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How to scaffold learning through free-flow play (SchemaPlay 1 of 4)

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This is the first of a series of four articles exploring different aspects of what are often referred to as schemas in early childhood learning and development.

Many early years' practitioners will have observed the repeated patterns of behaviour that young children apply in their play. These normal behaviours may or may not have been categorised or identified as schemas or schemas. However, children's fascinations of objects that 'rotate' or their joy in 'containing' and 'enveloping' objects, or transporting' things from one place to another, will have contributed to practitioner's understanding of what their key children are motivated to do.

Identifying operative schemas is crucial to supporting children's learning in free-play, because when we are able to build upon what a child 'can do', we are providing emotional scaffolding to their learning. Cheryl Hadley from Maple Tree Nursery provides an example of how this can work in practice:

AJ (51 months) was first observed throwing small stones onto a paving slab, and then he walked over to where a ball was on the ground and started throwing it up in the air. He did not attempt to catch it, but repeatedly threw it. He then started to roll it along the ground. AJ spent approximately one hour finding things in the outdoor environment to throw and roll. His behaviour suggested that he had a horizontal and vertical trajectory scheme, which he appeared keen to apply to a variety of contexts. When noticing this trajectory scheme being applied outside, I was also able to identify it in the indoor environment – in painting activities, and in his engagement with resources such as the 'jumping frogs'. AJ had not previously chosen to engage in maths-type activities or show any interest in numbers. He did recognise numbers 1-3 though. Applying SchemaPlay it was very interesting for me to understand how to build upon the schemas (what a child 'can do'), as I had not previously looked at them in this way. I was able to see how a scheme, such as the horizontal and vertical trajectory links to maths – to addition, measuring, as well as writing etc., and this was exciting. Over the weeks that followed, my practice started to change. I became more aware of schemas and started to get into a flow of how to support progression. I provided AJ with numbered buckets 1-3 to throw beanbags into (building upon the trajectory and known numbers to support quantity recognition). I also provided the game of hopscotch (at first introducing new numbers 4 and 5). This play built upon his trajectory scheme and took into account what he already knew. AJ continued with this play for some weeks and then after having seen me tallying in another activity, he decided to copy me. He went on to tally the number of beanbags he had thrown into each numbered bucket, so he was recording quantities for his own



purpose. The environment was then seeded with other activities that provided him the opportunity to apply his trajectory and tallying schemes, as well as his number and quantity recognition 1-10. For example number symbols were added to the jumping frogs activity that he had previously played with. He matched the jumping frogs to the numbers and thought this was funny.



It has been a really interesting journey, not only for my own practice, but I can also now recognise how each child's learning journey is different, and how, by building upon children's schemes, I can effectively scaffold their individual learning in the various curriculum areas – all through play. Although I refer to a maths case study here, I also have journeys showing his progression across the curriculum, and all of these journeys have promoted his learning, not to mention his self-esteem and emotional development.

The subject of schematic play was first systematically studied in a five-year investigation in the 1970s by Chris Athey, who found from the beginning that it was necessary to distinguish between the apparent form of the children's thinking, and its realisation in objective content. To consider this from a practical perspective, if you close your eyes and think of 'containment' or 'transporting', you will be unable to, even though you are quite expert in both, you can only think of them in a particular context; there has to be an object that *is* contained or transported. Athey used italics in her writing to denote the form of the action, and single quotation marks to identify the content of it. Athey also referred to this distinction in Piaget's terms as being between the operative scheme, and the figurative schema, and she clearly intended that her studies would be extended beyond her initial 'exploratory' investigations to develop this distinction further (Athey, 1991, p129).

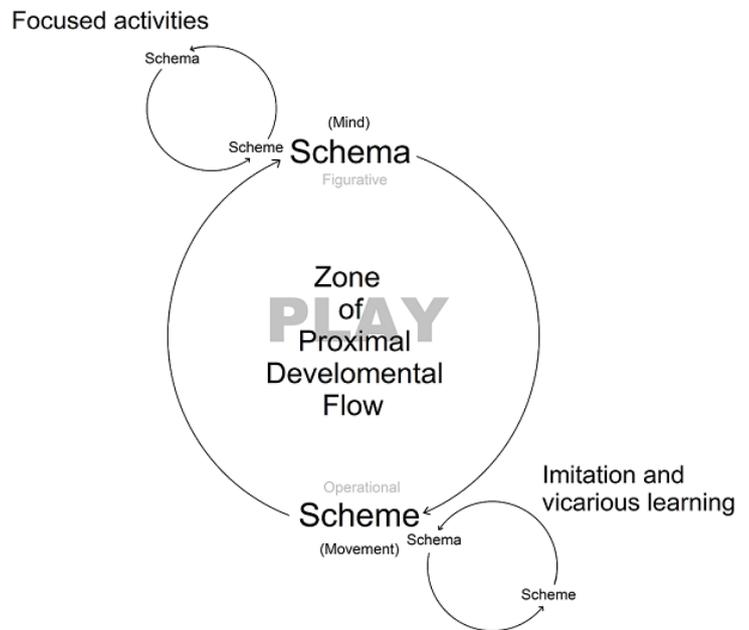
Since Athey, further investigations have been carried out and have been influential. Arnold (2001, 2010) Bruce, (1991, 2001), Featherstone *et al* (2008) Nutbrown (2011), Atherton and Nutbrown (2013) Brierley and Nutbrown (2017) and Grimmer (2017) have all contributed significantly to a growing awareness that operative schemes reveal the foundations of young children's learning, and that these may be encouraged and built upon in the preschool to support their continued learning and development. Now new evidence that provides a much stronger evidential and theoretical understanding of the theory and practice of schematic play has come from two quite separate disciplines; from neuroscience and from cognitive linguistics. The contribution that neuroscience has made to the recognition of the embodied nature of cognition was noted in the findings of the Cambridge Primary Review (Alexander *et al*, 2010):

"Piaget's recognition that children actively construct their knowledge of the world through their action upon it has been upheld. As Goswami and Bryant explain, the discovery of 'mirror neurons' (brain cells which fire both when a person performs an action and when they observe someone else performing it) indicates that sensorimotor knowledge is the starting point of cognitive development, but that it is augmented rather than replaced by symbolic representations 'gained through action, language, pretend play and teaching'" (p91).

Cognitive linguistic studies following Lakoff (1987) and Mandler (2000) are also showing that some schemes are so embedded in our lives, in our thinking and in our language that as adults we have become entirely unaware of them, just like a fish is unaware of the water it swims in, or as we are also unaware of the ocean of air that our lives depend upon.

'Embodied schemes' such as 'containment', 'path', and 'up-down' represent our very earliest concepts that developed in our first stumbling interactions with the world. They are determined by the particular anatomical features of our bodies, and by the environmental constraints and affordances that we interact with and they provide enduring foundations for our continued understanding and appreciation of the world around us.

The SchemaPlay model provides a representation of the processes of learning that are involved in children's free-flow play. The large central cycle highlights the interactive nature of the child's playful engagement with their material, social and cultural environment. They learn about the world through acting upon it. In terms of their cognitive development we see this as an ongoing assimilation of new schema contents and contexts to their emerging schemes which initially include 'containment', 'transportation', 'rotation', 'positioning', 'connecting' etc. A spiral would show this process more adequately as occurring over time, but a circle is used here to emphasise the cyclical nature, and in the interest of simplicity in presentation.



The adult's role, represented in the smaller learning cycle at the top left, is to draw upon their own knowledge of appropriate schemes and schema in seeding the child's play environment with physical, cultural and linguistic resources. The point at which these two cycles meet is a genuine 'meeting of minds' and has been identified in empirical study as 'sustained shared thinking'. Sustained shared thinking was the most significant and distinctive feature of adult-child interactions in the preschool settings that contributed the most to children's outcomes in the *Effective Pre-school and Primary Education Project* (Sylva et al, 2010). In a busy preschool, the curriculum is co-constructed 'in the moment' of these intense engagements with the adult, and also with all of the other peers and family members who engage with the child. The latter influences are represented by the smaller cycle on the lower right. One of the greatest limitations of any such model is its inadequacy of showing the enormous influence of the wider cultural-historic and material context in which the child is learning and her interactions with all of those around her.

The model identifies the importance of the adult drawing upon their knowledge and experience to identify the schemes that children are applying, and to respond to these in offering the most appropriate resources to enable the child to progress. SchemaPlay provides practitioners support with this through the identification of prerequisite schemes, curriculum ideas and the publication of examples of childrens' extended 'learning journeys'.

Key Points:

- Distinguishing between operative schemes and figurative schema helps us a great deal in understanding how it is that young children learn through play.
- The SchemaPlay model also helps us understand the role of the adult in supporting learning through play.
- SchemaPlay provides an early childhood educational and environmental culture which enables the child to always feel in control, to develop their self-esteem, value,

and a recognition of themselves as active learners and achievers in their own driven play.

- SchemaPlay is collecting the evidence that is required to keep 'play' firmly on the EYFS agenda. Our work is already showing significant improvements in learning outcomes especially in disadvantaged communities where teachers actively observe and engage with the 'schemes' children bring with them into the play environment.
- This article has provided an introduction to SchemaPlay. Future articles will provide practical guidance for practitioners in applying the principles and show in more detail how SchemaPlay works in theory and in practice, and how it relates to current policy.

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