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## Schematic pedagogy: supporting one child's learning at home and in a group

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### ABSTRACT

In this paper, we identify ways in which the learning of very young children can be supported by practitioners developing a schematic pedagogy which focuses on structures of children's thinking. First, we provide a critical overview of relevant literature on schemas and schematic approaches to pedagogy. We then outline an original study undertaken to identify and support the learning of seven young children. Taking one child, whom we call Annie, we illustrate how her attention to the fine detail of elements of her home and group environments as she played offered strong clues to her pedagogues about her persistent interests (schemas). We show how careful observation by practitioners can be used to understand and support future learning encounters through a schematic pedagogy, and we consider implications of such an approach for practice in toddlers' early learning.

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### Introduction

The pedagogy of play is pluralistic, complex and intricate, and perspectives on play are culturally informed and generated within centuries-old traditions and heritages. Play, playfulness, playing, can worry adults as is shown in the lingering policy scepticism around the place of play in early learning. Though young children take play seriously, many adults remain to be convinced of the deep thinking that takes place during play and remain uncertain about play as synonymous with excellence in practice in the early years (Howard 2010; Moyles 2010; van Oers and Duijkers 2013; Alcock 2013; Wu 2015). A pedagogy of play must be thoughtfully understood if it is to remain a pertinent fundamental of childhood and, in this paper, we identify ways in which the learning of very young children can be supported by practitioners developing a schematic pedagogy which focuses on structures of children's thinking. Following a critical overview of key studies on schemas and schematic approaches to pedagogy, we outline an original study to identify and support the learning of seven babies and toddlers. Taking one child, whom we call Annie, we show how her schematic play interests in her home and group environments offered her pedagogues considerable insights into learning. We discuss

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the importance of deep observation by practitioners to understand and support learning encounters through a schematic pedagogy, and we consider the implications of such an approach for practice in toddlers' learning.

### Schemas and young children's learning

In the past two decades, there has been a developing international research interest in the learning of babies and toddlers, and strands of research have emerged and re-focused attention both on the importance of the kinds of experiences which best nourish and support young children's learning (Brierley 1994; David and Powell 1999; Nurse and Headington 1999; Selleck 2001; Goldschmied and Jackson 2004; Sylva et al. 2011; Page, Clare, and Nutbrown 2013).

Neuroscientific studies have contributed to a greater understanding of how the young brain develops (Catherwood 1999; Blakemore and Frith 2005; Goswami 2006) and although there remains some scepticism regarding the direct implications of neuroscience for education (Hannon 2003; Bruer 2006), neuroscientific research highlights the importance of learning in the early years. Alongside these, psychological studies which have explored young children's development and learning processes in the early years have continued to draw attention to this vital time for learning (Rogoff 1990; Gopnik, Meltzoff, and Kuhl 2001; Siraj-Blatchford et al. 2002; Siraj-Blatchford et al. 2003; Rinaldi 2005). There has also, during the same period, been increased interest in understanding young children's learning from a schematic perspective. Drawing on the seminal work of Athey (2007), whose work focuses on three to five year olds, others have observed young children's actions, speech and graphic representations in order to better match their pedagogy to children's concerns and interests (Arnold 2003; Meade and Cubey 2008; Nutbrown 2011; Atherton and Nutbrown 2013).

The Froebel Early Education Project (Athey 2007) identified developments in their children's thinking, from early motor and perceptual behaviours, to the symbolic and thought-level, emerging forms of thinking were identified and recorded. Athey (2007, 49) defined these forms of thinking as 'patterns of repeatable actions that lead to early categories and then to logical classifications'; continuing and clarifying schemas as 'commonalities and continuities ... in spontaneous thought and behaviour' (113).

The reiterative nature of schemas as patterns of behaviour is confirmed in many definitions (Shea and Wulf 2005; Smidt 2006) and was picked up by Atherton and Nutbrown (2013, 13), who identified that, 'the private aspects of individual minds are made public through actions, language and representations' and that 'tangible insights into children's minds are shaped by encounters with the things around them and the people they meet'. Athey (2007) observed that children pay attention to aspects of their environment shaped by personal motivations and advocated that material nourishment and attuned accompaniment were appropriate. Athey (2007) identified figural or static representations linked with emerging perception which were visible in children's drawings, model making, constructions and clay, and characterised children's learning and development in terms of the following dynamic schemas, discernible in actions:

- dynamic vertical,
- dynamic back and forth,

- dynamic circular,
- going over and under,
- going round a boundary,
- going through a boundary and
- containing and enveloping space.

Babies and toddlers learn with their whole bodies and all their senses, they are physical thinkers. Through haptic investigations – using touch – and other sensory exploration, young children secure knowledge of physical characteristics of objects in the environment, which can be evoked at a later date (Corbetta and Snapp-Childs 2009). Similarly, Meltzoff and Moore (1998, 224) observed that repetitional exploration enabled children to further their knowledge through ‘detecting regularities, forming expectations and even making predictions about future states or affairs’. Play is powerful means through which children grapple with new ideas, especially where investigative excitement is ignited (Dahlberg, Moss, and Pence 2007; Wood 2013a, 2013b).

The importance of children’s playful practical encounters is widely accepted (Selbie and Wickett 2010; Macintyre 2012; Robson 2012), sometimes seen as an ‘alternative’ (Goouch 2008, 94) or ‘playful’ (Moyles 2010, 8), pedagogy, where perceptive relationships which take account of children’s own significances are preferred. Within such play places, creativity is unleashed and adventure, inventiveness, excitement, poignancy, struggle and accomplishment are possible (Atherton and Nutbrown 2013). Where adults’ practice is shaped by children’s own creativity of thought, action, talk, and where enable nurturing environments flourish, children can feel unbounded in their learning. In these invigorating places, children ‘make connections between schemas to form new ideas’ (Meade and Cubey 2008, 155), building up ‘systems of thought’ (Athey 2007, 153) which Nutbrown (2011) observed were the structures within which children experienced a range of ideas. Looking at children’s learning from a schematic perspective allows for new and different understandings to emerge and seemingly unconnected behaviours stimulate powerful young thinkers’ intentional, conceptual explorations.

## **The project**

The data in this paper were generated in a project investigating the schematic learning of seven children under three years of age (Atherton and Nutbrown 2013). Over 18 months, the toddlers were observed in a day-care setting where children’s schematic interests became clear, and consistent patterns in what their child did and said were shared with parents.

## **Methodological approach**

### **Observation narratives and photographs**

Deep and sustained observation of what the children were attentive to was used to create narratives of the small details of each child’s personal exploration priorities, some of those moments were also photographed. As confident ‘orators’, the children articulated their thinking concerns in their play through their actions, talk and the things they made. Observation revealed the persistent interests and focussed explorations of the children.

### **Ethical considerations and actions**

It was necessary to spend time getting to know the children and what mattered to them long before any observation began so that a *comfortableness* could evolve. ‘Permission’ to observe and record interactions is problematic in the context of work with the very young. The discourse around consent, assent and dissent is prolific and wrestles continuously with some core complexities (Hannon and Nutbrown 2003; Cameron 2005; Flewitt 2005; Harcourt and Conroy 2005; Dockett and Perry 2007). As children go about their own important business, it is imprudent for a researcher to feel confident when the research context is a pre-school setting and the intricacies around children’s sanction to our involvement must not be underestimated. It was essential to find ways to ensure that they were content for a researcher to be nearby. The children could not give ‘informed consent’ but could convey acceptance, approval or disapproval of a new presence. Throughout the study, it was essential that the children felt able to express their views, including demonstrating their readiness or rebuttal, in actions, gestures, vocalisations or representations. As Dockett and Perry (2007) remind us, to have rights is a dignity which allows for an independent expression of oneself, where choices can be made. For the very young in this research, a continuum of consent was the compelling ethic in the study, with an acute awareness of the fluidity of nuanced endorsement from the children and an accommodation of this, as a matter of respect, was a prerequisite.

### **Annie’s schemas**

Annie was eight months old when the study began, and attending a children’s centre on a sessional basis. The observations highlighted several schemas, but in this paper, we highlight her actions – motor and symbolic behaviours involved in ‘containing and enveloping’.

### **Containing and enveloping**

Annie often explored containers, including small wicker baskets and an empty cardboard tissue box (Figure 1). Annie (0.8) explored a basket inside and out, with a physical and



**Figure 1.** Exploring inside the basket.

quiet investigation. Three months later, Annie (0.11) picked up a tissue box, noticing the hole at the top she looked inside. She posted a metal disc through the hole in the box then pushed her hand into the box. Removing her hand, she tipped the box upside down and shook it until the disc fell out. Annie put a variety of objects (lids, toy animals, blocks, wooden balls and a banana) inside a range of containers (yoghurt pots, tissue boxes, baskets). She also enjoyed putting herself inside the mirror box (Figure 2).

Over several months, Annie held a continuous focus on containing and enveloping. Playing at the water trough, Annie (0.10) put both hands under the water, pulling a yoghurt pot towards her and when playing with the Treasure Basket, Annie (1.1) held a small ball in one hand and then tried to fit it inside the egg cup. Annie (1.6) crawled to the floor-level sand pit, clambered in and sat down. She chose a spade and filled a tub with sand, then emptied and re-filled it three times before crawling out of the sand pit. Annie (1.6) posted shapes into a shape sorter toy, tipping them out when it was full.

Sitting at the painting table, Annie (1.8) dipped the paint brush into the paint and painted the palm of her hand, then turned her hand over and painted the back (Figure 3). Annie tried to fit her hand into the paint pot and then held her hand up – seemingly satisfied to see her hand covered in paint (Figure 4).

Annie's 'containing and enveloping' behaviour, included putting things in, emptying out, re-filling and covering.

At the setting, Annie explored 'insideness', through a range of motor-level actions, including putting hands inside baskets, posting lids, tipping out, and climbing into spaces. Through her 'containing and enveloping' schema, Annie was experimenting with fitting things inside objects. At home, Annie's prevailing form of thought can be seen in the sequence of photos taken by her mother (Figure 5) as Annie played with a box of drinking straws. In picking straws out of the tub, putting straws back in, tipping straws out, and posting them back, then repeating this pattern with a different container (a pink cup), her 'containing and enveloping' schema, her exploration of insideness and fit, was visible.

Annie's actions in containing and enveloping were important foundations upon which later concepts of capacity, volume and space are built. These are the kinds of powerful



**Figure 2.** Inside the mirror box.



**Figure 3.** Covering hands with paint.

discoveries, which Athey notes as ‘experience providing the content of representation ... the “stuff” or “content” of mind’ (Athey 2007, 200).

Annie’s exploration of insiderness at (0.11) demonstrated an advance in thinking in that she posted lids into boxes, turned the box upside down and shook it until the lid fell out and she had retrieved it. She searched for disappeared objects, knew the lid was inside the box even though it was now out of sight. Annie’s posting, hiding and tipping evidenced an exploration of ‘spatial interrelations of objects: the relation of *contents to container*’ and, in



**Figure 4.** Hand covered.



'Annie took the straws out of the plastic tub.'



'Then started to put the straws back into the tub.'



Annie tipped the straws out of the tub all over the floor.'



'She starts to put the straws back into the tub.'



'Annie picks up the cup and tries to put a straw inside.'



'She puts the yellow straw into her mouth then puts it into the cup.'

**Figure 5.** Posting and tipping straws.

up-ending the box to retrieve the lid she had put in, was evidence of reversible operation. Annie seemed to co-ordinate 'means' and 'ends'. She wanted to get the lid out so she poked her hand inside the box to pick it out. When this is unsuccessful, she tried another method – she shook the box. Willattes (1984, 133) maintained that '9-month old infants were able to co-ordinate two separate actions into an effective sequence' as Annie did following her active and sustained experimentation.

Annie's (1.10) 'containing and enveloping' schema can be thought of as 'patterns in children's actions' (Meade and Cubey 2008, 3). Annie assimilated information (content and company) incorporated this into her existing schema (containing and enveloping) and accommodated her existing schema to fit these external influences. The holistic nature of Annie's thinking is apparent and her pursuit of her 'containing and enveloping' schema allowed for many ideas to be explored.

### **Schematic pedagogy in action**

This section discusses how 'teaching' can be fine-tuned to create a schematic pedagogy that 'fits' with children's observed persistent interests and explorations, much as Goldschmied and Jackson (2004, 99) observed that some babies' learning requires patient and diligent observation.

#### ***Observations of Annie tell a schema story ...***

This is a story of containing and enveloping, involving: selecting containers from the treasure basket; putting her hands inside the basket; looking into the hole; posting a lid inside the box; reaching inside; dropping banana into a bowl; Annie's hands under water and inside pots; putting a ball into a cup; Annie covering her hands with paint; Annie herself, inside the mirror box.

#### ***The observations tell a learning and development story ...***

##### ***Personal blossoming***

Annie was offered an environment of choice. She explored her surroundings and the resources within it. She made particular selections (basket, box, different containers) and investigated their possibilities. She was coming to know what she preferred at this time, demonstrated in how she used the things around her. Annie's developing confidence to search for and examine objects of interest, is Bereiter's (2002, 255) 'learning and knowledge building', Samuelsson and Carlsson's (2008, 626) 'act of learning', of personal significance for the child. 'Meaningful knowledge building occurs in the context of self-motivated participation in authentic activities' (Hedges and Cullen 2012, 925) and Annie persisted for periods of time (inspecting the hole in the tissue box, posting, attempts to retrieve the lid) and persevered until tasks were completed (the lid shakes out of the box). Laevers' (1997, 8) understanding of security and involvement is suggested in Annie's actions with the basket and box. He described children who adopt an 'open and receptive attitude towards their environment, are spontaneous and can fully be themselves' as having high levels of well-being.

From birth onwards, young children are capable of learning, reasoning and knowing as well as thinking and feeling (Gopnik, Meltzoff, and Kuhl 2001); they develop the ability to connect with others and to learn their ways (Lindfors 1999; Rogoff 2003). As a consequence, to be alert to what enthral young children, as well as accept the responsibilities implicated if we know they may seek our company, and grasp our ways, is a serious matter for practitioners in the early years.

A listening pedagogy which foregrounds the place of young children and heeds their voices more determinedly is at the core of the Early Years Learning Framework for Australia (COAG 2009), which affirms the importance for children to feel a sense of belonging, and to have a sense of identity and place. Similar listening is at work in the pedagogical practices of the Reggio Emilia approach (Rinaldi 1994).

Annie was busy following through her own particular interests confidently, purposefully, with richly available content that she appeared to find appropriate for her pursuits. To enable this level of involvement to be maintained, the provision of intriguing environmental content for young children is vital, as are practitioners who are eager to come to know the children in their care and have the masterly skill and compelling ethic to do so.

### *Expressive growth*

Annie concentrated on things which captured her interest (gazing at the hole in the box, hand inside a basket and sitting inside the mirror box). Annie's activities appeared to give clues to her thinking, with important considerations fluently expressed in her actions. Young children need time to relax into environments, with gentle support and tranquil encouragement. When Annie was exploring the treasure basket (a wicker basket containing a range of household objects, mostly made with natural materials), (Goldschmied and Jackson 2004), there was a pervading serenity and quietness. Young children need time to become engrossed without interruption, which sometimes requires a patient slowness for adults who must resist imposing their ideas on children's necessary private thinking. Goldschmied and Jackson's (2004, 107) characterisation of the role of adults working with babies 'to provide security by [an] attentive, but not active, presence,' is challenging, in that it proposes an alternative comprehension of commitment and involvement, one of cautious, considered and timely connection.

Annie was communicating with the accompanying adult. They were physically close and sitting near each other around the treasure basket. They made eye contact, the adult smiled, she sometimes placed different objects within reach of Annie, or occasionally offered Annie something different to explore. The adult was quietly present, playing alongside Annie, picking up objects, touching them – not talking but watching and listening. Annie was aware of the adult but appeared happily engrossed in her own explorations.

Bruner (1997, 63–64) suggested that 'for all its privacy, mind generates a product that is public ... there is adaptation to the natural and social worlds through appropriate actions'. Although Annie was involved in an individual endeavour, she was not isolated and separate. She was mentally active in trying things out (the space inside the basket) and was solving problems (shaking the box to release the lid) but did so in a social context. She revealed her private thinkings in her public actions. Annie's best partners in learning will witness and understand this, then interpret and respond – an act of high skill and attunement.

As Annie co-ordinated hand and eye movements, she was engaging in motor activities which could be called upon to support later representations. For Shore (1997) and Friedman (2006), the significance of these first physical (and social) encounters for very young children connect appropriate stimulus in the early years with dramatic brain development. As Annie selected from an increasing range of resources available to her, her skills in manipulating these developed. The journey during which her brain development and learning would change rapidly – from reaching and grasping, towards mark making,

via dough and clay, paint and glue, sand and water, threading and baking, using brushes, sponges, rollers, knives, sticks, scoops, sieves – was underway.

### *Wonder and awe*

Annie was investigative and explorative, employing her senses to make meaning from her experiences. She appeared to contemplate objects carefully, and seemed determined to solve problems through her action on objects (when the lid could not be retrieved by reaching inside, she shook the box upside down so that it would fall out). It cannot be said that she was displaying an understanding of cause and effect here, which Athey (1990, 70) more accurately described as ‘functional dependency’ the ‘effects of action on objects or material’ but what is apparent is Annie’s persistence to solve a problem through her own deliberate actions.

Annie’s actions in trying to release the lid from the box cannot determine that she was an imminent conserver, as her problem-solving approach at this stage seemed to be one of more trial and error. She did not identify an immediate resolution before embarking on her actions but tried one thing (groping inside the box), then another (up-ending and tipping), the latter with success. If she had been a conserver, Annie would have understood that to release the lid, the box must be tipped and shaken and would have been able to mentally orientate around the problem before acting.

Athey (1990, 70) recognised the importance of practical undertakings like Annie’s, which, she suggested, support later internalised operations. She confirmed that ‘sensory and perceptual information accompanying motor actions led to true operations that can be carried out in the mind’. Annie needed time to explore and try things out, and time to think things through and solve practical problems – again and again – in an exciting and enjoyable environment.

In the basket and box play, Annie seemed to happily work alongside the observing adult; she was beginning to form attachments to significant others and responding to adult attention. The response may not be overt and explicit but one of quiet contentment. For Annie to continue with her activities in the presence of another person was a positive response.

Bornstein et al. (1997, 202) found that children’s reactions in the learning environment were more positive, ‘when the stranger/experimenter acted like mother’. This was echoed by Malmberg et al. (2007), who suggested that the sensitivity of the mother impacts upon the mood of the infant, in that change in infants’ moods was related to change in mothers’ sensitivity. Annie was starting to build new relationships and appeared comfortable with the adult present, seemingly happy to continue with her activities. Erikson’s (1963, 249) proposal that a relationship ‘which combines sensitive care of the baby’s individual needs and a firm sense of personal trustworthiness’ was important for adults working with young children. The adult was not Annie’s mother but was calm, gentle and considerate when working with her in the real sense of *loco parentis*. This was vital to enable Annie to feel contented, at ease, secure and relaxed and therefore more inclined to absorb herself in her work. It was also an important element of the ‘ethic of care’ (Noddings 1984).

Early foundations of scientific concepts related to materials and their properties were being developed as Annie explored ‘insideness’. Her investigations of a variety of containers (rough baskets, shiny lids, smooth boxes and hard bowls) helped develop her understanding of similarities and differences in materials. She was coming to know about ‘cause

and effect' as her actions made things happen to objects and materials (shaking can release stuck lids). When Annie selected objects from around her to explore, she also appeared discerning as to their properties in that she choose items which were containers, then appeared to find things to contain.

### ***Inquisitive resolve***

Annie observed solving problems as she explored objects. Unable to remove a lid from a box at the first attempt, she tried something different. Whether she had made a connection with past experiences in her previous practical investigations of 'insidiness', we do not know, but her repeated actions were clear. She had an understanding that things exist, even when out of sight and was developing an awareness of shape, form and texture in her sensory exploration of the basket, and bananas at snack time. Annie was coming to know through her investigations with the basket and tissue box that some objects were the same size and shape even when they were turned around and were upside down.

The foundations of skills of estimation and concepts of capacity were being laid through Annie's exploration of 'things inside'. She was investigating what fitted by putting the lid in the box, her hands in the basket and herself in the mirror box. Objects selected appeared to be containers, and in selecting by these criteria, Annie was developing an understanding of classification and comparison in that some objects were containers and could fit things inside and some were not and so could not.

### ***Sensory, bodily inquiry***

Annie's learning environment offered many possibilities for her to using her senses to investigate. She made purposeful choices in changing position, moving towards and away from things, selecting and rejecting objects and setting herself new challenges. Selleck (2001, 90) acknowledged the extent to which 'children's preoccupations' should influence adults in the learning environment. She asserted that to be 'out of synch with an infant's moods and meanings', can impact upon the quality of a child's play and learning. Through meticulous watching, we may come to know children more thoroughly and this level of acquaintance, established through deep observation, 'lays the foundation for thought' (Arnold 2003, 40). Through her physical action, Annie's mental activity could be interpreted, in that her selection from many objects available to her and how she used them, suggested her *form of thinking*.

Annie's everyday experiences may be considered as assimilated to her 'containing and enveloping' schema because she exhibited a particular sensitivity and receptiveness to similar environmental stimuli. Structure which was 'context-sensitive' (Cheng and Holyoak 1985, 135) relates to Athey's (2007, 92) 'schemas ... sensitised to similar things in the environment'. Annie's selection of containers and containing objects suggested an inclination towards 'insidiness'. She appeared to spot specific things around her, which enabled her to follow her *form of thought* 'containing and enveloping'.

### ***Creative expression***

Creativity seems to be about adventure and inventiveness, excitement and poignancy, struggles and accomplishments. It is about enabling and reciprocal relationships and professional adults who infuse their practice with opportunity and a knowing understanding of who and what they observe. It is about children who feel free to share the most intimate

matters of personal significance. Moyles (1989, 70) recognised the affective nature of creativity and stressed the importance of the conceptual, seeing creativity, as a ‘personal expression and interpretation of emotions, thoughts and ideas ... a process which outweighs any product particularly’. Moyles’ ‘process’ suggested a certain dynamism which should not be confused with action. Moyles’ ‘creative process’ seemed more aligned with journeying. At times Annie’s journey was halted, or impeded, but on other occasions, it proceeded without interruption. This ebb and flow was acknowledged by Malaguzzi’s (1998) characterisation of creativity as having the ability to come in and out of view:

Creativity? It is always difficult to notice when it is dressed in everyday clothing and has the ability to appear and disappear suddenly. Our task, regarding creativity, is to help children climb their own mountains, as high as possible. Malaguzzi (1998

, 77)

Brierley (1994, 67) understood creativity as, ‘the capacity to respond emotionally and intellectually to sensory experience’ which Selbie and Wickett (2010, 76) alluded to in their consideration of playful approaches, stating that, ‘whenever and wherever play is encouraged, babies and young children will be learning through exploration, at a practical level but also in self-discovery’.

Brierley (1994) and Selbie and Wickett (2010) infer something more complex than practical, sensory engagement in acknowledging the place for emotional response and a personal coming to know. Forman and Fosnot’s (1982, 190) acknowledgement that ‘one can be mentally active yet physically passive’ suggested that although there may be times when babies and young children appear still and so their industry may be hidden – a mental busyness obscured from view yet made visible through creative expression.

Annie was engrossed in vital exploration. Her investigations were essential practical endeavours which would underpin later understandings. She noticed, identified, resolved and made discoveries, and such practical engagements are acknowledged as fundamental, ‘the foundation of symbolism and representation’ (Piaget 1959, 283).

## Conclusions

Having described Annie’s containing and enveloping actions and outlined our suggestions on Schematic Pedagogy, we conclude this paper with a set of indicators to show what we take specifically from Annie’s actions in terms of Schematic Pedagogy.

### *Unconventional beacons of possibility*

Athey (2007, 153) observed that ‘co-ordinations of schemas can only be illustrated and described rather than measured’ and from these early observations of Annie, her explorations of the schemas ‘enveloping and containing’ are evident. These valuable investigations establish a richness of experience which could support later understandings such that, for example, Annie’s knowledge and understanding of shape is founding upon physical and mental activity.

What we take from this towards a schematic pedagogy is the importance of practitioners having a ‘permission’ to describe their practice with young children as creative, artistic, imaginative, unconventional beacons of possibility, where learning environments

(which are incendiary in terms of their prospects to ignite children's own intentions) can be places of real activity, where mental and physical action is fuelled and where schemas may be pursued and nourished with relish.

### ***Paying careful attention to what matters to children***

Through deceptively simple motor-level explorations (hands through hoops, fingers through holes, hands through handles), Annie was, we suggest, building up *systems of thought*, as in Gardner's (1984, 64) 'one or more basic information-processing operations or mechanisms which can deal with specific kinds of input'. Similarly, Nutbrown (2011, 67) observed that schemas were the structure within which a child might learn about something they were interested in. Annie's exploration of 'containing and enveloping' were the structures within which she was experiencing a range of ideas, including shape, size, rotation and space. As her schemas became co-ordinated, Annie was able to assimilate different and new content into her existing schemas and so she was about to 'make connections between schemas to form new ideas (concepts)' through early practical encounters (Meade and Cubey 2008, 155). *What we take from this towards a schematic pedagogy is ... an openness and determination to pay careful attention to what matters to children, the aspects of thinking, learning and development which are evident as they pursue their schemas. Professional adults, who take notice of children's patterns of learning through meticulous observation, are able to cultivate an approach to practice which centres the child and their individual thinking concerns.*

### ***The tessellated nature of pedagogy***

Elkind (2007, 107) recognised the importance of action in learning in that 'children will engage in all important intellectual activity on their own for long periods of time if given the materials and freedom to do so'. Elkind also emphasised the place of mental activity in learning, arguing that 'the infant's mastery is organised and purposeful, even if it is not obvious to us', warning that not all practitioners responded to the capabilities of young children. What we take from this towards a schematic pedagogy is a recognition of the tessellated nature of pedagogy which encompasses both the relational and physical. To be in the company of the youngest children is a kinship, a place of many acquaintances where parents and professional adults may come together around the child. As these relationships develop and understandings deepen, children's particular actions may take on new, perhaps unexpected significance if viewed through a schematic lens. The formidable prowess of already remarkable children can intensify when the particular, individual characteristics of their play is understood both holistically and schematically.

### ***Knowledgeable, captivated accompaniment***

The correlations, associations and relationships in children's thinking, revealed in their play, cannot be understood unless those observing have a conceptual awareness of what is seen. To be able to discern children's *forms of thinking*, as they play, is a required insight which allows for a more appropriate accompaniment in learning. An accompaniment which adjusts and modifies in the light of what is seen and heard. What we take from

this towards a schematic pedagogy is the certainty that knowledgeable, captivated accompaniment of children as they play, can yield great riches. Adults who partner children in play admire and appreciate the young proficients in their care and endeavour to offer a worthy match. A determination to take time to attune to children's own significances is at the route of accomplished pedagogy.

### **An endless possibility**

In this illumination of Annie's explorations in her preschool setting, we have used schema theory to hold a lens to the learning of one child. In so doing, we have illustrated how a schematic pedagogy might shine a light on young children's learning and all aspects of their development. We suggest that a schematic pedagogy is creative, artistic, inventive, unconventional and filled with possibility. There is a determination in schematic pedagogy to pay attention to what matters to children and cultivate an approach to practice which centres around the child and their particular, individual thinking concerns. Schematic pedagogy is a pedagogy of tessellation where 'fit' of ideas and approaches are core, and where the relational and physical come together. It is a place where professional adults come to know children in new ways through meticulous observation and where practice may be shaped to fit what is significant to each child. In schematic pedagogy, children are partnered in their play by adults who admire what they see, knowing children to be young proficients and determined to match this with precise accompaniment. Schematic pedagogy is an accomplished approach to supporting early learning through taking time to attune to children's own significances, thus yielding great riches of learning and understanding.

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