly better. I couldn’t help feeling a little sad that not all children could benefit from being a part of the Froebel Project.

Finally, has this book changed the way I view children’s drawings, actions, dialogues, behaviour and thought processes? Absolutely. Forever.

What is a schema?

A schema is a pattern of behaviour. Children can and generally do have several schemas that they are interested in at any one time, but commonly have one dominant schema that will remain with them into adulthood.

When do schemas begin?

Schemas begin from birth. Initially schemas are very simple but they will develop rapidly if they are supported. Research has shown that brain paths develop faster when connections are supported; schemas are a way of supporting children and extending their learning.

How do we know about schemas?

Schemas were first identified by Piaget a childhood theorist his work has been further developed by the work of Chris Athey during the 1970`s. Additional research has now been undertaken about how children learn and how their brains develop, because schemas follow interests they can develop high levels of concentration and learning in children.

How do schemas work?

A child will have an area in which they are mainly interested at any one time. To learn about how this interest works they will repeat an action over and over again until they understand about this interest.

If adults can tune into the child`s interest we can support a child to develop their knowledge and extend their interest so further increasing the knowledge.

When a baby is dropping things from a high chair repeatedly they are exploring vertical trajectories or up and down schemas, this can be extended by showing them a yo-yo on a string or lifting them up and down,

It has been known for many years that we learn from doing, when a child is repeating an action they are learning from what they are doing. In addition to repeating an action a child will look for other ways to explore their interest.

When a toddler carries everything to you they may be exploring transporting of items, giving them bags and trucks they can put things in will support this. Extensions can be made by encouraging them to help with the shopping in the supermarket or going on a picnic Older children may become interested in how people are transported and trips could be made to an airport or train station maps could be drawn showing how we get to places. Supporting children in areas they are interested will enable them to continue their interest. Schemas can be seen in children`s play and artwork as well as seen in body language and heard in speech.

How many schemas are there?

There are many schemas and the following table may help you to recognise and support your child's schema. Children's schemas will grow and develop with them and a dominate schema will still be evident in adulthood.

Schema	Definition	Example	Extension ideas
Transporting	Moving objects from one area to another	Carrying items to a special person.	Give items that can be moved, Take on picnics or trips to see trains, buses etc transporting people draw maps, follow roads

		Loading a buggy with lots of items.	
Assembling	Making piles, or structured arrangements	Lining items up, stacking things randomly or neatly	Use construction items that can be piled such as wooden bricks, Give scarfs etc you are happy to pile.
Positioning	Placing objects / themselves in particular places	Always lining up cars etc, likes to stand at the front or back of a line	Have lots of items that can be lined up, use the interest to practice sorting and positioning language. Make caterpillars or trains etc.
Orientation	Interested in different points of view	Turns items over or looks behind pictures	Show how to balance in different positions such as upside down. Take photos of items from different view points
Dab	Random or specific marks	Interested in making marks such as spots or eyes	Give opportunities to spot with paint. Look for patterns that contain dots and dabs. Look at items such as ladybirds, eyes, flower heads etc.
Horizontal or Vertical trajectory	Interested in either up and down or side to side	Paints in lines, climbs upwards on climbing frames, Throws things	Target practice, Play with ribbons waving them up and down or side to side. Build towers from a variety of materials. Make zebra crossings.
Diagonally	Makes diagonal or zig zag lines	Drawing diagonal lines	Paper folding activities such as paper planes that require a

		or pattern boarders	diagonal fold. Explore slopes, saw wood etc.
Enclosure	Surrounding a border	Plays with farm animals making fences for them	Use lego boards etc to develop building houses. Design borders on paper.
Enveloping	Covering themselves or other items	Hides under blankets, wraps things up paints over pictures	Make dens, have layers of clothing available, practice wrapping presents or putting letters into envelopes. Make houses with roofs.
Core and radials	Making circles and extending with lines from them	Draws spiders or suns,	Look at spiders and other insects in detail, Sit in circles or play circle games.
Rotation	Explores things that turn	Interested in wheels or cogs	Visit roundabouts, roll with rolling pins, explore cogs and water wheels etc.
Connection and separation	Interested in how things join together	Tie knots, take things apart	Make trains and carriages, Look at different types of knots, explore with a stapler and other office materials to join paper together. Use building material that join together such as macarino.