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**TECHNOLOGICAL PRACTICE
IN EARLY CHILDHOOD
AS A DISPOSITIONAL MILIEU**

A thesis
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of
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by
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ABSTRACT

This study investigated the learning of a group of four-year-olds as they worked in the construction area of a sessional early childhood setting. The researcher participated and observed as the children constructed with cardboard, rolled painted marbles around in a box to make Jackson Pollock style paintings, added collage and paint to pictures and constructions, and screen-printed cut-out figures and shapes of various kinds. These were described as technological practices, and five of them were compared as contexts for learning dispositions.

Although the literature had provided discussion and definition of dispositions in early childhood, the connection between the psychological notion of disposition and an historically or socioculturally framed dispositional milieu had not been researched. The study investigated empirical evidence for a transactional model of the interface between learning disposition and dispositional milieu, and learning dispositions were located in discourse, narrative and technological practice. The affordance of the technology and the tools played an important part in the transaction between individual and environment, in particular the technology's transparency, challenge, and accessibility. The five technological practices were analysed as complex sociocultural worlds in which multiple discourses jostled for privileged positions, children made decisions about whether discourse membership was for display or for exploration, they tackled difficulty with enthusiasm or avoided it in imaginative ways, and they engaged with others from a range of positions of power and responsibility. These sequences of events were described as learning narratives: historically and socioculturally co-constructed event structures about goals, challenge, and agency. A learning narrative was defined, identified, and investigated.

Learning dispositions have been defined but not specified for early childhood. This study suggests that dispositions can be interpreted as parts of a learning narrative, and for this study key dispositional domains were identified as privileged discourses, preferred responses to difficulty, and favoured patterns of responsibility. Four learning dispositions emerged from these domains: courage, mindfulness, perseverance, and responsibility. These learning dispositions find a parallel in the strands of the early childhood curriculum document for Aotearoa New Zealand, *Te Whāriki*. The researcher followed up the observations by interviewing the children for their viewpoint on preferred responses to difficulty using an interview that reflected their experiences back to them as a picture book.

Although much of the learning appeared to be attached to the context, and the privileged meaning and intent for that context was a key element, the transactional nature of the learning revealed individual learning dispositions and narratives that were developing in the early years and that may be robust and enduring.

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I have had the great good fortune to be associated with science, mathematics and technology educators in the University of Waikato's Centre for Science Mathematics and Technology Education - and their academic visitors - over the past ten years, and this association has enriched my vocabulary and my viewpoint: my work in early childhood mathematics education came from a collaboration with Jenny Young-Loveridge and Sally Peters; Andy Begg was always helpful with ideas on education as well as advice on statistics and diagrams; and Jane McChesney and Bronwen Cowie became friends as well as colleagues who argued and debated ideas and sent me papers that I 'must read'. Raewyn Oulton drew the diagrams with her usual careful attention to design and detail. My early childhood colleague and friend, Helen May, now at Victoria University, encouraged me throughout; it was our collaboration on the national early childhood curriculum guidelines that started all this off. My colleagues and friends in the Department of Early Childhood Studies at the University of Waikato have supported me throughout the research and writing; they have generously tolerated a chairperson whose mind was often on four-year-olds. The Dean, Noeline Alcorn, also understood my lack of attention to internal brown envelopes.

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PART ONE :
INTRODUCTION, LITERATURE SURVEY
AND METHODOLOGY

1

INTRODUCTION

1.1 CHILDREN'S STORIES

Polly wakes up on her fourth birthday, looks at herself in the full length mirror in the bedroom that she shares with her older sister, and storms into her parents' bedroom. Her parents are woken by an angry four-year-old, hands on hips. 'Four!' she shouts. 'And the *same size!*'.

My interest in the stories about development and learning that children receive from their culture began with family anecdotes like this one. Polly had received a story about birthdays and growth, a story that probably emerged from grown-ups telling her 'You'll be a big girl when you're four'. She had interpreted this to mean that over night before a birthday everyone grows a significant amount. It was a particularly attractive theory because of her interest in growing to be as big as her eight-year-old sister. Susan Carey (1985, p.68) tells a similar story about her four-year-old daughter's theory that people grow on their birthdays and that eating birthday cake is crucial to the process. At age three years, my older daughter had a theory about development that took a longer view. Here is her story:

Merophie is three years old. On this occasion her mother is insisting that she travel in a special child's seat in the back of the car. She is reluctant, but finally accepts the inevitable. As her mother drives off she says darkly: "When I grow up I'll be driving the car (pause) and when you grow down I'll put *you* in the kiddy car seat".

She has constructed an image of growth and development: some people are growing up and some are growing down. All children construct images, theories and stories about growth, development and learning without being taught. No one (to my knowledge) taught these theories to Polly and Merophie. They came from their observations about relative size, their emerging understandings and misunderstandings about how things grow, and their interpretations of messages from older people in the community around them. They were no doubt considerably influenced by their particular purposes and passions at the time: Polly to grow as big as her sister as quickly as possible, and Merophie to find a way to accept with equanimity the powerlessness that goes with being a three-year-old. As they grew older, new experiences and purposes encouraged them to modify or abandon these early stories and theories.

Not all early stories are refuted by later experience as readily as the stories about growth that Polly and Merophie developed. When stories are given authority by frequent observations and other apparently supporting events, they provide guidelines that tell children how to act and what to expect. They take on a dispositional quality: they become the rationale for ‘habits of learning’ or ‘learning dispositions’ that dispose the learner to recognise, interpret and respond to their experiences in particular ways. As their mother, reflections on Polly’s and Merophie’s experiences and perceptions before they were five-year-olds led me to a career in early childhood education. As an early childhood educator I became more and more interested in learning dispositions that emerge early and may resist change, and how these influence children’s relationship with, and access to, the learning environment. That interest led me to this thesis.

This thesis is about (i) learning outcomes and processes in an early childhood setting, in particular learning dispositions, and (ii) the role of these learning dispositions in the relationship between the learner and the learning environment, including the role of technology - the materials and the tools. This chapter traces the strands of experience that have contributed to my weaving of these two topics into a thesis, and outlines the preconceptions interests and questions that I brought to this task of enquiry.

1.2 LEARNING OUTCOMES AND DISPOSITIONS

1.2.1 Early childhood curriculum development

In 1991 the Ministry of Education funded a curriculum development project to establish a common set of aims for all early childhood programmes. The draft New Zealand national early childhood curriculum, *Te Whāriki* (a Māori word meaning a woven mat) was distributed to centres in 1993, and the final curriculum document was published in 1996 (Ministry of Education, 1993, 1996; Carr and May, 1993). I was one of its two project Directors, and coordinator of the Young Child (three- and four-year-olds) Working Group. The Curriculum Development Team comprised 15 members who were practitioners or early childhood educators with nationally recognised expertise and standing. It included the co-ordinators of four specialist working groups: Māori Immersion, Curricula for Pacific Island Children (Tagata Pasefika), Including Children with Special Needs, and Home Based Programmes. Of particular importance was the partnership formed with the Te Kōhanga Reo National Trust which operates Māori immersion early childhood programmes: the Trust recruited the members of the Māori Immersion Working Group and oversaw its work. Consultations with the Curriculum Development Team and their working groups, and

discussions in seminars across the country with early childhood practitioners, took fourteen months. They centred on key learning outcomes and processes for infants, toddlers, and three- to four-year-olds in early childhood settings outside the home. The curriculum framework that emerged was bilingual and bicultural, with a set of Māori strands (*mana atua, mana whenua, mana tangata, mana reo, mana aotūroa*) and a set of parallel English strands (well-being, belonging, contribution, communication, exploration). These discussions, and the writing of the curriculum, were important precursors to this thesis. In particular what emerged from the process was a framework that emphasised the transactional ecological and cultural nature of early childhood curriculum. Aims and goals for children in four of the five strands were defined in terms of the relationship to the environment. Outcomes for learners had now been defined in these relational terms, and I began to ask questions about how practitioners might observe and 'assess' them. In 1994 I received a grant from the Ministry of Education for a research project on assessing children's experiences in early childhood settings, and this thesis forms part of this wider project.

1.2.2 Dispositions

Lilian Katz (1993 p.20) had written that 'it seems timely to include dispositions among important outcomes of education at every level', and the new national early childhood curriculum included 'dispositions' as important learning outcomes (Ministry of Education, 1996, p.44), describing them as 'habits of mind' or 'patterns of learning'. In 1995 I spent part of a sabbatical as an academic scholar with Harvard University Graduate School of Education's Project Zero where David Perkins, Shari Tishman and Al Andrade were working on thinking dispositions as outcomes for primary and secondary curricula. I had become interested in the idea of learning dispositions and was trying to link them to the five early childhood curriculum strands (Carr, 1994a, 1995), and this period of discussion and thinking about dispositions as an outcome for early childhood made a significant contribution to this study. Katz (1993, p.19) wrote 'Much research is needed to determine which dispositions merit attention' and I wanted to contribute to that research.

In a Report written for the Royal Society for the encouragement of Arts, Manufactures and Commerce in the United Kingdom on the impact for later learning of experience in centre-based early childhood settings Kathy Sylva (1994a, p.94, her emphasis) concluded: 'The most rigorous studies show that *high quality* early education leads to lasting cognitive and social benefits in children which persist through adolescence and adulthood'. She wrote (p.90) that the most important impact of early education appears to be on children's 'aspirations, motivations and school commitment' and she asked if there was a theory of developmental psychology which could explain the patterns so

far. She offered the work on individual motivation and children's emerging theories about the nature of intelligence by Carol Dweck and colleagues in the United States (for example Smiley and Dweck, 1994) as an answer. The work of Dweck and others in the field of motivation has demonstrated that learning is as much a matter of the heart as of the mind, of inclination as of ability. I had become interested in Dweck's work (which has been mostly with older children), particularly her suggestion that from an early age children incline towards what she describes as 'learning' goals or 'performance' goals. I came to see inclination and 'disposition' as key constructs for defining more clearly the trajectory of early experience and for connecting motivation and inclination to *Te Whāriki*. But I was convinced that disposition was not just about temperament, and I puzzled over how to tie it to the social, cultural - and historical - context, as my earlier training as a geographer and the curriculum development experience had taught me to do.

1.3 THE RELATIONSHIP BETWEEN THE LEARNER AND THE ENVIRONMENT

1.3.1 Technology in early childhood

Before I became an early childhood educator - in a kindergarten and then in a university - I was a potter, and before that a geographer, teaching human geography and demography to university students. In a way, this thesis - with its focus on the sociocultural context and the role of technology - weaves together all those experiences. When I was the head teacher in a kindergarten in the 1980s, I was particularly interested in the influence of the tools and materials on what the children did. I brought my earlier experience as a potter to the task, and the programme included making a sawdust fired kiln from a metal rubbish bin, introducing projects that took many days, and encouraging understandings about the technological process of firing clay as well as planning, sequencing and modelling. I invented a safe drill for carpentry (Carr, 1987), and with the help of two easy carpentry drills (one with a 1 mm. bit and one with a 5 mm. bit) the children made constructions with wheels and other moveable parts, added dowelling to boats, studied the best design for floating a boat the right way up, and generally explored a range of designing and problem-solving processes. An interest developed in what I will come in this thesis to call the 'affordance' of the tools and materials, what learning they encourage or permit. From my earlier experience as a human geographer I knew that technology was central to defining a cultural setting, but as a kindergarten teacher I was primarily interested in the skills and knowledge that the tools and materials were teaching.

1.3.2 The social milieu

The social and cultural setting, the geography, the place, returned as an interest. By 1989 I was back at a university and in a paper published in the *New Zealand Journal of Educational Studies* entitled 'The costs of calculation' and co-authored by Guy Claxton (author of *Live and Learn*, 1984; and *Being a Teacher*, 1989) expressed reservations about the notion that the task of early childhood is to teach children an array of physical, intellectual, emotional and social skills that they carry away in their heads, ready for later challenges (Carr and Claxton, 1989). We argued against what we called the Lego model of learning, and wrote (pp.133-134):

We now know that learning, even when its 'topic' is a feature of the natural, or even the symbolic, world, is an irreducibly social and cultural process (see Light, 1983; Bruner & Haste, 1987). One of the child's most fundamental needs is for him or her to feel located within, and attuned to, the social world, and cognitive development both proceeds from this secure socio-emotional base, and is channelled by the messages, structural as well as explicit, that this world contains. Cognitive processes arise as deeply embedded features of familiar social 'scripts', and only slowly, as a result of the constant accumulation of rich and varied experience, do they become disengaged from the social milieu, and capable of transportation to other, more remote tasks and contexts. Cognitive growth is more usefully seen as an organic emerging, not a mechanical assembling.

I have remained interested in researching the emergence of these 'cognitive processes' from the social milieu. I turned first to an interest in children's early understanding of number, and developed a framework of social purposes for children using numbers at home and in an early childhood setting (Carr, 1992). Research using this framework indicated that status (being four) and entitlement (being fair) were popular social and cultural purposes into which four-year-olds inserted numbers (Carr, Peters and Young-Loveridge, 1994). Later (Carr, 1994c), I analysed the social and personal contexts of emerging science skills (asking questions, representing, making analogies, thinking about language and learning, imagining, and deductive reasoning). I wondered about the underlying scripts and purposes - the sociocultural milieu - as children work with technology in an early childhood setting.

This theme, the relationship between a developing individual and the sociocultural environment, has provided the emphasis for studies in early childhood and human cognition in recent years, and these studies are discussed in chapter 3. In particular the theme owes much to the ecological and cultural viewpoints put forward by Bronfenbrenner (1979) and Bruner (1990). The curriculum development process had illustrated the coming together of two traditions for researching and explaining children's learning: the child as developing individual (an interest, for example, in

cognition, temperament and disposition), and the child as acquiring membership of a social and cultural community (an interest, for example, in language, ‘belonging’ and discursive practices). I was interested in trying to reflect the ‘holistic’ principle of the new curriculum by researching the connections between the two. Researching the ‘whole child’ is much more difficult and may be less precise than researching an isolated skill; it involves case studies (Pollard, 1996), metaphors (Paley, 1990), and the search for patterns (Rogoff, Mistry, Goncu and Mosier, 1993) in interpretivist and ethnographic studies.

1.4 THE RESEARCH

1.4.1 Research topic

My interests have therefore see-sawed from a focus on individual learners (working in a kindergarten and asking what skills and knowledge the individual learns from tools and materials) to the sociocultural environment (sociocultural milieux and purposes) and back again (to an individual’s disposition to learn). The education literature is now beginning to put the two together, utilising such ideas as narrative or story (Bruner, 1990), discourse (Gee, 1992), voice (Wertsch, 1991a) and niche (Gauvain, 1995). I decided to use these ideas to pursue my interest in learning dispositions and their construction in one early childhood sociocultural context: a New Zealand kindergarten.

Dweck’s work had been in contrived contexts, and focused on only one learning disposition: to persist with difficulty. I wanted to research a number of learning dispositions in the real context of an early childhood centre. It had occurred to me, from observations in centres before I began the research reported here, that a number of learning *dispositions* might cohere together as learning *narratives*. I decided to look not only for learning dispositions but also for learning narratives that young children might be assumed to carry with them from the early childhood setting to school. I hoped to end up with a response to Sylva’s (1994a) call for a theoretical model, an elaboration or adaptation of Dweck’s (e.g. Smiley and Dweck, 1994) theory of learning goals, and to Katz’s (1993) call for a list of learning dispositions for children in early childhood centres. I wanted both of these outcomes to be useful to practitioners as they implement the new national early childhood curriculum guidelines in New Zealand.

1.4.2 Research context

The research was carried out in the construction area of one kindergarten programme. New Zealand early childhood education for three- and four-year-old children includes

sessional kindergartens as part of the state (increasingly privatised) funded sector. Most kindergartens provide access to construction materials for cardboard and paper construction and collage; in this case the construction area included screen printing and 'marble painting' (painting in a shallow box by rolling painted marbles around). The research was carried out during the morning session for older children who had 'graduated' from the three-day-a-week afternoon session that they had attended from the age of about three and a half years. The advantages of this setting were:

- the children were over four years old and their conversations could (usually) be deciphered from audio recordings
- the area was physically contained for easy observation and video recording
- construction activities often needed technical assistance so the area included adults
- many of the activities and tools would have been unusual at home so learning unique to an educational setting away from home might be identified.

The research enabled me to study the influence of tools and materials as a central feature of the cultural landscape. I was a participant observer. Field notes were supplemented by audio recordings and video recordings, and two weeks after the observations I interviewed the children. The research methodology is documented in detail in chapter 4.

1.4.3 Outline of the thesis

Part one: Introduction to the study

The next two chapters of the thesis analyse the literature on the two topics outlined in this chapter: (i) learning outcomes and processes in an early childhood setting, in particular the argument for learning dispositions as a key outcome (chapter 2), and (ii) the relationship between the learner and the learning environment, including the role of technology - the materials and the tools (chapter 3). Chapter 3 also looks at ways that these two topics have been integrated, and sets out a transactional model of learning that integrates the two.

Chapter 2 argues for three domains of learning disposition: the choice of goal, the response to difficulty, and responsive and reciprocal relationships. It concludes with three research questions for the study:

1. Were there (socioculturally or historically based) goals that children inclined towards and that influenced their learning?
2. Did there appear to be key learning orientations and strategies (dispositions) associated with responses to difficulty?
3. Did there appear to be key learning orientations and strategies (dispositions) associated with responsive and reciprocal relationships?

Chapter 3 argues that learning dispositions may cluster together as learning narratives. It also suggests that these dispositions and narratives are in the environment,

influenced by the materials and tools of particular activities, and providing learning niches for children. It concludes with two further research questions for this study:

4. In this setting, was a technological practice characterised by a particular clustering together of dispositions in event structures or learning narratives which could be described as a 'dispositional milieu'?
5. (a) In what way could the technological practices in this early childhood setting be described as a set of learning *niches* of familiar and comfortable learning narratives?
(b) In the short time frame of the observations, was there any evidence for shifts in children's learning dispositions and narratives?

Chapter 4 sets out the research design and the methodology and defines the terms used in the study.

Part 2: The observational data in five technological practices

Chapters 5 to 9 set out the observation data for five different activities in the kindergarten. Each of these activities (in the study these are called 'technological practices', a term defined in chapter 4) are analysed in terms of three features that emerged as important from the literature outlined in chapters 2 and 3: (i) the children's goals (ii) the children's responses to difficulty and (iii) the distribution of responsibility.

Part 3: Discussion and conclusion

Chapters 10 to 14 provide answers to the research questions, using the data from Part 2 and occasionally supplementing it with observation data from other activities or interview data. Question 1 is the topic of chapter 10; question 2 is the topic of chapter 11; question 3 is the topic of chapter 12; question 4 is the topic of chapter 13; and question 5 is the topic of chapter 14. Chapter 15 provides a summary conclusion, and assesses the model of learning that was tentatively proposed in chapter 3. It summarises the findings as four key learning dispositions for early childhood, and outlines the implications of the research for early childhood education and for further research.

2**THE CASE FOR LEARNING DISPOSITIONS****2.1 INTRODUCTION**

Early childhood curriculum is being reconceptualised (Kessler and Swadener, 1992a; Mallory and New, 1994; Hatch, 1995; Lubeck, 1996; Ministry of Education, 1996). The old conceptions included assumptions that learning in early childhood is about acquiring the early steps of a hierarchy of defined knowledge and skill, a process that begins the climb to grown-up ways of thinking and learning. The new conceptions recognise that in early childhood children receive and construct their first messages about who is of value and how we respond to differences (Sapon-Shevin, 1992; Siraj-Blatchford, 1994), about what is fair play and justice (Katz, 1984), about what it will mean to grow up being male or female (Davies, 1989; MacNaughton, 1997), about 'possible selves' (Cross and Markus, 1994), and (the interest of this study) about what it is to be a learner. Old conceptions focused on the learner as an individual; new conceptions focus on the individual-in-action, or the 'individual-acting-with-mediational-means' (Wertsch, 1991 p.12). This study argues for and investigates the viewpoint that early childhood learners are 'individuals-acting-with-mediational-means' who are receiving and constructing views about themselves as learners that incline them to interpret and interact with their environment in a number of characteristic ways.

This chapter is the first of two background literature chapters. It has two aims: it argues a place for learning dispositions as outcomes in early childhood, and at the same time it argues for three major domains of learning disposition: reciprocal and responsive relationships, the children's response to difficulty, and their choice of goal. The structure of the chapter is as follows. Section 2.2 documents reconceptualised views about development, direction, and outcome in early childhood. It outlines alternatives to defining developing intelligence and intelligent ways of knowing as a pathway of stages to an end point. This section also examines the readiness for school literature and longitudinal studies to argue against the hierarchical model and for responsive and reciprocal relationships as the engine for change, and looks at new ways to conceptualise knowledge that incorporate the social context but include direction within critical imperatives. This section paves the way to a focus on

dispositions as an outcome for early childhood (sections 2.3 and 2.4) and transactional models of learning (a topic more fully explored in chapter 3). Section 2.3 introduces the topic of disposition by outlining the research on learning orientation. Section 2.4 defines learning dispositions, argues a place for them as important outcomes for early childhood, and discusses their practical application. The chapter will be summarised in section 2.5, and three research questions to emerge from the discussion will be set out in section 2.6.

2.2 OUTCOMES IN EARLY CHILDHOOD: FROM HIERARCHIES OF SKILL AND KNOWLEDGE TO RESPONSIVE AND RECIPROCAL RELATIONSHIPS

This section briefly overviews the literature that questions the viewpoint that outcomes in early childhood are a sequence of individual skills and understandings, and argues that accumulated experiences of contingent relationships and shared responsibility in quality early childhood environments form dispositional outcomes of great importance. In early childhood, the concept of outcomes as residing in a hierarchy of skill and understanding is usually described as a 'developmental viewpoint'. For early childhood practice, an extensive literature reappraising the nature of developmental sequences followed the influential American document edited by Bredekamp (1987) on 'Developmentally Appropriate Practice' (e.g. Polakow, 1992; Mallory and New, 1994; Smith, 1996b). More recently a special edition of the *Early Childhood Research Quarterly* was devoted to discussion of child development knowledge and early childhood teacher preparation (Goffin, 1996; Katz, 1996; Lubeck, 1996; Stott and Bowman, 1996). Although development can be defined in a number of ways (as 'the imposition of some kind of pattern on a sequence of events', Morss, 1996 p.2, or as a biological unfolding), most definitions of child development share at least one of the following features: (1) a concern with stages and an end point, (2) an assumption that we can predict the effects of early experiences, and (3) a reference to direction and change over time. The literature on these three features will be discussed in sections 2.2.1, 2.2.2, and 2.2.3. The first feature has been severely reshaped by turning stages on their side, the second has been re-focused to pay more attention to relationships as the predictor, and the third has been reconceptualised and strengthened. In the discussion that follows, development and learning will be treated as 'inextricably interwoven processes' (Smith, 1988 p.1).

2.2.1 Stages and an end point

Piagetian stage theory, and the strong influence of the early intervention movement in early childhood, have provided a firm foundation for the enduring viewpoint that skills and understandings have an 'early' stage and that the task of early childhood is to ensure that specific developmental skills are taught in an orderly sequence. The influence of this viewpoint on inclusive early childhood programmes is outlined in Cavallaro, Haney and Cabello (1993) and Carr and Dowson (1995). In its most individualistic form, this assumes that a skill or understanding is independent of the context in which it is learned, and once learned, will be brought into play whenever a task or problem logically fits it. Skills are often measured by tasks or tests that are assumed to be context-free, and what differentiates the 'bright' from the 'slow' child is a different amount of 'content-free' logical or psychological capability, probably developing in a manner that was pre-programmed at birth or before. Research has re-examined the two implicit assumptions in Piagetian stage theory: stages and end points.

(i) *Stages: re-examination of the egocentric pre-operational child*

Piaget's stages of development (Piaget, 1954; Piaget and Inhelder, 1967) have had a profound impact on early childhood curriculum. They are often cited as constraints on learning. For instance, when Hatch (1990) analysed the problems of interviewing young children in studies that use a qualitative or ethnographic approach he described one of the problems as the 'pre-operational thought problem':

Young children (from 2 to about 7) are at a stage of cognitive development known as pre-operations (Piaget, 1954). Several characteristics of pre-operational thought may limit children's ability to respond in the same ways we might expect older informants to respond. Such characteristics include egocentrism (the inability to take another's point of view), complexive thinking (the stringing together of ideas that have no unifying concept), and centering (the inability to consider more than one aspect of a situation at one time . . .). Hatch (1990, p.257)

Experimental studies in the 1970s and 1980s were to seriously question Piaget's descriptions of the pre-operational child. The most celebrated of these were Donaldson and her colleagues' studies, published as *Children's Minds* (Donaldson, 1978). They reported studies carried out with young children to 'rework' the Piaget studies on conservation, transitivity, and perspective taking. They showed that when the context has meaning for children, they reveal new abilities. Piaget's perspective-taking task for instance indicated that children under the age of eight or nine years could not as a rule take another perspective (Piaget and Inhelder, 1967). Piaget's task was to sit children at one side of a model of three mountains, each mountain different from the others by snow, colour, or some distinguishing feature. A doll was placed at another side of the

table, and the child was asked which viewpoint the doll could see (the child is shown pictures of the mountains from various positions). Four-year-olds do very poorly on this test, and most children under the age of six or seven years choose their own viewpoint rather than the doll's. In a task devised by Hughes, the test situation was two intersecting walls with two dolls, representing a policeman and a little boy. The child was asked to hide the doll so that the policeman could not see him. Then, in the test proper, another policeman was produced, placed at another point on the intersection, and the children were asked to hide the boy from both policemen. The responses of thirty three-and-a-half- to four-year-olds to this task were ninety percent correct. Donaldson pointed out that 'in the "policemen" problem, a situation has been found that *makes sense* to the child' (p.16; Donaldson's emphasis). Piaget also claimed that children under the age of seven could not conserve number. Another Donaldson colleague invented a character called naughty Teddy, who was 'liable to emerge from his box, swoop over the experimental material, disarrange it, and thus "mess up the game"' (Donaldson, 1978, p.62). When the agent of a transformation is seen as Naughty Teddy, and therefore the change is seen to be an understandable accident, young children can successfully conserve a changed array of objects. Donaldson described the more accessible tasks as 'embedded' in a meaningful context.

Stages of development are intuitively attractive and comforting, because they provide guidelines for practitioners making decisions about what activities to introduce to children. Piagetian stage theory defined what the three- or four-year-old was or ought to be 'like'. When these characteristics are called into question, a number of traditional scaffolds for early childhood practice are pulled away. The literature provides new supports, however, notably those associated with changing views about the domains of intelligence, views that turn stages on their side and describe them as different ways of knowing.

(ii) *An end point*

A hierarchy or sequence implies an end point, and views about the domains of intelligence have changed substantially since Piaget's theory of a logico-mathematical end point to development: the single developmental path has given way to alternatives. In 1978 the writers of an innovative Piaget-based curriculum for children (the Weikart High/Scope programme) could assume that learning is about individuals acquiring knowledge and skills of an increasingly general, abstract, symbolic, and logical nature (Hohmann, Banet and Weikart, 1979). Piaget had identified the central components of that knowledge and skill as logico-mathematical structures that marked the path to an end point called 'formal operations' (Piaget, 1971; Meadows, 1983). Later,

translations of the work of Vygotsky suggested that these skills were located in a cultural context but Vygotsky still described the end point as the 'higher modes of mental functioning' that come from the mastery of scientific concepts (Vygotsky, 1962 p.116, 1978). The Weikart High/Scope programme was innovative because it redefined cognitive development and gave early childhood a role in developing the individual's capacity for symbolisation and decontextualisation. Other early childhood programmes have emphasised these outcomes, including early symbolic skills such as: recognises and completes patterns, matches numerals to sets of objects, tells stories in a sequence, and uses drawings to record thoughts (Graue, 1993, pp.281-284). However, although feelings and emotions had been woven firmly into the fabric of learning in early childhood by writers from a psychoanalytic viewpoint (for example Isaacs, 1932, 1963; Axline, 1964; Erikson, 1965; Somerset, 1967; Stallibrass, 1974; Honig, 1990; Ratner and Stettner, 1991), the notion that higher cognitive function is the single *end point* of development, or the 'highest' way of knowing, has been questioned for the wider education field by (a) a revaluing of the 'concrete' and the 'here and now': placing stages on their side (b) an ethic of care in writing on education, integrating affect with the social and the cognitive to emphasise relationships, and (c) cross-cultural studies.

(a) A revaluing of the 'concrete' and the 'here and now': turning stages on their side

Stages of development had been questioned theoretically by the social construction of development movement in the 1970s (e.g. Harré, 1974; see the review in Morss, 1996 p.33). Morss (1996 p.33) wrote of Harré's contribution as follows:

Harré takes any hierarchical account of children's (or adults') growth and turns it on its side: a set of stages becomes a set of alternatives. This procedure is a challenging one.

Bruner (1996 p.155) also commented on his change of mind about the three stages of representation that he had advocated in 1971:

You represented the world in action routines, in pictures, or in symbols, and the more mature you became, the more likely you were to favor the after end of the progression than the starting end. At the time we thought that the course from enactive through iconic to symbolic representation was a progression, although I no longer think so. But I do still find it useful to make a threefold distinction in modes of representation, although not on developmental grounds.

Another influential writer, Gardner (1983), developed his theory of multiple intelligences in response to the unsatisfactory nature of Piaget's hierarchy:

Over and above its failure to convey the universal pattern of cognitive growth which all normal children are alleged to traverse, Piaget's scheme - restricted at its mature end to the classroom exercises of a high school science class - emerges as even less relevant to that discovery of new

phenomena or that positing of new problems which many consider central to the life of the mind. (Gardner, 1983 p.21)

The theory describes five unique symbolic domains (linguistic, musical, logical-mathematical, spatial, and bodily-kinesthetic) and two domains of personal intelligence (intra-personal and inter-personal) that children and adults may become especially interested or gifted in. Gardner's (1983) influential work has provided a lever for change for early childhood practitioners who were uneasy about single developmental paths and definitions of intelligence.

Feminist and other scholars in the wider education arena have also argued for the validity of multiple ways of thinking and knowing (Gilligan, 1982; Belenky, Clinchy, Goldberger and Tarule, 1986; Turkle and Papert, 1992, 1993; Bloch, 1992). They have challenged the 'hegemony of the abstract, formal, and logical' (Turkle and Papert, 1992 p. 3), in particular to revalue the concrete and the 'here and now', originally seen in Piagetian terms as an immature stage of development. Turkle and Papert have illustrated this direction in the context of working with computers. Papert (1993 p. 143) made this point when he said that:

the construction that takes place "in the head" often happens especially felicitously when it is supported by construction of a more public sort "in the world" - a sand castle or a cake, a Lego house or a corporation, a computer program, a poem, or a theory of the universe. Part of what I mean by "in the world" is that the product can be shown, discussed, examined, probed, and admired. It is out there.

Papert emphasised the action and the product; he celebrated 'concreteness' and criticised what he called the 'perverse commitment to moving as quickly as possible from the concrete to the abstract' (p.143) at school. He put it nicely when he suggested 'formal methods are on tap, not on top' (p.146). The value of Piaget's work, he maintained, is that he gave us valuable insights into the workings of a non-abstract way of thinking but (together with Lévi-Strauss)

They failed to recognize that the concrete thinking they had discovered was not confined to the underdeveloped - neither to Lévi-Strauss's "undeveloped" societies nor to Piaget's not yet "developed" children. Children do it, people in Pacific and African villages do it, and so do most sophisticated people in Paris or Geneva. (Papert, 1993 p.151)

In other words, the concrete and the abstract are different ways of knowing, not necessarily following one from the other. This celebration of concrete ways of knowing and thinking - for all ages - has given early childhood practitioners permission to focus on and value action in the 'here and now' without seeing it as a stage en route to better things.

(b) *An ethic of care in writing on education, integrating affect with the social and the cognitive to emphasise relationships*

The second shift towards different ways of knowing is the integration of affect with cognition, to emphasise relationships as a valued domain of knowledge. An ethic of 'responsibility' and 'care' has been proposed, in which relations with others are a *primary* aim in education rather than a means to an end (e.g. Noddings and Shore, 1984; Noddings, 1984, 1994, 1995; Donaldson, 1992; Noblit, 1993; Thayer-Bacon, 1993). It is interesting that at the same time as the concept 'care' was being edged out of early childhood rhetoric by the Piagetians (Hohmann et al., 1979; Forman and Kuschner, 1978; Kamii and Devries, 1978), and 'early childhood care and education' was becoming 'early childhood education', care was re-entering educational discourse from another direction. Thus,

an ethic of care helps to avoid self-serving relations of domination by focusing a primary concern on the need for the teacher to nurture an empathic, honest, interdependent and trustful relationship with the student . . . In the absence of an ethic of care, which celebrates feelings, values and emotionality in communicative relationships, the threads of knowing and being are likely to be woven into a cultural fabric of ephemeral value. (Taylor, in press, pp.11-12)

A nice recognition of the duality is illustrated by Smith's introduction to early childhood of the term 'educare' (see Smith, 1992; also taken up by others, see Singer, 1996). Following on from the pioneering work of the feminists, Goleman's (1996) popular book on what he called 'emotional intelligence' developed further the personal intelligences domain. Writing from a neurological viewpoint he said that early childhood is:

a crucial window of opportunity for shaping lifelong emotional propensities; habits acquired in childhood become set in the basic synaptic wiring of neural architecture, and are harder to change in later life. (Goleman, 1996, p.226)

Goleman argued that the emotional intelligences are key ingredients in children's developing understandings of how to learn, and he cited a United States report that redefined Headstart (an early childhood fund in the United States for assisting children at risk) as *Heartstart* (Brazelton, 1992; cited in Goleman, 1996, p.329).

(c) *Cross-cultural studies*

Cross-cultural studies have also challenged beliefs in the universal superiority of stages towards one end point, scientific rationalism, indicating that any valued end point is a cultural construction not a developmental inevitability (see Ogbu, 1988 for an early review from the United States; Webber, 1996 for studies from Aotearoa New Zealand; Tobin, Wu and Davidson, 1989 and Lamb, Sternberg, Hwang and Broberg,

1992 for early childhood cross-cultural collections). For example, an early ethnographic early childhood study by Lubeck (1985) compared two preschool classrooms in different neighbourhoods in the same suburb of an American city. In the Head Start Center, the teachers and students were black; in the preschool, teachers and students were white. In the latter, individualism, personal growth, and individual achievement was emphasised; in the Head Start Center, the teachers were concerned with group solidarity and

the extended family is re-created in the classroom. . . . These cultural patterns are learned early. They are part of the repertoire of behaviors that a child brings to early schooling, and they likewise reflect the previous socialization of the adults who organize the children's experience of school. (Lubeck, 1985, p.113)

Hence, coping with change and being able to create their own alternative visions become outcomes for children that will sit alongside learning the current community's ways of knowing and doing. Chapter 3 of this thesis discusses cultural and sociocultural viewpoints further, and a cross-cultural study of adult-child relationships in learning by Rogoff, Mistry et al. (1993) is outlined later in this chapter (section 2.2.2 (iii) (c)). Cross-cultural studies in particular have validated relational ways of thinking. Evidence from cross-cultural studies now suggests that development is less a function of biological unfolding or maturation than a function of environmental transaction over time (Crnic and Lamberty, 1994).

2.2.2 Predicting the effects of early experiences

The second assumption in the literature identifying developmental outcomes for early childhood is that early experiences are predictive. The literature that explores this assumption can be divided into three closely related topics: (i) the concept of readiness for school in American studies (ii) the search for sequence in longitudinal studies, and (iii) definitions of quality early childhood environments. Research that seeks predictable paths of skill and knowledge has had mixed success, but the research on quality early childhood environments has consistently highlighted responsive and reciprocal relationships as a key element of quality, and it is argued here that this forms a dispositional outcome (not a means to another outcome). Each of these three topics will be discussed.

(i) *The concept of readiness for school in American studies*

'Readiness' as a characteristic of an individual child is critically analysed by such writers as Shepard and Smith (1986), Eisenhart and Graue (1990), Kagan (1990), Graue (1992, 1993), and Crnic and Lamberty (1994). There are two views of

readiness: maturation (readiness increases as the child grows; Gesell, 1940; Ilg, Ames, Haines and Gillespie, 1978), and educational (readiness increases as the child acquires the appropriate knowledge and skills). The notion that learning precedes development has been vividly expressed by Vygotsky (1978) in his metaphor of a 'zone of proximal development', a zone of progress in which children are assisted by more expert adults or peers (discussed later in chapter 3, section 3.3). Implicit in both the development and the educational viewpoints of readiness is that a sequence can be defined. There are two general problems with this view: firstly, the sequences are not consistently confirmed by empirical work; secondly (a reason for the first problem), readiness as a characteristic of individual psychology ignores the very real influence of the context.

Readiness for school is conventionally seen as 'a stable, measurable capacity that can be assessed by professionals' (Graue, 1993, pp 4-5). In the United States screening children before kindergarten or between kindergarten and first grade is a common procedure to assess whether children are ready for these experiences. Children not deemed to be ready may be retained or held back for a year in preschool or kindergarten. Instruments used in America for screening or placement decisions have been shown to have poor predictive or external validity (Shepard and Smith, 1986; Meisels, 1987; Peck, McCraig, and Sapp, 1988; NAEYC, 1990; Shepard, 1994; Wylie, Thompson, and Lythe 1996). Developmental checklists, often progressing from the active to the abstract, from simple to complex, are 'neither precise enough nor conceptually appropriate for designing a curriculum for individuals' (Ballard, 1991, p.147). Several reasons have been given for this:

- The instability of 'developmental' traits at *young ages* (Shepard and Smith, 1986; Katz, 1994)
- The predictive validity of early measures is altered by the fact that achievement can be predicted from *teacher expectations*, and both measuring and retention or promotion alter teacher parent and student expectations (Blatchford, Burke, Farquhar, Plewis and Tizard, 1989; Bredekamp and Shepard, 1989; Weinstein, 1989)
- The *programme* makes a difference: Graue (1993) found that the meaning of readiness was defined differently in each of three early childhood settings she studied, and these different meanings were used to shape instruction and develop standards and policies
- Other aspects of the environment encourage children to behave differently in different places (Kagan, 1990; *contextual* factors affecting learning are further discussed below and in the next chapter).

Therefore, empirical and theoretical studies of school readiness have not supported a hierarchy of skill or knowledge that will predict later achievement. To conclude this section:

While there have been attempts to identify individual development or skill correlates of readiness, we currently have no theory or credible empirical base from which to judge what the most critical skills for readiness may be. (Crnic and Lamberty, 1994, p.96)

Again, Graue (1992, p.65): 'None of the current (readiness) instruments is sufficiently accurate to predict whether a child will have later problems at school'.

(ii) *The search for sequence in longitudinal studies*

Empirical data from longitudinal studies has contributed to the discussions on 'readiness for school' by attempting to identify factors that are correlated with success at school or with positive social and cognitive measures during the school years or later. One of the best known of these is the American Ypsilanti longitudinal study by Weikart and colleagues in which graduates from a range of early childhood programmes, including Weikart's own High/Scope programme, were followed to age 27. Initial academic gains quickly 'washed out', and it was not until the children were well into their teens and a range of social measures were used that significant differences (between children who had attended an early childhood programme and those who had not) emerged. Sylva (1994b) described the 'graduates' at age 27: by this time, the High/Scope graduates were more likely to have stayed on at school, got and held a job, stayed out of jail, and committed fewer crimes. She quotes Schweinhart and Weikart (1993, p.4) as they speculated on the mechanisms which brought about lasting change in disadvantaged children:

The essential process connecting early childhood experience to patterns of improved success in school and the community seemed to be the development of habits, traits, and dispositions that allowed the child to interact positively with other people and with tasks. This process was based neither on permanently improved intellectual performance nor on academic knowledge. (Schweinhart and Weikart, 1993, p.4)

Findings from recent New Zealand and Swedish studies have been complex:

(a) *the New Zealand Competent Children Study*. A New Zealand longitudinal project, the Competent Children Project is following 306 four-year-olds from early childhood to age eight. The children were first observed and interviewed in 1994. The researchers sought measurable outcomes that would be robust enough to provide longitudinal data for children from age four years (Meade and Cubey, 1995; Wylie, Thompson and Hendricks, 1996; Wylie, Thompson and Lythe, 1996). They settled on six "be-ing" competencies (communication, inquisitiveness, perseverance, peer social skills, social skills with adults, and independence), assessed by asking the child's

teacher to describe the child on a five-point scale; and a set of "do-ing" competencies, assessed by tasks included in an interview with the children in the study: peer social skills competence, early mathematics, early literacy, motor skills, and logical reasoning. Early results for six-year-olds in the Competent Children Project indicate for the researchers some 'puzzling' trajectories (Wylie, Thompson and Lythe, 1996). For instance, the children's "be-ing" competencies appear to have declined. The authors note that the reasons for this may be ecological and contextual (school is a new environment) or methodological (these competencies were not observed over an ongoing period of time, and the reason for their apparent decline may be that the primary teachers knew the study children on average for only six months, whereas the early childhood teachers knew them for an average of two years). The Competent Children study also found a low correlation between ages five and six for the "do-ing" competencies, the children's tasks.

What these low correlations suggest is that we may not be able to predict the particular competency level of a child in one educational environment at the age of 6 from the competency level of a child in a different educational environment at the age of 5, using the same instrument. (Wylie, Thompson and Lythe, 1996 p.9)

Although ' sleeper' effects (effects that lie dormant for a period and then reappear at later ages), found in the Weikart study (Schweinhart and Weikart, 1993) and in a Swedish study described below, may appear when the children are observed or interviewed again at the age of eight years, this study points out the difficulties of trying to describe a ladder of universal development or progress *along one variable* that can be helpful for teachers at the early childhood level. When the learning context changes, in this case from early childhood centre to school classroom, the predictive value of the competency measures, and perhaps of the competencies themselves, runs into trouble.

(b) *Swedish studies.* Two recent longitudinal Swedish studies also explored development through the early childhood years. The most significant finding in the first study of 119 children, followed to the age of thirteen years (Andersson, 1989; 1992), related to the comparison between those children who entered child care between the ages of six to twelve months and those entering child care at a later age. Children with the earlier centre-based child care experiences performed better on later tests of cognitive abilities and received better ratings of cognitive competence from their teachers. The second study (Broberg, Wessels, Lamb and Hwang, 1997; 146 children to age eight years) focused on children's cognitive development when they were eight years old in the context of individual (gender, temperament, number of siblings, prior cognitive abilities), family (socioeconomic status, quality of home environment, extent of paternal involvement), and child care (type, amount, and quality) factors that might affect cognitive development (in this case measured as

verbal and mathematical ability). 'Sleeper' effects were deduced from the fact that correlations between 40 and 101 months of age were 'unexpectedly' (p.67) higher than those between 40 and 80, and between 80 and 101 months. As in the Competent Children Project, the authors suggested that at age 80 months the children were still settling into a new setting (in this case, Swedish kindergarten). When they analysed the *home factors*, they found that cognitive abilities were enhanced by increased paternal involvement, but socioeconomic status did not predict difference. *Individual factors* indicated that earlier measures of cognitive ability (prior to the child care experience) were good predictors, but temperament (inhibition or shyness) was not. *Centre-based experiences* had positive 'sleeper' effects by age eight. Dynamic measures of centre quality (the quality of adult-child interactions) predicted verbal abilities, and structural measures of quality (child-staff ratio, group size, and age range) predicted mathematical ability. The authors introduced the idea of children choosing their own environmental 'niche':

We had . . . not expected that measures of the home environment, which predicted verbal abilities in earlier phases, would no longer be predictive when the children were in second grade . . . One interpretation of these results is that later development is more driven than earlier development by the child's ability to choose her or his own environment, a process known as *niche-picking*. (Broberg et al., 1997, p.67)

Broberg et al (1997, p.68) suggested that because the quality of early alternative care became more predictive of verbal abilities as the children aged, this is inconsistent with *genetically* formed inclinations to choose a particular environment ('niche-picking'). It is, however, consistent with *socioculturally* formed inclinations to choose a particular environment, a position on niches that will be discussed later, in chapter 3 section 3.4.5 on transactional models of learning.

(iii) *Definitions of quality early childhood environments*

Although it has been difficult, if not impossible, to find individual skills that, acquired in early childhood, will predict later competence, in many studies *experience in a quality early childhood environment* has been found to correlate with a range of individual characteristics later at school. Indicators of quality in the early childhood environment - structural indicators like small group size or adult-child ratios, and non-structural indicators like relationships with peers and adults - predict a learning trajectory that includes later social development and adjustment to kindergarten as well as success at school (Rubenstein and Howes, 1983; Howes, 1990; Howes, Phillips and Whitebook, 1992; Broberg et al., 1997). In New Zealand, a longitudinal study by Smith, Inder, and Ratcliff (1993) found that the earlier and 'more intense' (full time) the early childhood centre experience, the better children's academic progress was rated at school. American studies have not been consistent (Broberg et al., 1997, p.62)

although Clarke-Stewart and Fein (1983) documented significantly higher language and perceptual scores at school for children who had experienced child care in comparison with those of similar background from home care, and Scarr and Eisenberg (1993 p.628) concluded:

High quality [nonmaternal] care has potent positive effects on the cognitive development of children from socially disadvantaged families.

A longitudinal study of children in child care by Howes, Matheson and Hamilton (1994) found positive correlations between the four-year-olds' social competence with their peers and relationships with both their initial teachers and their preschool teachers. Typically, these studies document the influence of high quality early childhood programmes: centres with small group sizes, high staff-child ratios, qualified and stable staff, safe child-centred environments and good parent-staff relations.

Some key process features of quality environments are now being articulated. Early psychological studies on this topic were set in home environments, emphasising the importance for later development of contingent responsive relationships with adults (Rutter, 1986). A New Zealand study of one hundred centres licensed for under-two-year-olds (Smith, 1996a) used the Abbott-Shim Assessment Profile (Abbott-Shim and Sibley, 1987) to evaluate centres in terms of whether they facilitated the learning and development of children, and the Melhuish-Howes Observational Schedule to assess the sensitivity and responsiveness of the caregiver environment. Smith (1996a, p.39) concluded:

In good quality centres teachers focus on the children, respond to their initiations and real reciprocity exists between the child and the staff member. In poor quality centres children are often bored, unstimulated, frustrated or distressed. Staff do not interact much with children who are left to amuse themselves. The main interactions staff have with children are negative with children being reprimanded and controlled continually. Staff members do not respond when children get into difficulties.

In summary, responsive and reciprocal relationships are a key feature of a quality early childhood environment: 'children with involved and responsive caregivers displayed more exploratory behaviors . . ., were more positive . . ., and had better peer relations' (Scarr and Eisenberg, 1993 p.629). Smith (1997) reviewed the literature on reciprocal relationships or 'joint attention' and commented

An important feature of high quality early childhood environments is the extent to which adults participate with children in joint attention or involvement with objects, activities or ideas. . . . Recent research evidence suggests that the engagement of adults and children in joint attention episodes (Moore and Dunham, 1995) has many important functions in early development. For example joint or shared attention allows basic information to be conveyed, affective understanding to be

apprehended and provides the basis of shared experience needed for the acquisition of language (Corkum and Moore, 1995). (Smith, 1997 p.4)

Responsive and reciprocal relationships in early childhood participate in development and learning in three ways: (a) they facilitate language development, (b) they include shared responsibility, and (c) they weave positive affect into learning tasks. All three are closely related, and they lead the argument in this chapter towards beginning to identify 'dispositions' that may be influential on learning in later years. Each influence is considered in turn:

(a) *Language development.* Responsive and reciprocal relationships in early childhood settings may enhance language development, which has significance for later learning. The study by Broberg et al. (1997) indicated that the quality of adult-child interaction in a child care centre predicted verbal abilities at age eight. A number of early American studies reported that children enrolled in child care facilities with more responsive caregivers had higher language development scores (Carew, 1980; Rubenstein and Howes, 1983; McCartney, 1984); and sensitive, responsive and contingent relationships have been shown to enhance language development irrespective of the early childhood setting in which the relationships are located (Melhuish, 1991).

(b) *Shared responsibility.* A number of writers have analysed relationships and interactions between children and adults in early childhood settings (Wood and Wood, 1983; Tizard and Hughes, 1984; Cross, 1989; McNaughton, 1991; Sylva, 1992; Cicognani and Zani, 1992; Rogoff, Mistry et al., 1993; Fleer, 1995; Gardner, 1996) and suggested that, perhaps underlying language development factors, initiations by learners and shared responsibility for learning are a central feature of quality. Responsive relationships also involve learning strategies for sharing an understanding of the task at hand, and shared power or responsibility. Rogoff, Mistry et al. (1993) examined how toddlers and their caregivers from four cultural communities collaborated in shared activities. The aspects of guided participation that they found to occur across all four communities were (1) shared understanding: the collaboration between toddlers and adults allowed *bridging* between their individual understandings of the situation at hand, and (2) the communication *structured* each other's participation in the problem-solving tasks that the researchers set. These bridging and structuring processes have been described as cognitive 'scaffolding' (Wood, Bruner and Ross, 1976). In an early experimental study by Wood, Wood and Middleton (1978) preschool children in a 'contingent' (scaffolded) group learned to assemble blocks (demonstrated at a later time and on a different task) more effectively than three other groups that were taught in different ways. The perception that shared

understanding and communication is part of the learning process is an outcome of early childhood experience.

(c) *Weaving affect into learning.* The third way in which reciprocal and responsive relationships connect to later learning is that they integrate the affective, the cognitive, and the social. And it is this integration that translates into motivation and learning disposition. Sensitive and contingent relationships may not be primarily about the 'headstart' of early language development or the scaffolding of cognitive skills; they may be more to do with the 'heartstart' associated with how the child and the family come to view and value him- or herself, and how the child and the child's family come to relate to education and educators (Sylva, 1992; Goleman, 1996). Sylva (1992):

I will argue here that social interactions during early learning communicate to the child messages about her intellectual capacities, how to meet success and failure, and how to plan for the future. (p.141)

Affect and cognition, woven together, make connections with self-worth and these will contribute to 'learning dispositions' or expectations about learning. Vygotsky's zone of proximal development can be described as affective structuring as well as cognitive structuring, and the two are becoming interwoven (Ratner and Stettner, 1991). Vygotsky was aware of this, highlighting purpose and affect as central causal 'engines' or motivators in mental life:

By isolating thinking from affect at the outset, we effectively cut ourselves off from any causal explanation of thinking . . . when thinking is isolated from affect, investigating its influences on the affective or purposive aspects of mental life is effectively precluded. (Vygotsky, 1987, p.50; cited in Ratner and Stettner, 1991 p.2)

Feelings typically mediate in interview and experimental studies, especially with young children (e.g. Hatch, 1990). Looking for a theoretical position, Ratner and Stettner (1991) cited studies of research on attachment and young children that link affect to attention and persistence. They suggested that

an adult's joy, enthusiasm and interest will increase or maintain a child's attention, creating a shared context and making learning possible. Indeed, secure attachments, revolving around positive affect, are related to children's greater attention, patience, and persistence in cognitive tasks. (p.8)

They linked shared responsibility within positive relationships to attention and persistence. Anxiety, on the other hand, influences attention and reduces intuition and problem-solving capacities (Claxton, 1997 pp.130-131). Affect plays another role too: a critical contribution of emotion may be to do with feedback, especially when a child makes an error. Ratner and Stettner (1991, p.10) maintained that the 'freedom to err' seems critical to the development of cognitive behaviour; they added that 'freedom to express' may be critical to emotional development. Responsive relationships are centrally involved in the motivation to learn.

2.2.3 Issues of direction and change over time

The literature discussed so far has indicated that traditional end points and sequences of development and learning have been called into question. *Relationships* - more than interactions - appear to be central to the trajectory from early childhood experience into later learning. These relationships may be more than mediating variables, means to cognitive ends. New voices have suggested that responsibility, care, and intuition, are end points too. Has *direction* been lost in this process? The social construction viewpoint, that humans construct the reality they experience through interpersonal processes, will weave its way through this study. It is reflected in an interest in 'development' as story, and 'developmental processes' as discursive. But the notion of direction, and development, has not been abandoned. Arguments in this chapter, and in this study, suggest that reciprocal relationships and responsibility, valuable in the here and now of an early childhood setting, are also pivotal to the first messages about the self as a learner that children receive in early childhood settings, messages that may have an enduring effect on their dispositions to learn in later years.

Morss (1996 p.1) suggested that 'We should be on our guard against the implication of the developmental attitude to people's lives and hopes. It treats others as behind or below ourselves, but destined to follow the same path'. This emancipatory and critical view of 'development' has led to some strongly anti-development post-structuralist positions, describing infancy and the child (and, by extrapolation, early childhood) as a fiction (Bradley, 1989; Burman, 1994; Morss, 1996). This study will straddle the post-structural and the critical, taking a moral and emancipatory view of the role of education, see section 4.2.1 of the methodology chapter. One response to the anti-development position, described as 'analysis paralysis' by Katz (1996 p.143) and 'theoretical nihilism' by Stott and Bowman (1996 p. 171) is to seek new directions in the following four ways. All of these four directions emphasise the role of relationships and incorporate the notion of developing dispositions that constrain or shape later learning:

- (i) new epistemologies that incorporate the social context but include direction within critical imperatives
- (ii) extended schema theory that emphasises the dispositional quality of schema
- (iii) the argument that young children appear to be developing a theory of mind
- (iv) transactional models of development:
 - (a) Bronfenbrenner's ecological model and
 - (b) a neural network model of the mind/brain

(i) *New epistemologies that incorporate the social context and include direction within critical imperatives*

New epistemologies incorporate the social context and include critical imperatives. In early childhood, Donaldson's work as well as new research on language and social development, especially surrounding Bruner (Bruner, 1983, 1990; Cazden, 1988; Tizard and Hughes, 1984; Wells, 1993; and Dunn, 1993) emphasised the *social* context of knowledge construction. Knowledge construction was beginning to be seen as a sociocultural activity, subject to the 'quality control' of group or community consensus. Taylor (in press, p.7; 1996) describes the emergence of a social and critical epistemology in education generally as the coupling of constructivist theory with the critical theory of Habermas (1972; 1984). Habermas added an emancipatory direction for education: a critical theory of social action that aims to reform society rather than only to understand and interpret it. These new aims include equality of opportunity amongst participants, and critical awareness by participants of normally invisible cultural norms and assumptions. These normally invisible norms and assumptions are embedded in what writers have called 'discursive practices' (e.g. Davies, 1987, 1989) or discourses, which are received, constructed and altered by children as they work and play in the community of the early childhood centre. Davies illustrated this critical approach when she wrote about the potential for flexibility (my emphasis) in gender discourse:

One reason for conducting the longitudinal aspect of the study [from pre-school to primary] was to examine the stability of children's positioning within the discourses through which they speak themselves, and are spoken, into existence. Through access to new discourses or through shifts in positioning within the old, I was interested to find *changes in interpretation of their genderedness* and of the possibilities they saw being open to them as males and females. (Davies, 1993, p.3)

New interests for early childhood curriculum in anti-racism (Siraj-Blatchford, 1994; Ritchie, 1994) and gender equity (Davies, 1989; MacNaughton, 1997) reflect this shift in the definition of valued knowledge and direction. Taylor (1996 p.152) quotes the cultural anthropologist Geertz describing human beings as 'suspended in webs of significance [we ourselves have] spun', and culture as those webs of significant knowledge. These emancipatory and discursive frameworks focus on children's socioculturally (and historically, as they are handed down by previous generations) derived goals for themselves: to be a kindergartener, to be a schoolboy, to be a netball player, and ask in what way these goals constrain or enhance their learning.

(ii) *Extended schema theory that emphasises the dispositional quality of schema*

'Schema' in the mind provide a framework for determining direction in terms of children's goals. Knowledge as 'schema' in the mind was a metaphor introduced by Piaget, and recently given a popular place in early childhood (Athey, 1990; Rouse and Griffin, 1992; Drummond and Nutbrown, 1992; Nutbrown, 1994; Meade and Cubey, 1995, Meade, 1995). Schema theory gives the name 'schema' to cognitive structures; Meade (1995 p.15) described a schema as a 'piece of thought'. The Competent Children Project looked not only at competencies but also at schemas (Meade, 1995b). In that Project, following Athey, schemas were described as 'vertical dynamic', 'trajectory', 'connecting' and 'going around a boundary'. They are kinaesthetic, motor and symbolic patterns. The schemas were located at four levels: 'motor', 'symbolic representation', 'functional dependency' (clustering and connecting different schema), and 'thought'. These levels, based on a sequence of action, representation, and abstract thought, come from a reading of Piaget (1971) and Bruner (1971), although, as noted earlier, by 1996 Bruner had changed his mind about the progression of schemas that Athey had developed (Bruner, 1996, p.155). Although there is no evidence that the sequence from action to abstract thought is a necessary progression, the popularisation of schema has not been without value for new conceptions of early childhood. It has refocused attention on children's goals and emphasised the connection between play and thinking. Meade and Cubey (1995 p.2) commented that although the schema chosen for their research were predominantly logico-mathematical 'others, such as gender concepts, could be studied'. D'Andrade (1984 p. 93) suggested the term 'cultural schema' to include social interactions and discourse and the idea that children develop favourite patterns of social interaction and discourse - are 'disposed' or inclined towards certain patterns.

(iii) *The argument that young children appear to be developing a theory of mind*

There is a growing literature about children's emerging 'theory of mind' that questions the Piagetian notion of the 'egocentric' nature of the young pre-operational child, but retains a developmental focus. Children's theory of mind is described as the 'newly emerging ability to understand that others have mental states differing from their own, and, possibly diverging from the real situation as well' (Tomasello, Kruger and Ratner, 1993, p.498). Researchers disagree about the age at which children 'acquire' or 'reveal' this understanding that others will act on their beliefs and desires, and that these beliefs may be false, but the research indicates that it is certainly evident by age three or four years. Bruner (1990) placed it earlier in the child's life; other researchers (Astington, Harris and Olson 1988; Wellman, 1990; Astington, 1993; Lillard, 1993;

Tomasello et al., 1993; Bartsch and Wellman, 1995) have placed it at age three or four. Dunn (1993) from her work with young children on their close relationships in natural settings wrote extensively about young children's interest in and ability to understand another's viewpoint. She commented:

Children from their second year onward talk about feelings - their own and those of other people (Brown & Dunn, 1991). They inquire about and debate why people behave as they do And over the preschool years, they develop an increasingly firm grasp of the links between people's behavior and their intentions, desires, and beliefs (Astington, Harris & Olson, 1989 (sic.); Wellman, 1990). (Dunn, 1993, p. 12)

An interest in other people's intentions desires and beliefs will certainly appear in the transcripts in this study. These include references to 'being right', making a mistake, lying, and on one occasion a collaborative effort to make someone else believe something false. This non-egocentric *talk* appears at age three or four, but the evidence is also consistent with a theory of mind being available much earlier, awaiting a social and cultural climate for it to be useful.

(iv) *Transactional models of development*

There has been a shift of interest from static approaches to knowledge and skill acquisition (what the learner knows or knows how to do at a particular time), towards more dynamic approaches (how the learner behaves in situations where he or she knows or does not know what to do). A contributing factor to this discussion is a concern about the *transfer* of knowledge and skill as a direction for education (for example, Brown and Campione, 1984; Crisafi and Brown, 1986; Pea, 1987; Perkins and Salomon, 1989). Prawat (1989) provides a useful overview of this shift, and adds:

Despite its practical and theoretical significance, however, there is surprisingly little consensus about how best to facilitate transfer. This lack of consensus may reflect a more basic disagreement about what counts as the key transferable product. (Prawat, 1989, p.1)

Two models of development have reflected this interest: Bronfenbrenner's ecological viewpoint (Bronfenbrenner, 1979), and Edelman's neural network model of the mind/brain (Edelman, 1992). These two models are outlined.

(a) *An ecological model of development*

Bronfenbrenner (1979) was interested in action or activity as the central unit of analysis. He defined development as 'a lasting change in the way in which a person perceives and deals with his [or her] environment' (p.3) and 'activity is at once the source, the process, and the outcome of development' (p.289). In this model, a developmental trajectory is the involvement of the developing person in a succession of new settings in (1) ongoing activities that have meaning to the participants, (2)

dyads in which each person pays attention to or participates in the activities of the other and there is a balance of power, and (3) roles (social positions differentiated by age, sex, kinship, and so on). Bronfenbrenner (1979 p. 60) emphasised that learning and development is facilitated when dyads meet optimal conditions of reciprocity, progressively increasing complexity, mutuality of positive feeling, and gradual shift in balance of power. Bronfenbrenner's ecological framework was a landmark in early childhood studies, defining development not as a hierarchy of defined knowledge and skills but as a transaction both within and across settings or 'microsystems'. An example of research that illustrated the power of this approach was a study of employed mothers of insecure infants reported by Belsky (1988). It suggested that the mothers,

by trying possibly to make up for lost time . . . inadvertently exceed the information processing capacities of their infants, causing them to avoid interaction and contact . . . By engaging in what they believe is compensatory attention, they exacerbate rather than ameliorate the effects of their being gone all day. (p.263)

The effect of child care was acknowledged as being as much to do with the effect of the family's reaction to their perception of the quality of the child care as it was to do with the quality of the child care. This described a complex and interactive relationship between the child, the home, and the centre, and supports Bronfenbrenner's (and Piaget's) view of development as a complex process of accommodation. Lamb and Sternberg (1992) also take an ecological view of quality early childhood environments when they comment that the benefits of high-quality care (summarised by the authors as sensitive patterns of interaction, displays of appropriate emotion and the intuitive understanding of children by the adults) may be compromised by the demands of parents' work roles.

(b) A neural network model of the mind/brain

New models of the way the mind/brain works provide new frameworks for direction: from the idea of predispositions to dispositions. There is some support for what might be called a version of schemas in a 'neural network' model of the brain/mind that has been outlined and elaborated in various ways (Rumelhart, McClelland and the PDP Research Group, 1986; Edelman, 1987, 1992; Sacks, 1995; Goleman, 1996). It straddles in an imaginative way the nature/nurture debate about whether schemas are innate or transactional. A very accessible description of a neural network model can be found in Gee (1992):

A neural network model may well turn out not to be the whole story of the mind/brain. There probably is no single story; the mind/brain may very well operate in several different ways for different purposes. But I believe that it will turn out to be a main and important story about the mind/brain. Furthermore, and this is my central interest in this theory, it allows us to see that there is much about human mental life that (somewhat

paradoxically, perhaps) has nothing much to do with individual brains or minds, but a lot to do with human social practices. (Gee, 1992, p.25)

A neural network model emphasises the interpretive and constructive role of the mind and the influence of sociocultural practices. Gee described the mind as having what he called 'weight configurations', which may be both innate and established by experience. A network does not store a pattern or schema, but excitatory links between units, if they are strong, will 'mimic' a schema. The network learns patterns of co-occurrence of individual items. He used as an analogy our idea of a typical kitchen: it is made up of a co-occurrence of particular household items; we can get to the point where activating the unit for one prominent kitchen feature (the oven for instance) would activate in a kind of chain all the other units we have come to expect to be found in a kitchen. Different weight configurations between units are different working theories or knowledge bases (Gee, 1992, p.47). We can communicate well with others in our community because the weight configurations of our networks are very similar: we have had experiences in common and we focus on (select for attention) the same aspects of those experiences that originally set up the units, connections, and weights. We share the same sociocultural practices, and therefore share the same interpretations of experience.

The middle-class mother asks for the hundredth time of a picture in a book she and her child have read repeatedly, "What's that?", "What's that say?", "Where did we see a donkey?", and the child is no longer tempted to answer, "You know, why are you asking me?" but picks up a whole theory of books and reading. (Gee, 1992, p.48)

Many capacities and predispositions may be 'built-in' to the genotype but their development (or lack of development) may depend on experience. This is particularly so for culture-specific language capacities (Karmiloff-Smith, 1994) and capacities like musical ability; and different weight configurations created by experience may be especially evident in identical twins who have been separated at birth (Sacks, 1995, p.119). Stern (1985) describes the world of the infant in a way that fits with this model, although he takes a more maturationist view of later-appearing capacities than Gee. He identifies what he calls a 'sense of the self' (p.6) that exists long before self-awareness and language: it includes the senses of agency, of physical cohesion, of continuity in time, and of having intentions in mind. These predispositions (Edelman calls them *values*) lead us to interpret our experience, to make meaning of our experiences, in a certain way. Their triggers (like the oven in the kitchen) are often feelings or emotions (Sacks, 1995, p.105). The theory of neural networks, with the notion that children develop working theories about the world that predispose them to interpret their experience in certain ways puts a new spin on constructivist and generative theories of learning (Osborne and Wittrock, 1983), and alerts us to the research on temperament, predispositions, and dispositions as they have been used in education.

In early childhood, there is an extensive literature on temperament (for example, Chess, 1990; Reynolds, 1990; Kagan and Snidman, 1991; Scarr and Eisenberg, 1993; Kagan, 1994), in which some children are described as temperamentally inclined towards, for instance, being timid or bold, 'upbeat' or melancholy, when they meet the unfamiliar. Goleman (1996, p.215) took a chapter to illustrate that 'temperament is not destiny', and a research project by Fein (1995) provided an example of links between 'pre-disposition' and 'disposition', mediated by caregiver relationships and affect associated with those relationships. She observed 99 infants at entry into child care and again six months later; she also observed caregiver interaction. She found that caregiver interactions to a large extent depended on the entry temperament of the infants. Expressive children received more and different types of attention from the adults than non-expressive children. She concludes 'some 6-month patterns have their roots in temperament dispositions, with differential outcomes determined largely by caregiver responsiveness' (p.261). Other research on relationships in child care suggest that when toddlers form stable relationships with their teachers, these relationships are not related to maternal attachment relationships, and they predict the children's peer relationships at four years of age better than attachment relationships with their mothers (Howes and Hamilton, 1992; Howes, Matheson and Hamilton, 1994). The quality of relationship provided by caregivers is again shown to be a crucial mediating sociocultural variable, strengthening original 'working theories' about the world, or establishing new ones by overcoming temperamental inclinations that might lead to despair and detachment. The notion of a learner as an 'individual-acting-with-mediational means' (Wertsch, 1991 p.12) will be explored in the next chapter. It does not separate the individual from key mediating variables.

2.3 ORIENTATION TOWARDS DIFFICULTY AND UNCERTAINTY

The previous section summarised the arguments against attempts to identify a list of skills and understandings as the first necessary steps on a developmental or learning staircase, and for a viewpoint that highlights positive relationships with adults as a key condition for development and learning. It suggested that responsive and reciprocal relationships integrate affect with learning and set up dispositions to do with communication and shared responsibility.

The final step on a conceptual pathway arguing for learning dispositions as key outcomes for early childhood is the work on learning 'orientation' of Dweck and her colleagues in the United States (Dweck and Reppucci, 1973; Dweck and Bempechat, 1983; Dweck, 1985; Dweck, 1986; Licht and Dweck, 1987; Dweck and Leggett,

1988; Dweck, 1989; Dweck, 1991; Heyman, Dweck and Cain, 1992; Erdley and Dweck, 1993; Smiley and Dweck, 1994; Cain and Dweck, 1995). Dweck and Reppucci (1973) identified the influence of what they called 'learned helplessness', a research theme that was to continue for more than two decades, observing children's reactions to failure and classifying them as 'helpless-' or 'mastery-oriented' (Cain and Dweck, 1995). Dweck argued that

a deep understanding of motivation requires an understanding of the specific goals individuals are oriented toward when they behave in a particular situation (Dweck, 1985, p.289).

The idea of 'orientation' is very close to 'disposition', but for Dweck it has a very special meaning: she described children (including four- and five-year-olds) as having an *orientation towards 'performance goals' or 'learning goals'*. When children are oriented towards 'learning goals', they strive to increase their competence, to understand or master something new. When they are oriented towards 'performance goals' they strive either to document, or gain favourable judgements of, their competence or to avoid negative judgements of their competence.

Learning goal children experienced the same roadblocks to task solutions as Performance goal children, and some of the Learning goal group lacked confidence in their future success. Nevertheless, as a group the Learning goal children remained focused on strategy and maintained an even emotional keel during the hard task; they evaluated their skills positively and persisted after failure . . . Holding a learning goal may be adaptive; even low confidence did not prevent children from attempting tasks for which success was uncertain but which could provide learning experiences. (Smiley and Dweck, 1994, pp. 1739-40)

Most of Dweck's research was with ten-year-olds, but three studies focused on four- and five-year-olds: Hebert and Dweck (reported in Dweck, 1991); Heyman, Dweck and Cain (1992); and Smiley and Dweck (1994). The latter is an extension and refinement of part of the study by Hebert and Dweck, and it is worth describing it in some detail to clarify the idea of orientation towards learning goals because the idea links closely with the 'learning dispositions' that will form a central feature of this thesis. The subjects were 78 children from nursery and kindergarten classes at the Laboratory Schools of the University of Chicago: from middle- and upper-middle-class families and ranging in age from 3:11 (three years and eleven months) to 6:2 years (median age 5:0 years). The children were seen in two sessions.

In Session 1, they:

- (a) were asked to evaluate their overall puzzle-solving ability
- (b) were asked to put together an age-appropriate puzzle (the puzzle pre-test), and
- (c) completed a tower-building task in which over six trials they estimated how high they could build a tower and then built it using a set of wooden blocks.

In Session 2, they

- (a) completed a puzzle task that involved first working on three insoluble puzzles and then on one solvable puzzle

- (b), made self-ratings of their emotion for each of the puzzles (using a face scale of five faces from 'very sad' to 'very happy')
- (c) responded to a question about future success on this task
- (d) answered the question about overall puzzle-solving again
- (e) were asked to indicate whether they preferred to work again on one of the insoluble puzzles or on the solvable puzzle and to give a reason for their choice
- (f) were given all the correct pieces and asked to complete the preferred puzzles, and, finally,
- (g) they were asked to state their preference and reason for working on yet another of the four (insoluble or soluble) puzzles.

Session 1 was used as a 'level of aspiration' task, to assess subjects' tendency to seek or avoid challenge. Session 2 (e) (to repeat an easy task or try again on a hard one) tapped into their tendency to seek or to avoid challenge after an experience that included failure (a).

Two groups emerged from these two measures: a group of 38 children who sought challenge (providing evidence of learning goals) and one of 40 that avoided it (providing evidence of performance goals). The latter group either chose the success puzzle or chose a difficult puzzle but seemed interested in ensuring confirmation of their competence. The children who chose the non-challenging task chose it because it was easy, and those who chose the challenging task chose it because of its difficulty. In addition, the learning or performance goal orientation was a good predictor of aspects of their achievement behaviour: concern with adequate performance, task engagement, and self-reported emotion during failure, as well as task confidence and self-evaluations of jigsaw ability after failure.

These patterns of learning or performance orientation were especially pronounced under conditions where difficulty was experienced. Ability and confidence did not appear to affect children's orientations. In the earlier work with older children goal orientation was linked to implicit theories or beliefs about the mutability of intelligence. The older Learning goal children were characterised by an incremental view of intelligence (a belief that intelligence can change), Performance goal children by an entity view (a belief that intelligence is inborn and fixed). The researchers assumed that four- and five-year-olds were not able to characterise intelligence in this way, and that therefore 'the young (preschool) child appears to have everything one would wish for in an achievement motivational system' (Dweck, 1989, p.119). Dweck assumed that four- and five-year-olds would be characterised by learning goals and persistence after failure. However, by 1991 Dweck was wondering whether 'our focus on achievement and ability as vehicles for studying motivation may have blinded us to the domain in

which young children are operating' and that young children may have implicit theories of 'goodness' analogous to the implicit theories of intelligence of older children. Research using role plays reported in Dweck (1991) and Heyman Dweck and Cain (1992) provided preliminary support for the view that for young children behaviour and outcomes, even on skill tasks, are evaluated on the more general dimension of goodness-badness (Dweck, 1991, p.213).

There are a number of features of this research on orientation that are of interest to and raise questions for a thesis on learning disposition. These features are:

- (i) the central importance to the learning process of *response to difficulty*, challenge and uncertainty
- (ii) children's goals in the domain of '*being good*' may be influential
- (iii) 'orientation' is an example of the close *interweaving of affect and cognition* in learning
- (iv) the evidence for *continuity* of orientation patterns
- (v) there may be *other social and cultural goals*
- (vi) orientation may be *linked to situation*.

Each of these features will be summarised.

- (i) *The central importance to the learning process of response to difficulty, challenge and uncertainty*

Carl Rogers (1969, p.120): 'Changingness . . . is the only thing that makes any sense as a goal for education in the modern world', and Claxton (1990, p.164) concluded that

in a society where knowledge, values, jobs, technology and even styles of relationship are changing as fast as they are, it can be strongly argued that school's major responsibility must be to help young people become ready, willing and able to cope with change successfully: that is, to be powerful and effective learners.

The research on orientation suggests that a fruitful focus of attention is not on skills by themselves, but on performance or learning orientation, and on the deployment of those skills in response to situations of difficulty or challenge.

- (ii) *Children's goals in the domain of 'being good' may be influential*

In a number of the studies with four- and five-year-olds (Dweck, 1991) role play situations followed imagined failure (a present for the teacher that turns out to have a mistake, something missing). The 'performance goal' children imagined more criticism, negative affect, and punishment from parents and teachers than the learning goal children, and treated flawed products as permanent losses. Whereas for the older children ability was linked to judgements about intelligence, for the younger children ability was linked to self-judgement and *being good*: not only did the performance

group see themselves as 'not clever', they were also 'not good'. The learning goal children on the other hand imagined that teachers and parents would praise them for effort, for good intentions, or for the parts of the product that were complete, and they set themselves new goals of fixing it or doing a new one. They were more likely to see making a mistake as part of the process of getting something right. So Dweck was not only identifying an orientation towards challenge or failure as early as age four years, her research was also suggesting that some children were confounding ability with goodness. Although this was in contrived tasks and role plays, the findings are of considerable interest to research on learning disposition in early childhood settings.

(iii) *'Orientation' is an example of the close interweaving of affect and cognition in learning*

Although Dweck has downplayed the role of feelings in motivation, it is a central feature of the motivational aspects of both orientation and disposition. The role of feelings or affect in motivational studies is emphasised by the research of Csikszentmihalyi and colleagues (Larson and Csikszentmihalyi, 1983; Csikszentmihalyi, 1991; Csikszentmihalyi and Rathunde, 1992) who suggest that theories of motivation generally explain the reason for action in functional terms and tend to ignore how the person feels. They described the feeling of 'flow' in experiences that one enjoys and wishes to repeat. They asked why so many people perform time-consuming, difficult and often dangerous activities for which they receive no discernible extrinsic reward. A programme of research that involved extensive interviews with rock climbers, chess players, athletes, and artists concluded that

the respondents reported a very similar subjective experience that they enjoyed so much that they were willing to go to great lengths to experience it again. This we eventually called the *flow* experience, because in describing how it felt when the activity was going well, several used the metaphor of a current that carried them along. (Csikszentmihalyi and Rathunde, 1992, p.58)

Earlier discussion in this chapter (the research reported by Fein, 1995) illustrated the central feature of feelings in children's access to early childhood opportunities. For very young children, sadness and despair, especially at times of transition from the familiar to the unfamiliar, may be severe constraints on learning orientation.

(iv) *The evidence for continuity of orientation patterns*

The research that tracked children into high school (from 6th to 7th grade) and found achievement at high school linked to goal orientation and theories about intelligence in 6th grade (Dweck, 1991, p.211) suggests continuity of goal orientation from early to later learning. Smiley and Dweck (1994, p.1724, my emphasis) state that 'there is also

evidence for *continuity* through early childhood in these affective and behavioral response patterns'.

(v) There may be *other social and cultural goals*

Dweck is a motivational goal theorist (other work on motivation is reviewed by Pryor and Torrance, 1995; Ames and Ames, 1989). She has alerted researchers to the motivating force of orientation towards achievement goals (to learn or to perform), and she has described an orientation towards learning or performing that appears at very young ages. Other social or cultural goals are possible (a suggestion raised in the context of motivation by Urdan and Maehr, 1995). This study will suggest that there are socioculturally or historically determined goals that might occur *prior to* achievement or learning goals. Dweck's studies highlighted four- and five-year-olds' morality goals, to be good or to be not good. This thesis will suggest that both morality (being good) and achievement (being able) goals may be derived from 'possible selves' (Markus and Nurius, 1986; Cross and Markus, 1994), identity or community alignments: an implicit goal, for instance, to be a good girl, a nearly-five-year-old, a kindergartener, a technologist.

(vi) *Orientation may be linked to situation*

Goal orientations may be adaptive in some circumstances but not in others. However, most of the literature assumes that learning (or mastery) and performance goals are mutually exclusive, and the adaptation has been little explored. There is some evidence that school students base their learning orientations on their perceptions about the purpose of the course (Prawat, 1989), but there has been no research on this in early childhood. One question that emerges from Dweck's work is whether children *shift* between performance and learning goals when the occasion arises. Dweck wrote only occasionally about children operating with performance goals in some circumstances and learning goals in others. In 1988 she and Leggett were saying (p.260) that 'adaptive individuals effectively coordinate performance and learning goals' and that it was only 'when an overconcern with proving their adequacy (to themselves or others) leads individuals to ignore, avoid, or abandon potentially valuable learning opportunities that problems arise'. They wrote about the role of situational versus dispositional factors in determining behaviour. This is the only reference I have found in Dweck's writing where orientation is referred to as 'disposition'. They asked (Dweck and Leggett, 1988, p.269):

Does the existence of dispositions imply, as some have argued, that an individual's behavior should be similar across diverse situations? And how do dispositional and situational factors combine to produce behavior?

They suggested that dispositional variables determine the *a priori* probability of adopting a particular goal, while situational factors have the potential to alter these probabilities. But by 1994 Smiley and Dweck appeared to be taking a more global stance:

The results of our research and some related studies suggest that by 4 or 5 years of age children have internalized an investment either in the evaluation of their achievement products or in the process of learning. (Smiley and Dweck, 1994, p.1741)

They were implying in that comment that the orientation, or tendency, will be ready for all occasions. Although Smiley and Dweck suggested that their tower task assessed 'the generality of subjects' tendency to seek or avoid challenge' (p.1727), the nature of both the special block building task and the jigsaw tasks does not warrant such a conclusion. Indeed, an unusual task set by a researcher may well look like an evaluation of achievement to many children familiar with tests and assessments. Underplayed by Dweck is the idea that in some circumstances performance goals are absolutely appropriate, and they may not indicate helplessness. If a four-year-old wants to be chosen for the trip to the shops, it may be sensible to display as much goodness as possible. An important disposition for learners will be therefore to shift orientation when the circumstances warrant a shift, i.e. to take a (probably implicitly) critical view of achievement goals and to be in charge of their deployment.

2.4 DISPOSITIONS AND CHILDREN'S GOALS

2.4.1 Dispositions: what are they?

The discussion so far has been heading towards giving a significant role in learning to dispositions. This section looks more closely at dispositions, continues the argument about why they might be important for education, and comments on their practical application. When in 1988 Katz answered the question 'what should young children be doing?' she listed four categories of learning: knowledge, skills, dispositions and feelings.

Dispositions are a very different type of learning from skills and knowledge. They can be thought of as habits of mind, tendencies to respond to situations in certain ways. (Katz, 1988 p.30)

The chief current exponents of disposition as an outcome for education are Katz (1988, 1993; Katz and Raths, 1985; Katz and McClellan, 1991), Perkins, Jay and Tishman (1993; also Tishman, Jay and Perkins 1993; Tishman, Perkins and Jay, 1995; Tishman and Andrade, 1995), and Langer (1989). The label was first linked to early childhood education by Katz in 1985 (Katz, 1985; cited in Katz, 1993). Applied to education generally, however, it has a longer history. Holt (1969, p.104) wrote

about a child who had ‘acquired the habit of acting unintelligently’. Rousseau (1762/1964) wrote about giving a child the ‘taste’ for learning:

It is not your business to teach him the various sciences, but to give him a taste for them and methods of learning them when this taste is more mature. (Rousseau, in *Emile*, 1762/1964, p.134)

[It needs to be added that Rousseau's 1762 image of the child as a free developing self (*Emile*), acquiring a 'taste' for learning, applied only to the male. Girls were not to receive the same education, but rather ‘woman is formed to please and to live in subjection’ (1762/1964, p.218)].

There are three questions that emerge from the literature in relation to the definition of dispositions, and these will each be discussed in turn:

- (i) Does disposition include skills and strategies or is it a separate entity?
- (ii) Orientation to broad goals as part of the definition of disposition: what are they?
- (iii) Learning dispositions or thinking dispositions for early childhood?

(i) *Does disposition include skills and strategies or is it a separate entity?*

There are two views about the relationship between disposition and skill or strategy. One is that disposition includes skill (Nisbet and Shucksmith, 1986; Cullen, 1988, 1991; Perkins, Jay and Tishman, 1993). The other view is that they are separate (Katz, 1988; Ennis, 1987; Baron, 1985). Figure 2.1 provides an example of the inclusive viewpoint of the relationship between skill strategy and disposition, adapted from Nisbet and Shucksmith (1986):

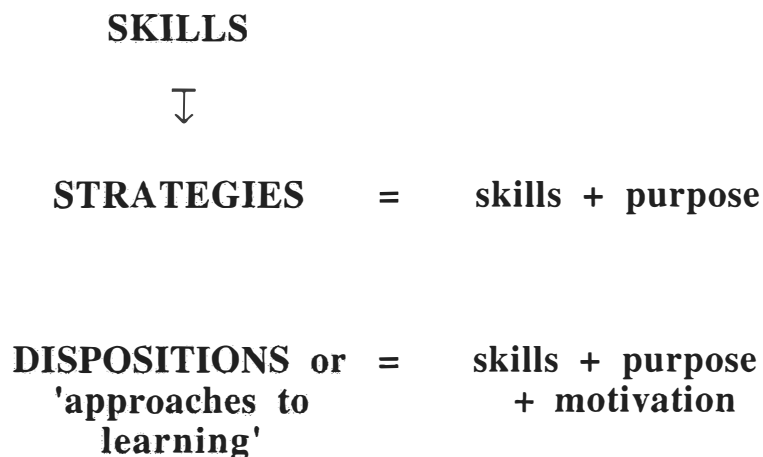


Figure 2.1. Skills, strategies and dispositions

In this scenario, one step along the way from skills to dispositions (called ‘approach to learning’ by Nisbet and Shucksmith) is ‘learning strategy’. Nisbet and Shucksmith

suggested that a learning strategy is a series of skills used with a particular purpose in mind.

Strategies are different from skills in that a strategy has a purpose, it is a sequence of activities and it is more readily modified to suit the context. (Nisbet and Shucksmith, 1986, p.vii)

While they used a football team as an analogy, for this discussion a netball team would do as well. Netball players practice the skills of ball handling, fast footwork, and goal shooting. When they play a team with very tall defenders who are not very fast, an especially good team can change their style of play to meet a new team: monitoring the new situation, revising their tactics, redeploying their skill combinations. Learning strategies, often associated with the idea that children are 'learning to learn', have been described as outcomes for education in general (Claxton, 1984; Nisbet and Shucksmith, 1986) and for early childhood education (Cullen, 1988; 1991). Claxton (1984, p.144) maintained that 'Intelligence inheres in having a good set of learning strategies (*and* avoidance strategies) and deploying them appropriately'. Nisbet and Shucksmith described strategies like planning ahead, monitoring one's progress to identify sources of difficulty, asking questions. For the infant, learning strategies include investigating, prodding, floundering, imitating, bridging (fitting together already possessed expectancies), practising, and playing (Claxton, 1984). Learning strategies for three- and four-year-olds have been described by Cullen (1988; 1991). Cullen's research evoked the continuity of learning from early childhood to school, as she observed children using the same strategies in play in their kindergarten and then in reading lessons at school: task persistence, use of (experiments with) resources, use of peer as a resource, use of adult as a resource, seeing self as a resource for others, directing self, and directing others. She described these as 'metacognitive abilities', or 'repeated patterns of behavior and language which indicate an active, strategic *approach to learning*' (Cullen, 1991, pp.45-46, my emphasis). Cullen linked these strategies to being ready for school and concluded that

preschools have a valuable function of assisting children to acquire a range of independent strategies which will help them to become competent learners. (Cullen, 1988, p.1) .

But she also noted that in the different context of the primary school classroom such abilities or strategies may not be demonstrated if, for instance, there is little opportunity to use a creative approach to choosing resources appropriate to the task in hand, or for the child to see herself as a resource for others. In an earlier study, Cullen (1985) studied 90 eight-year-olds, separately measured strategic thinking and persistence on problem-solving tasks, and found a strong relationship between the two. Students who had the strategic ability to cope, did cope: those who could, would.

Nisbet and Shucksmith (1986) anticipated the later literature on orientation and dispositions when they suggested that there may be a hierarchy of learning strategies.

At the higher level they placed strategies in which attitudinal and motivational factors play an important role. They called these 'style' or '*approach to learning*', cited 'planfulness' as an example, and concluded that such approach-type characteristics may be extremely difficult to influence. They concluded (p.29) that perhaps the only way of influencing these styles and approaches is 'via counselling'. Other writers on orientation and disposition however (Dweck, for instance) suggest that approaches to learning are a product of experience, and are therefore very strong candidates as aims for education and particularly for early childhood education.

The inclusion of skills or abilities within the definition of disposition is also part of the definition employed by Perkins, Jay and Tishman (1993) who described dispositions as a trio of inclination, sensitivity and ability. Inclination is the tendency to want to do something, sensitivity is being alert to the appropriate occasion, and ability is the strategy or ability to do it. As Bruner (1990, p.71) said of language development at an early age: 'the child is not learning simply what to say but how, where, to whom, and under what circumstances'. The triarchic framework (sensitivity to occasion, inclination, and ability) has been nicely summarised as 'ready, willing and able' (Claxton, 1990 p.164) or 'will and skill' (Sylva, 1994b, p.163; Salomon, 1995, p.106). Research on abilities or strategies has usually been separate from research or discussion of disposition; exceptions were Prawat (1989), Cullen (1985), and Nisbet and Shucksmith (1986).

Prawat (1989, p.27) suggested that 'The relationship between dispositions and cognitive skills is a key organizational issue that has yet to be adequately addressed'; he cites research that seems to indicate a strong relationship between strategic thinking and motivational orientation. It is clearly a strong relationship, but one of the values of the construct is that abilities and motives need not be congruent as Dweck's research has indicated with such power: 'able' students often refused to tackle difficult tasks. Prawat (p.28) suggested that 'Apparently, more effective students are better able to align their strategic thinking with their motivational orientation'. Dispositions are motivators, grounded in personal goals, beliefs, and values. They tell the learner 'why' she should proceed, whereas skills and abilities tell the learner 'how' she should or could proceed. The link between disposition and motivation was clearly set out by Katz (1993). In a comprehensive review of dispositions, with early childhood practices in mind, she suggested that the construct of disposition 'offers a way of distinguishing capabilities and capacities from their manifestation' (p.9).

(ii) *Orientation to broad goals as part of the definition of disposition :what are they?*

Katz has provided a definition that includes ‘orientation to broad goals’.

A disposition is a pattern of behavior exhibited frequently and in the absence of coercion, and constituting a habit of mind under some conscious and voluntary control, and that is intentional and *oriented to broad goals*. (Katz, 1993, p.16, my emphasis)

Nisbet and Shucksmith (1986) attached purpose to an 'approach to learning' or disposition. Prawat (1989) emphasised the connection with purpose and goal as well, citing research on reading education that links strategy (action) to action identification, or goal. Goals in this case (reading) might be (1) looking at words (2) understanding main ideas, or (3) gaining knowledge about things. Reading (an *action*) will be associated with a *goal* or goals. The perceived goal will also determine the *achievement orientation*. And both of these (goals and orientation) will determine which strategies will be deployed. Goals have been used in this discussion so far in (at least) three different ways:

- (a) as different goals within a task (when the task is reading: identifying letters or words, understanding meaning; from Prawat, 1989)
- (b) as orientation towards performance or learning goals (from Dweck, 1986)
- (c) as broad socioculturally and historically derived goals (being good, being able; also from Dweck, 1991 but more especially from Gee, 1992 and Davies, 1989).

For the purpose of this study, ‘broad’ goals are defined as socioculturally and historically appropriated (a term used by Rogoff, 1990) or constructed by the learner. These goals will be analysed in more detail in chapter 3, where they will be described as discourses. Connections between activities, broad (sociocultural and historical) goals, achievement orientation, and strategies, are described in diagrammatic form in Figure 2.2.

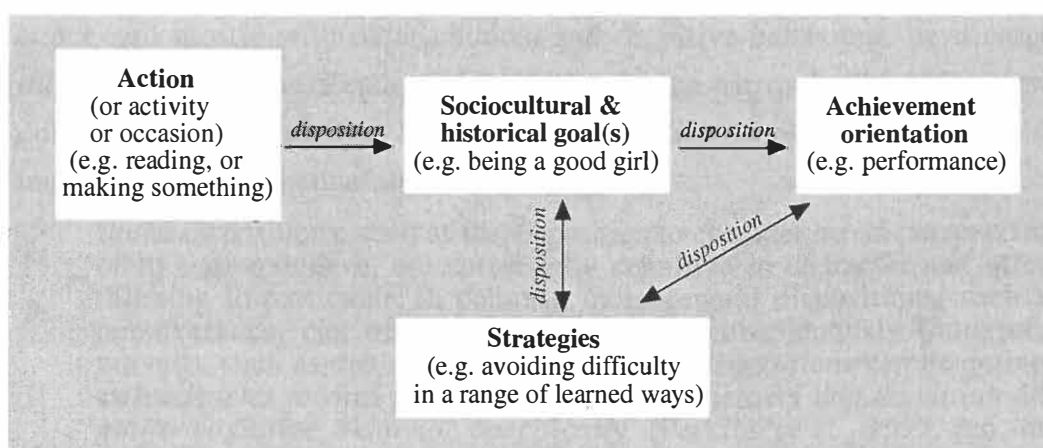


Figure 2.2. Interconnections between goal, orientation and strategy

The arrows in Figure 2.2 describe processes that might include dispositions. For example, if Jane is attempting to write her name (the *activity*), and she perceives the

goal here (for her) is to be a good girl, she will be oriented towards *performance* and may use *strategies to avoid difficulty*, because if she tries something difficult (writing her surname perhaps) she runs the risk of being seen to be incompetent and therefore not good. This view of dispositions is a complex one; it emphasises the ‘starter’ disposition, to interpret the task at hand in terms of certain sociocultural goals, and it implies that other dispositions (in this case to strive for performance, and to avoid difficulty) may be largely determined by this first decision. As Cullen’s research illustrated, there is also a feedback loop from strategies to goals and to achievement orientation: the relationship described is a *transaction*. Given increasing skill in reading, a novice reader’s goals might change from ‘being a good girl’ to ‘being a reader’: reading to gain knowledge about things. If Jane has learned a number of effective strategies for avoiding difficulty, she may be more inclined to deploy them, reinforcing her inclination towards performance goals (and encouraging her to choose sociocultural goals like being a good girl because her skills in this area make achieving ‘being a good girl’ very satisfactory). This thesis follows Katz’s (1993) definition, retains the distinction between disposition and strategy (or skill), and emphasises the role of goals. Goals in all three senses are a key feature of disposition. The research in this study will explore them.

(iii) *Learning dispositions or thinking dispositions for early childhood?*

Writers on disposition either write about learning dispositions or thinking dispositions. Katz (1993) focused on *learning* dispositions, using as her point of departure an unpublished United States National Educational Goals Report which included ‘approaches to learning’ as one of the five dimensions of school readiness to be assessed in national samples of preschoolers (Katz, 1993 p.2). Other writers, concerned mostly with older children and cognitive behaviour, have emphasised *thinking* dispositions. Perkins et al (1993) take the narrower (thinking) view of the domain of disposition. They have developed a taxonomy of dispositions for ‘flexible, insightful, and productive’ thinking (p.3).

Some dispositions, such as the disposition to consider broad perspectives or to seek evidence, are specifically cognitive in character and affect thinking in particular. In contrast, more general dispositions, such as perseverance, can often benefit many not conspicuously thoughtful pursuits, such as dieting. Therefore *thinking dispositions* can be defined as *tendencies toward patterns of intellectual activity that condition and guide cognitive behavior specifically*. (Perkins et al., 1993, p.6, my emphasis at the end)

This study focuses on learning dispositions: it does not separate out cognition from other domains of learning (affective, social or sensory, for instance) and, following Dweck (e.g. Smiley and Dweck, 1994), it is particularly interested in perseverance in

relation to challenge. This implies two assumptions to do with what learning is about that have been developed in the discussion so far:

(i) Learning is about the combination of affective, social, physical (kinaesthetic and sensorial) and cognitive domains. The literature in this chapter on the central role of responsive and contingent relationships, critical and emancipatory concerns for social justice and communication, and new emphases on concrete, sensory and intuitive learning as ends in themselves (rather than steps on the way), have provided the background for this assumption.

(ii) Learning is about children engaging with challenge, uncertainty, and change. Dweck's research, highlighting children's responses to difficulty and challenge (see section 2.3 in this chapter), has provided strong arguments for this assumption.

Learning dispositions for early childhood are therefore about more than 'thinking' or cognition.

2.4.2 Why are dispositions important?

The longitudinal educational outcome study in the United States by Weikart and colleagues, quoted earlier, concluded that habits and dispositions appeared to provide the engine for long-term positive outcomes from quality early childhood programmes. There are a number of reasons for suggesting that dispositions should be included among the goals of early childhood education:

- (i) The Dweck research (e.g. Cain and Dweck, 1995) provided one of these reasons: a disposition towards a specific goal about the self (for instance, to be judged to be clever) will influence and may prevent the deployment of acquired skills (choosing easy tasks allow children to avoid complex planning and problem solving). More generally, the acquisition of knowledge and skills alone does not guarantee that they will be used. Disposition *precedes* the use of skill and knowledge.
- (ii) A second reason is that, by implication, a disposition is 'relatively enduring' (Katz, 1993, p.16), and reflects a continuity of educational experience: longitudinal studies and Dweck's research suggested that dispositions in early childhood will influence later learning. Dispositions are relevant for learning now, *and* they will influence learning in the future.
- (iii) Thirdly, one can extrapolate from the notion of positive individual dispositions to a programme that encourages and models them, and this provides some guidance for change. Dispositions, by their very nature, emerge from and influence transactions - two-way processes between learner and environment. For instance, the research on learning orientation indicated that feedback by an adult to a child might be differently interpreted, as either providing a judgement about performance or specific scaffolding for learning. This will depend both on the child's general

inclination as well as how the child interprets this situation (her sensitivity to the occasion).

- (iv) Fourthly, a disposition knits or weaves together the cognitive, the affective and the social in a learning pattern: it reflects the way teachers work, with the 'whole' child, and includes strands from the literature on the central role of affect in cognition.
- (v) Finally, the disposition and related literature has highlighted the debate between the notion of innate 'predispositions' and socially and socioculturally constructed 'dispositions', and allowed a rapprochement between the two. A strongly 'innate' view is that important dispositions to learn are 'most likely present in some form at birth in all normal infants' (Katz, 1993, p.15), and we should be identifying these and then protecting them. Stern (1985, p.6), for instance, described the infant's sense of agency and a sense of having intentions in mind, and Bruner perceived a capacity to make sense of the social world as possibly innate.

In a word, we come initially equipped, if not with a "theory" of mind, then surely with a set of predispositions to construe the social world in a particular way and to act upon our construals. This amounts to saying that we come into the world already equipped with a primitive form of folk psychology. (Bruner, 1990, p.73)

It has also been argued that a 'drive' to communicate is present at birth (Trevarthen, 1993). However, Britzman (1995), taking a post-structural viewpoint, criticises what she calls the humanistic notion of an 'essential self that has somehow been repressed by some condition, person, idea, or social structure' (p.236). She denies this essential (coherent) self, and concludes 'At the very least, it means approaching ethnographic writing as an effect of a contest of discourses, even if the ethnographer has the power to suggest what is at stake when identities are at stake' (p.236). Read in this post-structural way, a disposition is entirely a cultural construction. The neural network model of the brain/mind allowed a combination of the post-structural and the structural position, a view of *predisposition* as early 'learning maps' (another metaphor used by Gee, 1992 and Edelman, 1992), templates of neurological connection that influence interpretation and response, and of *disposition* as weight configurations that, over time, have strengthened or altered these neural networks. This study accords with a view of development that suggests that infants' capacities, temperaments and early learning maps provide templates for perceiving and interpreting experience, but that transactions between the individual and the social and cultural milieu shape learning dispositions that may be enduring, especially if the social and cultural milieu remains much the same over time.

2.4.3 The practical application to education of the notion of learning disposition

The practical application to education of the notion of a learning disposition is difficult because a disposition is a 'slippery' concept, hard to pin down. Responses can be observed; the inclinations that have preceded the responses can only be guessed at from a careful observation of the circumstances, observations over time, and perhaps discussions with the participants. The definition adopted in the previous section describes it as a 'pattern of behavior exhibited frequently' (Katz 1993, p.16). Perkins et al. (1993, p.18) admitted however that a disposition may be difficult to observe and define:

Yes, dispositions inevitably include reference to things that are genuinely hard to pin down: motivations, affect, sensitivities, values and the like. But these factors exert no less of an influence on behavior simply because they are hard to define, and we have argued that they must figure prominently in a full account of good thinking.

Attempts to observe, assess and list dispositions, highlight these difficulties. So far, a range of assessments have been explored, all of them coming from 'critical thinking' or 'good thinking' curriculum in school contexts (Tishman and Andrade, 1995; 'critical' used here to mean careful and analytical). Norris (1992) used open-ended yet focused problem situations, such as a search for living creatures on another planet. Students' responses to opportunities to derive hypotheses, interpretations, and conclusions, were analysed. Self-report assessments are exemplified by the California Critical Thinking Dispositions Inventory (CCTDI) (Facione and Facione, 1992) where students respond to 75 items using a six point Likert scale. A third approach is currently being developed by the Perkins, Tishman and Andrade team at Harvard. They use a three-task sequence to distinguish between ability, inclination and sensitivity and to assess their relative contribution to 'overall critical thinking performance' (Tishman and Andrade, 1995, p.6). The sequence is based on thinking shortcomings embedded in a story text; students are asked to read the text and respond in various ways. These instruments are not observations 'in the real world' and they provide little guidance for the early childhood educator.

Although most curriculum statements include knowledge and skills, dispositions are more elusive. Taxonomies of educational dispositions that include values and attitudes have however been adopted by a number of school programmes in the United States of America. In a multi-cultural public school in Harlem described in Meier (1995, p.157), five 'habits of mind', translated into questions, are listed on every classroom wall, discussed every week in a newsletter, used to organize curriculum, and are the basis for their 'standards' for judging portfolios on graduation: evidence (what's your evidence?); viewpoints (what viewpoints are we hearing?); connections (how are

things connected to each other?); voice (can we imagine alternatives?); and conventions (who cares?).

Academic life at the University Heights School (UHS) (Expeditionary Learning Outward Bound, 1995) focuses on seven 'Domains and Habits of Learning' which are the school's standards: (i) communicating, crafting, and reflecting; (ii) knowing and respecting myself and others; (iii) connecting the past, present, and future; (iv) thinking critically and questioning; (v) valuing and ethical decision making; (vi) taking responsibility for myself and my community; and (vii) working together and resolving conflicts.

DISPOSITION LIST 1 (MEIER)	DISPOSITION LIST 2 (UHS)
examining the evidence	thinking critically and questioning
understanding the viewpoint on offer	
finding connections	connecting the past present and future
seeking alternative voices	communicating crafting and reflecting
critiquing conventions	valuing and ethical decision-making
	working together and resolving conflicts
	taking responsibility for self and community
	knowing and respecting myself and others

These two lists have some connections ('examining the evidence' parallels 'thinking critically'; 'finding connections' parallels 'connecting the past and future'; 'seeking alternative voices' parallels 'communicating and reflecting', 'critiquing conventions' parallels 'valuing - honesty, justice, fairness, equality etc. - and ethical decision making'), but the University Heights School list is more oriented toward the community.

Finally, Goleman (1996, pp 193-194) provided a list of what he described as the seven key ingredients for the capacity to know how to learn (all related to his view of 'emotional intelligence'):

confidence: includes a sense that he or she is more likely than not to succeed and that adults will be helpful

curiosity: includes the sense that finding out about things is positive and pleasurable

intentionality: the wish and capacity to have an impact, and to act upon that with persistence

self-control: the ability to modulate and control one's own actions in age-appropriate ways, and a sense of inner control

relatedness: the ability to engage with others based on the sense of being understood by and understanding others

capacity to communicate: the wish and ability to verbally exchange ideas feelings and concepts with others; this is related to a sense of trust in others

cooperativeness: the ability to balance one's own needs with those of others in group activity.

Goleman's list (he cites Brazelton, 1992 as its source) is a mixture of beliefs, wishes, and abilities, but it looks more like a list of early childhood dispositions.

Dispositions for early childhood have not been specified in any detail. In 1988 Katz provided an illustrative list:

Curiosity is a disposition. It's not a skill, and it's not a piece of knowledge. It's a tendency to respond to your experience in a certain way. Friendliness is a disposition. Unfriendliness is a disposition. Creativity is perhaps a set of dispositions. Being bossy or a bully are dispositions. Not all dispositions are desirable. Think about the difference between having reading skills and having the disposition to be a reader, or having writing skills in contrast to having the disposition to be a writer. (Katz, 1988, p.30)

Katz (1993) later provides an important guideline: the 'disposition to go on learning' is the most important.

. . . the most important disposition to be listed in educational goals is the disposition to go on learning. Any educational approach that undermines that disposition is miseducation. (Katz, 1993, p.20)

Katz's comprehensive review of the concept of disposition in education concludes (pp.19-20):

Much research is needed to determine which dispositions merit attention, and whether dispositions of a general or specific focus should be addressed by educational goals. If the desirable dispositions listed among the goals are very specific, the list is likely to become unmanageably long However if dispositional goals are too general, they become too difficult to observe and therefore to assess. Ideally, educational goals should include dispositions that strike an optimal balance between generality and specificity.

This study is interested in the children's emerging learning dispositions as outcomes for early childhood education. The new early childhood curriculum (Ministry of Education, 1996 p.44) has included (but not specified) dispositions, habits of mind, or patterns of learning, as a major outcome. It will be a task of this study to suggest what some of these key learning dispositions might be.

2.5 SUMMARY

This chapter argued for learning dispositions as an outcome for early childhood education. It began by outlining the literature on developmental sequences and predictive hierarchies - in particular Piagetian stage theory, school readiness, longitudinal studies and predictions from quality early childhood environments - and

argued for searching for outcomes in responsive and reciprocal relationships, a frequent indicator of quality early childhood environments. A key feature of responsive and reciprocal relationships was child initiation or shared responsibility in meaningful tasks.

The extension of the definition of 'skill' took the argument to Dweck's work on learning orientation. Dweck's research highlighted the significance of orientation towards performance or learning goals, a very specific disposition that appears to emerge in her American studies at least by age four. Her work focused the definition of learning on the disposition to persist with difficult tasks or tasks with uncertain outcomes.

The final section looked at a definition of learning dispositions, and argued that they are separate from (but closely related to) skill and strategy. A learning disposition was defined as including broad goals, and it was suggested that sociocultural and historical goals, like sociocultural schema, intervene as mediators between activities, strategies, and learning or performance orientation (Figure 2.2).

The arguments in this chapter suggest therefore that learning dispositions are worthwhile learning outcomes for young children, and that they will be to do with: reciprocal and responsive relationships, persistence in the face of difficulty (with the associated performance and learning orientation), and broad socioculturally or historically based goals.

2.6 THREE RESEARCH QUESTIONS

Three research questions emerge from the discussion so far:

- Were there (socioculturally or historically based) goals that children inclined towards and that influenced their learning here?
- Did there appear to be key learning orientations and strategies (dispositions) associated with responses to difficulty?
- Did there appear to be key learning orientations and strategies (dispositions) associated with responsive and reciprocal relationships?

3**THE CASE FOR A TRANSACTIONAL MODEL****3.1 INTRODUCTION**

The last chapter argued for learning dispositions as an outcome for early childhood and for three key domains of learning disposition: children's socioculturally and historically based goals, their responses to difficulty, and responsive and reciprocal relationships. This chapter looks at what role the learning environment has to play in their development. There are three general viewpoints on this: that knowledge and skill (and, by extension, learning dispositions) are (i) anchored to the learning environment (ii) appropriated from the learning environment, or (iii) transacted in the learning environment. The first of these viewpoints asks what aspects of the environment make a difference to 'in-the-head' skills, knowledge and dispositions: it has been called 'situated' cognition by Brown, Collins and Duguid (1989a) and 'anchored' by The Cognition and Technology Group at Vanderbilt (1990). The second viewpoint, that learning dispositions are appropriated from the environment is described here as the 'community of practice' position. The third viewpoint is that learning dispositions emerge from a transaction between the individual and the environment: this is illustrated by the 'distributed cognition' literature, and transactional models of learning. This chapter will argue for the third position, and describe a transactional model of learning that will be investigated in the research. It will argue that the first, individual psychology, position is untenable given the domains of disposition that emerged from the discussion in chapter 2, and that the entirely sociocultural community of practice position does not adequately describe the process of change.

This chapter has a second purpose. The discussion of transactional models weaves together several strands of literature and sets up three units of analysis for the research: discourse, narrative, and technological practice. One of the domains of learning disposition set out in the last chapter, the children's socioculturally and historically derived goals, will in this chapter be described as discourses. The framework of analysis to be established in this chapter is set out in Figure 3.1.

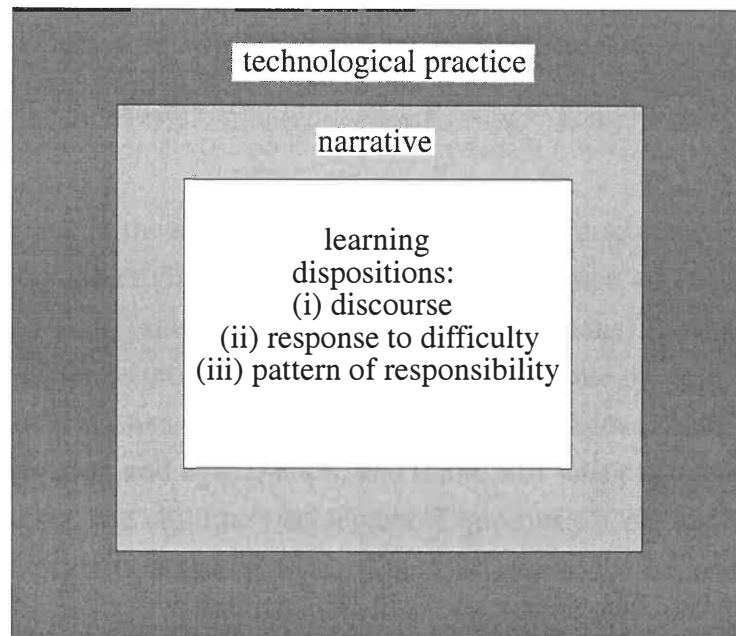


Figure 3.1. Technological practice, narrative and learning dispositions

The areas of learning disposition: discourse, response to difficulty, and patterns of responsibility (a more general label for responsive and reciprocal relationships) are at the centre. They are located within narratives about learning, and narratives about learning are located within technological practices. All these terms will be defined in this chapter.

3.2 DISPOSITIONS ARE ANCHORED

Much of the research on dispositional ideas - orientation and temperament especially - come from an interest in individual psychology. The most extensive body of research, that of Dweck and her colleagues (e.g. Dweck, 1986), defined orientation in terms of the individual's performance or learning goals. They looked for the source of learning orientation in implicit (internal to the child) theories or beliefs about the mutability of intelligence or goodness. In the last chapter (see Figure 2.2) it was suggested that these theories or beliefs may in turn have emerged from socioculturally or historically derived goals and locations. Dweck and her colleagues researched orientation in contrived settings and tasks, on the assumption that their findings would apply in the everyday world of the classroom or early childhood setting. Perkins and his colleagues (e.g. Perkins et al., 1993; Tishman and Andrade, 1995) defined a disposition as being anchored to, or 'sensitive to' an occasion, but they believed that thinking dispositions could be identified by pencil and paper tests. Investigations of the impact of the environment on individual orientation or disposition has been described as coming from a 'situated' cognition viewpoint (Brown, Collins and Duguid, 1989a, 1989b; Palincsar, 1989; Wineburg, 1989; Hennessy, 1993), but the adjective 'situated' has

also been applied to the community of practice position by Lave and Wenger (1991) so the description 'anchored' (The Cognition and Technology Group at Vanderbilt, 1990) is used here.

A series of studies in the 1970s and 1980s revealed the importance of details in the physical and social environment that make a difference to children's apparent knowledge and skill (and, presumably, their dispositions). Some of these were described in chapter 2 (sections 2.2.1 and 2.3.1) to illustrate the role of intention in a definition of skill. For example, Donaldson and her colleagues changed the Piagetian tasks on conservation and egocentrism, and found that when tasks were anchored to everyday meaning, the children's achievement improved. Ceci and Bronfenbrenner (1985, 1991) reported on studies with 10- and 14-year-olds that also showed how a change in how a task is located changes the children's skill. In one study they replaced a *laboratory computer setting* in which the position of geometric shapes was to be predicted with a *video game setting* in which the migration of birds, bees and butterflies was to be predicted. The cursor was changed to a picture of a butterfly net: the students were asked to 'capture' the animals in the butterfly net rather than point to the position of the shapes given certain algorithms (e.g. different shapes move left, right, or not at all; different colours move up, down, or not at all; different sizes move short or long distance). Although the algorithms remained the same in the two contexts, after a number of trials the 10-year-olds working with the animals increased their accuracy rate to almost perfect performance, but the accuracy of the group with the shapes remained very low. They also described strategic and attentional behaviour that was more efficient at home than in a laboratory context. In this research, the surroundings and seemingly irrelevant aspects of the frame of a task's context are changed: the cursor becomes a butterfly net, the mountains become a maze with a small boy hiding from a policeman, the environment is changed by Naughty Teddy rather than an adult, the setting shifts from the laboratory to home. There appear to be several aspects of the context that anchor the skill, knowledge, or strategy.

Although [problem-solving] strategies have been found to differ depending on the context, just what in the context produces such differences has not been clear . . . Part of the difficulty lies in the multiple uses of the word context. (Berg and Calderone, 1994, p.110)

Berg and Calderone (1994) listed (citing researchers): (i) the place in which an activity occurs, (ii) the domain or content of the activity, (iii) the functioning or meaning of the task, (iv) the way in which the task is framed, (v) the presence or absence of others and (vi) the familiarity of stimulus items. The above examples have included changes in four of these: meaning (boy and policeman), familiarity of stimulus items (butterfly net), familiar setting (home vs laboratory) and the way in which the task is framed (Naughty Teddy). For a variety of reasons, then, the change in the context changes the

child's *access* to their knowledge, skill, or strategy. The way things look improves, or reduces, the performance. The anchored viewpoint was mainly interested in what contributed to the individual's 'in the head' schema or ability, and in how to assist the transfer of the knowledge or skill to another occasion: how to move the anchor.

This anchored viewpoint, although it comes from an interest in individual psychology, departs from a view of skills knowledge and disposition as 'in the head' *independent* of environmental conditions. This departure has been described by Bruner (1990, p.106) as the 'contextual revolution' in psychology. It has become increasingly environment-centred, borrowing from cultural anthropology and interpretive history; its emergence has been described by Bruner (1990), Shweder (1990), Shweder and Sullivan (1993), and Harré and Gillett (1994). The attention has shifted from internal structures, and representations in the mind, to meaning making, intention, and relationships in the experienced world. Harré and Gillett summarised the shift in attention:

If the mind is to be understood as a domain of skills and techniques that renders the world meaningful to the individual, then our conception of mind as a Cartesian entity sealed into its own individual and self-contained subjectivity must be revised. We must learn to see the mind as the meeting point of a wide range of structuring influences whose nature can only be painted on a broader canvas than that provided by the study of individual organisms. (Harré and Gillett, 1994, p.22)

Shweder (1990) too emphasised the meaning-making and intention-seeking nature of the mind in his paper 'Cultural psychology - what is it?'. He said: 'A sociocultural world is an intentional world' (p.2). The previous chapter argued for three domains of learning disposition, two of which - socioculturally and historically derived goals, and responsive and reciprocal relationships - are more firmly embedded in the social and cultural environment than the metaphor of 'anchoring' would imply.

3.3 DISPOSITIONS ARE APPROPRIATED

One response to the 'contextual revolution' in psychology was to describe learning as 'appropriated' (taken up) in 'authentic' cultural locations, defining these as communities of practice (Bourdieu, 1972; Lave, 1991; Lave and Wenger, 1991). Lave defined learning

not as a process of socially shared cognition that results in the end in the internalization of knowledge by individuals, but as a process of becoming a member of a sustained community of practice. (Lave, 1991, p.65)

Davies (1990) used a similar construct when she wrote about the relationship between the self and the 'collective'. Lave and Wenger (1991) wrote about (p.111) the significance of becoming part of a community, and about the learning processes that

confer a sense of belonging. They illustrated their communities of practice with five studies of apprenticeship: midwives, tailors, quartermasters, butchers and nondrinking alcoholics. Communities of practice were delineated by analysing reproduction cycles from novice to expert, and on the whole they appear to be also defined by location; examples refer to workplaces and school, Alcoholics Anonymous meetings. They crucially involve participation, and learning includes 'an increasing understanding of how, when, and about what old-timers collaborate, collude, and collide, and what they enjoy, dislike, respect, and admire' (p.95).

Rogoff (1990) referred to this process as apprenticeship, and the focus on appropriation has also been emphasised by Rogoff (Rogoff and Lave, 1984; Rogoff and Morelli, 1989; Rogoff 1990, 1991a, 1991b, 1995; Rogoff, Mistry et al., 1993; Rogoff, Chavajay and Matusov, 1993). Rogoff rejected the idea that the individual is an interpreter of the environment, or is supported by an affording environment. She specifically criticised the notion that culture has an 'impact' on the individual, or that individuals 'acquire' culture:

It is not necessary . . . to assume a boundary between individual and cultural processes, and to do so, we argue, limits the way scholars can understand how individual and cultural processes function . . . In the appropriation model there is no boundary between the individual and the rest of the world, and there is no need to posit a link between the elements; rather the focus is on understanding processes of participation in shared activity. (Rogoff, Chavajay and Matusov, 1993, p. 533)

They add (p.533) 'We agree with [the] . . . view that a primary cultural role of caregivers is deciding about the activities in which children participate and with whom'. In their cross-cultural study of interactions between toddlers and adults in learning tasks, Rogoff, Mistry et al. (1993, p.v) have made connections between the segregation of children from adult activities in their community and children not taking responsibility for learning (through observation or participation). They describe this as a 'key difference' in the teaching/learning styles in different communities. In those families where the role of the adult in relation to the children appeared to be to do with preparation for formal schooling, interactions were not, for the children, genuinely participatory.

Taking a moral position similar to that of Dweck (but not a similar ontological position because Dweck takes an individual psychology stance), Lave and Wenger differentiated between authentic 'learning to know', and inauthentic 'learning to display knowledge for evaluation' (Lave and Wenger, 1991 p.112). They 'steer . . . clear of the problem of school learning' (p.39) because they wanted to take a new look at learning. Because they took the view that knowledge must be contextualised, 'analysis of school learning as situated requires a multilayered view of how knowing

and learning are part of social practice' (p.40). Later, they lamented the artificial nature of schooling, and it is worthwhile to include the following quote in full because it contains their argument that school classrooms rarely include any 'real' community of practice except one to do with schooling, a view that could clearly apply to early childhood:

When the process of increasing participation is not the primary motivation for learning, it is often because "didactic caretakers" assume responsibility for motivating newcomers. In such circumstances, the focus of attention shifts from co-participating in practice to acting upon the person-to-be-changed. Such a shift is typical of situations, such as schooling, in which pedagogically structured content organizes learning activities. . . . The commoditization of learning engenders a fundamental contradiction between the use and exchange values of the outcome of learning, which manifests itself in conflicts between learning to know and learning to display knowledge for evaluation. (Lave and Wenger, 1991, p.112)

Lave (1991) suggested that children may form ad hoc communities mostly outside the classroom, or interstitial communities of practice in classrooms which she described as usually misrecognised or institutionally disapproved attempts to privilege knowledge not valued by the institution. When children study physics at school, Lave and Wenger (1991 pp.99-100) indicated that they are not entering the actual 'reproducing' community of professional physicists. In effect, they were placing learning and performance goals (Dweck, 1986) into a sociocultural and historical context. They maintained that performance goals are the inevitable result of the 'alienation and commoditisation of children in school (and, one could add, early childhood centres).

The literature does, however, provide examples of early childhood settings or classrooms that have been described as communities of practice. The Reggio Emilia region of northern Italy provides an example of a socialist community that has deliberately attempted to incorporate authentic community participation into their early childhood programmes by including resident artists and craftspeople, and by taking their projects out into the local community (Edwards, Gandini and Forman, 1993). A school example is provided by Brown, Ash, Rutherford, Nakagawa, Gordon and Campione (1993) who described their innovative classrooms as exemplifying a 'community of learners' who are learning to learn (p. 190) or a 'community of scholars' in which children are apprenticed to the traditional academic disciplines (p.191). The classroom climate that fostered their community of learners had four main qualities: (i) joint responsibility (ii) respect (iii) constructive discussion, questioning and criticism, and (iv) ritual (participation frameworks that are practised frequently). They acknowledged a debt to Vygotsky (1978) when they described the learning and teaching as 'mutual appropriation operating within a zone of proximal development' (p.193). The idea of appropriation being two-way or *mutual* is more usually seen as a transactional model; their analysis sits across community of practice and transactional positions.

In the Brown et al (1993) study, Vygotsky's zone of proximal development is utilised as the theory guiding a community of practice. The zone of proximal development (zpd) is a vivid metaphor for learning as shared activity. Perhaps one reason for its popularity is that it sits across the anchored, the community of practice *and* the transactional positions, depending on whether the emphasis is on the 'internalisation' of higher mental functions, the adult as expert and the child as apprentice, or on the joint conversation and co-construction of learning outcomes between adult and child. Vygotsky defines the zone of proximal development as 'the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers' (1978, p.86). It is the difference between a child's performance with or without assistance. His famous comment elaborates:

Every function in the child's cultural development appears twice: first on the social level, and later, on the individual level; first *between* people (*interpsychological*), and then *inside* the child (*intrapsychological*). (Vygotsky, 1978, p.57; italics in the original)

The function of the zpd was to enable students to master abstract and scientific concepts, psychological tools that mediate 'higher' functioning. Vygotsky differed from the community of practice viewpoints of Rogoff and Lave with his interest in 'internalisation' of 'social speech' into 'egocentric speech' for the self, into 'inner speech': from the interpersonal to the intrapersonal. This concept of 'internalisation' has been discussed at length by writers such as Rogoff (1990) who want to remove the boundary between the internal and the external. Rogoff replaced 'internalisation' with 'appropriation'; within their relational theory of learning, Lave and Wenger (1991) emphasised participation and replaced 'internalisation' with 'legitimate peripheral participation'.

. . . given a relational understanding of person, world, and activity, participation, at the core of our theory of learning, can be neither fully internalized as knowledge structures nor fully externalized as instrumental artifacts or overarching activity structures. Participation is always based on situated negotiation and renegotiation of meaning in the world. (Lave and Wenger, 1991, p.51)

The concept of *scaffolding* within the zpd (Wood, Bruner and Ross, 1976) has both an apprenticeship and a transactional aspect to it. As a description of the expert's role in the zpd it has become a frequent reference in early childhood. The term has come to refer to the teachers' role: adults remind, provide focus, encourage and break tasks down e.g. Fleer (1991), Elliott (1994) Wood (1986), Wood, McMahon and Cranstoun (1980). Wood et al.(1980, p.115) provided an example of a child solving a jigsaw with adult help, and added:

What are the adults actually doing in these instructional episodes? In the first place, . . . they often supply the 'glue' that holds the whole

enterprise together, helping the child to move on from one act or operation to the next, not allowing him to get swamped by too much complexity. They highlight things the child should attend to, drawing his attention to the effects of his actions, reminding him of constraints he should consider, and so on. They also help the child to maintain the right frame of mind for working things out.

But in the classroom climate described as a zpd by Brown et al. (1993), the *children* take joint responsibility for direction as well.

The analysis of children's learning as entering, belonging to, and excluding others from, a community of practice has great value, in particular because a community contains not only people but also artifacts and symbolic systems. Learning to belong to a community includes learning its language, its symbols, and how to use its artifacts or technology. However, a community of practice, like the metaphor of a learner as an apprentice used by Rogoff (1990) as well, does not include the learner changing the community in any way: an important emancipatory role for education. The community of practice viewpoint describes how things *are*; but except for the Brown et al. (1993) example it is less helpful about how members can question, criticise, or discuss how things might be or ought to be.

3.4 DISPOSITIONS ARE TRANSACTED AND DISTRIBUTED

3.4.1 Introduction: mediated action

Between the community of practice and the individual psychology viewpoints about where learning dispositions might reside is the 'distributed' viewpoint, where learning is seen as transacted or 'jointly composed' (Salomon, 1993a p.112). This viewpoint derives mainly from Vygotsky's (1978) notion of 'mediated action', taken up by Wertsch (1991a). Wertsch explained these terms ('action' and 'mediated') as follows:

The notion of action I have in mind owes a great deal to the various "theories of activity" that have been outlined in Soviet psychology When action is given analytic priority, human beings are viewed as coming in contact with, and creating, their surroundings as well as themselves through the actions in which they engage. Thus action, rather than human beings or the environment considered in isolation, provides the entry point into the analysis

The most central claim I wish to pursue is that human action typically employs "mediational means" such as tools and language, and that these mediational means shape the action in essential ways . . . the relationship between action and mediational means is so fundamental that it is . . . appropriate, when referring to the agent involved, to speak of "individual(s)-acting-with-mediational-means" than to speak of "individual(s)". (Wertsch, 1991a pp.8 and 12)

'Distributed cognition' is closely related. It elaborates on the notion that 'People appear to think in conjunction or partnership with others and with the help of culturally provided tools and implements' (Salomon, 1993b p.xiii).

Unlike cognition and ability . . . distributed cognitions do not have a single locus "inside" the individual' . . . (They) are jointly composed in a system that comprises an individual and peers, teachers, or culturally provided tools. (Salomon, 1993a p.112)

Salomon wrote that this interest in distributed cognition comes from at least three sources: the increasingly important role that computers have come to play in thinking and learning, the growing interest in Vygotsky's cultural-historical theory, and the growing dissatisfaction with cognitions as in-the-head tools, 'shifting focus to their situated, context-dependent, and thus potentially distributed nature' (Salomon, 1993b p.xiv). Perkins (1992) wrote about distributed cognition as the 'person-plus':

One might sum up the person-plus perspective in two principles:

1. The surround - the immediate physical, social and symbolic resources outside the person - participates in cognition, not just as a source of input and a receiver of output but as a vehicle of thought. The surround in a real sense does part of the thinking.
2. The residue left by thinking - what is learned - lingers not just in the mind of the learner but in the arrangement of the surround as well; yet it is just as genuinely learning for all that. The surround in a real sense holds part of the learning. (Perkins, 1992 p.135)

The surround does part of the thinking, and holds part of the learning. A pen and notebook are both a means of the thinking and a container of the learning; knowledge acquisition and knowledge itself are both distributed, stretched across tools and resources. Wertsch (1995), using the term 'mediated action', cited pole vaulting as an analogy. He said (p.66) 'It is clearly futile, if not ridiculous, to try to understand the action of pole vaulting in terms of the mediational means (i.e. the pole) or the individual in isolation'.

Graue and Walsh (1995), writing about qualitative research in early childhood settings made a clear differentiation between action and behaviour. In a section entitled 'activity theory' they said:

A key distinction we would make is between action and behavior. Action is located within specific cultural and historic practices and time. It is populated by meaning and intentions, and is tethered to particular communities and individuals. In contrast, behavior is stripped of these local characteristics; it is mechanical description without narration. To develop thick descriptions of children's actions, we must go beyond simply detailing what people are doing. Going beyond involves exploring meaning and intention. (p.148)

Wertsch (1991a pp.9-11) generated a set of categories of action based on an overview by Habermas (1984), and these categories have been adapted to shape the discussion in this section. The categories are to do with the relationship between the actor and three 'worlds' (the three-world idea originally came from Popper, 1972):

- (i) the world of 'presentation of self' (in this study, self-categorisation is emphasised, and the action is described as *discourse*)
- (ii) the world of a social group who orient their actions to common values (in this study those values are described as learning dispositions, and the action is described as *narrative*)
- (iii) the world of physical objects and physical states (in this study, tools and materials are emphasised, and the action is described as *technological practice*).

Habermas proposed a fourth type of action, communicative, simultaneously oriented to all three worlds, and Wertsch developed this idea to describe 'voices of the mind', emphasising the assumption that 'certain aspects of human mental functioning are fundamentally tied to communicative processes' (Wertsch, 1991a p.13). The term 'voice' comes from the work of Soviet semiotician and philosopher Mikhail Bakhtin; it refers to social language and allows for the 'multivoicedness' of human action, an idea also explored by Gilligan's (1982) *In a Different Voice*. Wertsch commented (p.14) that:

we must consider how and why a particular voice occupies center stage, that is, why it is "privileged" ..in a particular setting.

In most studies of discursive practices however, 'privileging' refers to discourse, and 'discourse' replaces 'voice' as the unit of analysis that includes self-categorisation and the close tie with communicative processes. But they are not the same: voice is an ultimately holistic unit of analysis, an umbrella term that covers all three of Popper's other worlds. 'Discourse' could be used in that way as well, although it is not used in that way in this study; the closest to 'voice' is 'narrative'.

3.4.2 Discourse

Two locations that can reflect the jointly composed system of a classroom or an early childhood centre are discourse and narrative. This section discusses the first of these. 'Discourse' is embedded in the social, cultural and historical context, and incorporates notions of self-categorisation and group identity.

Inspired by the work of French postmodern theorists, especially Foucault (1972), recent research and writing on the role of language within a sociocultural framework has described multiple voices or perspectives as *discourse* (e.g. Walkerdine, 1984; Fairclough, 1992; Gee, 1992; Davies 1990, 1992; Davies and Harré, 1990; Harré and Stearns, 1995; Jones and Jacka, 1995; see Morss, 1996 pp.123-147 on the influence of Foucault on developmental psychology). Discourse in sociological analysis is defined by Davies and Harré (1990, p.45) as 'an institutionalised use of language and language-like systems'. In this use of the term (Davies and Harré, 1990; Harré and Gillett, 1994; Walkerdine, 1988), centrally implicated is an analysis of power and, in

contrast to the more determinist notion of communities of practice and apprenticeship, the possibility of resistance and of rejecting entrenched and oppressive structures. The latter aspect is implicit in the notion of discursive 'position', the set of rights, duties, and obligations within the discourse that one perceives for oneself. Selfhood is produced discursively, through competing discourses, and within those discourses, through competing positions. Davies (1993) elaborated:

The human psyche is no longer seen as being determined by the structures of language, or of social structure, or of the brain, but as being in process, as capable of multiple possibilities as it finds itself positioned now one way and now another in relation to its own history and context, spoken into existence through multiple and contradictory discourses. (Davies, 1993, pp.38-39)

Another use of discourse, similar, but slightly further away from language (and perhaps closer to a community of practice), comes from Gee (1992). Gee defined what he called a discourse (he used a capital D).

Discourses are tied to particular social groups and the "identities" their members take on when playing their apportioned "roles" within the social practices of the group. . . . Discourses are always ways of displaying (through words, actions, values, and beliefs) membership in a particular social group or social network (people who associate with each other around a common set of interests, goals, and activities). (Gee, 1992, pp.104, 107)

Gee described the discourses that develop within the family as 'primary' discourses; these form a base for later communities of discourse and for many people the primary discourse and its values and ways of doing things will always remain part of their lives. Discourses are inherently 'ideological' in the sense that they crucially involve a set of values and viewpoints about the relationships between people and the distribution of social goods. A discourse will put forward certain concepts viewpoints and values at the expense of others: it will marginalize conflicting viewpoints and values. It will shape a learner's perception and interpretation. In other words, a discourse is dispositional.

Discourses form an inclusive unit that includes the individual and the sociocultural environment. On the one hand, they are 'an amalgam of language, bodies, heads, and various props in the world' (Gee, 1992, p.87). On the other hand they include the notion of an individual seeking to 'belong' and to 'make sense'. Like communities of practice they integrate social practice with other aspects of culture, particularly language; unlike communities of practice they incorporate the potential and the possible. The concept is particularly useful in a transactional model of learning because discourses do not just reflect or represent social practices, they construct them as well.

The idea that education (or care and education, or educate) can critically approach and change received stereotypes and inequities is a key feature of the notion of multiple discourses. As Davies (1990) suggests that

classroom practice is not only a collaborative venture between teachers and students in which they constitute themselves and each other as such (cf. Davies, 1983), but a complex weaving together of contradictory beliefs about the rights of the individual and the collective, about what it means to be gendered, about what it means to be a teacher or a student. (Davies, 1990, p.342)

This shifting and changing nature of the relationship between the individual and the collective, the 'complex weaving together of contradictory beliefs', is not captured by the notion of a community of practice and the metaphor of apprenticeship. But the significance for learning of a sense of identity, a 'possible self' (Marcus and Nurius, 1986; Cross and Marcus, 1994), is included in the community of practice viewpoint. To illustrate this, Goodenow (1992) described two research projects with urban high-school students. In one project, Farrell (1990) identified several different "selves" prominent in the lives of his study participants. Other people responded to the adolescent as friend, sexual being, parent, but never as student or future worker, so there were few opportunities to gain an elaborated and realistic understanding of themselves as students or future workers. In the second project, Fordham and Ogbu (1986) described an "oppositional social identity" through which children or adolescents took pride in not being like the majority or dominant group. For instance, for some Blacks this meant the perceived psychological and social necessity to "disown" the goals perceived as White prerogatives, in particular open academic striving and success. Goodenow argued that academic motivation and engagement may need to be enhanced in ways that are not perceived as compromising these important social dimensions of identity. She added (Goodenow, 1992 p.182):

. . . research in educational psychology may benefit from exploring more explicitly the links between students' self-categorizations and group identities, on the one hand, and their behavior, motivation, and learning, on the other.

Other writers have highlighted the significance of self-categorisations and group identities for explaining behaviour motivation and learning. In early childhood research, group identities have variously been described as: being a kindergartener (Ferne, 1988; Lubeck, 1988; Kantor, 1988; Reifel, 1988); being a friend (Corsaro, 1988; Davies 1991); or being gendered (Davies, 1987, 1989, 1992; Davies and Banks, 1992; Browne and Ross, 1991; MacNaughton, 1997).

Much of this early childhood research has usually taken *one* discourse and described its characteristics, often describing children's display or re-positioning within the discourse of interest. Three exceptions to this were Ferne, Davies, Kantor and McMurray (1993), Paley (1986b), and Dyson (1989). In Ferne et al (1993),

American and Australian researchers worked together on the same transcripts to describe a 'multiple viewpoint': the American researcher contributed insights about 'becoming a student', and the Australian researcher contributed insights about 'being gendered' (defined for the girls as 'being good'), and being a peer. They concluded:

This example was a key to the realization that a multiple perspective is required to understand the complexities of how a child seeks to become a person with full social membership in a classroom, and to our discovery that the appropriation of new identities by children in the preschool often occurs in an integrated and simultaneous fashion. Multiple perspectives research can be accomplished in several ways, including bringing different theoretical and analytical perspectives to bear on different dimensions of single events. (Ferne et al., 1993, p.99)

The second example is Paley (1986b) who described friendship and age (birthdays) as topics of great meaning for her three- to five-year-olds. She wrote:

The act of teaching became a daily search for the child's point of view As I transcribed the daily tapes, several phenomena emerged. Whenever the discussion touched on fantasy, fairness, or friendship ("the three Fs" I began to call them), participation zoomed upward....the phenomenon of birthday looms large...."Birthday" is a curriculum in itself. Besides being a study in numbers, age, birth, and death, it provides an ongoing opportunity to explore the three Fs. (Paley, 1986b pp.124, 126)

The third example was Dyson (1989) who studied 'friends learning to write'. She studied eight focus children in a grade one classroom, studying the children 'as individual artists in the company of friends' (p.276). She described how the process of being a writer was embedded in their social lives, and their 'feeling of belonging' to a community (p.xvii). She linked the writing and the children's stories with 'Being with One's Friends' (p.65) in a similar way to Paley (e.g. 1986b).

3.4.3 Narrative

Another location that reflects a jointly composed distributed system is narrative. The notion of sociocultural practice as the construction of interpretive narratives is an attractive and accessible bridging metaphor, for we are familiar with stories handed down to us in the world, with the idea of stories in our heads, and with jointly constructed and negotiated stories. Narrative had a role within communities of practice: in midwife training courses for instance, apprenticeship learning is supported by stories of problematic and difficult cases (Lave and Wenger, 1991, p.108). It provides a nice way of integrating the individual and the social without losing either. As commented above, it has some kin with Wertsch's (1991a) concept of 'voice', but defining a narrative is difficult. As Howard (1991, p.192) says

The claims of narrative (or storytelling) psychologists (Bruner 1986; Howard, 1989; Mair, 1988, 1989; McAdams, 1985; Polkinghorne, 1988; Sarbin, 1986) have become more strident of late. For example, Sarbin in referring to human psychology (and after explicitly exempting the part of

psychology that deals with sensory physiology) made the following remarkable claim, "So psychology is narrative" (p.8). What part of psychology, then, is narrative in nature according to Sarbin? Almost everything of interest!

Wertsch (1995 p.56) has suggested that 'the goal of sociocultural research is to understand the relationship between human mental functioning, on the one hand, and cultural, historical, and institutional setting, on the other'. He described the relationship as being located in human *action*, 'concrete, dynamic human action existing in real spatiotemporal and social contexts' (Wertsch, 1995 p.62). Within this inclusive unit of analysis there are 'dialectically interacting moments', and Wertsch asked what these moments or aspects might be. He suggested that

some promising ways for elaborating the notion of action can be found in the writings of Burke (1962, 1966). His "pentad" of act, scene, agent, agency (or instrumentality), and purpose was designed to understand action (as opposed to "sheer motion") and the motives that organize it, and several aspects of his formulation seem to have direct implications for sociocultural research. (Wertsch, 1995 p.72)

Bruner (1990, p.50) referred to Burke's pentad for guidance as well, not to define 'action' but to define narrative. He cited Burke (the 1945 edition of *Grammar of Motives*; Wertsch referred to the 1962 edition) and said:

Well-formed stories, Burke proposed, are composed of a pentad of an Actor, an Action, a Goal, a Scene, and an Instrument - plus Trouble. Trouble consists of an imbalance between any of the five elements of the pentad: an Action toward a Goal is inappropriate in a particular scene . . . an Actor does not fit the Scene . . . or there is a dual Scene . . . or a confusion of Goals. (Bruner, 1990 p.50)

Narratives, schemas, scripts and frames sometimes appear to be used interchangeably. Narratives have a story line, and the major difference between a script and a narrative as it will be used in this study is that scripts are about the emerging understanding of local social events, while narratives are defined here as historically and socioculturally co-constructed event structures about goals, challenge, and agency.

The construct of an narrative in educational psychology has been most clearly set out by Bruner (1986, 1990, 1996). He traced the source to an array of narratives about 'human plights' in folk psychology: they contain coherent beliefs, desires, values. Narratives summarise not simply how things are, but how things *could* be (our sense of the possible, Bruner, 1996 p. 96) and how things *ought to* be (they often contain a deontic modal: 'that's what you're supposed to do'). In the western and English speaking world, classics like Cinderella and Sleeping Beauty and Pinocchio 'play out the eternal conflicts of good versus evil' (Howard, 1991, p.193). Bettelheim (1976) and Egan (1993) also analysed the binary nature (good vs bad) of the cultural messages in classical stories. Bruner (1993, p.516) laments that many accounts omit this aspect: 'The representation of the intentions and beliefs of others is as deontic as it

is 'epistemic'. Typically, socioculturally and historically derived narratives carry not only the message of agentivity but also what is normatively canonical, and this is why they are such a powerful unit of analysis. They require support from guilt and shame for noncompliance, and they particularly come into play when things are not as they ought to be, when there is trouble. In the wider sociocultural arena they are represented by religious precepts and legal systems.

Narrative in education usually refers to teachers' stories and stories about teachers (Connelly and Clandinin, 1988, 1990, 1995; Clandinin and Connelly, 1990; Gudmundsdottir, 1991; Carter, 1995; Beattie, 1995; Middleton and May, 1997). I suggest that when the term is used in education about children's educational experiences, there are two kinds of narratives or stories.

- (i) explanatory narratives: explanatory frames that 'make sense' of the world and our experiences, and
- (ii) learning narratives: packages of learning dispositions that go together.

The stories constructed by Polly and Merophie, in the introduction to this study, were explanatory stories. So are the 'working theories' that appear as outcomes in the New Zealand early childhood curriculum (Ministry of Education, 1996 p.44: outcomes are summarised as working theories and learning dispositions). *Learning* stories or narratives have not (yet) appeared in the literature.

(i) *Explanatory narratives*

Narratives as they are used in psychology and education are usually explanatory: they are stories through which we make sense of the world. Howard (1991, p.194) described Life as 'The Stories We Live By'; Psychopathology as 'Stories Gone Mad'; and Psychotherapy as 'Exercises in Story Repair' (also combining the epistemic and deontic quality of narratives, see Monk, Winslade, Crocket and Epston, 1997). At the same time he described how young children are learning explanatory stories about (making sense of) the world and their experiences, often using classical stories as metaphors.

Davies (1987; 1988) described explanatory stories when she explored the responses of four- and five-year-olds to stories in which the heroine and/or the hero acts outside of what is commonly understood as appropriate for their gender. She describes the binary 'either/or' nature of children's gender ascriptions: 'Maleness in our society is defined in large part in terms of one's capacity not to behave like a girl' (p.46). Wolf (1993, p.42) describes 'the role of narrative in allowing young children to make meaning of the flow and flux of experience'. The most well known of early childhood writers who

uses explanatory story as a framing device for her programme is Paley (1981, 1984, 1986a, 1986b, 1988, 1990, 1992; Wiltz and Fein, 1996; Rasberry, 1996). Paley's children tell and act out stories that have special meaning for them: often they start out from classics like Jack and the Beanstalk, or television stories, with the children adapting them and making them their own. Research on young children's dramatic play has documented the epistemic (establishing valued knowledge) and deontic (establishing appropriate ways to behave) nature of young children's stories and story lines (e.g. Berry, 1993; Klugman and Smilansky, 1990). The stories that children appropriate and construct about power and gender (e.g. MacNaughton, 1997; Davies, 1987, 1989, 1993; Dyson, 1994) have been extensively documented. In early childhood, documented narratives from children's perspectives have been mostly set in sociodramatic play contexts, with self-categorisation rather than learning as the theme.

(ii) *Learning narratives*

Narratives *about learning* do not appear in the literature. However, a closely related concept, *scripts for learning*, do. A New Zealand research project (Cullen and St George, 1996) observed five-year-olds during their first term in a new entrant classroom, and then their classroom experiences a year later. School beginners viewed learning in terms of procedural matters and classroom routines. Their teachers emphasised procedural aspects of classroom life, and the children socialised each other using the same script. In their second year, the children were shifting away from the 'acquisition of scripts for classroom life' (p.16) towards 'scripts for learning'. '. . . increased awareness of their own role as an agent in learning, and of (the) purposes of learning . . . produced multiple perspectives on learning which did not conform to the original script concept' (p.17). Scripts for learning acquired in the second year included a much greater awareness of self-regulation, knowledge of learning strategies and collaboration with peers. Interpreted as being in line with Pramling's (1990) hierarchical model of conceptions of learning, the children's emergent understanding of learning was given as the reason why children began to construct their own dynamic scripts. The work of Cullen and St George (1996) is an extension of Cullen's earlier work on the development of metacognitive strategies for learning (Cullen, 1988, 1991, 1992).

The learning narratives in this study are event structures about goals, challenge, and agency. They have three linked parts: (i) the privileged goals or discourses that the children are inclined to choose and to become involved in (ii) the children's preferred response to trouble challenge or uncertainty, and (iii) their favourite distribution of

responsibility. This privileging, preferring, and favouring connects the dispositional milieu to the disposed individual.

3.4.4 Technological practice

In a transactional model of mediated action, learners are described as ‘individual(s)-acting-with-mediational-means’ (Wertsch, 1991a p. 12), and the mediational means centrally include materials and tools and how they shape the action in essential ways. A focus point for this thesis is materials and tools as mediational means. The essential ways in which technology shapes the action will be described in this section in terms of the extent to which the materials and tools are transparent, challenging, and accessible. This section is planned as follows: (i) A definition of technology (tools and materials) has been drawn from technology education, in particular from the New Zealand Technology Curriculum for schools (Jones, 1995; Ministry of Education, 1995). (ii) Four examples illustrate different ways in which writers have described technology as mediational means in an early childhood setting. (iii) Three essential ways in which materials and tools shape the action (the affordances of technology) are defined and described.

(i) *A definition of technology*

The New Zealand Technology Curriculum (Jones, 1995; Ministry of Education, 1995) takes a wide view of the artifacts in a technology curriculum, including those that support the symbolic system (information and communication technology). They describe seven areas of technology:

- (a) *biotechnology*: includes the use of living systems to manipulate natural processes, the making of compost for instance
- (b) *electronics and control technology*: includes knowledge use and design of electrical and electronic systems and devices, as well as pneumatic, hydraulic or mechanical control technology
- (c) *food technology*: includes understanding and using safe and reliable processes for producing preparing presenting and storing food as well as packaging and marketing
- (d) *information and communication technology*: systems that enable the collection, structuring, manipulation, retrieval, and communication of information in various forms
- (e) *materials technology*: includes the investigation, use, and development of materials to achieve a desired result
- (f) *production and process technology*: includes the manufacture and assembly of products from individual components as for instance in a furniture factory

(g) *structures and mechanisms*: includes simple and complex structures or mechanical devices such as a monument or a high-rise office block, a mousetrap or a motor car.

Much early childhood research on play is about playthings and materials, and Montessori led the way in focusing on the educational role of materials and blocks (Montessori, 1965). In New Zealand an influential curriculum manual by Lex Grey (Grey 1974) described the stages of development of children's play with sand, water, blocks and dough. But most recent studies of 'technology' in early childhood in relation to cognition focus on information and communication technology, in particular, computers (e.g. Fein, 1987; Sewell, 1990). Fler (1992; Fler and Sukroo, 1995), Forman and Kushner (1978), Kamii and deVries (1978), Forman and Gandini (1995), Carr (1994b), Hatch (1992) and Siraj-Blatchford (1996) are exceptions. Siraj-Blatchford's work is primarily focused on school-aged children. Fler (1992) linked her research to a 'design, make and appraise' curriculum paradigm (referred to in High/Scope programmes as the 'plan, do, review' approach, see Sylva, 1992, p.141), and described children drawing plans of the early childhood centre and of home from various perspectives. Forman and Kushner, and Kamii and deVries, took on a Piagetian framework to develop their interest in cognitive conflict and surprise in structures and mechanisms: they described the value for learning of such artifacts as a car with one wheel out of alignment, and a pulley system.

(ii) *Four early childhood examples*

Four examples illustrate different ways that early childhood writers have interpreted the connection between everyday technology and learning. The first is about structures and mechanisms (Papert, 1980); the second is about production and process technology (Carr, 1987); the third is about materials technology (Hatch, 1992); and the fourth is about an early childhood programme that involves technological problem-solving in all these three domains (Forman and Gandini, 1995). These studies take an increasingly environment-centred approach to the relationship between technology and the environment; (a) and (b) take a predominantly 'anchoring' position; (c) and (d) include transactional elements:

- (a) A drill for problem-solving (Carr, 1987)
- (b) The gears of my childhood (Papert, 1980)
- (c) Sandbox play (Hatch, 1992)
- (d) An amusement park for birds (Forman and Gandini, 1995).

(a) *A drill for problem-solving in carpentry* (Carr, 1987)

Carr (1987) wrote about the invention of a safe carpentry drill for four-year-olds, one that allows children to drill 1mm and 5mm holes by themselves. She suggested that it enhanced 'independence, problem-solving and planning' abilities (p.3). The drill increased the accessibility of carpentry activity and enhanced the capacity of carpentry enterprises to promote sequence, persistence and transformations, in play. For instance, one boy is shown making a boat by drilling two 5mm holes in a block of wood, sawing and hammering in short lengths of dowel (for masts), and then floating it in the water trough (it falls to the side; later attempts to get it to float the right way up are not recorded); one girl has drilled holes in 'wheels' cut from an old broom handle, attached them to a piece of wood, attached a staple and some string, and pulled it along as a car or cart. These three qualities (sequence, persistence and transformation) were described by Sylva, Roy and Painter (1980) as characterising advanced or 'higher-order' play, presumably with links to advanced or higher-order thinking 'in the head' of the learner.

(b) *The gears of my childhood* (Papert, 1980)

Papert's (1980) book *Mindstorms* is about 'children, computers, and powerful ideas', and he introduces it with an autobiographical story to illustrate what he considered to be a fundamental fact of learning: 'Anything is easy if you can assimilate it to your collection of models', and 'What an individual can learn, and how he learns it, depends on what models he has available' (p.vii). He describes this as an expanded view of Piaget's genetic epistemology, where intellectual structures (in the mind) grow out of one another by a process of equilibration: assimilation and accommodation. The Papert expansion incorporates a concern with the affective: he writes about falling in love with gears (and his book conjectures that there could be a parallel process with the computer).

Before I was two years old I had developed an intense involvement with automobiles. The names of car parts made up a very substantial portion of my vocabulary: I was particularly proud of knowing about the parts of the transmission system, the gearbox, and most especially the differential. It was, of course, many years later before I understood how gears work; but once I did, playing with gears became a favorite pastime. I loved rotating objects against one another in gearlike motions and, naturally, my first "erector set" project was a crude gear system. Papert (1980, p.vi).

Later, he says that the model of gears carried many otherwise abstract ideas 'into my head': he saw multiplication tables as gears, and equations in two variables 'immediately involved the differential'. His interest in gears, he suggested, is an example of Piaget's assimilation: assimilating equations to gears; and he rejects as a theoretical framework his father's explanation that he was 'being clever', in the sense of being born clever, 'quick', able to understand (a popular intuitive or folk theory

about learning). This framework, learning as assimilation to specific kinaesthetic figurative or motor schema, taken up as a guideline for early childhood programmes by Athey (1990) Nutbrown (1994) and Meade and Cubey (1995), has been discussed in chapter 2. Nutbrown for instance wrote about dynamic vertical, dynamic circular, containing and enveloping schema as 'common threads' in children's play and thinking. Meade and Cubey described them as the 'core of developing minds' (p.20).

(c) *Sandbox play (Hatch, 1992)*

As part of a larger study of four kindergarten children over six months, Hatch (1992) observed four- and five-year-olds in various areas of their preschool programme, looking for what he called personal, local, and cultural forces. He was particularly interested in the development of children's abilities (Gardner, 1983) and styles, and found the development of ability and style to be surprisingly situation-specific. After a discussion about the fact that children's abilities to draw, for example, were different in different situations he commented:

Similarly, based on the speed and spontaneity of Maggie's ideas and behavior in many parts of the classroom, it would seem logical to suggest that she is impulsive. But Maggie is only impulsive under certain conditions. Knowing the personal, local, and cultural forces that affect Maggie in different situations makes it possible to account for the fact that she can be quite planful and systematic when making a crown at the art table even though she jumps from goal to goal while building with blocks.

Hatch (1992 p.226)

He concluded (p.230):

I came to this setting looking to see how the children's personal forces affected their classroom activities; but, looking back, perhaps it should be no surprise that in a kindergarten classroom - even one which offers a "free choice" - the local forces have such an important impact on the children's activities.

Hatch and Gardner (1993) concluded from their study of two five-year-old boys playing in the sand box that 'the skills are literally embedded in the sand'. They argued that the physical nature of the sand in an early childhood centre's sand box was a constraint on the nature of the learning. Because the previous day's constructions were not destroyed, the sand box created a context for repetitive construction and social learning rather than for individual exploration. They compared the activity of the same two boys in the art area, where the cognition was differently distributed. Using a concentric model of distributed cognition to illustrate the idea that an individual's intelligences, interests, and concerns are formed in interactions with peers, family members, and teachers, constrained by available materials, and influenced by cultural values and expectations they described (p.165) factors or 'forces' at three different levels that contributed to the cognition in this [early childhood] classroom:

1. *personal factors* (genetic proclivities, personal experiences):

Personal factors are the attributes and experiences that individual children bring with them to many of the “local settings” where they spend their time: Gardner’s profile of abilities or intelligences, for example.

2. *local factors* (resources, people, physical constraints):

Individuals depend on a wide variety of tools, people, and other resources to help them carry out their activities. ‘Affordances’ are factors in the local environment - functions that can be carried out given the properties of both the setting and the people who occupy that setting. Art areas usually afford drawing, painting etc., sand tables afford the building of sand castles

3. *cultural factors* (institutions, practices, beliefs):

Cultural factors include schooling, childrearing practices, language practices. They influence: the kinds of skills that people can exhibit, the way those skills are developed, and the purposes to which they are directed.

Hatch and Gardner conclude: ‘We argue that we need to expand the scope of such terms as ‘cognition’ and ‘intelligence’ to include the conditions under which problems are discovered and solved and within which skills are developed’ (Hatch and Gardner, 1993 p. 165). They have used the notion of distributed cognition to analyse the children’s learning within a transactional model, giving a central role to the materials and tools.

(d) *An amusement park for birds (Forman and Gandini, 1995)*

Another example of a transactional model of ‘mutual appropriation’ (although they do not use this term; it emerged from the classroom as a community of practice viewpoint in Brown et al., 1993) is provided by an activity in one of the Reggio Emilia early childhood programmes in northern Italy. The early childhood programmes in Reggio Emilia have been extensively documented in written and videoed form (Edwards, Gandini and Forman, 1994; Malaguzzi, 1987a; New, 1994; Forman and Gandini, 1995; Katz 1995a).

The event described as ‘an amusement park for birds’ was documented in detail in a video with that title (Forman and Gandini, 1995). The children, three- to five-year-olds, designed and built an amusement park for birds, including observing drawing modelling and constructing fountains and water wheels. Adults documented the process of ‘emergent curriculum’ with wall charts, videos and photos. Their main role was to do with keeping an eye on transparency (authenticity), uncertainty (they describe their role as ‘provocateur’ for example), and access. When the topic focused on fountains, the children visited the town centre and parks to sketch and photograph the fountains, returning to the school to draw and make models in clay, explaining to

and questioning each other. They drew their imagined pipe system on paper inside projected slides of real fountains, and they also drew on acetate over photos, a process called by Forman 'decontextualising', to highlight the symbolic nature of the process. When the topic turned to water wheels, the children discussed and argued about how water wheels work, made drawings (discussed with the teacher and other children, who asked questions about why it is like it is), made models in paper and clay and straws, and participated in a joint construction of a water flow inside, before assisting in constructing a water wheel as part of the park outside. In an interview, Malaguzzi outlined the three criteria of a good project: (1) an interest, initial motivation, from discussions with the children on a theme (a perception of what might be interesting and challenging), (2) an awareness by the adults of what could be done (access) and (3) an awareness by the adults about the paths that children can enter, their capacity to predict and develop hypotheses (transparency). A key player was the resident artist, who assisted and demonstrated the drawing, designing and modelling: he represented the community of practice of designer architect and artist to which this project belongs. Similarly, a bird expert was also called in to advise about bird houses.

This activity combines elements of anchored cognition, communities of practice and transaction viewpoints. The aim of children using complex representational and symbolic processes ('higher-order thinking', with a debt acknowledged to Piaget, Malaguzzi, 1987a p. 19) has some elements of anchored cognition. Forman emphasises this aspect of the Reggio programmes. A 'communities of practice' viewpoint is seen when the classrooms and centres are described as a community of learners with 'a set of routines, rites, and rituals that assist the participation of individuals and provide avenues for a continuing sense of belonging and contribution to the larger group' (New and Mallory, 1994 p. 195), and children also participate in other communities of practice, for example the annual grape harvest (Malaguzzi, 1987b, p. 96). Connections between thinking and the 'decontextualising' nature of photographs, drawings, acetate overlays, and slide projections, together with debate and discussion is an illustration of distributed cognition. A central practice is argument and debate, cognitive conflict, adult as *provocateur* (New and Mallory, 1994, p.193).

(iii) *The affordance of technology: three types of affordance*

This section looks carefully at how learning (and therefore learning dispositions) might be distributed across materials and tools within a particular activity or technological practice. In a transactional model, learning dispositions will be, in part, a transaction between the learner and the materials and tools. The notion of 'affordance' is a particularly useful way to describe the distribution of learning across technology

(Norman, 1988, 1993; Roth, Woszczyzna and Smith, 1996). It refers to the perceived and actual properties of an object or artifact, those properties that determine just how it could *possibly* be used (Norman, 1988, p.9) and how the technology facilitates or hinders learning of various kinds (Roth et al., 1996 p.997). Malone and Lepper (1987) studied the attributes of computer games that increase intrinsic motivation: these included control of the activity, interactivity, immediate results, graded goals, conflict, and moderate uncertainty. The technology literature appears to fall into three categories of affordance: *transparency* (which is about whether a meaning or intention is clear, and includes the capacity of the technology to provide feedback about success or failure), *challenge* (which includes whether there are graded levels of difficulty or uncertainty and the flexibility of the materials or tools), and *accessibility* (which includes who is in control). They are elaborated as follows:

(a) *Affordance: transparency*

In its simplest form, transparency implies that the inner workings of an artifact are able to be understood by the learner (Lave and Wenger, 1991, p. 102). But in a more significant sense, it can refer also to a particular kind of affordance, understanding the purpose of a tool or material. Immediately appreciable results, as with a jigsaw, increase the transparency of an artifact. This is the principle behind many Montessori materials: the quality of being 'autotelic', where the materials signal to the learner that she or he is on track or has made a mistake. Many computer software packages for young children incorporate a mechanism whereby a sound or a picture indicates success or 'try again'. The materials provide the feedback. Artists and architects at Reggio Emilia, using the artifacts of their craft, increase for the children the transparency of the technology of design and landscape planning (Forman and Gandini, 1995). Sometimes there is spatial or mathematical potential 'in' the artifact (cf. Papert's gears, Papert 1980; transformational activities described for early childhood by Forman and Kushner, 1978) that may encourage connections and transfer; although this may well be transparent to the adults but not to the child. If the technology is designed to teach something, as Roth et al.'s (1996) computer programme was designed to teach specific concepts in physics, then transparency can refer to whether the tool facilitates understanding of the concept. In their study they reported (p.1011) that the computer facilitated students' understanding in important ways because of the screen's capacity to display changing vector diagrams - but that students may easily lose the correspondence between the computer's 'microworld' and events in the real world. In early childhood programmes screen printing can be challenging, but not transparent: they may not 'see the point'. The children may have to be cued in by adults or other experts to remember the many steps involved. Until children become familiar and interested in the process, the form of participation it

encourages may be an expert-novice relationship where each step is perceived as having an autonomy of its own. Roth et al. used the term 'unready-to-hand' to describe technology that is unfamiliar and not transparent. They commented that

many teachers may find it impossible to spend the necessary amount of time to familiarize students with the software so that it shifts from a tool unready-to-hand to a transparent device for testing and exploring ideas. (Roth et al., 1996 p.1012)

When a tool is 'unready-to-hand' it focuses attention on the tool rather than on the task.

(b) *Affordance: challenge*

Another kind of affordance is whether artifacts are challenging or not. Early childhood educators and toy manufacturers spend a lot of time designing artifacts for young children that will provide optimum levels of challenge, levels that will depend on the user's ability, experience, and familiarity with the technology. Familiarity and passionate interest (Papert, 1980, described himself as being 'in love' with gear systems) alters the perception of challenge. And Wertsch (1991a) described the power of historical context in shaping mediational means at an inappropriate level of difficulty:

. . . let us consider the functioning of an object that is mediating my action as I write, the keyboard of a personal computer. The configuration of this keyboard stems from the work of its designer, Christopher Latham Sholes. . . . Early versions of his (typewriter) machines were "slower" than typists' fingers, so the keys constantly jammed. Sholes's solution was to redesign the keyboard in an effort to slow the typist down . . . the most common letters . . . became widely distributed, frequent combinations such as ED were arranged so that they had to be struck by the same finger, and the typist was required to use the weaker left hand 57 percent of the time. The familiar "QWERTY" keyboard that resulted was thus specifically designed to insure a kind of inefficiency. (Wertsch, 1991a, pp.34-35)

Another aspect of challenge is flexibility. The physical characteristics of an object can open up possibilities or close them down, and the open-ended nature of sand, water, clay and blocks is the reason why these materials are staple fare in early childhood programmes. Social practice may manipulate this openness, a point discussed further in (iv) below. Langer (1989, pp120-121), writing about 'mindfulness' and 'creative uncertainty' in learning described some experiments that explored this. She and a colleague introduced a collection of different objects to one group of subjects in an ordinary unconditional way ('This is a hair dryer', 'This is a dog's chew toy'), and to another in conditional terms ('This *could be* a hair dryer', 'This *could be* a dog's chew toy'). The latter implicitly suggested that under some circumstances the object could be seen in different ways. They then gave out pencils and forms to be filled out, and deliberately made errors in the instructions, creating an urgent need for an eraser. They announced that they could not finish the study because the original forms had been

filled out wrong and there were no spare forms. Only those subjects introduced to the toy (made of clean rubber) in a conditional way thought to use it as an eraser. Uncertainty resulted in more creative solutions than certainty. They ran another, similar study, that included what they called a 'temporarily conditional' group, and this study temporised on this shift of agency: 'I don't know what it is, but it could be . . .'. This group also found the new use, but then when a second need was created, the first use became absolute: once the toy was seen as an eraser, it couldn't be seen as a ball. At least twice as many people in the conditional group ('This could be a . . .') as in either of the other two groups thought of a way to fill the second need. Langer suggested that 'this conditional group came to see that people create uses for objects' (p.122), and she contrasted this conditional way of learning with the way we usually learn. Hatch and Gardner (1993) illustrated the different affordances of the art area and the sand tray in a kindergarten because of the different 'finishing routines': in the sand tray the day's constructions were left intact for the next day, but in the art area there was clean paper and a 'new start' prepared for the next day.

(c) Affordance: accessibility

The accessibility of a technology relates to the form of participation enabled, or afforded, by its use. When Lave and Wenger (1991) wrote about communities of practice, they said that the key to legitimate peripherality is access, and that the artifacts provide a good arena to illustrate the importance of access:

The artifacts employed in ongoing practice, the technology of practice, provide a good arena in which to discuss the problem of access to understanding. In general, social scientists who concern themselves with learning treat technology as a given and are not analytic about its interrelations with other aspects of a community of practice . . . the understanding to be gained from engagement with technology can be extremely varied depending on the form of participation enabled by its use. (Lave and Wenger, 1991 p.101)

In an early childhood setting for instance, some artifacts afford peer collaboration: large pipes and planks for instance, that have to be put in place by more than one person, trolleys that need one person to push and another to steer. Accessibility is influenced by transparency: an artifact that is not transparent (its purpose or inner workings are not clear to the learner) may become accessible if an expert demonstrates or assists. Roth et al. (1996 p.1009) described how a computer display 'affords a possibility for constructing a coherent conversation' because of the shared physical presence of the object of talk. They pointed out that in many domains, pictures and drawings are often central to both sense-making (transparency) and communication (accessibility); concept maps are an example (Roth, 1995). The space around the computer however may lead to the exclusion of some members of the group. Hutchins (1993) refers to the 'openness' of a tool to refer to the degree to which it allows the interaction of all team members.

(iv) *The affordance of technology: mindset and social practice*

Affordance can come from the physical characteristics of the object or material, but clearly it also comes from the social practice attached to it either by convention or for a particular occasion. Usually the experienced affordance is a mixture of both, but physical characteristics may provide a 'bottom line' to possibilities. This is one place where age and development enter the picture: young children find it very difficult to use an 'egg beater' style carpentry drill, for instance, mainly because of their height and strength (they have to push down and rotate the handle at the same time). Four-year-olds have to practise hard to be able to skip with a rope. However, mindset can considerably lift physical capacity, as the work of Langer (1989), included in the discussion of challenge, has illustrated in many ways. She described three kinds of mindset that can *reduce* affordances: entrapment by category, automatic behaviour, and acting from a single perspective (Langer, 1989, p.10). Staying open to new categories and viewpoints Langer calls 'mindfulness', an attribute of a learner also of considerable interest to Salomon and Globerson (1987), Salomon, Perkins and Globerson (1991) and Claxton (1997). Claxton (1997 p. 183) described being mindful as 'not jumping on the first interpretation that comes along'. So actual properties may be necessary but not sufficient: Perkins (1992, p.144) described what he calls the 'fingertip effect' (just because useful 'stuff' is handy, it doesn't mean it will be used) to make the point that affordance may be in the eye of the beholder. Turkle and Papert (1992, 1993), also writing about computers, commented on the diversity in the practice of computing that is often denied by its social context. They argued that some learners are more like painters than logicians, and equal access requires what they call an 'epistemological pluralism' or a mindset that accepts multiple ways of knowing and thinking. An activity, its physical affordance modified by mindset and social practice, can be described as a *technological practice*. Technological practices are sites for transactions between dispositional milieu and disposed learner; they are primary contexts for this study.

3.4.5 A transactional model

Asendorpf and Valsiner (1992 p.253), summarising 'six biases in contemporary developmental psychology' call for 'efforts to enrich our repertoire of concepts that allow us to make sense of the person-environment co-development'. One model that retains the value of the notion that learning is distributed and mediated across the sociocultural, without losing the individual's dispositions, is a 'transactional' educational model (Sameroff, 1975; Woodhead, 1988). A 'transactional' model is

about ecological, responsive, and reciprocal relationships. It recognises that the effects of early childhood experiences are the result of a complex interaction of variables in home and other early childhood settings throughout the early years and beyond, and also that

the children themselves play an active part in the process through the images they project and the self-concept they acquire of themselves, either as competent and motivated, or apathetic, problematic, and unwilling. (Woodhead, 1988 p.449)

One type of transactional model is a social recursive cycle of poor self-concept and rejection. Katz and McLellan (1991, p.11) describe a long-term social recursive cycle:

. . . children who are unattractive, unfriendly, and difficult to approach or enjoy tend to be avoided or rejected by others. In response to this avoidance and rejection, they tend to repeat the same patterns, often with increased intensity, making them even more unlikable and unattractive. This sequence increases the likelihood that these children will be avoided or rejected more and more often. Subsequently, their opportunities to interact with peers and to practice and polish whatever skills they do have gradually diminish. Thus a debilitating cycle becomes well established. Such social patterns, once organized, become more and more resistant to change with each uninterrupted recurrence.

Recursive cycles in education are implicit in transactional models of the relationship between teacher expectation and student achievement following the research on self-fulfilling prophecies about children's achievement by Rosenthal and Jacobson (1968). Teacher expectation has been found to be a critical variable in the development of children's expectations for their own learning (Blatchford et al., 1989; Weinstein, 1989). Weinstein's model of self-fulfilling prophecies highlighted the role of both teachers' and children's perceptions, allowing for the 'individual differences in teachers' and students' interpretations or attributions (dispositions) that may affect susceptibility to expectancy effects' (Weinstein, 1989, p.191; my addition in brackets). The research by Fein (1995) cited earlier (section 2.2.2) was an example of a recursive cycle in which the temperament of infants directed the caregivers' response. Scarr and Eisenberg (1993, p.630) also cited research indicating that children direct the social behaviours of their caregivers. The use of the term *narrative* to describe recursive cycles has become part of the counselling literature (Monk et al., 1997); it incorporates the notion of an habitual sequence of events. But, unlike a community of practice, a cycle or narrative image implies the possibility of resistance or change: the cycle can be broken, the sequence can be interrupted. This element is important for an educational programme.

Another transactional model, similar to the recursive cycle image, has been called 'niche-picking'. It was originally introduced to psychology to link 'nature' and 'nurture' together, to incorporate findings from the psychological literature into new

culturally-based paradigms. The notion of the environment as a dispositional milieu contains within it the idea, introduced in chapter 2, that the transaction between dispositional milieu and disposed learner will include children picking and 'inhabiting' familiar learning *niches*. The biological idea of an ecological 'niche' was introduced to this study by Broberg et al. (1997; section 2.2.2); it has been adapted by Scarr and McCartney (1983), Super and Harkness (1986), Tharp and Gallimore (1988) and Gauvain (1995) to conceptualise the interface between child and culture, learner and environment. Niches are 'templates' that dispose children to respond to the environment in certain prescribed ways: a niche is both familiar and comfortable. It 'feels right'. A developmental niche is 'a social psychological nexus that provides organisms with regulation and direction for development by means of the cultural system in which they live and grow' (Gauvain, 1995, p.28). Gauvain suggests that this is one way to incorporate the research literature from a 'development' viewpoint with the new culturally based paradigms.

Thus, a difficult task for the future is the reconciliation of findings from non-culturally based research with culturally based investigations of the same and related phenomena. . . . The task is made more difficult by the traditional division of developmental research into cognitive social and emotional realms. A sociocultural approach integrates these domains, requiring more comprehensive examination of development than is currently the norm.(Gauvain, 1995, p.42)

Scarr and McCartney (1983) outline a theory of Genotype→Environment Effects. This is a theory of development in which 'genotype' (differences and temperament derived from other family members) affects 'phenotype' (observed behaviour) through three kinds of processes: *passive* (environments provided for the learner by parents or siblings, an attempt to keep a genotype effect running over two generations), *evocative* (responses elicited from others by the learner), and *active* (selective attention and active participation by the learner). They suggest that the relative importance of each effect changes with development: the importance of the *active* increases as the child gets older. Individuals increasingly select their own experiences. An example of *passive* genotype→environment effects is reading: parents who read well and enjoy reading are likely to provide a literacy rich environment, a community of readers, for their children. An example of *evocative* genotype→environment effects is when smiling sociable babies receive more social stimulation and responses than sober and passive babies (the Fein, 1995, research cited in 2.3.2 was an example). The *active* genotype→environment effect is described as the 'niche-picking or niche-building' sort: 'We all select from the surrounding environment some aspects to which to respond, learn about, or ignore' (p.427). The research on orientation or disposition suggests that for all these processes 'genotype' can be replaced by 'disposition' (which includes temperament, pre-disposition, or early neurological mind maps). Utilising the notion of 'niche' for this study: the cultural system provides children with a set of

dispositions, and these dispositions in their turn begin to construct the effective cultural milieu, in three ways: by providing dispositional milieu (*passive*), by adults and peers responding to the learner's orientation (*evocative*), and by the learner being disposed to selectively attend to and participate in aspects of the environment (*active*). Different dispositional milieu provide a range of potential learning niches for the predisposed learner to comfortably inhabit.

A third transactional model, also linking biology to culture, is the neural networks model of the mind, outlined in chapter 2. Neural 'weight configurations' or maps establish habitual patterns, in a similar process to 'niche-picking'. In this model the emphasis is on change; in the niche-picking model the emphasis has been more towards the niche or the template.

A fourth transactional model of development was provided by Bronfenbrenner (1979), also outlined in chapter 2. In Bronfenbrenner's model, a developmental trajectory is the involvement in a succession of new settings of the developing person in (i) ongoing activities that have meaning to the participants, (ii) dyads in which each person pays attention to or participates in the activities of the other and there is a balance of power, and (iii) roles (social positions differentiated by age, sex, kinship, for example).

A fifth transactional model was outlined in the last chapter, Figure 2.2, in which a narrative sequence was described from action through goals and achievement strategies to strategies. Feedback loops from strategies to goals and achievement orientation described the transaction. Well-established strategies (for example, for avoiding difficulty) will incline children to choose certain goals. This chapter has described this narrative sequence as *distributed* learning by a learner-acting-with-mediational means. A similar model to section 2.2, but coming from the literature on distributed cognition, is provided by Salomon (1993a). It is also framed around the idea of a narrative sequence. It clearly incorporates change: Salomon called individual change 'cognitive residue'. He outlined an interactive spiral-like dynamic view of how 'solo' and distributed cognitions interact over time, affecting each other, developing from each other, and changing each other. He said (p.xviii) 'In this way I overcome the situational determinism I see in the radical view of distributed cognitions [the community of practice viewpoint] and the intrapersonal determinism in radical solo views of cognition' and added (p.111) that in some views of distributed cognition:

The individual has been dismissed from theoretical considerations, possibly as an antithesis to the excessive emphasis on the individual by traditional psychological and educational approaches. But as a result the theory is truncated and conceptually unsatisfactory.

He described reciprocal relations between individuals' cognitions and distributed cognitions as an interactive spiral: 'the "components" interact with one another in a spiral-like fashion whereby individuals' inputs, through their collaborative activities, affect the nature of the joint, distributed system, which in turn affects their cognitions such that their subsequent participation is altered, resulting in subsequent altered joint performances and products' (p.122). An important differentiation was made by Salomon and colleagues (Salomon, Perkins and Globerson 1991) between the effects *of* distributed activities and the effects *with* them. There is a place for both. The effects *of* distributed activities are described as 'cognitive residues' in the mind of the individual. He uses as an example a computerised guidance-providing tool for essay-writing skills. Writing ability improves *while* the students are using the tool, but the activity also leaves 'certain cognitive residues in the form of an improved ability (or, at least, tendency) to self-regulate in a way that is similar to the guidance provided by the tool' (Salomon, 1993a p.123). Change (adapted or new dispositions for instance) is described as 'cognitive residue'.

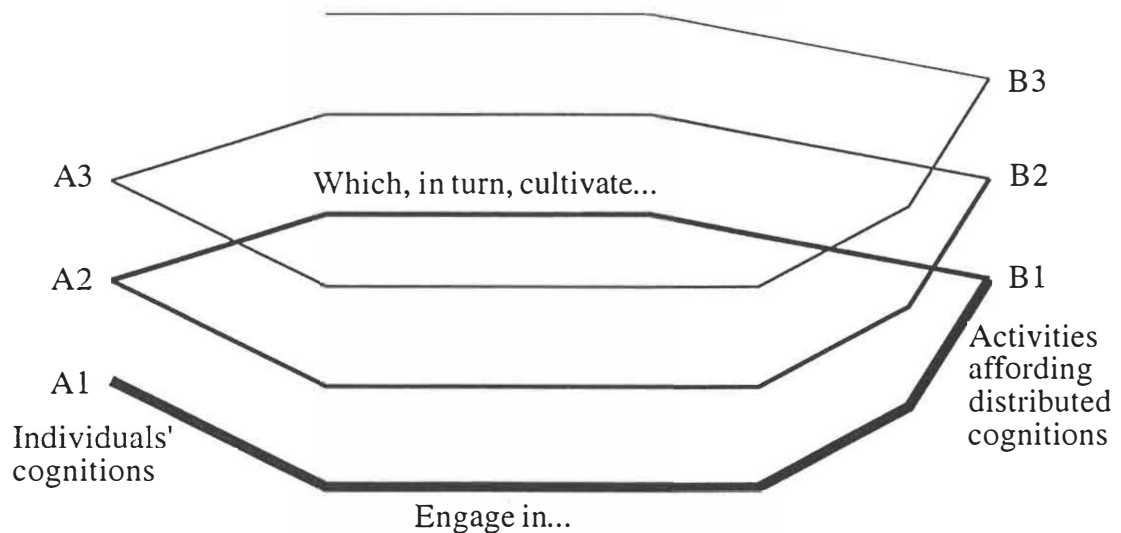


Figure 3.2. The reciprocal relations between individuals' cognitions and distributed cognitions. From Salomon (1993a, p.123)

Individuals enter activities at point A1 with individual knowledge skills or dispositions; they engage in activities that afford distributed cognitions at point B1. Their participation changes the activities and they are changed by those activities: a 'cognitive residue' shifts their individual capacities and dispositions to point A2, and the spiral continues as they engage in the changed activity (B2). This model is transactional, framed as a narrative, and includes change. It also incorporates the notion of a niche: for those learners who stay in a niche, their experience is not a spiral that moves forward; they circle from point A1 to B1 and back to A1 and B1 again, interpreting and engaging with their experience in the same way each time. The model

also incorporates the notion of a learning disposition that underpins 'a pattern of behavior exhibited frequently' (Katz, 1993, p.16): the model describes how experiences change and shape (and are changed and shaped by) the dispositions that underpin and are the product of that frequent and habitual behaviour. It will provide a framework for this research.

3.5 SUMMARY

The literature surveyed in this chapter and the last has provided guidance for the research in this study in a number of ways.

The previous chapter argued the case for learning dispositions as an outcome for early childhood, and for three key domains of learning disposition: children's socioculturally and historically based goals, their responses to difficulty, and responsive and reciprocal relationships. These domains will be a focus for the research.

This chapter examined three different ways in which learning disposition might be connected to the environment: anchored, appropriated, or transacted, and argued the case for a transactional model of the relationship between the learner and the learning environment. One particular transactional model was described in detail and will provide a guiding framework for this study, because it described participation in a joint, distributed system and had the capacity to explain how there could be resistance to or shifts out of established and comfortable habits and niches, an important role for early childhood education.

Three sites for transaction were identified: technological practice, narrative, and discourse. The research so far into children's stories has not focussed on learning narratives; the narrative interest from children's perspectives has concentrated on the psychological implications of children's play, especially their self-categorisations, self-concepts, and friendships. The research has usually been set in sociodramatic play, not in contexts where the major mediational means are materials and tools. The research will investigate technological practices for historically and socioculturally co-constructed learning narratives about goals (discourses), challenge and responsibility, the three domains of learning disposition.

Attention was given to the specific part that the materials and tools, the activities or technological practices, might play as mediational means in this transactional relationship, and three types of affordance were defined and described: transparency,

challenge, and access. This study will investigate the relationship between these affordances and learning dispositions.

Research so far has not bridged the gap between the psychological notion of orientation or disposition in early childhood, and an historically or socioculturally derived dispositional milieu. The literature comes often from research on older children, and usually in contrived or experimental contexts. It is assumed for this study that when the model of learning is a transactional one, the research will need to be in the context of the transactions: the busy and complex world of the early childhood centre. The methodological implications of that assumption are the subject of the next chapter.

3.6 TWO FURTHER RESEARCH QUESTIONS

This chapter now sets out two more research questions to do with learning narratives and niches:

- In this setting, was a technological practice characterised by a particular clustering together of dispositions in event structures or learning narratives i.e. could it be described as a 'dispositional milieu'?
- (a) In what way could the technological practices in this early childhood setting be described as a set of learning *niches*: i.e. were individual children constructing their own learning environments by 'inhabiting' familiar and comfortable learning narratives?
(b) In the short time frame of the observations, was there any evidence that children's learning dispositions and narratives shifted at all?

4

METHODOLOGY

4.1 INTRODUCTION

The previous two chapters argued for learning dispositions in early childhood as a topic for investigation, and for locating them in a transactional model of development and learning. This chapter outlines the research methodology for the investigation. The research paradigm, determined primarily by ontological assumptions, is outlined and discussed in section 4.2.1. Post-structural issues associated with researchers imposing order onto ‘shifting sands’ are discussed in section 4.2.2. The *methods* chosen for this investigation, determined primarily by the research paradigm, are interpretive; and the characteristics and purposes of interpretive methods are discussed in section 4.3.1. Interpretive methods in early childhood are reviewed in 4.3.2, and 4.3.3 analyses a range of ways in which interpretive studies are made accountable or plausible. Issues of generalisation in interpretive studies are raised in section 4.4. Section 4.5 outlines the research design for this study. It outlines the context, and describes how accountability has been addressed. Section 4.6 summarises the time line. The units of analysis are described and explained in section 4.7: (i) episodes (section 4.7.1), (ii) technological practices (section 4.7.2) and (iii) learning narratives made up of discourses, responses to difficulty and uncertainty (labelled, after Bruner, as ‘trouble’), and distributions of responsibility (section 4.7.3). Section 4.8 summarises the major points of the chapter.

4.2 METHODOLOGICAL PARADIGMS

4.2.1 **Ontological assumptions: technological practices, discourses and narratives**

Ontological assumptions, the researcher's view of reality, underpin and steer the methodology of a research project on learning, just as they underpinned the decisions about units of analysis for the study. Guba and Lincoln (1994, p.111) describe four major research paradigms, differentiated by their ontology: (i) *positivism*'s position of naive realism, which assumes an objective external reality upon which inquiry can converge (ii) *postpositivism*'s position of critical realism, which still assumes an

objective reality but grants that it can be apprehended only imperfectly and probabilistically (iii) *critical theory*'s historical realism, which assumes an apprehendable reality consisting of historically and socioculturally situated structures that can be as limiting and confining as if they were 'real', and (iv) (radical) *constructivism*'s relativism, which assumes multiple, apprehendable, and sometimes conflicting social realities that are the products of human intellects, and in which the nature of knowledge is an agreement or consensus. Both constructivist and critical theory positions assume relativist ontologies and interpretive epistemologies, and deploy interpretive naturalistic research methods. But to suggest that a position is 'critical' makes two important assumptions: the purpose is change, and the curriculum developer (or the researcher working within this paradigm) has 'insight' into the 'right' direction for that change. Many critical positions take a Marxist or neo-Marxist standpoint (for example, Bowles and Gintis, 1976), focusing particularly on socio-economic relationships, power, and oppression associated with class relationships and technology under capitalism.

It has already been argued (in chapter 3, sections 3.4.2, 3.4.3, and 3.4.4) that historically and socioculturally situated structures (discourses, narratives, and technological practices) define reality in this study. This 'new' paradigm owes particular debts to Vygotsky (1978), Wertsch (1991a, 1991b, 1995), Bruner (1986, 1990, 1996) and Gee (1992). Harré and Gillett compare the Old Paradigm (Newtonian) and the New Paradigm (Discursive) in a table as follows:

Ontologies	Locative systems	Entities	Relations
Newtonian	Space and Time	Things and events	Causality
Discursive	Arrays of people	Speech acts	Rules and story lines

Table 4.1. Two ontologies. From Harré and Gillett (1994, p.29)

They analyse an ontology in terms of locative system (where things are that we are going to describe), entities (what we are interested in: 'a decision we make about which aspects of our complex world are to occupy our attention as scientists'), and the basic system of relations (those relations that bind the entities together to create a world). A discursive ontology is interested in speech acts, the location is 'arrays of people', and the system of relations is rules and story lines. The previous chapter (section 3.4.2) introduced discourse as an entity of interest in this study, defining it, after Gee (1992) and Fairclough (1992), as wider than texts and speech acts to include ways of belonging. In that chapter, discourse as self-categorisation was emphasised, and Gee's (1992 p.143) definition was used: discourse as 'a socially accepted association among ways of using language, of thinking, feeling, believing, valuing,

and of acting that can be used to identify oneself as a member of a socially meaningful group'. A discourse will put forward certain concepts, viewpoints and values at the expense of others, and it will marginalise conflicting viewpoints and values: in this sense it is dispositional and ideological. Ideology is defined in the Collins dictionary, 1991 3rd edition, as 'the set of beliefs by which a group or society orders reality so as to render it intelligible', and Jones and Jacka (1995) describe the connection between 'discourse' and 'ideology' as follows:

We have deliberately used the term "discourse" rather than "ideology" in this discussion, although in many ways they may be used interchangeably Discourse is a useful term because it draws attention to the ways in which subjects ('individuals') are shaped. Earlier structuralist Marxist ideas about ideology as false or distorted sets of ideas have largely been replaced by a (post-structuralist) view of discourse as a coherent and forceful system of written and spoken ideas which are both produced by, and produce, human beings (subjects) who must engage or resist them as a constitutive feature of social life (Cocks, 1989). (Jones and Jacka, 1995, pp.170-171)

This study straddles the critical-theory/radical-constructivism and structuralist/post-structuralist binaries by locating discourse within technological practice. It seeks to find out whether patterns of discourse are structurally determined, where structure is framed by technology (not, in this instance, by social class). In this study then, the ontological position is one in which the locative system is technological practices, the entities are (broadly defined) discourses, and the relations are narratives and story lines (Table 4.2).

Locative system	Entities	Relations
Technological practices	Discourses	Narratives and story lines

Table 4.2. Ontological assumptions for this study

In the previous chapter these three units emerged from Popper's (1972; from Wertsch, 1991a) notion of three worlds: the world of physical objects and physical states (in this study, tools and materials will be emphasised), the world of a social group who orient their actions to common values (in this study, responsive and reciprocal relationships within learning narratives will be emphasised), and the world of 'presentation of self' (in this study, discourses and their associated learning or performance goals will be emphasised). The three units were described as a nested system: discourses (about the self) nested as one of the learning dispositions within narratives (the relationships) which in turn are nested, located, within technological practices (see Figure 3.1).

4.2.2 The search for orderly, meaningful and coherent story lines

Although interpretive inquiry is about constructing a meaning that cannot be said to be *the* 'truth', research findings are usually about creating some sort of 'order' out of the chaos of data. Meaning is often presented as an orderly and coherent story. This study is no exception. Scheurich (1995), discussing research interviewing, argues however that meaning is 'fundamentally indeterminate'. Post-structuralist writers maintain that an ideological (coherent story) stance is entirely arbitrary, a 'good' story created by the 'restless appropriative spirit of the researcher':

The researcher then fills this indeterminate openness with her or his interpretive baggage; imposing names, categories, constructions, conceptual schemes, theories upon the unknowable; and believes that the indeterminate is now located, constructed, known. Order has been created. The restless, appropriative spirit of the researcher is (temporarily) at peace. (Scheurich, 1995, p.249)

This is also the implicit viewpoint of Britzman (1995, p.233) when she describes her own ethnographic study of student teachers.

I confess that I still have difficulty uncoupling myself from the persuasive promises of ethnography. I desire to construct good stories filled with the stuff of rising and falling action, plots, themes, and denouement.

And in this vein, Tobin (1995) argues that the field of early childhood education could use some '*unreadings*':

From Erikson we have learned that what looks like random play and bizarre symptomology can be read as the playing out of predictable stages of psychological dynamics. From Paley (1984) we have learned to hear in children's doll corner conversations complex negotiations of gender roles. There is something aesthetically pleasing in readings such as these which transform children's talk into orderly, meaningful, coherent narratives. But are these readings uncovering meanings that are already there, or imposing adult meanings onto children's conversations? (Tobin, 1995, p.234)

The early childhood field is very susceptible to the construction of coherent stories - or fashionable ideologies. Katz (1995b) suggests that the vacuum generated by data weakness in early childhood is inevitably 'filled by ideologies':

A basic assumption here is that in any field in which the data base is unreliable - especially in terms of its validity - the vacuum generated by such data weakness is filled by ideologies. It is reasonable to assume that if scholarly disciplines were rank ordered in terms of their accessibility to reliable data, and ordered in terms of their freedom from ideological conflict, we could show a positive correlation between these two attributes. (Katz, 1995b, p.213)

She describes the early childhood field as especially susceptible to data weakness, and therefore to ideological critique. The immaturity of young children is one reason: change is unstable, they are developing rapidly which makes interpretation difficult,

and they are relatively powerless (they do not have a say in the nature of their programmes, so adults say it for them). It is fertile ground for diversity, but the flip side of diversity is ideological battles and charismatic leaders, fads and bandwagons (Katz, 1995b, p.215). Tobin (1995), for example, criticises the simulation and inauthenticity of emotion that he sees in such early childhood education settings that have rules such as 'You are not allowed to tell someone "I won't be your friend"'. (This latter he attributes to Paley, who in fact tried out a rule that said 'You can't say *you can't play*' - my emphasis - and used this as a context for encouraging the children, and the reader, to reflect on the consequences for equity of free play). Data 'weakness' in education generally also comes from the fact that definitive or critical experiments that might settle important empirical questions cannot be performed (for example comparing the relative merits of home-based versus child care settings), so we must rely on case studies and insights (Katz, 1995b).

This is a considerable dilemma for the researcher who wants research to inform practice. Jardine (1992, p.56) is helpful: he uses the metaphor of 'fecundity', and writes about research as 'regenerative tendrils' of sense. In the following quote I have replaced his topic of interest (initiation) with a central concept in this study (dispositions):

This particular instance, then, can be understood as bearing forward the phenomenon of (dispositions), re-invigorating it and thus transforming it, making it fruitful, making it a forebearer . . . (allowing it to) wind its regenerative tendrils out into the 'old growth' from which it has erupted - insofar, that is, as we do not begin our work by severing precisely these regenerative tendrils of sense.

In this way he describes the 'fecundity of the individual case'. Changing the metaphor, Jardine says that a new study adds to the investigative and analytical story and 'changes what we will come to understand the already past chapters to have meant' (Jardine, 1992, p.56).

Just as there is diversity in the field, multiple readings of research findings will always be possible. Walkerdine and Lucey (1989), given access to Tizard and Hughes' original transcripts, find a re-reading of the Tizard and Hughes (1984) data, re-writing the story from their 'own histories as working-class girls', writing it out of 'anger (that) . . . working-class child-rearing practices have been either systematically pathologised or patronised' (p.2). They bring new ideological assumptions about the relationship between child-rearing and gender and class, to do with power and oppression. Fernie, Davies, Kantor and McMurray (1993) bring different interpretations to incidents from an Ohio State University pre-school and two Australian pre-schools: the Americans (Fernie, Kantor and McMurray) looking at peer

and student construction; the Australian (Davies) looking at gender construction. Tobin (1995) describes several readings of an interview with an elementary student after the researcher had showed her an action scene from the Disney movie, “Swiss Family Robinson”, in a research project whose aim was to ‘get at’ (p.234) children’s reactions to violence, sexism, and racism.

All research studies with a critical edge run the danger of contributing to yet another catch-cry, and researchers must ‘show their working’: their assumptions as well as the data. This is so even for statistical studies where ideological assumptions guide decisions about sampling, units of analysis, and coding categories. A critical position is exemplified by Siraj-Blatchford when she says that ‘by ‘laying the foundations’ for racial equality in the early years we are making a major investment for future racial harmony and for the development of a confident and well-informed citizenship’ (Siraj-Blatchford, 1994, p.xiii), and by Davies (1989, pp.x-xi) when she says that her analysis of the dualistic gender order experienced by preschool children has ‘opened up the possibility for programs of change that may genuinely work’. I take an emancipatory or transformation (Jungck and Marshall, 1992) view of early childhood curriculum, as outlined in the previous chapters, a concern for equity of access to learning that derives especially from the work on orientation and disposition of Dweck (e.g. 1986), Katz (e.g. 1993), and Perkins and Tishman (e.g. Perkins et al., 1993); and although in order for this research to inform that perspective a story line will be written, the research remains interpretive and the data ambiguous. The research *method* must acknowledge this ambiguity, and the researcher is reminded that

We run the risk of not fully addressing the perplexities, the contradictions, and the conflicting perspectives if we attempt to create cohesion at the expense of complexity. (Knupfer, 1996 p.142)

4.3 INTERPRETIVE METHODS

4.3.1 The nature and purpose of interpretive methods

An ontology or research paradigm that rests on discourse and narrative as entity and relation (Table 4.2) steers the researcher towards an interpretive and naturalistic research method. In this study, the focus of interest is on action or activity, ‘populated by meaning and intentions and . . . tethered to particular contexts’ (Graue and Walsh, 1995, p.148; see the full quote in section 3.4.1). Smith (1995 p.11) has called for more effort in research on children in Aotearoa New Zealand to include children’s perspectives and to relate these to the contexts of children’s lives. The research questions for this study included the following requirements: (i) investigation in a natural setting (ii) stress placed on understanding the children’s perspectives (iii)

patterns emerging in the process of the fieldwork (iv) observations ‘tethered’ to the context, both in the immediate setting and in the larger contexts within which the immediate setting is framed. These are features of interpretive and ethnographic research methods (Walsh, Tobin and Graue, 1993).

Interpretive and ethnographic methods can employ data collection and analysis methods that are both qualitative and quantitative. Even a ‘non-interpretive’ statistical study that uses large ‘samples’, pre-established coding categories, time sampling, and a statistical basis for assessing generalisability includes judgements and interpretations about the sampling, category construction and coding. In a statistical study, drawing a sample or deciding that two settings are similar is an interpretation about significant factors. The segmenting of time intervals is a judgement about behaviour. The observers make judgements about coding, and the coding categories are an interpretation of experience. My earlier research on four-year-olds is an example. In the Early Mathematics Investigation of Four-year-olds project (EMI-4s), we studied the mathematical knowledge of four-year-olds in four early childhood centres, and measured the progress of the children after intervention in three, keeping one as a ‘control’ (Young-Loveridge, Carr and Peters, 1995). Although this was primarily a statistical study, we made judgments and interpretations early in the research process.

A predominantly quantitative method, with its set of coding categories and time intervals, loses the *action, activity or local culture*, that provides the link between the individual and the setting. These are the window for the effort to understand the meaning that children are constructing as they participate in ‘the richness, complexity, and interdependence of events and actions in the real classroom’ (Salomon, 1991, p16), ‘a teeming social milieu’ (Smagorinsky, 1995, pp.203-4). Statistical data has lost the ambiguity and the possibility of other readings and interpretations. In quantitative studies, significance becomes ‘intimately linked with frequency’; it becomes ‘mathematized’ (Jardine, 1992, p.54). In a reference back to the importance of ontological assumptions about ‘truth’, Jardine says:

Of course, the methodical attainment of such objectivity [in positivist studies] does not altogether prevent playful, risk-laden, unanticipated interchanges. They will still occur. However, their occurrence is divested of any claim of or access to *truth*. Truth and method become identified. It is precisely this identification that the interpretive disciplines work against.

A closely analysed - perhaps an unusual - episode may well provide insight into meaning.

Interpretive and naturalistic research methods are described by Miles and Huberman (1994) as a methodological tool when the research looks for a contextualized account of the everyday from the 'inside'. Miles and Huberman describe interpretive methods as 'qualitative': so do Denzin and Lincoln (1994), although interpretivists may use quantitative methods as well.

Qualitative research is multimethod in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. (Denzin and Lincoln, 1994, p.2)

In early childhood research, the label 'interpretive' is used by Corsaro (1990) and Walsh, Tobin, and Graue (1993), and 'ethnographic' by Fine and Sandstrom (1988) and Zaharlick and Green (1991). The EMI-4s study took the more traditional track of providing qualitative material to supplement and illustrate predominantly quantitative data (Young-Loveridge et al., 1995); this study includes quantitative material to illustrate and supplement the qualitative interpretation of observations and transcripts. Rogoff, Mistry et al.'s (1993) cross-cultural study of mothers interacting with their toddlers includes quantitative data in the same way.

4.3.2 Interpretive studies in early childhood

Interpretive or ethnographic research in early childhood settings has a rich history. The early British tradition of closely observing and then interpreting children's behaviour is best illustrated by Isaacs (1932) and Stallibrass (1974), coming from an Eriksonian or psychoanalytic theoretical framework: behaviour was interpreted in terms of individual emotion, a tradition continued in the United States by Paley (e.g. 1988, 1992). The next phase of early childhood observational research in the 1970s and 1980s in the United Kingdom had a more cognitive focus: the Oxfordshire studies of children in English nurseries, notably by Sylva and Wood (Sylva et al., 1980; Wood et al., 1980), and the Tizard and Hughes (1984) study of working class and middle class girls at home and at nursery school (later given a different reading by Walkerdine and Lucey, 1989). Current studies, more frequently American or Australian, are more likely to be about action or activity, located within specific cultural and historical practices and time. Examples include Corsaro (1985), Lubeck (1985), Kantor (1988), Bloch and Pellegrini (1989), Davies (1989) and Hatch (1995a). Walsh, Tobin and Graue (1993) described a constructivist/social critique category of interpretive studies as an approach that is 'concerned with destabilizing widely accepted assumptions and constructing social change' (p.468). These authors, writing particularly about interpretive studies as they are found in early childhood education, described three categories: ethnography, case study, and constructivist/social critique. In the latter

group they placed Davies' 1989 study of gender construction in early childhood. Another study in this category is Suransky's *Erosion of Childhood* (1982) which used ethnographies of five preschools to critique what is usually described as 'good practice'. Kantor's (1988) study of how children 'become students' was placed by Walsh et al. in their 'ethnographic' category: 'interpretive, contextually rich studies of classrooms' (p.467), recreations of shared lives of a group of people through descriptions of their beliefs, knowledge, behaviors and tools' (p.466). Paley's work was described by Walsh et al. (1993) as case study (e.g. *Mollie is Three*; Paley, 1986a) and ethnography, but her controversial *You Can't Say You Can't Play* (Paley, 1992) would also fit the social critique category. None of these studies specifically study the process whereby children are constituted and constitute themselves as *learners*. This study makes some critical assumptions about learning: in chapter 2, I argued the case that 'good learning' is do with learning dispositions.

4.3.3. How is the data accountable in interpretive studies?

The fact that multiple readings or interpretations are possible raises the major question in interpretive studies, and that is 'how is the data accountable'? Or, as Salomon (1991, p.10) asked, 'How would one know how to distinguish a scholarly interpretation of a classroom event from that of a delirious observer?' The researcher makes judgements and interpretations, chooses case studies and omits others. In 'positivist' and 'post-positivist' studies, conventional criteria of rigour are imposed on the collected data: validity, reliability, and objectivity. One looks to the coding (for instance) for consistency across studies, sites, and observers; and to the role of the observer for neutrality and invisibility. One seeks appropriate levels of probability in the statistics. In interpretive studies however, the local and cultural variables are central to the study, and the observer, if he or she is visible to the children in any way, is part of those local influences. The research itself is situated, and, as the examples of multiple readings indicate, questions of accountability and generalisability become serious issues. 'Measures' of validity and reliability are replaced by judgements of 'plausibility' and 'trustability'. Other words for 'plausibility' and 'trustability' have been used:

The narrative that is produced and presented to the reader must have what Dewey (1929) and Geertz (1973) described as "assertability", Campbell (1978) termed "plausibility", Denzin (1989) labelled "verisimilitude", Erickson (1989) called "trustability", and what Wolcott (1990) simply calls "understanding". (Walsh, Tobin and Graue, 1993, p.472)

I have referred to the process as 'accountability', which includes both 'plausibility' and 'trustability'. There are a number of ways in which the research gains

accountability. In this research there were two major requirements: (a) clearly described data collection, and (b) clearly acknowledged researcher assumptions.

(a) Firstly, the data collection must be as 'transparent' as possible: readers should have enough information to track and understand the interpretation presented, and to find alternative readings if they want. The role of the observer in interpretive studies, for instance, is central, and must be clearly described. The data cannot be presented in crisp statistical tables, so it will be necessary to present lengthy transcripts and analyses, and to find imaginative ways of presenting models and relationships in diagrams and pictures. In quantitative studies, what might be called 'interpretive closure' occurs early, often at the coding stage; in qualitative studies interpretive closure should come as late as possible, to allow the reader to follow the trail.

(b) The second major requirement is that the 'baggage' or assumptions that the researcher brings to the interpretation must be identified. In this study, these background assumptions and characteristics have formed the subject of the first three chapters.

Accountability is therefore addressed in interpretive studies in a range of ways. The following seven are relevant to this study:

- (i) describing and explaining the more or less intrusive and interventionist role of the researcher as observer, including the way in which ethical issues of informed consent, confidentiality and harm may influence the relationship between the researcher and the researched, and therefore the 'trustability' of the data collection and analysis
- (ii) including, and justifying, the collection of additional data of a more focused or contrived nature; interviews that follow from observations are an example
- (iii) ensuring the robust nature of the primary data
- (iv) outlining the characteristics and experience of the researcher
- (v) taking a comparative approach
- (vi) collecting sufficient data, and
- (vii) combining the analytic with the systemic.

Each of these are described in some detail below. The way in which this study has addressed each of them will be outlined in section 4.5.2.

(i) *The role of the observer*

A researcher does not come to observe the 'natural world', 'uncontaminated' by her investigations (Hammersley and Atkinson, 1983). As Smagorinsky (1995, p.208) concludes 'Our effort should not be to avoid participating in the construction of data, but to recognize and account for the ways in which we inevitably contribute to the

shape our data take'. An observer is neither a fly on the wall, nor a full participant, and in classroom or early childhood setting studies, no matter how one might try to become one of the children, one is always identified with 'the adult team' (Ball, 1985). Atkinson (1979; cited in Simon, 1989) summarises the different roles of a participant observer as follows: (a) complete participant (operates under conditions of secret observation and full participation) (b) complete observer (entirely removed from interaction with those under observation) (c) observer as participant (the researcher's identity is known but he or she remains a relative stranger) (d) participant as observer (the fieldworker becomes more closely involved with the actors).

Jordan, Cowan, and Roberts (1995) provide an example of (b) when they observed Australian kindergarten and preschool children's power strategies.

The observation was noninteractive. The observers stationed themselves as unobtrusively as possible, usually seated on a child-sized chair near one of the activity areas. They discouraged attention from the children by rising and leaving the area if they were drawn by them into any interaction. (Jordan et al. 1995 p.344)

The authors did not appear to see this as problematic. An example of (c), is King's (1984) sociological study of infant classrooms: *The Man in the Wendy House*. He describes his method as 'non-participant' but

I did allow myself to be approached by children to begin with, but I soon found that they treated me as a teacher-surrogate as they did other non-teacher adults, showing pictures, asking me spellings, which I sensed Mrs Pink [the teacher] was not happy with and which prevented my observing clearly and researching effectively. My routine became to spend a short first visit to a new classroom, making no notes, to be observed by the children rather than to observe. This was to allow the teacher and the children to get over any unease or curiosity. I politely refused requests for help, referring the child to the teacher, and met requests for approval only with smiles. (King, 1984, p.123)

An example of (d) is Corsaro in his study of peer and friendship culture in nursery schools (Corsaro, 1985, 1990; Corsaro and Molinari, 1990).

I utilised what I term a 'reactive' method of field entry, allowing the children to react to and define me and gradually draw me into their activities. This strategy was successful in that the children came to see me as an atypical adult and in many ways as a 'big kid' (many of the children referred to me as 'Big Bill'). (Corsaro, 1990, p.15)

Sometimes the exigencies of a project have meant that researchers' roles changed during an ethnographic study: from (b) (complete observer) to (a) (complete participant) for example. Suransky (1982) describes her observations in five different early childhood centres. In the Montessori school she was asked not to be a participant observer; she had to 'remain seated outside the periphery of activity, interacting as little as possible with the children' (p.210). When she observed in the Martin Luther King Childcare Center, however, 'I was unable to maintain the role of an observer' (p.141),

involving herself much more fully in the life of the school. Lubeck (1985) began her study of a Headstart centre by taking intensive notes with little active participation. She began to realise that this role was making the teachers uncertain and anxious, and she stopped taking notes during sessions, taking on more of the role of a teacher, a role that made the staff more comfortable.

Issues of informed consent, confidentiality and harm

Issues of informed consent, confidentiality and harm, are ethical matters. But they are also accountability matters as well. They are to do with choosing and negotiating meaning, and they can reduce the myriad of alternative readings that are created by (a) informants who are not informed (second guessing as to what the researcher is looking for and how they are 'shaping up'), (b) informants who are unsure as to whether what they say and do will become public knowledge (encouraging unusual behaviour and idealistic accounts), (c) practitioners who suspect that they will be misrepresented (engendering suspicion and silence), and (d) practitioners who are not reassured that the researcher will intervene if harm to a child appears likely when the researcher is clearly able to prevent it (incurring antagonism and distance between practitioner and researcher).

Although data is collected in a 'natural' everyday context, the analysis of the data is anything but natural or everyday. Transcripts are listened to over and over again, and chance remarks that normally have a life of a few seconds can take on a significance that is only constructed by the researcher. Writing them down turns an 'event into an account' (Knupfer, 1996 p.142). When the subjects are adults, it is possible to play back a tape or an interpretation and ask if that is what they 'really' had in mind, and most interview formats with adults do this. This is not very easy with four-year-olds, although MacNaughton (1994) played back videotapes of play to four-year-olds and asked them for their interpretation. An interesting early childhood project that played back observations to children and practitioners was a cross-national study by Tobin, Wu, and Davidson (1989). Some of the ethical difficulties that arose are outlined by Tobin and Davidson (1990). They used videotapes of 'typical days' in preschools in China, Japan and the United States as starting points for discussion; eight to ten hours of videotape for each country was edited into three 20 minute 'visual mini-ethnographies'. They included scenes of arrival, free play, structured group activities, lunch and departure. The videotapes were not being used as data but as the first voice in what Tobin and Davidson call a 'polyvocal ethnography'. For other voices they returned to the sites and showed the tapes to staff and children, then showed each tape in five or more early childhood sites in the same country, and finally to foreign audiences: the American tape to Japanese and Chinese teachers and parents, and so on.

They describe the final research report as ‘a multivoiced dialectic of interpretation, evaluation, and critique’ (p.272). Ethical difficulties arose from the choice of events in the final videotape (they were chosen to create discussion, and at least one Japanese administrator felt that this biased the picture), and the lack of anonymity in a videotape presentation (at least one child was embarrassed in front of his peers). Tobin and Davidson (1990) summarise some of the ethical difficulties in qualitative research as follows:

We present these concerns not in apology for ethically questionable work (for all research is ethically questionable), or to disarm potential critics by anticipating their responses. We do so because we believe that innovative research methods are strengthened by ongoing reflection and reanalysis. The ethical questions raised by our work and by related qualitative investigations are not problems to be solved by right thinking, well meaning researchers. Rather, they are tensions inherent in the research enterprise, in the ongoing negotiation of meaning between scholar and practitioner, and between insider and outsider. (Tobin and Davidson, 1990 p.272)

The authors asked whether one of the Japanese children, shown interfering with a teacher’s lesson, was harmed by the research. In this study of Japanese, Chinese and American early childhood settings, informed consent from four-year-olds where there cannot be confidentiality was an issue. It is still an issue in any study. Fine and Sandstrom (1988, p.45) include a comment from Mandell (1988, p.450) who maintained that in her research she could ‘suspend all adult-like characteristics except physical size’ and become one of the children; it highlights ethical issues of adult responsibility, trust and harm to respondents.

Once, on an elaborate pretend fishing trip with four children, I became so immersed in my noninterfering least-adult role that I calmly watched one boy cut open another boy’s head with the shovel, ignoring an observing teacher’s warnings to intervene and avert the blow. The teacher classified my inattention as negligence.

I am not surprised. Children expect adults to protect them; and teachers have a right to withdraw hospitality from an adult researcher who did not intervene in a crisis. However, the line is not usually drawn as clearly as in the Mandell example: an observer must make a judgement about whether children and adults will come to expect that she will take on a ‘policing’ or supervisory role.

Hatch (1995b) described an ethical dilemma to do with a researcher’s non-intervention ‘passive participant observer’ role that was raised when he presented a paper at the national research conference on his classroom observation study of the social behaviour of kindergarten students. In the study he described a boy called Lester who was stigmatized as an outsider and treated as ‘less than normal’ by his peer group. A teacher from the audience asked why the researcher had not intervened in support of Lester. Hatch reported being ‘stunned’ and ‘embarrassed’ by the teacher’s question

(p.216). He called on researchers to problematise such non-intervention and to critique a research framework that builds non-intervention into its structure, and he suggested that there is a 'voyeuristic' dimension to participant observation research. He described the 'thrill of the voyeur being in the right place at the right time' (p.217), and warned of the 'objectification' (Foucault, 1972) of the children in the research process.

(ii) *Collecting additional data from a contrived context*

One of the reasons for carrying out research in natural settings is that in the real world, the findings from clinical studies or contrived interviews may not apply. As Cole has pointed out:

the crosscultural literature is replete with discussions of the methodological dilemmas that arise once one suspects that experimental cognitive tasks are special kinds of culturally mediated social interaction and not privileged windows on the mind. (Cole, 1991 p. 408)

However, additional data may contribute to understanding. In interpretive methods, this additional data is usually in the nature of a contrived interview. Interviews introduce a number of methodological difficulties, especially if the interviewees are young children, but one way to keep a project focused on the children's perspectives is to interview the children. Langsted (1994) describes a project in which five-year-olds were interviewed about their daily lives at home and at the early childhood centre. Interviewers observed the children beforehand, and then asked the children to take them on a 'sightseeing trip' of their daily lives. Langsted concludes:

. . . we still have little experience of interviews with young children. A good deal of imagination and creativity is required to design interviews for this age group. (Langsted, 1994 p.34)

An interview is a highly contextualized event (Scheurich, 1995). Examples of unsuccessful interviews with young children are provided by Hatch (1990) and King (1984). Hatch (1990) asks a five-year-old to explain his friendship choices (pp.254-255):

Researcher: Why, what makes you think Tom is a good friend?
 Dan: (pause) 'Cause he be nice.
 R: I see, and Jeff?
 Dan: 'Cause he be nice.
 R: I see. Why do you think they are nice to you?
 Dan: They be good.
 R: How do you know that?
 Dan: (silence)
 R: What do you do that means 'bein' good'?
 Dan: (silence)
 R: (with an edge in his voice) How can you tell when somebody likes you? What do they do?
 Dan: Be good.
 R: OK, only one more question.

Dan is not interested in the researcher's question, and does not want to reply. On another occasion Hatch asks a preschooler 'What do you like doing best in the housekeeping corner?' and the response revealed that the child was searching for the right answer: when he didn't respond immediately after she said 'Play dress-up', she added 'Is it computer?' (Hatch, 1990, p.256). King (1984) also outlines similar problems and discovered that 'Any accidentally leading questions were always affirmed. "Yes" is easier to say than "no"' (p.126). Tammivaara and Enright (1986) point out that one of the most difficult aspects of questioning young children is the researcher-informant relationship. They recommend (a) having something to talk about, (b) 'playing dumb' (implying that the researcher needs help and guidance), (c) embedding the questions in interesting and meaningful activities, and (d) ceding control over the topic and not doing all the initiating. Davies (1982) recommends group interviews because they can *recreate* the relationships and cultural meanings of the classroom; so do Walsh et al. (1993).

(iii) *Ensuring that the primary data is robust*

An interpretive researcher must ensure that the primary data is robust. Just as statistical methods tend to use large samples, so interpretive and ethnographic methods enhance their 'validity' by the use of 'thick' or rich descriptive material and primary material. Rogoff, Mistry et al. (1993, p.31): 'Rigorous ethnographic researchers provide checks on their interpretations by presenting rich transcript material and by balancing a small sample of individuals with more intensive analysis of the sample of observed behavior in order to examine all relevant data'.

(iv) *A knowledgeable practitioner with conceptual interests and more than one disciplinary perspective*

It can be argued that in interpretive studies, a knowledgeable researcher is a more reliable research instrument than a researcher who is not familiar with the field. Miles and Huberman (1994) suggest that the analysis of an unfamiliar researcher runs the risk of being naive, easily misled, and easily distracted - and may lead to the collection of far too much data. They summarise this argument as follows:

. . . although unfamiliarity with the phenomenon or setting allows for fertile "decentering", it also can lead to relatively naive, easily misled, easily distracted fieldwork, along with the collection of far too much data. . . On balance, we believe that a knowledgeable practitioner with conceptual interests and more than one disciplinary perspective is often a better [better than being inexperienced and having a single-discipline focus] research "instrument" in a qualitative study: more refined, more bias resistant, more economical, quicker to home in on the core

processes that hold the case together, and more ecumenical in the search for conceptual meaning. (Miles and Huberman, 1994, p.38)

'Ecumenical' here means, I think, ecological: taking in a wider world view. In an educational setting, a knowledgeable and experienced researcher also brings credibility in the eyes of the practitioner. Practitioners know that the researcher has the capacity to understand what it is really like for them in the setting, because she has been there herself. They may see her therefore as being less judgemental, enabling them to act naturally.

(v) *Taking a comparative approach*

A fifth way to address accountability in interpretive studies, and to enhance generalizability, is to use the same methodology over several cases, posing the question 'do these findings make sense beyond a specific case?' (Miles and Huberman, 1994, p.173).

Multiple cases not only pin down the specific conditions under which a finding will occur but also help us form the more general categories of how those conditions may be related. (Miles and Huberman, 1994, p.173)

Qualitative or interpretive studies are often comparative. Heath's (1983) study of the differences in the ways children learned to use language compared two different cultural communities. She observed and interviewed in homes, school and other settings over a period of nine years. Lubeck (1985) observed and interviewed to compare two culturally different pre-schools: a Headstart programme for black children, and a pre-school programme for white children. She describes the different uses of time, space, activities, materials and patterns of interaction. Tobin, Wu, and Davidson (1989) compared preschools in the United States, Japan and China by videotaping episodes of classroom life in each of the three cultures, and recording the interactions of administrators, teachers, students and parents from different cultures to the episodes. Rogoff, Mistry et al. (1993) compared the different ways in which toddlers and their caregivers collaborate in shared activities in four different cultural communities: a Mayan Indian town in Guatemala, a middle-class urban group in the United States, a tribal village in India, and a middle-class urban neighbourhood in Turkey. Eisenhart and Graue (1990) compared the different ways in which 'readiness' for first grade was constructed in three different kindergartens in Colorado, using interviews with teachers and parents, and including the different proportions of children held back. Corsaro (1988) compared the development of peer culture in American and Italian nursery schools.

(vi) *Collecting sufficient data*

Ethnographic studies vary in length and the amount of data collected. Corsaro's study of peer culture in a *scuola materna* in Italy took six months of participant observation: he collected 325 interactive episodes in field notes, and 40 episodes on audio or video tape. He videotaped 15 additional episodes during a six week return visit to the school a year later. Heath's (1983) study took nine years. Davies' early childhood gender study (Davies, 1989) was carried out in four venues. In three of them, she spent one week collecting data (videotaping in one, audiotaping in another). The greatest amount of time was at a preschool in Armidale, where she spent two days a week over a period of three months. Studies by Fernie and Kantor (Fernie, 1988; Kantor, 1988; Kantor, Elgas and Fernie (1989); Kantor, Miller and Fernie, 1992) were carried out in a Laboratory School at The Ohio State University. Data collection in this school is ongoing. One of their studies examined children's play styles and object use from data collected during the first two weeks of school (Browning and Hatch, 1995, p.103). In the Mayan community section of the Rogoff parent and toddler interaction study (Rogoff, Mistry et al., 1993), Rogoff had worked with 180 children in the town a decade previously, had come then to know many of the families well and remained in contact over the years. Most of the participants in the toddler study were siblings, nieces or nephews of the children who had been studied a decade before. Thus Rogoff 'entered the homes not as a stranger but as a familiar foreigner, greeted with affection and reminiscences about shared experiences' (p.23).

(vii) *Combining the analytic with the systemic*

A final way to address accountability is to combine the analytic with the systemic. As Salomon (1995) comments, when we observe parts of the real world, the whole tends to disappear:

we have gradually come to realize that phenomena of interest (e.g. the functioning individual and the learning environment), once broken down into their more basic elements such as discrete cognitive processes, motivational attributions, or computer-related activities, cease to resemble or represent the real-life phenomena of interest. (Salomon, 1995, p.106)

One way to solve this is to take a 'systemic' approach (Salomon, 1991), one that describes an early childhood setting as a complex combination of interdependent and nested sub-units. The sub-units can be analysed in some detail, but authenticity remains with the system. The ecological framework provided by Bronfenbrenner (1979) - nested systems each comprising molar activity, interpersonal relationships and roles - is just one such systemic approach that is useful for interpretive studies.

The way in which this study addresses these accountability issues and strategies will be described in section 4.5.2.

4.4 ISSUES OF GENERALISATION

The purpose of an interpretive (or ethnographic) method is to provide a close-up description of a setting from the point of view of some of the people who inhabit that setting. It is the best method for understanding the processes that are *possibly* going on in a setting or a situation, and the beliefs and values of those in it. Can one generalise to other settings from this? The most common argument for generalising from a research study is usually thought to be extrapolation from a sample to a population. Probability sampling requires large populations and large samples, often randomly assigned groups within the sample, interventions and controls. I have already argued that even such studies include interpretations, and that probability defines significance (narrowly) as frequency. Further:

most high-quality scientific program studies have used illustrative rather than random samples . . . (and) generalization is not necessarily lost as a result. The major difficulty with the sample-to-population argument is that it is difficult to sample all the things that must be sampled to make a generalization: . . . the units affected. . . , the treatments, the outcomes, . . . and the settings, including culture, historical period, and a variety of other dimensions. (Firestone, 1993, p.18)

The settings are often sampled, but the ‘treatments’ seldom can be.

Quantitative researchers make sense of the world by counting and classifying; interpretive researchers make sense of the world by thick description and narrative’. (Walsh Tobin and Graue 1993, p. 468)

‘Thick’ description includes motives, goals, and connection with context. I have argued that interpretive researchers also count and classify, just as quantitative researchers make judgements and interpretations. In educational settings even positivist and post-positivist research is an interpretation, a construction of reality by the researcher: early in the process, samples are chosen and categories are constructed and defined as if they are ‘really’ out there. The *accountability* measures of predominantly quantitative methods are, however, statistical: significance is mathematised.

There are two processes (other than extrapolation from a sample) through which research can be generalised: analytic generalisations and case-to-case transfer (Firestone, 1993). Firstly, Firestone argues that qualitative studies can *generalise to a theory*, and that this is different from generalising to a population. What is at issue in interpretive studies is the relationship between the data and the theory, the concepts,

the conceptual framework or the model. 'When one generalises to a theory, one uses the theory to make predictions and then confirms those predictions' (Firestone, 1993, p.17). The scope of the theory or model - the conditions under which it applies - may also be identified. Secondly, *case-to-case analogies* are another form of generalisation. They are common in law, medicine, and clinical psychology. Such generalisations may be made *by the reader*, who may assess the applicability of the study's conclusions to his or her own situation, given a rich and detailed description of the case and an analysis of where the case might fit within the continuing story of the topic: Jardine's notion of an individual case winding its 'regenerative tendrils' out from the old growth (Jardine, 1992). This study will seek generalisation in both these ways: as a case study, and generalisation to a theory (in this case to a transactional and narrative model of the relationship between learning dispositions and a learning environment).

4.5 THE RESEARCH DESIGN

4.5.1 The context for the primary data collection

The context chosen to observe four-year-olds learning was the construction area in a kindergarten. This area was chosen because of the research questions' focus on aspects of the sociocultural context - activities, relationships, and children's understandings and responses to difficulty. Informal observations over the previous year had indicated that this area was popular with the children, included adults in a range of roles, involved a range of tools materials and artifacts, and was an area in which children chose their own activity and worked at many levels of difficulty. The construction 'area' comprised two construction tables and a screen printing table as well as the surrounding floor area where the children made things. Paper, card, scissors, staplers, glue, paint, rollers, brushes, pens and materials for collage were all readily available on nearby shelves or tables. The area included the shelves and boxes to house the paper, card, tools, and materials, and drying racks were located nearby.

The wider setting was a New Zealand kindergarten. This was a state-funded kindergarten, run under the management of a regional kindergarten association which managed 24 kindergartens. At Barclay Road Kindergarten (not its real name) children started attending kindergarten three afternoons a week when they were aged between three- and three-and-a-half years, depending on the waiting list. Children left for school from the morning sessions on their fifth birthday, and as vacancies occurred in the morning session so children 'graduated' to morning kindergarten from the afternoon session. Children at the morning session at Barclay Road were aged four

years three months to five years. Seven children left for school during the observation period, and seven children moved in to the morning session from the afternoon. This kindergarten took children from a range of socio-economic areas, although it is sited in a middle class suburb of well-established housing. Some children came from nearby rural areas and some from a nearby lower-income housing area. There was a roll of 45 children, with three teachers; the Head Teacher and one of the other teachers were permanent appointments, the third teacher was a reliever. All teachers were qualified with a Diploma of Teaching in early childhood (a three-year qualification or its equivalent). The data was collected during the first six weeks of the first term in 1995. During the observation period the third relieving teacher left and was replaced by another (qualified) reliever, and the Head Teacher left to go overseas. For the last eight days of the observations the Head Teacher was replaced by a succession of relievers. One teacher was therefore at the kindergarten throughout the observation period, during which there were two holidays, two strike days, and one morning taken up by a farewell morning tea for the Head Teacher. This resulted in 25 mornings of observational data.

I observed the construction table (and nearby floor and screen printing area) every morning session from after 'mat-time' (a period at the beginning of the day, about 20 minutes, when children and a teacher or teachers gathered together for stories songs notices and discussions) until 'tidy-up time': about two or two and a quarter hours a day. This was a 'free play' time when children were allowed to play anywhere, so most of the activities were self-chosen and self-directed, with adults and peers either helping or alongside. I was a participant observer (section 4.5.2 (i) gives details of my role). I wrote field notes, and audiotaped the talk: one audiotape recorder sat on the construction table (providing data on what I called the Table Tape), one audiotape recorder sat in my shirt pocket (providing data on what I called the Pocket Tape). A video camera recorded the action at the construction table for the final fourteen days of the observations (section 4.5.2 (iii) describes the nature of the primary data). The research procedures are further detailed in the section on accountability that follows.

4.5.2 Accountability

The previous discussion has indicated that there are a number of ways in which interpretive studies must address accountability and ethical issues. A further accountability measure, very much in the spirit of interpretive inquiry, might have been to have two researchers observe the same episodes (for example, Cullen and St George, 1996); however even though this was not practicable in this case, in an early childhood setting it might have altered the naturalistic quality of the setting beyond the

usual and driven the teachers away. Accountability concerns and issues already raised in this chapter were addressed in this study in the following ways.

(i) *The role of the observer*

In this study, I was a participant observer. Sometimes I observed only, and sometimes I assisted children with their constructions. My role was closer to Atkinson's (1979) category (d) - participant as observer, in which the fieldworker becomes more closely involved with the actors - but rather different from Corsaro's (1990) in which the children treated the observer as a 'big kid'. I had already been part of the kindergarten scenery for the previous year, taking on a mixture of observer and helper roles. It was too late to be a 'big kid' even if I wanted to, which I did not. Such a role is too ambiguous, creating a new category of research-induced 'peer' relationships between adult and child that I did not want to introduce. Children saw me as an adult. Davies (1989), in her study of the construction of gender in an Australian preschool says that she was sometimes granted 'child status' and describes an event in which she is chased to the top of a climbing frame by a group of boys (pp.37-38). Although Davies was observing in this centre two days a week over a period of three months, reading them stories, discussing gender roles, and participating, I cannot imagine that the granting of 'child status' was in any way the same as peer status for a child. It had to be a new research-induced and ambiguous relationship, linked in some way to the fact that Davies was also creating contrived opportunities for surfacing gender beliefs and roles. She also describes herself as occasionally taking the role of 'contingency friend':

I gained access to many conversations in this capacity. I could be used as a contingency friend since I was often sitting around on my own. I was a good listener, and I did not cling on to them when their real friend came along. (p.35)

I occasionally took on this role too, perhaps not a contingency *friend*, but as a safe place for a child to stop and have a chat, sharing information about themselves perhaps, or surveying the social scene and waiting for a friend to appear. For example, one of the children comes past dressed up and pushing a pram, and tells me she could do with a 'sister' but can manage without one (she does not see me as a candidate) (20/2¹ FN² and PTA³); another child comes over to tell me that Dad took her little bed and 'broke it in the pieces and put it in the garage' and she sleeps in a big bed now (28/2 PTA).

¹ Date: 20/2 is February 20th. The first term for the year began on January 31st.

² FN = Field Notes

³ PTA = Pocket Tape side A. PTB = Pocket Tape side B. TTA = Table Tape side A. TTB = Table Tape side B.

I wanted to take on a role that was familiar to the children and acceptable to the teachers, and the role can best be described as that of a distant parent helper. Like King (1985), I did not want to be a ‘teacher-surrogate’, not so much because it would give me an unusual view of the children, but because I did not want the teachers to stay away from the construction area. They were part of the every day environment, and I wanted to see that in action. Also, I did not want to end up in a supervisory role. When I thought children were demanding too much of my attention, I used King’s (1984) tactic of avoiding eye contact (appearing to be watching somewhere else), or smiling but not helping. For part of the time I sat near the construction table and took notes. When the children asked me questions I responded, when they asked for help I usually helped, and occasionally I initiated an interaction, asking the children how they were getting on or if they could explain their difficulty. When I did take an active role in assisting with construction I copied the teachers (who were professional and competent), following Dyson (1989 p.17) who, as a participant observer of child writers in a first grade classroom said ‘I occasionally responded to the first graders’ completed products as their teacher did, in order to maintain the children’s trust’. Dyson’s original strategy of observing a child make an error, and smiling and nodding when the child showed her the work, had led to ‘anger and mistrust’ when the teacher later made corrections. She commented:

I, therefore, did respond to their complete work as Margaret [the teacher] did, when requested to do so and when such a response would not interfere with my observing a particular child (i.e. when I was not “too busy”). (Dyson, 1989 p.17)

Typical interactions were supportive or, occasionally (when requested), as collaborator. An example of adult support is included later in this chapter in section 4.7.3.3. My interactions with Martin (described as adult support) and Tom (described as adult collaboration) are described in detail in the chapter on making a dinosaur and making a monster (chapter 6). On one occasion Susie asked me to get the rabbit out of the cage for her to hold.

Susie: Can we hold can we hold um your the rabbit?

Observer: The rabbit. Oh. I don’t know about the rabbit. I’m not in charge of the rabbit.

Susie: You’re not you’re not you’re not the real teacher.

Observer: No, no. I’m an observer who helps sometimes. So I’m not a rabbit person I’m afraid.

Susie: No. (she laughs)

(9/3PTA 11.14-11.30⁴)

Susie probably reflected the other children’s views when she said ‘you’re not the real teacher’.

⁴ Numbers refer to time on the tape; in this case from 11.14 to 11.30 minutes on side A of the Pocket Tape. The Pocket tapes were not always transcribed; they provided back-up for the Table Tapes.

Issues of informed consent, confidentiality and harm

In this study, the children knew I was observing, audiotaping and videotaping the construction area; my responsibility as a researcher was to respect their trust that there would be no harm in this. Their families had given written permission, and knew that the identities of the children would be confidential. The teachers too knew that their identities would not be revealed. Although the major 'subjects' were the children, I regularly discussed the research with the teachers, informally over morning tea, and in a taped interview in the middle of the observations. By the time I had fully analysed the data neither of the original permanent teachers was still at the kindergarten. A few weeks after I had completed my observations I wrote a 'Work in Progress' paper for the teachers and the parents. The only teacher who was still there read it, did not want to change anything, and was pleased with the picture it presented of her teaching. I was happy that she was comfortable with the early analysis, but I had removed her ownership of it by making her anonymous, since I had promised anonymity to all the players. She was not harmed, but nor was she given appropriate credit. Halfway through the project I made a display of some of the photographs for the kindergarten wall, to provide families and children with a progress report on the project. In the taped interview with the teachers we talked about their reactions to the recording, and I asked their opinion on the discourses I was finding. They were becoming very busy with staff changes, and, once they were reassured that they were doing 'OK', the most comfortable and convenient involvement for them was during informal chats over morning tea.

Part of being 'not the real teacher' was to avoid a disciplinary role. On only one occasion did I intervene in a 'disciplinary' manner, when two boys were hammering with staplers and the teacher nearby was trying to read a story, clearly unable to both attend to the story-readers and to the staple-hammerers (Field notes, 27/2). An observer who will not intervene in a crisis (although this was certainly a mini-crisis) runs considerable risk of alienating the adults; the teachers were very supportive and welcoming, and I had to make judgements that included not abusing their welcome and trust. In my observations I did not feel called upon to intervene in any major way, although during informal discussions with the teachers we talked about what the children were doing and on occasions this would have made a difference to their focus of attention. I knew that Lisa was being excluded by Nell and Jinny (Nell criticised her for watching, and said 'Don't watch my friend, Lisa. It's rude . . . Only friends are allowed to look at other friends' 21/2TTA 41.18), but so did the teachers, and they were working at encouraging Lisa to be less dependent on adult approval in the hope that this would help social interactions among peers. When to intervene is a difficult matter for teachers, as Paley's *You Can't Say You Can't Play* (1992) makes clear; it is

clearly an even more complex matter for a participant observer. My rule of thumb was to be responsible in major crises, not to be trapped into a supervisory role, and to minimise actions that would have made the environment especially unusual, given my role as a 'parent helper'.

(ii) *The collection of additional data of a more focused or contrived nature; often these are interviews*

The primary observational data was collected in field notes, audiotaped talk and videotape (see (iii) below). Additional data was collected from a focused interview with the children after the observations. This 'played back' the children's activities to them in a storybook format, to check out some interpretations about their goals and their responses to difficulty. It was the nearest I could get to an insider, four-year-old, voice on my interpretation. Many of the methodological difficulties of interviewing four-year-olds became rapidly apparent. Earlier, informal attempts at questioning the children about their learning had not been particularly successful. A typical response was as follows. As I tried to elicit thoughts from the children while we were involved in a threading activity outside, Nell shifted the conversation's topic to one where she was helping me with my threading.

Observer: What do you think you'll be able to do Nell, when you're five, that you can't do now?
 Nell: Don't know. (pause) Are you doing yours?
 Observer: I've only put one thing on mine haven't I?
 Nell: Can't you choose anything?...Here's something. What are you making?
 (16/2TTB10.40-11.03)

I devised a more structured interview, to try to reflect back to the children my interpretation of their learning stories, and to couch it in a learning story form, weaving story elements into the hero or heroine's dilemma. I prepared a story book with an incomplete ending, and two weeks after the completion of the observations I returned and interviewed 38 children over five days. The text was based on the technological practices and learning stories I had observed during the previous two months; the illustrations were an adaptation of the illustrations in a picture book 'Emma goes to nursery school' with an apology to Gunilla Wolde (Wolde, 1976). There was a version where the main player is male ('Joshua goes to kindergarten') and one where the main player is female ('Linda goes to kindergarten') (see Appendix 5). This format, a way of 'playing around' with the concept of an interview (Langsted, 1994; Scheurich, 1995), may have mitigated some of the traps of interviewing four-year-olds in the following ways:

(a) It provided *something to talk about*. As Davies (1989) found in the first stage of her study of four- and five-year-olds and gender, when she chose eight children

from varied backgrounds and ‘spent hundreds of hours’ reading stories to them, a conversation about a story is a good focus for an interview.

(b) It *made sense* to the children that I should write a story about making things in the kindergarten after having observed faithfully for so long. I may have found my way around the ‘right answer’ problem. An open-ended story was strange to them, but it gave me a reason for asking their advice: I needed help and guidance.

(c) Book reading was a natural and *meaningful activity*, and the children were interested in the story because it reflected their own experience back to them.

(d) I interviewed them wherever they chose or wherever seemed comfortable - storeroom, outside on a cushion, in the sand pit, in the book corner - and on five occasions I interviewed them in pairs. In a pair or *group* situation, children will answer the questions they want to, ignore those they see as incomprehensible, silly or irrelevant, talk about topics of interest, and walk away when they’ve had enough. On their own, children tend to be more polite and on task, struggling to give replies that they think might answer the questions. In hindsight, the group interviews give more *agency* and choice to the children. Here are some excerpts from my interview with Wendy and Rachel. They want to talk about being friends, and their conversation wanders off in directions that they are in charge of. It is a moderately natural event.

(Wendy says that the heroine should do what her friend says, and the conversation turns to being friends; I comment that their other friend Susie is away today).

Observer: Have you always been friends you three?
 Wendy: Yeah.
 Observer: How did you get to be friends?
 Rachel: Cos we just made friends didn’t we?
 Wendy: Yeah. We just knew each other’s names.
 Rachel: Yeah cos cos she told me.
 Wendy: Yeah. I used to play with Robert at afternoon kindy.
 Rachel: And I used to play with Robert as well eh?
 Wendy: Yeah.

· · ·
 (Observer has shifted the conversation to what is difficult; Wendy suggests writing her name).

Observer: What about you Rachel? Did you learn to write your name here or at home?
 Rachel: At home, cos when I left Mum showed me how to do ‘e’s cos I couldn’t.
 Observer: ‘E’s are tricky aren’t they.
 Rachel: When I was a baby I could do ‘e’s.
 Wendy: So could I.
 Rachel: And then we forgot.
 Wendy: (...) ⁵ scratch. Is that when you fell off the chair?
 Rachel: No! That’s when (pause) I went under my bed. I like my pony tail in my hair.

⁵ (...) = indistinct word or words

The children were asking questions too. Here, in contrast, is a one-to one interview with Joseph; the adult is in charge, and Joseph is searching for answers:

- Observer: What do you think he should do?
 Joseph: Make a sun hat.
 Observer: Make a sun hat. And how do you think he would do that?
 Joseph: Sew.
 Observer: (misunderstanding) What would he use to make the sun hat with?
 Joseph: Stitch
 Observer: (misunderstanding) Sticks? What kind of sticks?
 Joseph: You know, sew, and you put needles in.
 Observer: Oh, sew, he might sew it. With some material?
 Joseph: (nods)
 Observer: And what if he made a mistake? What would he do then?
 Joseph: Tell his Mum.

In a participant observation research method, in a natural setting, the agency can be shared with the children, in the same way as it would be if the researcher was a teacher. In a structured interview situation, however, the researcher has created a more or less artificial context, and the data comes from the children's interpretation of the researcher's intent. Children's responses will be, to a greater or lesser extent, an attempt to interpret the researcher's point of view and to provide the right answer. The lesser extent is enhanced by reducing the power of the interviewer in the ways described. This reduction in power, Tammivaara and Enright (1986) suggest, is assisted by the practice of beginning research with participant observation rather than interviews so that the interviewer enters the situation with assumptions that to the best of her knowledge are shared by the informants or their community, by developing rapport with the informants over time, and by a genuine desire to hear the informants' points of view. In this study, the participant observation informed the interview, I had become familiar to most of the children by the time of the interview, and I was indeed genuinely interested in their solution to the 'what should she/he do?' question and their comments on difficulty.

(iii) *Ensuring the robust nature of the primary data*

Talk at the construction table was audiotaped using a tape recorder with an attached baffle microphone on the table. Another tape recorder in my pocket provided backup transcripts if I was involved. I videotaped the last fourteen days of the observations, usually setting up the camera on a tripod at the end of the table and leaving it running. Occasionally I would move the camera, as I did for the butterfly episode (chapter 5), to the floor beside the construction table. I took some photographs of the children's work, but did this sparingly; it was unusual behaviour in this centre, and I did not want the children to start making things in order to have a photograph taken. I wrote field notes during the session, writing them out fully on the same day if possible. I had

hoped that a research assistant would have been able to transcribe the data, but I found that because I knew the context and rapidly came to recognise and to be able to interpret the children's voices, I had to transcribe the table tapes. The first run of the pocket tapes was transcribed by a research assistant: if I needed to use the material I listened to it as well.

I was prepared for the possibility that the audiotaped material would be mostly too difficult to transcribe, and that the children's speech would be characterised by indistinct mumble. Transcripts of four-year-olds in a busy early childhood centre are sometimes impossible to transcribe; often there was music in the background as well. However this did not, except occasionally, prove to be the case. Although the transcripts are not as clear as they would have been if the children were wearing microphones (a method we used in the EMI-4s study; Young-Loveridge et al., 1995), the transcripts provided a wealth of material, capturing the exchanges and the characteristics of the discourse in great detail. Putting microphones on the children is a possible strategy if the researcher is tracking a particular child; I was tracking a particular *place*, and putting microphones in the place worked well. Many four-year-olds are not particularly articulate, and I have included observations and episodes where the players are not necessarily doing much talking. I was mindful of Ball's (1985) warning that distortions can occur when researchers rely on outgoing and articulate children to provide 'good' data.

(iv) *The characteristics and experience of the researcher*

The researcher in this case could be described as a knowledgeable practitioner, having been a kindergarten teacher for five years prior to current employment at the university, and having been centrally involved in the writing of the national curriculum document. I brought another disciplinary perspective to the project from a background as a human geographer with an interest in the effect of technology on society and power structures. This early social and ecological interest has been supplemented (but not replaced) by an increasingly psychological focus (Carr and Claxton, 1989; Carr, 1994a) during my work as an early childhood educator at kindergarten and university. These two perspectives, sociocultural and psychological, and the attempt to integrate them within an educational framework, have informed this project at all stages. As outlined in the first chapter, it has provided one of the central tensions of the study. Incorporating a wide view of a topic increases what Jardine (1992) called the 'fecundity of the individual case': it adds to a story that has psychological, historical and sociocultural 'tendrils' of sense.

(v). *Taking a comparative approach*

Even within the micro-context chosen in this study, it was possible to use a comparative approach, using different activities or 'technological practices' (defined below) as 'case studies'. Episodes within each technological practice were not selected in any way: all were included. For instance, one of the technological practices chosen was marble painting, and all 17 episodes of marble painting were included in the data analysis. The marble painting summary was then compared with other technological practice summaries - screen printing (58 episodes) and hat making (42 episodes) for instance.

(vi) *Collecting enough data*

This study took six weeks of intensive participant observation. I observed the morning session every day that the kindergarten was in session. From the observational data I selected five activities that yielded 130 episodes in field notes, audio-tape, and/or video tape. Rogoff 'entered the homes not as a stranger but as a familiar foreigner, greeted with affection and reminiscences about shared experiences' (Rogoff, Mistry et al. 1993, p.23) I had spent a year regularly visiting the kindergarten before collecting data; the staff and the children had always made me welcome, knowing that I enjoyed the company of four-year-olds and saw it as important for an early childhood educator at the tertiary level to continue to experience young children in early childhood settings. I entered the kindergarten to collect data, not as a stranger but as a familiar and accepted outsider. I wanted to document the children's work every day, to capture changes from one day to the next, and to understand on-going topics and discursive practices. Miles and Huberman (1994) suggested that ethnographic studies can stop when events become repetitive. By six weeks, the same technological practices were occurring regularly, and they seemed to have the same features. It is also quite an intrusion for the teachers to have an observer every day, and the imminent arrival of a new Head Teacher confirmed that this was a good time to stop. I returned two weeks later to interview the children using the picture book, but not to observe the children.

(vii) *Combining the analytic with the systemic*

In this study, a big picture or system is described. Then sub-units of the big picture are analysed in some detail. The big picture or system is constructed of narratives about learning. One of the sub-units of a narrative is 'distribution of responsibility' and child-child and adult-child interactions from audiotaped transcripts are closely analysed using an 'adult power' coding scale (described below, see Figure 4.6) to provide

precision and definition. The different kinds of responsibility distribution are displayed in bar and line graphs.

I originally intended to analyse the data using the computer software package NUD*IST (Richards and Richards, 1994; Miles and Huberman, 1994). This programme will attach codes to segmented or chunked text and allow the researcher to make connections between codes through a 'tree' network. The preparation of the data into episodes was originally for this purpose. However, I found that I began to lose the continuity and the context when I attempted to code (and therefore to isolate) the segments or the chunks (speech moves, for instance) for the computer programme. It was an example, for me, of 'interpretive closure' that came too early in the data analysis. Keeping the context and the continuity in mind was easier for me without the software package, but it would be possible (and valuable for ethnographic studies of any size) to use qualitative analysis software for solving some of the problems of authenticity vs precision.

The methodology here, mixing quantitative and qualitative analyses, follows closely the methodology in Rogoff, Mistry et al. (1993), described there as 'functional pattern analysis' (see also Rogoff and Gauvain, 1986). Functional pattern analysis is defined by Rogoff, Mistry et al (1993, p.32) as follows:

1. Functional pattern analysis focuses on the unfolding development of purposive acts within ongoing events. Categories are functionally defined as they relate to the purposes of the event as a whole rather than as involving superficial behaviors independently defined and separated from their context.
2. The contributions of participants are examined in the context of other individuals; this differs from the traditional separation of individuals' behaviors to code them without reference to the efforts of others or to the development of joint activity over the course of an event. Evidence for constructing an account of the participants' goals is available in the communication of participants (including the researcher).
3. Patterns are analyzed with statistical methods as well as with examination of graphic arrays that allow tracking across multiple variables to examine patterns of interrelations and to account for anomalous or similar cases.

In each of four communities they visited the families of 14 toddlers (aged 12 to 24 months) for an interview focused on child-rearing practices and observations of (a) caregivers helping the toddlers operate novel objects (provided by the observers) (b) caregivers helping toddlers put on clothes at the request of the observers (c) toddlers exploring novel objects spontaneously during adult activities. Patterns of communication and attention were analysed for each family in each community, combining description, graphic analysis, and statistics. In this research, as in the Rogoff, Mistry et al. study: events are observed as a whole; the contribution of

participants is examined in the context of other individuals; and patterns are analysed with comparative graphic arrays.

4.6 THE RESEARCH TIME LINE

The time line of the research and related events is shown Figure 4.1. It begins with the work on the national curriculum project which included discussion with practitioners across the country about outcomes and curriculum for four-year-olds.

RESEARCH AND RELATED EVENTS TIME-LINE	
1991-1993	Researcher codirects with Helen May a national curriculum project to develop <i>Te Whāriki</i> , draft national curriculum guidelines for early childhood (Ministry of Education, 1993).
1994:	Informal and occasional observations at Barclay Road (not the real name) Kindergarten. Observer becomes familiar with the kindergarten; teachers and children become accustomed to her presence and note-taking. Approval and support from teachers for a proposed project, to make connections with the new curriculum and to be centred on the 'collage' or construction area.
1994:	Informed consent from Waikato Free Kindergarten Association and Barclay Road Kindergarten Committee. A letter sent out to families of Barclay Road Kindergarten children, and informed consent gained from families of children in the morning session and the older children in the afternoon session for observations, audiotaping, videotaping and photographs.
1995:	January-March. Intensive observations, tape recording, videotape recording of the construction area for the first six weeks of term. Photographic display mounted at the kindergarten for feedback to families.
1995:	April. Structured interview with the children, using a picture book written by the researcher on the theme of construction activities in a kindergarten.
1995:	August. Position papers and Work in Progress papers written to provide feedback to teachers, Kindergarten Committee, and Association.
1995:	September-October. Researcher works on theoretical framework - especially thinking and learning dispositions - with Robert Perkins and Shari Tishman during six weeks study leave as Academic Scholar with Project Zero at Harvard University.
1996:	Final curriculum document, <i>Te Whāriki</i> , published by the Ministry (Ministry of Education, 1996).
1995-1997:	Data analysis and write-up.

Figure 4.1. Research and related events: time line

4.7 THE UNITS OF ANALYSIS

As outlined in the last chapter, nowhere are the dilemmas to do with the sociocultural environment versus the individual, and with the whole versus the parts, more sharply focused than in the choice of units of analysis. It is the units of analysis that define an interpretive study. In chapter 3, and earlier in this chapter, three units of analysis (types of activity or action) were described: technological practice, narrative, and learning disposition. These were set out as a nested structure; with technological practice as the ‘locative’ system (Table 4.2). For the data analysis, episodes were gathered together into technological practices (Figure 4.2). Technological practices are: making a butterfly (a group construction), making a dinosaur or a monster, hat making, marble painting, and screen printing.



Figure 4.2. Episodes and technological practices

4.7.1 Episodes

Episodes or events have formed the context for a range of interpretive research studies, particularly those that focus on action or activity (Stodolsky, 1988; Csikszentmihalyi and Rathunde, 1992; Hatch, 1992; Rogoff et al., 1993; Carter, 1994; Smith, 1996c, 1997). In this study, the first decision was to combine the field notes, audio-transcripts, and video notes and divide the data into ‘episodes’. An episode was an event, defined by the nature of the activity and the child involved; if an adult arrived or left, it remained as the same episode. If the child abandoned one activity and started another, this was a new episode. In Smith’s (1996c, 1997) study of one hundred childcare centres licensed for under two-year-olds (see also Smith, 1996a), two children in each centre were observed using running records of the child’s activity in context for 10 minutes of each of two observation days. Every instance of a joint attentional episode was coded, a second independent observer read the observation notes, and the data coding was modified through agreement between two observers. Brief one or two turn interactions were excluded, and an episode of joint attention was defined as when both adult and child were attending to some activity, object,

conversation or game. In this study too, an episode was attached to an activity or a topic. Figures 4.3, 4.4, and 4.5 contain three examples of episodes described as 'marble painting'.

**AN EXAMPLE OF AN EPISODE (i)
MARBLE PAINTING, NELL & JINNY**

FIELD NOTES 21/2*

Nell and Jinny have arrived. Jinny writes name on paper, turns it over and puts it into the marble tray. She consults with Nell as to whether she can put her hands in. She tells Lisa not to watch Nell, but (Lisa is screen printing nearby) 'I'm allowed aren't I, 'cos I'm your friend'.

Lisa has been screen printing all the while, Alison comes over and suggests that she has done enough.

TABLE TAPE SIDE A 21/2

(37.11**)

- Jinny: Hey I do do a hand print.
 Nell: With this paint?
 Jinny: Yeah. I am. Get some more paint off it. Off that. (37. 20)
 Nell: There's heaps of purple. I mean yellow.
 Jinny: That's enough, that's too much.
 Nell: It's all twirly. Whoops. Do you want to do it? Can you please write my name on the back?
 Jinny: No. You can write it after.
 Nell: Gonna make one like me? Cos you'll get it all dark like that.
 Jinny: Yep. And then I'll do one with something else. Then I'll do one with.
 Nell: Pardon?
 Jinny: And then I'll do one with marbles.
 Nell: Same.
 Jinny: Think that's enough now.
 Nell: No I don't. You could make your own box. There's one what you can make it out of. The one that's. Find one middle sized and kind of like this one. (38.52)
 Jinny: I think I'll just probly like it.
 Nell: I've had enough now Jinny. (paper comes out) Ooh. (39.05)
 Jinny: I've written my name. (41.04) Should I really do it Nellie? Should I really do it?
 Nell: Yep.
 Jinny: Should I really really really? (put her hands into the paint)
 Nell: 'K. (they laugh). (41.18)
 Nell: Don't watch my friend, Lisa. It's rude.
 Jinny: Yeah.
 Nell: But I'm allowed eh Jinny.
 Jinny: Yeah cos you're my friend.
 Nell: Only friends are allowed to look at the other friends.
 Jinny: Look that's all, that's all I'm gonna do. See. Cos I want it in a nice colourful circle.
 Nell: I think I need some more paints. (41.57)

*date (21/2=21 February)

**position (time) on the tape

Figure 4.3. An example of an episode (i): marble painting, Nell and Jinny

**AN EXAMPLE OF AN EPISODE (ii)
MARBLE PAINTING, NICK**

TABLE TAPE SIDE B 21/2

(12.40)

Danny: What are you doing.

Nick: I'm going to be the monster again.

Danny: Eeeh. Gosh.

Nick: This one's squiggling, I'm going to getting my fingers all de dah. oooooaaah. So I can scare the baby bird.(13.09) I'm getting all, this is grease.I'm going to put some grease on my hands.

Danny: I like you being the monster. Cos I like them when I won.

Nick: Ah.(13.40)

VIDEO NOTES 21/2

(10.49) Nick puts paint and marbles into tray, rolls them around. (10.51) Nick is manipulating the marbles with the spoons. Danny stands nearby, looking around. He watches Nick.

FIELD NOTES 21/2

Nick (his last day) is spending the morning wandering around and roaring at everyone, not at all engaged.

Figure 4.4. An example of an episode (ii): marble painting, Nick

**AN EXAMPLE OF AN EPISODE (iii)
MARBLE PAINTING, NELL & PENNY**

FIELD NOTES 27/2

Nathan has got the last piece of computer paper. Nell is waiting for one before she does a marble picture. (Ann tears more off). Penny talks to Nell at the marble box: 'After you'. Nell spoons paint into the marble box. Penny uses her name card to write her name, puts it back, waits by Nell. Nell hangs up her marble painting and Penny takes over.

VIDEO NOTES 27/2

10.12. Nell comes with marble box and a piece of paper. Nell tries the paper in the marble box but it's too big. She stands there. Penny has borrowed her crayon? It appears back on the table, and Nell writes her name on the back of her paper. (10.12 am) Lisa gets a piece of paper, watches Nell do a marble painting.10.9 Nell is marble painting. 10.20 Penny now puts a sheet of paper into the marble box. Meg has come over, so has Linda. Meg is drawing/writing on a piece of paper. Linda gets a piece of paper. (10.20) Lisa watches Penny doing a marble painting. Penny is now finger painting in the marble box 10.23 Linda is painting opposite: Are you 'llowed to do that? Lisa watches too. She tells Ann who comes over: OK That's all right. 10.25 Penny hangs up her picture.

TABLE TAPE SIDE A 27/2

(28.07)

Ann: What would you like to do Penny? OK. Well you could have a turn after Nell. Would you like a little bit of help? (to Mark) That's great you've got it up there. It's just that it's tipping a little bit. You might like to put away the staplers and things you've been using. That's where they go now Mark, so it's ready for the next person.

Nathan: No, I'm going to make a picture.
(28.50)

MARBLE PAINTING, NELL & PENNY	
cont'd	
Nell:	Can you go and get me a crayon? (28.42). (29.03) Thank you. Now you've got to write your name.
Ann:	Well, you've got to draw your picture first. (29.23)
Lisa:	Look, I know how to do my name now.
Ann:	OK, we'll draw your picture first and cut it out for your screen print. That's your first job.
Penny:	I want to do something of that.(29.56)
Nell:	After me
(29.59)	
Penny:	Yes, after you.
Nell:	Yep, after me.
.....(cont'd)	

Figure 4.5. An example of an episode (iii): marble painting, Nell and Penny

Given the complexity (often eight or more children involved in a range of activities at the construction table at one time) it has not always been possible to pinpoint the beginning and the end of some episodes. At the time they were recorded or observed, they were often broken up, separated by other episodes; these interruptions have largely been lost. For instance on 7/2 (February 7th) the order of episode parts were as follows:

Hat, Peter and Observer (a) (*Peter's hat making begins*)

Collage, group, Linda, Meg and Alison (a)

Hat, Peter and Observer (b) (*Peter's hat making continues*)

Collage, group, Linda and Meg (b)

Hat, Peter and Observer (*Peter's hat-making episode ends*)

All the three parts of the hat-making episodes were then gathered in the one place, as the 'Hat, Peter and Observer' episode. The other divided episodes like it, were also moved together. Meaning took precedence over continuity. Stodolsky's research on ten-year-olds and classrooms used membership change, instructional format change, change of physical location, discontinuity of time, change of instructional topics or materials to define episodes (Stodolsky, 1988 p.26). Hatch (1992) in his study of four-year-olds in sand and construction play) did not include episodes or segments of less than five minutes. However, I was not always able to time an episode very accurately, and have included some for which I have scanty notes and transcript.

4.7.2 Technological practices

Technological practices were the primary unit of analysis for the data (Figure 3.1). Inspection of episodes indicated that the same activity occurred frequently. These were gathered together as case studies of activities or technological practices (Figure 4.2). One lengthy episode and another activity with two episodes were included in the

analysis because they illustrated the processes that emerged from the three larger groups. The technological practices contained the following number of episodes.

Making a butterfly:	1
Making a dinosaur or a monster:	2
Making a hat:	42
Making a marble painting:	17
Screen printing:	58

A technological practice has as its defining characteristic the physical setting, in particular a technological process (the use of specified tools materials and other symbolic mediational means like writing) or its product, or both (see Table 4.2). It is an activity of a similar nature but on a rather smaller scale than Bronfenbrenner's *molar activity* (which would include all art and craft enterprises for instance) (Bronfenbrenner, 1979), or Scribner and Cole's *activity* (which would include a community's literacy activity for instance) (Scribner and Cole, 1981).

TECHNOLOGICAL PRACTICE	PHYSICAL SETTING	TOOLS AND MATERIALS	PRODUCT
Making a butterfly	X	X	X
Making a dinosaur or monster	X	X	X
Making a hat	X	X	X
Marble painting	X	X	
Screen printing	X	X	

Table 4.3. Defining characteristics of technological practices in this study

Table 4.3 sets out the defining characteristics of the technological practices in this study. For two of the five technological practices described, marble painting and screen printing, the use of specific tools and materials is sufficient as a defining characteristic; the use of the readily defined marble-painting equipment did not always result in a marble painting, and the use of the readily defined screen-printing tools and materials did not always result in a screen print. The other three technological practices (making a butterfly, making a dinosaur or making a monster, and making a hat) share the same tools and materials: cardboard, paper, collage materials, paint, brushes, rollers, glue, staplers, cellotape, hole punch. They are defined by the process *and* the product, even if the product was abandoned part way through the process. In the butterfly-making technological practice, the product was a large mural-type butterfly. The data from other construction activities are included occasionally, especially where I wanted to see if the children's work in the target technological practices was 'typical'. Data from practices outside this construction area (block building, pretend play, mat time) is also occasionally mentioned, but this material is not part of the

central data. I have transcripts from nearby dramatic play and block building only because and when nothing was going on at the construction table. I was not, therefore, investigating the whole of the kindergarten programme. Other practices and narratives about learning were going on elsewhere, and I was not recording them.

4.7.3 Learning narratives

Another unit of analysis, nested inside the technological practices, was narratives. Narratives are the ‘relational’ unit of analysis (Bruner, 1990; Howard, 1991; see discussion in the previous chapter). Here I use the term to refer to ‘stories’ or *learning* narratives. They comprise three domains of learning disposition (see chapters 2 and 3 in which I argue for these three domains):

(i) *discourse appropriation, construction or display*. The topic is the appropriated discourse or discourses. The topic will be displayed or developed by elaboration or construction.

(ii) *response to trouble*. The story line also includes response to what Bruner has called ‘trouble’ (Bruner, 1996 p.94: trouble ‘drives the story’), a question or a challenge. A narrative topic and a narrative direction may be robust or fragile, persistent or vulnerable to the first sign of trouble. I have retained this notion of ‘trouble’ for difficulty and uncertainty throughout the data chapters (see below, section 4.7.3.2 for a definition).

(iii) *the distribution of responsibility*. Responsibility for keeping the action going and the direction coherent will be distributed across the adults and the children, in a symmetrical (as joint attention or collaboration, Rogoff, 1990) or asymmetrical way.

The parts of a learning narrative, the domains of learning disposition, are explained further in the next three sections.

4.7.3.1 Learning narratives

part 1: discourse appropriation, construction and display

During a year of preliminary observations of the construction table in various early childhood centres some frequent four-year-olds’ personal ‘agendas’ revealed themselves as salient topics in learning. I speculated about their influence on the children’s learning, discussed them with the staff in the centres, and wondered whether to call them agendas, domains, subjects, topics, or discourses. The literature (see chapter 3 and section 4.2.1 in this chapter) suggests that ‘discourse’ is the most useful term, and Fairclough (1992) Gee (1992) and Davies (Davies and Harré, 1990)

have provided rationale and definitions. Fairclough is particularly precise, emphasising linguistic strategies and the characteristics of text:

Discourses correspond roughly to dimensions of texts which have traditionally been discussed in terms of ‘content’, ‘ideational meanings’, ‘topic’, ‘subject matter’, and so forth. There is a good reason for using ‘discourse’ rather than these traditional terms: a discourse is a particular way of constructing a subject-matter, and the concept differs from its predecessors in emphasizing that contents or subject-matters - areas of knowledge - only enter texts in the mediated form of particular constructions of them. (Fairclough, 1992, p.128)

Fairclough recommended that terms for particular discourses should designate both the relevant area of knowledge (e.g. medicine) and the particular way it is constituted (e.g. techno-scientific); a discourse would then be labelled ‘techno-scientific medical discourse’. In this study the label ‘four-year-old-kindergarten friendship’ discourse means that the discourse is about friendship and it is constituted at the kindergarten by the children. Since no generalisations are, or can be, made about whether the nature of the discourses documented here are the same in other kindergartens, a more accurate title would be ‘Four-year-old Kindergarten A friendship’ discourse. The early part of the label will be dispensed with, and throughout the study discourses will be referred to as, for instance, the ‘friendship’ discourse, or discourse about ‘being a friend’.

Discourse is used in the research literature in a number of different ways. Petrova (1996) followed an analytical model proposed by Fairclough to analyse power and positioning in seven conversational sequences in a child care centre from a gender perspective. In three of the task situations (the Money Game, Making Pancakes, and Mixing the Witch’s Cake) she noted that

the girls position themselves in a *classroom* discourse, while switching back and forth into the *dramatic performance* discourse. (Petrova, 1996 p.140, my emphasis)

Another example of early childhood research that used discourse and discursive strategies as a basis was Jordan et al. (1995) who described young children’s physical and discursive strategies for gaining power, and within discursive strategies they focused on the use of rules. They described the discourses made available to children as discourses of *order*, *consideration for others*, *responsibility*, and *diligence*. They discovered that

Individuals wanting to gain control of equipment, to dominate others, or to resist domination can select from among these discourses the rule most likely to serve their purposes and insist that it defines the situation and determines the appropriate subject position of each of the actors. (Jordan et al. 1995 p.343)

They later (p.350) shifted to a different use of discourse when they described children’s ‘easy slippage’ between ‘discourses referring to the “real world” in which

they find themselves' and those which assume 'a shared fantasy world'. The first set of discourses referred to adults' imposed notions of good behaviour (selected by the children when it suits them); the second (in a similar fashion to Petrova) to a binary categorisation of the children's play world: 'real' or fantasy.

This study takes its definition of discourse from Davies (1993) and Gee (1992) (see chapter 3, section 3.4.2). It defines discourse as being like a 'club', invoking notions of membership, belonging, and inclusion (Davies and Harré, 1990). Gee (1992, p.20) uses Discourse (with a capital "D") to include people, objects (like books), and characteristic ways of talking, acting, interacting, thinking, believing and valuing:

Each Discourse in a society is "owned" and "operated" by a socioculturally defined group of people. These people are accepted as "members" of the Discourse and play various "roles", give various "performances", within it....Discourses are always ways of displaying membership in a particular social group or social network. (Gee, 1992, p.107)

Discourses in this sense include ways of being apprenticed, ways of showing you belong, and 'folk theories' (Bruner, 1986; Gee, 1992). In this study, *being a friend* is a discourse. So is *being a kindergartener*.

Privileging. This definition of discourse includes the notion of 'privileging'. Inter-discourse processes include decisions about which discourse or discourses are chosen over others that are available; a useful word for this process is 'privileging'. Wertsch (1991) used 'voice' as a unit of analysis instead of discourse; here he wrote about the choice of one voice or 'mediational means' over another in terms of *privileging*:

I shall address the issue of the organization of mediational means in a dominance hierarchy in terms of the notion of "privileging". Privileging refers to the fact that one mediational means, such as a social language, is viewed as being more efficacious than others in a particular sociocultural setting. My use of *privileging* instead of a term such as *dominant* or *domination* is motivated by several considerations. First, privileging comes with much less theoretical baggage attached to it, so one can use it in a more restricted sense. In addition, in contrast to domination, which is closely tied to the study of social structure, its focus is psychological processes. It is concerned with the fact that certain mediational means strike their users as being appropriate or even as the only possible alternative, when others are, in principle, imaginable. (Wertsch, 1991a, p.124)

The notion of privileging will be applied in this study to discourses, narratives, and dispositions.

Discourse appropriation, construction and display. The study will describe the children's involvement with discourses as *discourse appropriation, construction and display*. Rogoff (1990; Rogoff, Chavajay et al. 1993; Rogoff, Mistry et al. 1993) used

the word *appropriation* in preference to ‘acquisition’ of ‘transmitted’ social or cultural things to imply *participation* at the interface between the individual and the environment. This notion of discourse appropriation and construction implies a transactional model in which learners are interpreting an occasion, selecting and adapting a discourse. It includes the idea that discourse boundaries and membership criteria can shift and be shifted; it allows room ‘for both individual creativity and for social resistance to domination and hegemony’ (Gee, 1992, p.111).

. . . one can balance roles that actually simultaneously “count” in two or more Discourses and in the act of this admixture create rather “novel” performances. Both of these can change Discourses and even lead to new ones. (Gee, 1992, p.111)

Discourse ‘display’ returns to the idea that a discourse is like a ‘club’, and on many occasions the children’s aim will be to display their membership.

Not all the discourses identified in this study were as apparently linked to personal identity as, say, friendship. Children were making things and talking about what they were making; they were watching caterpillars weaving chrysalises and commenting on what they saw; they puzzled about many aspects of the way the world is or should be (Tizard and Hughes, 1984; Inagaki, 1992). One option is to call these latter more ‘worldly’ topics ‘communities of practice’, following Lave and Wenger (1991): communities outside the kindergarten into which the children are being apprenticed by their early childhood experience. However, in a sense, friendship is also just such a topic, originally developed in the world outside the kindergarten, and it seemed too unwieldy to have both discourses and communities of practice, so I decided to use the term ‘discourse’ (with a small ‘d’) for personal, social, and technological topics. The title of one of the latter, ‘being a technologist’, will give heavy weight to playing around with materials and making things, but I have kept that label because even although it is unlikely that the children aspire to, belong to, or see themselves as belonging to, the ‘club’ of technologists, they might use a word like ‘makers of things’ in this way.

The discourses, their appropriation, construction and display, are a central entity in narratives about learning and a key domain of learning disposition.

4.7.3.2 *Learning narratives*

part 2: response to trouble

Chapter 2 argued that the second part to a learning narrative is to do with the children’s response to difficulty or trouble. A central feature of Dweck’s research (for example, Dweck, 1986) was an investigation of how children approach and respond to difficulty

and uncertainty. I have followed the Bruner (1990 p.55) pattern and described this as trouble (section 3.4.3). Trouble was defined here as any one of the following:

- (a) an attempt by a peer or an adult to increase the difficulty or introduce a challenge (Meg will suggest that the children stop collaging bits of material and try to add antennae to the butterfly construction; an adult will ask Martin if he's going to try to add legs to his dinosaur),
- (b) a questioning of a child's right to belong to a discourse (Linda will tell Meg that she is not her friend any more),
- (c) the accepted rules or canons of behaviour that define a discourse are threatened (the girls will leave the butterfly construction when the boys act 'silly'; Penny will apparently flout the rules of proper kindergarten behaviour when she finger paints where she should be marble painting).

The research followed up the children's observed responses to difficulty by talking to them about an incident to do with the first of these, an attempt by a peer or an adult to increase the difficulty or introduce a challenge. This interview is described in chapter 11. Sometimes, but not always, trouble is accompanied by a change in affect: anxiety or excitement, but I did not explore this aspect of the response to trouble in any systematic way and did not use it as part of the definition.

4.7.3.3 *Learning narratives*

part 3: distribution of responsibility

The third key domain of learning disposition, argued for in chapter 2, is reciprocal and responsive relationships, or the distribution of responsibility. It is part three of a learning narrative, described variously as power (following Foucault, 1972; for example Bowers and Flinders, 1990 p. 164; Petrova, 1996), agency (for example Bruner, 1990, 1996), distribution of responsibility (for example Rogoff, Mistry et al., 1993), or positioning (for example Davies and Harré, 1990). In the literature on discourse, intra-discourse processes include how an individual changes her or his agency within the discourse: how she or he is 'positioned' and positions herself or himself.

. . . the concept of 'positioning'. . . helps focus attention on dynamic aspects of encounters in contrast to the way in which the use of 'role' serves to highlight static, formal and ritualistic aspects. (Davies and Harré, 1990, p.43)

One way to research this part of a narrative is by discourse analysis. Discourse analysis originally referred to the analysis of transcripts and texts for linguistic purposes, but code models have been overtaken in the education literature by socio-linguistic and hegemonic models (Fairclough, 1992). Examples of code models are Hoyle's (1994) research on discourse markers used by eight- and nine- year-olds as

bracketing devices, and Sprott's (1992) analysis of discourse markers 'because' 'so' 'and' 'but' and 'well' in young children's verbal disputes to document the emergence of reasons and contradictions. Harwood and Giles (1992) combined code and hegemonic models to analyse the language markers and humorous devices in six episodes of the television programme 'Golden Girls' that make age salient and propagate views of the elderly that are in effect inconsistent with the show's public agenda. Van Dijk (1993) uses critical discourse analysis to analyse parliamentary debates about ethnic affairs. Petrova's (1996) analysis of six conversations in a child care centre focused on organizational properties of the children's dialogue such as initiating and responding moves, turn-taking, questions, statements, and commands to analyse dominance and jointly produced collaborative speaking 'floors' (p.69). One of her conclusions (p.133) was that some contexts and tasks featured a more symmetrical participation between boys and girls, and other contexts were characterised by a more asymmetrical turn distribution.

Fairclough's analytical model was closely linked to text, to words writing and transcripts. However, at the same time he provided a useful way of combining language analysis and social theory by describing discourse (and discourse analysis) as three-dimensional. He analysed a 'discursive event' as simultaneously (a) a piece of text that invites close textual and linguistic analysis, (b) an instance of discursive practice that invites analysis of the types of discourse chosen and how they are combined, and (c) an instance of social practice that invites an analysis of the institutional and organizational circumstances of the event. This study analyses a discursive event mostly at Fairclough's levels (b) and (c), although adult speech will be coded for power as well (level (a)). Occasionally the children's speech is analysed for markers of collaboration (for example their use of each other's names, questions, instructions), but as a measure of the power within technological practice it is the adult's utterances that are examined and coded.

Two studies provided guidelines: (i) Rogoff, Mistry et al. (1993) and (ii) Wood and Wood (1983). Their contribution will be assessed, the coding for this study will then be explained, and alternatives compared.

(i) *The Rogoff, Mistry et al. study*. Rogoff, Mistry et al. (1993), in their cross-cultural study of mothers and toddlers used the term 'distribution of responsibility' instead of 'role' or 'position'. It refers to where the power is in a learning experience, who is making the decisions. Just as children can be 're-positioned' or 're-position themselves', so they can redistribute the power, or have it redistributed around them. In the introduction (p.v), they comment:

We examine the idea that a key cultural difference entails who is responsible for learning - whether adults take this responsibility by

structuring teaching situations or whether children take responsibility for learning through observation and through participating in adult activities with caregivers' support. We speculate that these two patterns relate to cultural variation in the segregation of children from adult activities of their community and in emphasis on formal schooling.

The Rogoff categorisation was the most relevant model for my purposes. In order to capture the guided participation style of adults with their toddlers in a family setting (they selected videotaped episodes from three contexts: novel objects, dressing, novel objects during adult activity), Rogoff, Mistry et al. (1993, pp.46 ff.) coded each episode for measures of verbal and non-verbal communication, explanation and demonstration, learning through observation, and adult-child roles in teaching and learning. Rogoff, Mistry et al. looked for (i) caregiver acts as playmate (ii) adult converses with child as peer and child converses with adult as peer (iii) caregiver uses babytalk intonation (iv) caregiver (and child request for) vocabulary lesson (v) mock excitement (vi) caregiver praise (vii) caregiver poised ready to help (viii) caregiver overrules child. These variables were given a scale, and the observer rated each episode on the scale.

(ii) *The Wood and Wood (1983) study*. The Wood and Wood coding system, designed originally to ascertain which teacher style elicits the greatest amount of child language in response, analyses dialogue. It measures control in the adult's contribution by coding each utterance at five levels: (a) phatics, 'conversational oil' (b) personal contributions (c) wh- type questions (d) two-choice questions (yes or no) (e) enforced repetitions. I have used this scale with students and practitioners, and found that in order to reflect teacher control it needs considerable refinement, for instance, to differentiate between questions that keep the action going and questions that change the topic ('how many are there?' 'what colour is it?'), and to include instructions.

(iii) *This study*. For an analysis of the distribution of responsibility in a narrative, where I wanted to make an evaluation of the style of guided participation (Rogoff, Mistry et al., 1993) or level of control (Wood and Wood, 1983) of interchanges between the adults and the children, I adapted Woods' (Wood and Wood, 1983) five point scale of adult control in an educational exchange. Using an inductive, ethological method (Pellegrini, 1996), I devised from the data a 25 point scale (with four major groupings) to code the extent to which the children were being asked to take responsibility. The purpose here was to compare the technological practices as 'responsibility milieu'. I also chose a 'typical' interchange of from 7 to 20 utterances to visually present a discourse 'genre' (Wertsch, 1991a, p.111) for different technological practices. I did not measure the *children's* responsibility directly, but ascertaining the responsibility taken or given by one member of an adult-child dyad (in this case the adult) gave me a measure of the distribution of responsibility for the child as well. The children's transcripts were not precise enough to analyse all their

utterances in such a detailed way, but in the two episodes of Technological Practice Two, making a dinosaur and making a monster, I did investigate the child's utterances to illustrate the reciprocal and responsive nature of adult style with child style.

(iv) *Other studies*. There are some similarities here with (a) the teaching continuum devised by Bredekamp and Rosegrant (1992): from 'non-directive' through 'mediating' to 'directive', a study of interactive style; (b) its adaptation by Gardner (1996); (c) the measure of adult engagement used in the Pascal and Bertram Effective Early Learning Project in the United Kingdom (Pascal, Bertram, Ramsden, Georgeson, Saunders and Mould (1995) and described by Mould (1995): measures of adult stimulation, sensitivity, and encouragement of autonomy; and (d) the Howes/Melhuish Observation Schedule (Smith, 1996a; Foote, 1996) which includes a measure of adult response to child initiation: ignore, negative affect, neutral affect, positive affect, and incidental teaching. The Smith (1996a) New Zealand study also investigated running record data on 200 under two-year-olds in 100 childcare centres in New Zealand for episodes of *joint attention* (Smith, 1996c, 1997). To be included as an example of joint attention, the child had to show direct engagement with the adults in reciprocal activity. Analysing language transcripts was not an option because of the age of the children. None of these measures focus directly on adult power, the variable of interest here, but the notion of joint attention (also used by Rogoff, 1990, and in Moore and Dunham, 1995) implies shared responsibility and power. Gardner's adaptation of the Bredekamp and Rosegrant coding system is the closest to Wood and Wood (1983) and to a measure of adult power. It describes statements, questions, and affirmations as 'indirect' forms of language interactions, and directives and negations as 'direct' forms of interaction. The Gardner study assumes that (1) more indirect dialogue opens up more opportunities for the child to actively engage in the ongoing process and (2) a direct stance encourages a more passive response. The codings in these other studies have usually been used to provide summaries for an adult, to describe their salient interaction style, just as in this study a summary has been made for each technological practice. They do not, however, describe the typical *shifts* of power during an episode: the alternating moves of initiative and support that characterise a contingent and symmetrical interaction for instance. This study assumes that it is the *patterns* of these shifts that open up or close down opportunities for active engagement and joint attention. Looking at these patterns provides a dynamic way of analysing the distribution of responsibility in an activity, and of investigating the processes involved in a transactional model of the relationship between learning dispositions and a dispositional milieu.

The adult power scale is described in Figure 4.6. The four levels of power are:

Level I: Social support

Codes 1-3 were described as 'social support'. They included 'phatics' (e.g. repeating the child's comment, and comments like 'was he?' 'uh huh'), personal contributions, and polite responses to questions (e.g. responding 'I'm good' to 'how are you?'). These comments are usually designed (intentionally or intuitively) to keep a social interaction going, but not to lead it in any direction. The subtext is 'I'm here; I'm here as social support'.

Level II: Adult assistance in response to child

Codes 4-8 were described as 'adult assistance in response to child'. They include comments that clarify the adult's understanding of the child's intent, offering assistance, prompting the next step, giving information on request. The subtext is 'I'm listening carefully; I'm here to offer protection and assistance'.

Level III: Adult initiative, child's enterprise

Codes 9-13 were described as 'adult initiative, child's enterprise'. These codes included comments that remain within the child's topic or enterprise, but they take an initiating role. They include making new suggestions about what to do next, asking for child's assessment of work, and evaluative comments that refer to the work.

Level IV: Adult instructions and judgements

The highest level, Level IV (codes 14-25), is described as 'adult instructions and judgements'. In these comments the adult is shifting the topic or the enterprise: giving instructions or information, asking questions that appear to be different from the child's purpose, giving unsolicited information on a new topic, and providing praise that either refers to approval or goodness ('I'm pleased with you', 'Ann will be proud of you', 'Good girl'). When children learn something new, or have to be reminded of the rules, or appear to need approval, these comments are entirely in order. They are not, however, common in joint attention and collaborative episodes.

Evaluative comments

Finally, codes 10-17, which span Levels III and IV, were described as 'evaluative'. They include judgements, queries about purpose, praise, and focused evaluative comments like 'Stapling would have been better than cellotape because. . .'. Evaluative comments at Level III were about the task, and invited the child to self-evaluate. Evaluative comments at Level IV were either very general or referred to the person: the child ('good girl') or the adult ('your Mum will be pleased with you').

ADULT POWER SCALE

LEVEL I ADULT AS SOCIAL SUPPORT

Friendly observing

1. Phatics, 'conversational oil', pardon, repetition, inversion (was he?). Another occasional venue for 'OK'.
2. Personal contribution (I think it's the paper, I don't know, I'll just be off now).
3. Response to child's question (How do I look? Good), being polite (could also be genuine, but no response would be strange).

LEVEL II ADULT ASSISTANCE IN RESPONSE TO CHILD

Technical assistance, information responses and prompts

4. Noting what child is doing, protecting, reassuring, permitting (different from rule reminding which interrupts action, this keeps child's initiative and responsibility going) A venue for Yep, OK, Right, if it does this.
5. Clarifying or focusing child's question suggestion or comment on action or continuing work (what thing?) Another venue for 'OK?' if it continues the tenor of the clarification etc.
6. Offering and giving help, technical assistance or advice, with using the stapler for instance.
7. Suggestion or question about the next step: more in the way of a prompt than an initiation.
8. Gives information, on request, in response to question (Is it morning tea time? Certainly is).

LEVEL III ADULT INITIATIVE, CHILD'S ENTERPRISE

Asking for evaluation by child or to encourage capacity of child to self-evaluate

9. Initiating, instructing, on next step: more initiating than prompts or technical assistance. (I'll show you, Look (at what I'm doing), How about...).
10. Asking for reason, purpose (Why did you cut that out?). Also 'How are you getting on?' Can be collaborative (What should we do next?). *[Evaluative]*
11. Evaluative comment on detail of on-going or final work (fabulous cutting, let's see those pieces). A venue (one of many) for 'OK' and 'That's right' if attached to gestures and specific reference to the action. *[Evaluative]*
12. Asking for child's assessment of the work or the proposed action (would that be a good idea? how did that work out?), asking for child's assessment of ability (can you write your name?). *[Evaluative]*
13. Questioning child's assessment, undifferentiated, often associated with emotion (are you pleased with it? are you happy about that?). *[Evaluative]*

LEVEL IV ADULT INSTRUCTIONS AND JUDGEMENTS

Taking the initiative

14. General undifferentiated praise (fantastic, wonderful, well done); sometimes difficult to separate from a phatic (good, meaning uh-huh). *[Evaluative]*
15. Comment on work from another adult's point of view (your mother will be proud of you; Ann will be surprised) or asking another child for comment: what do you think of it Anna? *[Evaluative]*
16. Comment, evaluation of work, from adult's point of view (I like, I'm proud of you, can I take a photo, This is exciting, Where's your picture (so I can have a look at it)). *[Evaluative]*

ADULT POWER SCALE	
cont'd	
17.	Comment, evaluation of child, praise (good girl). [<i>Evaluative</i>]
18.	Teasing (I hope you're not having fun today, calling children by strange names e.g. Hairy McLarey).
19.	Reminds or informs of rules or procedures, administration of queue (no, I'm helping Meg at the moment).
20.	Gives information, unsolicited (That's a monarch butterfly).
21.	Doing complete task for child with child participating but the enterprise is the adult's (writing a message in a birthday card, a story under a picture).
22.	Suggestion: new topic (You might like to make a...).
23.	Question: new topic (What colour is it?).
24.	Instruction, with rationale or implied rationale ('That can go back on the name board' following 'Write your name so we don't lose it') or request (Would you like to help?).
25.	Instruction, with no rationale. Taking over, completing or doing for the child an action that he or she could do for herself.

Figure 4.6. Adult Power Scale

Reference to the context, the field and/or video notes was often necessary for making an interpretation. The scale was specifically designed for construction activities. I have also noted which coding can be described as 'evaluative'. As a participant observer, my contributions were frequently in I (low power), often in II, and seldom at Level III or Level IV. The coding is an interpretive process; in transcripts many comments appear ambiguous and the context is crucial. The most difficult decisions were:

- (a) *OK*. This can be a phatic, conversational oil (1), an indication that the speaker is noting what the child is doing (reassuring, permitting: 4), or a stronger, evaluative, comment on the action, indicating that to the speaker it appears to be going in the right direction (11).
'OK?' can mean 'do you need any help?' (6) or 'do you understand what I've just explained to or demonstrated for you?' (9)
- (b) *An instruction to write your name, or to hang an object up to dry*. This can be a new instruction, coming 'out of the blue' (25, or with a reason, 24), a reminder of established rules and procedures (19) or an instruction about the next step in this particular event (9). I have usually coded it as 25 or 24 early in an episode, or as 19 if there is an implication that 'this what we always do' (Level IV); as the episode proceeds and as name-writing gets broken up into sub-instructions the coding has become 9.

Each adult 'utterance' (comment, question etc.) is coded. In the dinosaur episode, for instance, there are 44 adult utterances: 13 at level I, 25 at level II, 4 at level III, and 2 at level IV. A bar graph presents this below (Figure 6.2 from chapter 6). It is an example of 'low power' (75% or more of the utterances are in the lower two power levels).

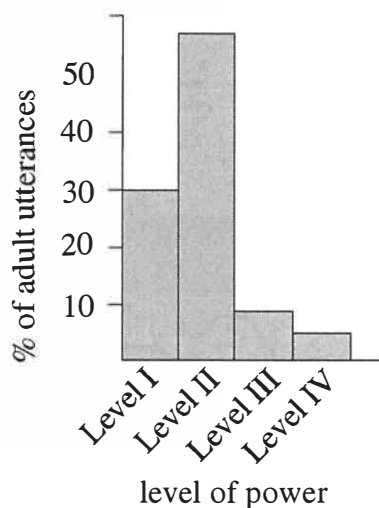


Figure 6.2. Dinosaur-making episode: distribution of adult power

Another, more dynamic, way of looking at the nature of the responsibility here is to take an interchange that looks, from the bar graph, typical, and graph it. Take the following, where the coding for the adult is added:

- Martin: Cos he's got one of he's got a (?) down there by his legs.
 Observer: There's legs as well? (question for clarification: 5) Are you going to be able to make legs? (question about the next step: 7)
 Martin: Na. I just making.
 Observer: Mmhm (phatic, keeping the conversation going: 1). So you're not going to make legs? (clarification: 5) Mmhm (acknowledgement: 4). So this which is this part here?(clarification: 5) This part here (5). That's the (5).
 Martin: Eyes.
 Observer: That's where the eyes go (acknowledgement: 4). Whoops (referring to an unexpected complication, one wing flaps over onto the other side, and anticipating the next question: 7). Is that a problem? (question about the next step, in this case asking if any next step needs to be taken: 7)
 Martin: Hmm. I know what to do.
 Observer: You know what's wrong (4). Uh huh (4). Mmhm (4).
 Martin: I know. (TTA46.27-47.28)

This is graphed in Figure 6.4 (chapter 6, repeated here). It is a pattern that can be described as *adult support*.

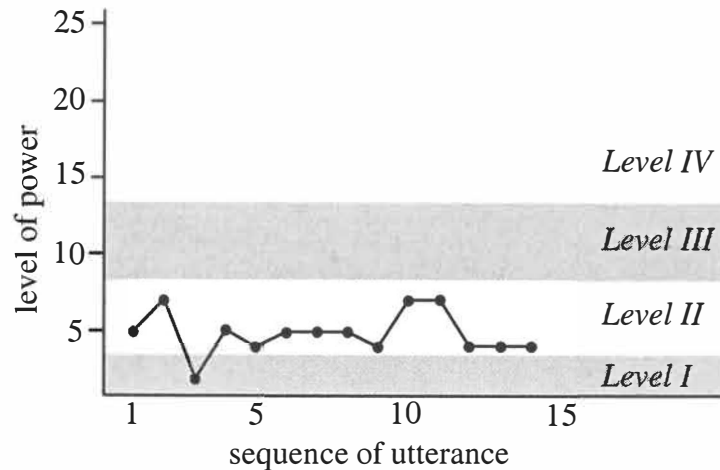


Figure 6.4. Adult support: graph of transcript from the dinosaur-making episode

4.8 SUMMARY

This chapter is the final chapter in Part 1 of the study. It argues that the research topic calls for an interpretive methodology. Accountability measures will be to do with: the role of the researcher (including issues of informed consent, confidentiality, and harm); the range of sources of data; the collection of additional data of a more focused or contrived nature; the robust nature of the primary data; the characteristics and experience of the researcher; the comparative approach; the decision about when there was enough data; and the combination of analytic and systemic approaches. This chapter has set up the framework for analysis: transcripts and observations of the children within selected technological practices will be analysed for the children's discourses and their responses to 'trouble'; a coding system of adult utterances will be used to analyse the patterns of responsibility within technological practices and selected episodes. The research will seek generalisation in two ways: as a case study, and as generalisation to a theory (in this case to a transactional and narrative model of the relationship between learning dispositions and a learning environment).

One of the major principles of interpretive research is that researchers must 'show their working', reveal the interpretive and value-laden baggage that they bring to the task, and outline the characteristics of the 'old growth' or continuing story of the topic. This has been the task of the previous four chapters. Part 2 of the study, which follows, sets out the research data for five technological practices: making a butterfly (chapter 5), making a dinosaur and making a monster (chapter 6), hat making (chapter 7), marble painting (chapter 8) and screen printing (chapter 9).

PART TWO : THE RESEARCH DATA

5

TECHNOLOGICAL PRACTICE ONE: MAKING A BUTTERFLY

5.1 INTRODUCTION TO PART TWO OF THE STUDY

The next five chapters analyse the data from five technological practices. Following the discussion in Part 1 of the study, data will be analysed in terms of

- the children's socioculturally and historically derived goals: these are described as *discourse appropriation, construction and display* (see section 4.7.3.1)
- responses to difficulty and uncertainty: these are described as *responses to trouble* (see section 4.7.3.2)
- responsive and reciprocal relationships: these are described as *distribution of responsibility* and are usually derived from exchanges between adults and children; occasionally from exchanges between peers (see section 4.7.3.3)

In Part 3 of the thesis, each of these will be summarised across all the technological practices. Chapter 10 will gather up and discuss the children's discourses, chapter 11 their responses to difficulty (adding some new data from an interview with the children), and chapter 12 the distribution of responsibility. Chapter 13 will summarise and discuss all the learning narratives. Chapter 14 will summarise the data for individual children.

The layout for each of the data chapters in Part 2 will be as follows:

- setting: the materials and the tools, and the players
- narrative story lines: the discourse appropriation, construction and display; responses to trouble; and distribution of responsibility
- summary of the learning narrative(s)

'Making a butterfly', a group construction episode, is the first technological practice to be analysed.

5.2 MAKING A BUTTERFLY: THE SETTING

5.2.1 The materials and tools

The research was undertaken in the summer, and a theme and interest for both children and adults had been butterflies, chrysalises, and caterpillars. Gum emperor caterpillars eating their way through gum leaves were observed with interest, one caterpillar obligingly wove a chrysalis one morning while the children watched. Monarch butterflies, with their distinctive orange and black markings, often flew into the kindergarten playground, and children had brought their translucent green and golden chrysalises to the kindergarten. On one morning in early March, after a discussion about moths and butterflies at mat time, one teacher brought out a large sheet of corrugated paper and suggested they make a big butterfly. Scissors, glue and collage materials were made available, as well as brushes, rollers and paint for painting. The challenges were to do with fine motor skill rather than the overall design: although the corrugated paper was difficult to cut (Sarah: 'It's very strong', Ann (teacher): 'It is rather difficult because they've all got upsy downs'), other materials (cellophane, ribbon, scraps of fabric) were on hand for cutting and pasting. The group-oriented nature of the enterprise afforded discussion and negotiation.

5.2.2 The social setting

A group of children joined in with enthusiasm. Here is Ann (the teacher) setting it up:

- Ann: And I thought the other thing we could make. Because we've got our big chrysalis. What comes out of the big chrysalis?
- : Christmas?
- : It isn't Christmas.
- Ann: I thought we could make a big butterfly, cos this would make wonderful wings. That look right?
- : Yep.
- Ann: I thought we could cut out the shape of a butterfly. Who would like to help me make the butterfly?
- : Yes.
- Ann: OK. Would you like to come and draw the big wings for me? (Yes.) Come on then, grab a crayon cos you kids are really good at this. Come and draw it then we'll cut it out and then you can all paint it and decorate it. We'll make some big room for it on the floor. OK. What say you draw really big wings down there for me Molly, right round the outside. No we'll just need one person to draw the really big wings. What shape are we doing it? (1/3TTA4.33-7.35)⁶

⁶Transcript notation: 1/3 refers to March 1st (the kindergarten year began on January 31); TTA refers to transcript from table tape recorder side A; 4.33-7.35 refers to the position, in minutes, along the tape. PTA refers to pocket tape recorder transcript, FN to Field Notes, VN9.46 to Video Notes 9.46am. TTB and PTB refer to side B of the audiotapes; on one occasion TTC is used, referring to a third side of table tape recording on one day.

A child came past and asked what they were doing. The teacher reminded them of the connections with the rest of the programme (setting up a 'being a kindergartener' focus, Figure 5.1). The teacher assisted the children to cut out the shape of two wings. As the wings were being cut out, the children commented on the difficulty of cutting the corrugated paper, and the shape (square, like shoes, like sunglasses). Once the symmetrical shape was cut (through two layers of folded corrugated paper and then opened out), the children decided how to decorate it, and the teacher (Ann) reminded them of the choice and of the fact that they can choose:

Ann: There's some paints and dyes and we've got little ones you can bring over. Or some of you might like to use some things to paste on. You can pick what you'd like to use. (1/3TTA10.56)

Ann: 'Course you can help. We're just decorating the butterfly's wings. Just whatever you like. There's lots of paints, there's crayons, there's bits of paper that can be stuck on. Anything you choose to use. (1/3TTA16.55)

One child said 'Let's paint it'; Meg said 'I'm gonna put flowers on (pause) cellotape flowers on'. The teacher then left, saying 'You can decorate it all by yourselves' (1/3VN9.46). She returned occasionally to provide new resources and encouragement. A changing group of children worked away at the task for 57 minutes, by which time the butterfly was well and truly, and variously, decorated. It was stapled onto the ceiling the next day.

5.3 THE NARRATIVE STORY LINE

5.3.1 Discourse appropriation, construction and display

'Discourse appropriation, construction and display' is explained in chapter 4, section 4.7.3.1. Learners interpret the occasion, and available topics and discourses are selected and adapted. On the face of it, this butterfly construction activity nicely complemented discussions at mat time and science activities around the kindergarten; the topic, set in motion by the teacher, was about 'butterfly making', a sub-group of 'mural making', a sub-group of *being a kindergartener*. As the activity progressed, however, three other discourses were introduced by the children, and these progressively and separately took centre stage. This activity was also about *being a friend*, *being good*, and *being a boy or being a girl*. Each of these, beginning with *being a kindergartener*, is described.

Being a kindergartener

Being a kindergartener was set up as the agenda by the teacher, Ann (see Figure 5.1), and her comments gave the children guidance about the discourse topic and what was expected. She linked the activity to other events at the kindergarten, to locate this

activity within a theme, referring to 'something we were talking about at mat-time today', 'because we've been bringing chrysalises and the Gum Emperor moth cocoon'.

BEING A KINDERGARTENER	
Child:	What are you doing?
Ann:	We just thought that <i>because we've been bringing chrysalises and the Gum Emperor moth cocoon*</i> that we might make a large butterfly today. Do you think that would be a good idea? Would you like to bring over some paints and sit them on the table and then when we've done it we'll be able to paint it and decorate it, our wings. (1/3TTA8.09-8.48)
-:	Now you're making a giant pair of sunglasses.
Ann:	No-o! It looks a bit like a giant pair of sunglasses.
-:	I know but it's not.
Ann:	<i>Something we were talking about at mat time today.</i>
-:	It's a butterfly.
-:	Yes it's a butterfly. (1/3TTA11.09-12.10)
	* connections with the rest of the programme made by the teacher are in italics for emphasis

Figure 5.1. Being a kindergartener: transcript of setting up the butterfly-making technological practice

Half way through the episode the teacher said:

Gosh how busy you've been with all the different colours and paints you've used. That looks fabulous. We're going to have to find somewhere really special to hang it when we've finished. Mm. Lovely.
(1/3TTA36.01-36.27)

Wow you've been really busy. (1/3TTB2.26)

When Peter told her 'I'm helping' she said 'That's neat to see you helping' (1/3TTB13.07). She told the children that they could use whatever they wanted for decoration ('You can pick what you'd like to use' 1/3TTA10.56), reminded them that the rubbish belonged in the rubbish bin (1/3TTA9.08), and then left them to do it 'all by yourselves' (1/3TTA11.12). The characteristics of this discourse were established: activities link together; large murals or pictures were constructed to complement the more central teaching events (at mat-time, and observing the chrysalises) and they were put on the wall for parents and children to see; children were kept busy; children were allowed to choose from a wide range of resources; children helped each other; there were rules, in this case where to put rubbish; and children could work by themselves (without an adult needed to tell them what to do).

The children started off with enthusiasm, discussing the range of materials (Meg: 'Here's some nice things' 1/3TTA20.14) and helping each other. The main players at this point were Meg, Linda, Molly, Myra, and Valerie. Meg found some yellow cellophane and brought it over, put it beside Linda and gave her some scissors:

'Here's some scissors' (1/3VN9.55). Valerie pulls off pieces of cellotape for Molly and Myra and sticks them on the floor: 'Here's some cellotapes' (1/3VN9.59). As people walked past Valerie told them: 'This is a butterfly' (1/3TTA28.01).

While the children worked together, their conversation consisted of describing what they were doing to the others, and commenting on the colours or the material; this sub-discourse of *being a kindergartener* was not about taxing their planning or problem-solving capacities:

- : Nice colours.
- : Nice yellow.
- : Yes.
- : Nice pink.
- : Nice yellow
- : Yes.(1/3TTA1210)
- : I put two pieces of flowers on it. (1/3TTA13.53)
- : Flowers everywhere, but I've painted them.
- Meg: I've got a white flower.
- : Same as that white flower.(1/3TTA15.08)

This continued for 20 minutes. Then Meg tried to introduce some problem-solving into the task, to do with how to include antennae. The children's talk so far had been to describe what they were doing and to comment on the materials, not to take on a technologist or scientist discourse with responsibility for the representation or the engineering. Meg's suggestion was ignored, and the children shifted their attention to a more attractive discourse, 'being a friend'. (The antennae and the body of the butterfly would be completed next day by Samuel, working on his own and using a reference book as a model).

Being a friend

BEING A FRIEND	
Valerie:	Do you know what, did you tell your mother I'm coming over?
Molly or Myra:	Did your mother tell you?
Valerie:	I only asked your mother and my mother but she said she'd ring my mother.
Molly or Myra:	I'll tell her and she might ring you. OK?
Valerie:	You tell your mother to ring my mother.
Linda:	I'm coming to your house today eh?
Meg:	Yep. . . (1/3TTA28.35-29.04)

Figure 5.2. Being a friend: transcript from the butterfly-making technological practice

Linda introduced a discourse that I have called *being a friend*: 'Meg, I'm going to your place today'. Meg responded ('I know'), and then Valerie picked it up by talking about playing at another child's house: a mark of friendship (see Figure 5.2).

The discussion then continued about who had been to whose house. This definition of being a friend will appear again in other technological practices. While he was making a hat, Peter told me that Robert was going to his house; and at an interchange at the Lego one morning he also raised the topic, asking Robert if he could come to his house. On the latter occasion, Emily felt excluded and said 'I aren't anyone's friend now 'cos.' (Peter interrupted with 'I'm Robert's friend') 'Whenever you come to my house I'n not going to play. . .' (2/3TTB10.05). The definition will be extended in imaginative ways, especially during the hat-making technological practice (chapter 7, section 7.3.1).

Being good

Shortly after this, some paint was spilled, and although as far as the teacher was concerned this is not a problem (Ann says at the end of the transcript: 'Well, won't matter, we can easily wipe it up' (1/3TTA41.23)), the children decided to get excited about it (Figure 5.3: the children's identities are mostly unknown, Ann is the teacher):

BEING GOOD: DEFINING GOOD BEHAVIOUR

- : Oh naughty, what's who spilt it?
 -: I don't know. It spilted over itself.
 -: I didn't.
 -: I didn't either.
 -: I didn't.
 -: Somebody spilt some paint.
 -: I didn't.
 -: I didn't.
 -: Not me.
 -: Not me either.
 -: Not me.
 -: She probly (sic) knocked it over.
 -: Who?
 -: Myrå.
 -: Yeah, you probly you probly. (giggling)
 -: She did it.
 -: Who?
 -: That one over there.
 -: You must of knocked it over.
 -: Yeah.
 -: No.
 -: Yeah.
 -: No.
 -: Who knocked that paint over anyway?
 -: Who knocked that paint over?
 Ann: Isn't the lid on properly there?

**BEING GOOD: DEFINING GOOD BEHAVIOUR
cont'd**

-: No.
Ann: Oh dear.
-: Somebody knocked it over.
Ann: I'll put the lid back on and we could find a little cloth. Who knows where we keep our buckets?
Meg: Me
Ann: Could you bring the whole bucket up for me Meg and we'll wipe it up.
-: Yeah, we have to wipe it up.
Ann: It's just that the lid's got to be pushed right on guys otherwise it'll keep spilling.
-: Well somebody had to do it. Myra. Myra did that paint. She spilt it.
Ann: It should be down by the painting. Under. On the floor, Meg. Have a look down there. Thank you Meg. That's great.
-: Oh God. Who spilt the paint.
Ann: Well, won't matter, we can easily wipe it up Valerie. It's just that the lid was a bit. (1/3TTA38.24-41.23)

Figure 5.3. Being good: transcript from the butterfly-making technological practice

Ann established, and they knew already, that at kindergarten it doesn't matter that the paint is spilt, nor who spilled it. But the children had left her kindergartener topic far behind; they were constructing meanings of their own, using 'being good' perhaps to forge alliances and allocate blame.

Being a boy, being a girl

Initially, the group working on this task was a group of girls who had been painting at the nearby table and who moved over to the floor space to work on it. By 9.45 am there were 5 girls working together. At 10.11 am two boys, Tom and Danny, arrived, and began to paint and roller paint in one corner; Danny got a pot of paint and began to paint in the same corner. Valerie said: 'We're decorating this one, you can decorate that one, OK?' and Molly suddenly said: 'Hey, that can be the boy one and this can be the girl one'. She had established a new discourse for the activity, and the children adopt it with alacrity. The dominant topic became gender, and light-hearted lines were drawn: boys worked on the 'boys' side, girls on the 'girls' side.

Valerie (to Tom, smiling): We're not finished yet. Not colourful is it?
Tom: No.
Valerie: We're not finished yet. Look at all these spaces. That's why there's nearly finished. It's got all things. We're decorating this one you can decorate that one OK?
Tom: Yeah.
Molly: Hey, that can be the boy one and this can be the girl one.
Valerie: Yeah this can be the girl one that could be the boy one (laughs).
Tom: Yeah. Yeah. You start with the girl one and we'll start with the boy. That's the girl. That's a boy one and that a girl one.
(1/3TTA42.14-42.50)

Ann (the teacher) asked why there was a gender difference, and Valerie reassured her that they were not serious, 'It doesn't matter':

- Ann: Oh. So you can't all paint together? What would happen if one of the boys painted where one of the girls wanted to paint?
 Valerie: Oh. It. Well it doesn't matter.
 Ann: Great. So you're just doing one side each at the moment. That's fine.
 (1/3TTA42.51-43 21)

They made another playful rule: boys use the blue, girls the yellow.

- Valerie: Oh God. I'm sticking yellow stuff.
 Ann: Yellow. Kowhai today (sings). Lots of things are yellow.
 Valerie: Boys can have the blue.
 Tom or Danny: And the girls can have the yellow. Yes. You can have the yellow. You use these ones.
 (1/3TTA43.22-43 50)

Molly brought a box of blue materials over for the boys to use. They had established an amicable and jokey definition of what it means to be a boy, and what it means to be a girl, and if you get it wrong it 'doesn't matter'. However, the boys started 'horsing around' and spoiling things, and the girls left. It was now the boys' work. Nathan came past:

- Nathan: Greg, you doing a big job there. Want me to help you?
 Danny: What? No thanks
 Nathan: Is it hard work
 Tom: Na
 Nathan: What're you making?
 Tom: A butterfly. . . ⁷
 Nathan: I'll help you do some eh?
 Tom: Well, you do that side. I'll do this side.
 Nathan: Yep. Want me to do this side?
 (1/3TTA4.12-5.26)

Tom and Danny left, and in a sequence reminiscent of Tom Sawyer (Twain, 1876/1955 pp.10-16) painting the fence, Nathan enticed first Peter and then Carl to help (the following transcript and Figure 5.4):

- Peter: Can I do one?
 Nathan: No.
 Peter: I could make I could put some things on yours
 Nathan: No. Do that side. You don't know what to do on my side.
 Peter: This side?
 Nathan: No that side.
 Peter: This side?
 Nathan: Yes.
 Peter: Can I paint it?
 Nathan: Yes you can paint it.(TTB7.08-8.01)

⁷ In the transcripts:

(...) = indistinct word or words.

. . . = an ellipsis, part of the transcript omitted.

BEING A BOY	
Peter:	We're making this (...) big one.
Nathan:	You can help.
Peter:	Yeah. If you want. Cos it's hard work. It's hard work, isn't it Nathan.
Carl:	(...) you going to do a lot of job eh.
Nathan:	You can help. Do that side, OK. You do that side. Don't tell him what to do.
Carl:	Is there any more rollers? (TTB9.05-10.40)

Figure 5.4. Being a boy: transcript from the butterfly-making technological practice

It became a 'big job', 'hard work', 'boys' work'. And once the boys established ownership of the task, Nathan's friend Susie found it difficult to persuade him to leave; *being a friend* was not on this occasion a privileged (see discussion in 4.7.3.1 on 'privileging') discourse:

Susie: I'm going. Are you coming or do you want to stay there?
 Nathan: Are you are you going to play with me?
 Susie: I'm going to play with Laura and you. Want to play with me or stay here? Hurry up. Make up your mind.
 Nathan: I want to stay here.
 Susie: I want you to come with me now.
 Nathan: No I'm staying here (...).
 Susie: 'K (...) I'll come back and get you when you've finished.
 (1/3TTB6.02-7.14)

The girls left as soon as there were signs of trouble; the boys left when they establish that the job was done:

Nathan: (standing up and admiring the completed work, to Ann) You like it?
 Ann: Great. I do. I think it looks fabulous. We're going to hang it up.
 (1/3TTB13.54-14.07)

Some of the characteristics of 'being a boy' and 'being a girl' were revealed. Girls do not get involved in trouble. Boys are a bit 'naughty', and do 'hard' work.

5.3.2 Responses to trouble

In chapter 4, section 4.7.3.2, 'response to trouble' was defined. The discourse in the butterfly-making episode shifted three times: from kindergartener to friend to good to boy/girl. Two of the shifts occurred in times of trouble, when difficulty loomed. Early in the episode, Meg tried to shift the discourse topic to one of technology, suggesting that they make the model a more accurate one. Meg's 'upping the ante' of the discourse is italicised in the following:

-: That's the middle. That's the butterfly's middle.
 -: Yeah. Body.
 Meg: *You forgot about those you forgot you forgot the things what go up like that.*

- Linda: Meg I'm going to your place today.
 Meg: I know. (takes on a funny voice) My friend's going to my place today. (ordinary voice) That's my friend.
 Linda: She always does that when I go to her place.
 Meg: *Now two more things what stick up. Those things what stick up.* (Amy, a teacher, and a child came past, saying 'beep beep' (excuse me))..
 Valerie: Do you know what, did you tell your mother I'm coming over?
 (TTA25.05-28.37)

To take up this challenge would mean shifting the discourse up a gear, making joint decisions, perhaps even allowing Meg to be the leader. It was ignored, a friendship discourse took hold, and the suggestion was buried.

The second response to trouble occurred when the boys started to 'behave badly', and although the girls had reassured the adult that the difference between boys and girls was light-hearted and 'doesn't matter', for the girls it now does matter. The boys put large bits of material on, and they acted 'silly' with the cellotape and the roller paints. The girls left. Valerie left (to 'wash my hands'). The boys took over their space (Figure 5.5):

RESPONSE TO TROUBLE (GENDER): RETREAT	
Tom:	Ah. How do you stick it on?
Molly:	Cellotape.
Valerie:	Oh, don't stick it on so big. (Boys giggle)
Tom or Danny:	(giggling) Stick that on there with nothing on it.
Valerie:	No. Stick it with the cellotape. (Laughter) We're making a butterfly Don't get nothing on my spot. Don't get nothing on my spot. Don't want that cellotape on me. You got cellotape on me! (Laughter)
Tom:	(chanting) Decorate it decorate it.
Valerie:	I'm going to wash my hands now.
Tom:	Ta ta!
Danny:	Ta ta! Ta ta! (The girls leave)
Danny:	Got all to ourselves. Good eh! Let's go painting. (Danny paints in "girls" half)
(1/3TTA43.51-46.53)	

Figure 5.5. Response to trouble: transcript from the butterfly-making technological practice

Although the children were initially prepared to be playful about the differences between boys and girls (boys paint with blue, girls with yellow) for the girls there was considerable overlap between *being good* and *being a girl*, and they left when their reputation as 'good girls' was threatened. On this occasion, they didn't want to take part in the boys' silliness, and they responded to trouble by retreating.

5.3.3 Distribution of responsibility

In chapter 4 (section 4.7.3.3) the notion of ‘distribution of responsibility’ (and the Adult Power Scale that measures it) was described in detail. The adult speech turns were counted, and adult utterances were coded using the Adult Power Scale. There are 25 categories to the Scale, and these have been grouped to form four levels: Level I (low, categories 1-3), Level II (categories 4-8), Level III (categories 9-13) and Level IV (high, categories 14-25). At Level I the adult is providing social and conversational ‘oil’ or support, at Level II the adult is giving advice and assistance in response to the child, at Level III the adult is taking the initiative but it is still the child’s enterprise, at Level IV, characterised by adult instructions and judgements, the adult is taking control of the topic and the direction.

SPEECH TURNS AND UTTERANCES	BUTTERFLY EPISODE
Total speech turns	312
Total adult speech turns	63
Adult speech turns as % total	20.2
Total adult utterances	198
Adult utterances per turn	3.14
Adult power as % of adult utterances	
Level I (low, categories 1-3)	10.1
Level II (categories 4-8)	39.9
Level III (categories 9-13)	21.7
Level IV (high, categories 14-25)	28.3
Levels I and II combined	50.0
Levels III and IV combined	50.0
Evaluation utterances (categories 10-17) as % of total	18.7

Table 5.1. Butterfly-making technological practice:
adult speech turns as % of total, and adult
utterances by level of power

Nested within Levels III and IV is a measure of the proportion of ‘evaluative’ comments (categories 10-17) from the adult. See section 4.7.3.3 for more detail. Combining Levels III and IV gives a rough index of adult initiative or power.

This technological practice (the butterfly-making enterprise) was initiated by the adult, as the final step in a series of events over the last month to do with butterflies: a gum

emperor caterpillar weaving its cocoon at kindergarten, monarch butterflies and their chrysalises, stories and discussions at mat time, reference books, and symmetrical folded 'butterfly' paintings. The adult kept the children on task by instruction, praise, and assistance. She left the episode for a good part of the time (only 20.2% of the speech turns in the episode are adult speech turns), and while she was absent the children changed the discourse. When she returned, she re-established the 'kindergartener' discourse by praise. The adult's speech turns were often uninterrupted (an average of 3.1 utterances per turn): this technological practice was not characterised by adult-child collaboration. The statistics of speech turns and utterances are summarised in Table 5.1, and the four levels of adult power are summarised in Figure 5.1.

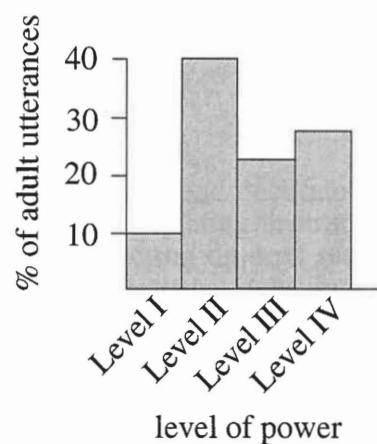


Figure 5.6. Butterfly-making technological practice: distribution of adult power

In later chapters, this pattern will be compared with other technological practices; it comes from a sequence of three teaching events: setting up the activity (high level of responsibility for the adult), providing on-going support (low level of responsibility for the adult), and giving praise (high level of responsibility for the adult). Over all, this is a high level of adult responsibility, a product of the effort needed to introduce a new activity and to keep the children on task.

Sequence of responsibility

When the adult is present, the sequence of adult responsibility is (i) high (adult tutorial, to set up the activity) (ii) low (adult support) and (iii) high (adult tutorial, giving praise). Examples are as follows, with the coding after each utterance:

(i) *Setting up: adult tutorial*

Ann: And I thought the other thing we could make (22: suggestion, new topic).
Because we've got our big chrysalis (22). What comes out of the big chrysalis? (23: Question, new topic)

- : Christmas?
- : It isn't Christmas.
- Ann: I thought we could make a big butterfly, cos this would make wonderful wings (22). That look right? (22)
- : Yep.
- Ann: I thought we could cut out the shape of a butterfly (22). Who would like to help me make the butterfly? (24: request)
- : Yes.
- Ann: OK (1: 'conversational oil'). Would you like to come and draw the big wings for me?(24: request or instruction, with rationale)
- : Yes.
- Ann: Come on then, grab a crayon cos you kids are really good at this (24: instruction or request, with rationale). Come and draw it then we'll cut it out and then you can all paint it and decorate it (24). We'll make some big room for it on the floor (24). OK (1: 'conversational oil'). What say you draw really big wings down there for me Molly, right round the outside (24). No we'll just need one person to draw the really big wings (24). What shape are we doing it? (23: question)
(1/3TTA4.33-7.35)

(ii) *Adult support*

Child: Let's paint it.

Ann: Yes, you can paint it and decorate it (4: agreement, permitting). We'll open it right out (9: initiating, instructing on next step). Put it down there (9: initiating, instructing on next step). It reminds me of a giant pair of sunglasses too (2: personal contribution). It's the same sort of shape (2: continuation of personal contribution). There you go (4: reassuring, keeping child on task). There's some paints and dyes and we've got little ones you can bring over (6: providing assistance). Or some of you might like to use some things to paste on (9: more initiating). You can pick what you'd like to use (4: permitting).

Meg: I'm gonna put flowers on.
(1/3TTA10.48-11.05)

(iii) *Praise: adult tutorial*

18.7% (37) of adult utterances were evaluative, mostly praise. These comments appear throughout the activity, but are especially common towards the end (before the girls have left) when the power level returns to high:

Ann: Oh girls! (17: evaluative of child e.g. good girl) Look at this, beautiful butterfly wings! (14: general praise) Gosh how busy you've been with all the different colours and paints you've used (11: evaluative comment referring to detail). That looks fabulous (14: general praise). We're going to have to find somewhere really special to hang it when we've finished (11: evaluative comment on detail; it's appropriate for hanging up). Mm, lovely (14: general praise). (1/3TTA35.39-36.27)

(iv) These styles are graphed in Figure 5.7

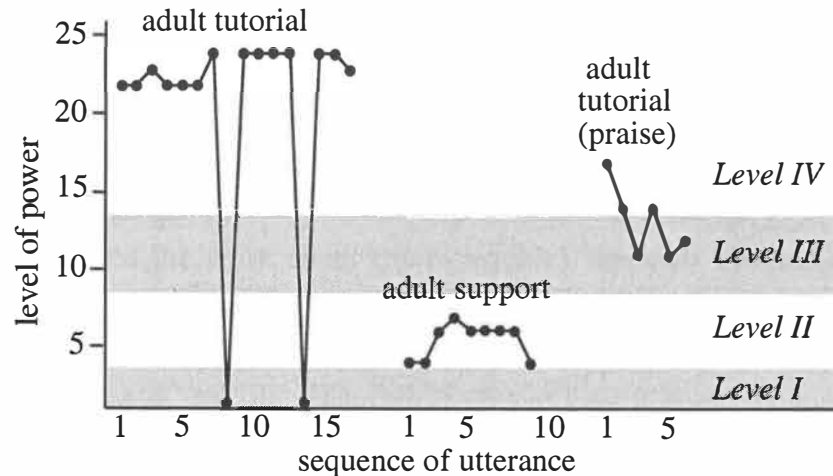


Figure 5.7. Adult tutorial alternates with adult support: butterfly-making technological practice

5.3.4 Summary of the learning narrative: butterfly making

One way of looking at this technological practice is to see it as the final step in a series of three: *science and related individual art activities* (observation of caterpillars chrysalises butterflies and moths, folded paintings that explore the symmetrical nature of a butterfly pattern, stories, and science books), *mat time discussions*, and *final display* (group construction). The 'real' learning occurred during the first two steps, and this was just the display (hence the discourse *being a kindergartener* rather than 'being a scientist').

The children were, however, acquiring and constructing learning narratives at all three steps, and from the children's point of view these three steps were probably separate events, each with their own learning narratives. The event described here was about group construction activities. The learning narrative was about which discourse took precedence over others that were available (was privileged), and which positions within the discourses would be chosen.

For the girls the story can be interpreted as follows:

Setting: Group construction. An adult and a group of children at the beginning, mostly a group of children on their own.

Story line. Discourse(s): The initial topic or discourse was set up by the adult: *being a kindergartener*. This was characterised by helping each other and commenting on what was being done (the topic was not technology or science).

Response to trouble: Although the adult did not suggest difficulty (in the kindergartener discourse), one of the children did (raising the possibility that they try to solve a problem within a science or technology discourse). This could

- be described as trouble, and was immediately rejected by the other children. Three strategies followed: shifting the discourse to *being a friend*, making a fuss about a minor misdemeanor (changing the discourse to *being good*), and being playful about gender markers. But when serious (as opposed to playful) questions to do with reputation were introduced, when the boys were naughty and messed the work about (more trouble), the girls became cross and left immediately: *being good* and *being a girl* appeared to be combined.

Distribution of responsibility: The responsibility for the kindergartener discourse remained with the adult, who set it up and kept it going by support and then praise (alternating a high power 'tutorial' style with low power 'support'). But the adult was not present for most of the time, and a parallel story line was kept going by the children, who shifted the discourse in response to trouble, avoiding difficulty and (the girls) conflict.

For the boys the story might be adapted as follows:

Story line: A group construction task could be taken over by being 'naughty' and making the girls cross, and one way to keep the persistence going was to describe it as a 'hard job'.

The next chapter turns to another technological practice. It describes further discourses and some new learning narratives.

6**TECHNOLOGICAL PRACTICE TWO:
MAKING A DINOSAUR AND
MAKING A MONSTER****6.1 INTRODUCTION**

This chapter analyses two technological episodes that look very similar. The social setting in each case was the same: an adult (the same adult) and a child. The technical process and its materials and tools were very much the same (constructing an object out of cardboard, glue, cellotape). Initially the distribution of responsibility was the same: the child initiated the project and the adult took a supportive role. But the children interpreted the occasion very differently - the discourse topics were different - and this made for rather different learning experiences or narratives. This chapter has a similar structure to chapter 5, but the two episodes are analysed separately. Section 6.2 outlines the setting for both episodes, 6.3 analyses the 'making a dinosaur' episode, and 6.4 analyses the 'making a monster' episode. 6.5 compares the two learning narratives.

6.2 THE SETTING: MATERIALS, TOOLS AND PLAYERS

Unlike the butterfly-making episode which was set up by the teacher with some special materials (large sheets of corrugated paper), the construction of a model dinosaur (and, later, a monster) was initiated by a child, using materials and tools regularly made available in the construction area. The construction table was sited between shelves of paper (of various kinds, including computer paper with perforated margins; also cardboard, glue, and pens) and boxes of collage/construction materials (cardboard boxes, cardboard rolls, plastic containers, wrapping papers, old birthday and christmas cards, material scraps, natural materials). A circular table nearby held staplers, cellotape, brushes, and paints. The size and shape of the cardboard changed every now and then. There were also large shaped pieces of card that children made into wings. These latter were originally designed by the advertiser or event promoter to be turned into cowboy hats, a complicated process that needed a great deal of adult help. The children occasionally adapted the shape to create wings, punching a few more holes and attaching string or wool to tie them on. During the last week of the

observations, circles of heavy card of two sizes were available and the children painted faces on them and combined them with other materials in a range of ways.

Affordance of materials tools or constructions

The term 'affordance' as it is used in this study was explained in chapter 3, section 3.4.4 (iii). *Transparency* as an affordance refers to whether the meaning or intention of the materials and tools (or what is to be constructed) within this technological practice was readily apparent. *Challenge* refers to the difficulty afforded by the materials or tools or the design of the construction. *Accessibility* refers to the form of participation enabled by the materials tools or constructions. The materials and tools at the construction table were designed to be open-ended and flexible in transparency, challenge, and accessibility. Like sand and blocks, they provided endless possibilities for construction; designs chosen could be meaningful to others (as hats are) or private; they could be difficult (like Tom's monster) or easy (Rita made some binoculars or 'lookies'); they could be individual enterprises (as most of them were), or needed others to help (as the wings constructions did). Although for some children cutting with scissors, stapling, and using the cellotape dispenser, were challenges in their own right, these processes could all be avoided. In particular the boxes and cardboard rolls encouraged children to make models: houses, binoculars, telescopes, cameras, and boats were all made during the observation period. This chapter is about two of these model-construction episodes, chosen for their contrasting narratives.

6.3 MAKING A DINOSAUR

6.3.1 Introduction

A dinosaur was made on one occasion, by Martin, during the period of the observations. The event was recorded from field notes, video notes, and audiotape transcripts. The dinosaur-making episode began with Martin choosing a sheet of computer paper from the paper shelf, then coming over to where the Observer was sitting to tell her what he got for Christmas.

Martin: Margaret do you know what I got for Christmas? It's some books. And there's something else.

Observer: Some?

Martin: 'laddin. There's one 'laddin book.

Observer: Aladdin ball.

Martin: No, 'laddin book.

Observer: A book. An Aladdin book. Yes. And what else?

Martin: Um. I think I got. What was it again? Yo yo. And a, a ball.
(23/2TTA37.40-38.42)

This conversation continued in a similar way for several more moves. Martin was in effect requesting (and receiving) friendly interest in his home affairs. He then punched

holes down one side of the computer paper, pulled off the perforated margins, folded it into a triangle (diagonally across, then the excess folded in), and punched more holes around the edge. He looked over and smiled at the play in the family corner where Ann (one of the teachers) was taking on the role of a 'sister' and asking the children for guidance about what a sister does and whether she should be a big sister or a little sister. He worked away with paper, hole punch, cellotape, and a cardboard tube. Early on in the sequence he called for the Observer's attention to what he was making:

- Martin: (to Observer) You know what I'm making? D'you know? A dinosaur. Look at my dinosaur.
 Observer: Pardon?
 Martin: My dinosaur.
 Observer: That your dinosaur?
 Martin: Yes.
 (23/2TTA42.53-43.54)

The adult participated. During the construction there was a 'fine tuning phase', when the Observer made some suggestions, but he did not want or need her ideas. The construction took 17-18 minutes of concentrated work, with a further fixing phase 20 minutes later when the wings came off after a period of vigorous flying.

6.3.2 Narrative story lines

6.3.2.1 *Discourse appropriation, construction and display*

Being a dinosaur maker

Martin had made dinosaurs before ('This'll look better'n last time I bet'). So one of the discourses might be labelled 'being a dinosaur maker', a sub-discourse of *being a technologist*.

After Martin had punched holes in a sheet of paper and folded it into a triangle, he found a long cardboard roll from the carton box, came over to be near the cellotape, and fixed the triangle onto the cardboard roll. He fetched another sheet of computer paper and repeated the process, slightly differently: this time he folded the paper into a triangle, undid the fold, and cut along the folded line. He attached this triangle to the other side of the cardboard roll. Then he cut a small triangle out of a green advertisement sheet, and carefully cellotaped it so that it stood up (later, with another, it looked like a beak, but he said it was for an 'eye'). He then cut out another small triangle, carefully matched the two small triangles by holding the second against the first: the second was bigger so he cut a bit off before attaching it. He then waved his construction up and down and found that one wing flapped over onto the other; he

worked out how to fix it (by adding cellotape). (Video notes 23/2). Martin went outside to fly his dinosaur; twenty minutes later he returned to make some running repairs.

Martin (to himself): Dinosaur lost his wings. I have to put new one on.
(TTB 23.38 23/2/95)

This is not a new model: he appeared to have made it before, but he was perfecting it. In one sense then, Martin was a technician, testing and adapting a basic dinosaur model. The process was one of *representation*, with a minimal amount of engineering.

Being nearly five

The comments in Figure 6.1 indicate where the idea, and model, for a dinosaur came from, and reveal Martin's special interest and ambition: to catch up in age to his seven-year-old older brother.

BEING NEARLY FIVE: DINOSAUR MAKING	
Martin:	Mm. (...) copy Ken's one.
Observer:	Copy?
Martin:	Ken's one.
Observer:	Copy Ken's one? Who's Ken?
Martin:	Um he he's at school.
Observer:	He's at school. Is he your brother?
Martin:	Mm. He's the biggest one of the lot.
Observer:	He's the biggest one of the lot? (1.57)
Martin:	Mm.
Child (Linda?):	<u>Look at my hat.</u>
Martin:	<u>(...)</u>
Observer:	Pardon?
Martin:	Craig's 7 and I'm (pause) catching up by five.
Observer:	You're catching up with five.
Martin:	Yeah. (23/2TTB0.39-4.16; 23/2PTB) Underlined sections are spoken at the same time

Figure 6.1. Being nearly five: transcript from the dinosaur-making technological practice

The process of making a dinosaur appeared to be also about being like his brothers. He told the Observer that he was copying Ken's (his older brother) dinosaur. Ken is 'the biggest of the lot', invoking a picture of Martin and a host of brothers, in ascending size. He commented however that he was 'catching up' on the next brother, who is seven, so the ascending size (with Martin as the smallest) was not seen by Martin as a permanent state of affairs. Martin aspired to be as big as his brothers, and this meaning was also apparent on a later occasion, two weeks later, and not his birthday, when he spent a period of concentrated time drawing the number five on a hat, drawing around a template. He then wore the hat all morning. Making a dinosaur was, then, not just about solving the technical problems of attaching the wings and

making them flap symmetrically, it was also about being nearly-five-years-old (and catching up on his seven-year-old brother). The discourse being-a-dinosaur-maker is nested within the discourse of *being nearly five*. The motivation to begin, and to persevere at, the construction task came from the latter, social, discourse. This discourse came from home, and the source of its 'apprenticeship', the valued knowledge, resided at home as well. His voice was that of his brother perhaps as he talked himself through the task.

Martin (to himself): This should be fine for me. Fold it that way. (TTA40.56)

Martin (to himself): This'll look better 'n last time I bet. (TTA41.46)

Martin: (...) copy Ken's one. (TTB1.10)

Martin (to himself): Dinosaur lost his wings. I have to put new one on. (TTB23.38)

6.3.2.2 *Responses to trouble*

At one point, when the wings didn't wave symmetrically, the observer asked Martin if there was a problem; he replied that he 'knows what to do'. He did, too, and fixed it by the judicious addition of a piece of cellotape.

Observer: Whoops. (one wing flaps over onto the other side) Is that a problem?

Martin: Hmm. I know what to do.

Observer: You know what's wrong. Uh huh. Mmhm.

Martin: I know.
(23/2TTA47.12-47.28)

The observer made two suggestions, both of which would have made the design more difficult: adding legs (Martin: Na) and painting (Martin: The quickest way should be crayon). He didn't want the design to be more difficult. He didn't ask for help. When he did need resources or assistance, his requests were not to other people, but to the environment (and therefore to himself):

Martin: Oh, where's some cellotape. Cellotape where are you? (TTA42.51)

Martin: Mm. Now where would the crayons be? (TTB0.03)

One reason for this was that Martin didn't need help. But another reason, also a possible motive for embarking on a task for which he didn't need help, was that for Martin kindergarten was not where the valued knowledge resides, it was not a place for joint negotiation and collaboration. Nor was it a place where the valued age-group resides: all the children here were four or four-and-a-half. Martin 'knows what to do', and perhaps his identity as a five-year-old-dinosaur-maker depended on it; his competence proved that he was eligible for what is in New Zealand a milestone birthday: at age five almost every child starts school.

6.3.2.3 *Distribution of responsibility*

In this chapter, the data to describe the distribution of responsibility will include an analysis of the children's talk. The first part of this section analyses the adult talk, and describes this episode as an example of adult support. The second part analyses Martin's purposes from his utterances. Together they describe an asymmetric distribution of responsibility: child initiation and adult support.

In this dinosaur episode, there are 44 adult utterances (details of coding for each utterance are in Appendix 1): 13 at level I (providing support, 'conversational oil', indicating 'I'm listening'); 25 at level II (mostly seeking clarification and offering assistance); 4 at level III (where the observer makes some new suggestions about making additions or painting, and asks for an interpretation or a reason for something: in this case the 'wings' and the reference to his brother); and 2 at level IV (the highest power, when the observer 'ups the ante' and asks him, then tells him, what the name of a flying dinosaur is). A bar graph describes this pattern (Figure 6.2). It is an example of 'low power' (75% or more of the utterances are in the lower two power levels). The statistics are included in Table 6.1.

	Dinosaur Number adult utterances	Dinosaur % adult utterances
LEVEL I (1-3, low)	13	29.6
LEVEL II (4-8)	25	56.8
LEVEL III (9-13)	4	9.1
LEVEL IV (14-25, high)	2	4.5
TOTAL	44	100.0

Table 6.1. Dinosaur-making episode: adult utterances by level of power

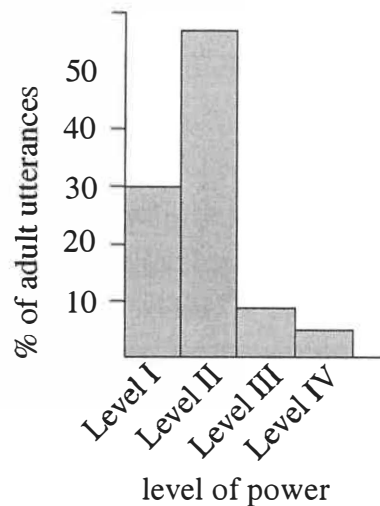


Figure 6.2. Dinosaur-making episode:
distribution of adult power

Adult support

The observer misinterpreted Martin's call for attention ('You know what I'm making? D'you know? A dinosaur. Look at my dinosaur') as a call for suggestions. She told him what the dinosaur's technical name might be, asked him if he was going to be able to make legs (Martin: Na), and suggested that he paint it. She attempted to 'reposition' him as an apprentice, and he resisted. Her suggestions were greeted with polite acknowledgement but little enthusiasm; it seemed that Martin just wanted the adult there as an interested spectator. Here are the transcripts that describe these attempts by the adult to provide new ideas, and Martin's resistance:

- Observer: (to Martin) It's a flying dinosaur?
 Martin: Yes.
 Observer: What kind of dinosaur is a flying one? (pause) Pterodactyl is it?
 Martin: Yeah probly is.
 Observer: Might be.
 Martin: Cos he's got one of he's got a ? down there by his legs.
 Observer: There's legs as well? Are you going to be able to make legs?
 Martin: Na. I just making.
 Observer: Mmhm. So you're not going to make legs? Mmhm. So this which is this part here? This part here. That's the.
 Martin: Eyes.
 Observer: That's where the eyes go.
 (23/2TTA46.00-47.12)
- Observer: (turns audiotape over) Is there any thing more you want to add to it? You don't want to paint it?
 Martin: Mmmhmm. The quickest way should be crayon. ✓
 Observer: Pardon.
 Martin: The quickest way should be crayon.
 Observer: The quickest way should be crayon?
 Martin: Yeah.
 Observer: Mmhm. Well that's a possibility isn't it.
 Martin: Mm. Now where would the crayons be?
 Observer: Where would they be indeed. They live up here.
 (23/2TTB0.03-0.37)

The adult then took her cue from Martin, and took on a role that was predominantly one of giving reassurance, support, and clarifying her understanding of Martin's comments.

Another, more dynamic, way of looking at the nature of the responsibility here is to take an interchange that looks, from the bar graph, typical, and graph it. See Figure 6.3, where the coding for the adult is added:

ADULT SUPPORT	
Martin:	Cos he's got one of he's got a (...) down there by his legs.
Observer:	There's legs as well? (question for clarification: 5) Are you going to be able to make legs? (question about the next step: 7)
Martin:	Na. I just making.
Observer:	Mmhm. (phatic, keeping the conversation going: 1) So you're not going to make legs? (clarification: 5) Mmhm. (acknowledgement: 4) So this which is this part here?(clarification: 5) This part here. (5) That's the. (5)
Martin:	Eyes.
Observer:	That's where the eyes go. (acknowledgement: 4) Whoops. (referring to an unexpected complication, one wing flaps over onto the other side, and anticipating the next question: 7). Is that a problem? (question about the next step, in this case asking if any next step needs to be taken: 7)
Martin:	Hmm. I know what to do.
Observer:	You know what's wrong. (4) Uh huh. (4) Mmhm. (4)
Martin:	I know.(23/2TTA46.27-47.28)

Figure 6.3. Adult support: transcript from the dinosaur-making episode

This was graphed as an example, Figure 6.4. The pattern can be described as *adult support*.

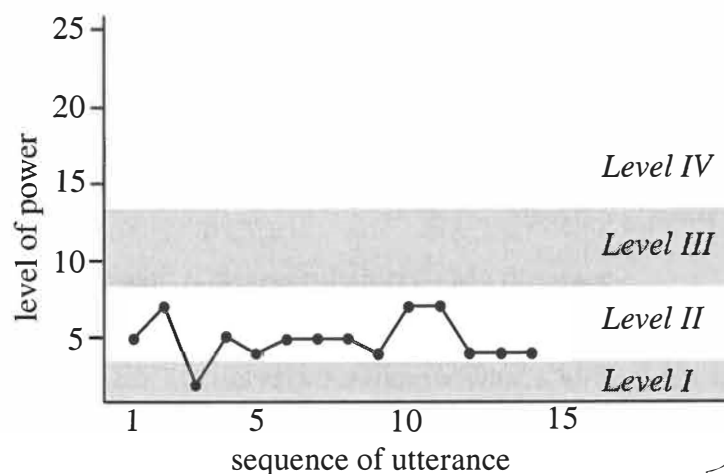


Figure 6.4. Adult support: graph of transcript from the dinosaur-making episode

Purposes of child utterances

The adult was taking her cue from the dinosaur maker. An assessment of the distribution of responsibility includes the contribution of the child. In this case, Martin was taking the initiative.

Child utterances: non-collaborative and collaborative	Dinosaur episode Number child utterances
Non-collaborative	
calls for attention	5
doesn't need help	2
clarifying information (not about the construction)	2
Collaborative	
explanations about the construction	5
questions about the construction	0
explanation of difficulty	0
instructions	0
TOTAL child initiations	14

Table 6.2. Dinosaur-making episode:
purpose of child-initiating
utterances

Excluding the discussion about what he was given for Christmas, 14 of the 27 child utterances could be described as initiating. Of these, five were calls for attention to what he was doing:

You know what I'm making?
D'you know?
A dinosaur.
Look at my dinosaur. (Observer: Pardon?) My dinosaur.

Two utterances told the adult (and himself) that he was in control:

I know what to do. (Observer: You know what's wrong. Uh huh. Mmhm) I know.

Two utterances gave the observer clarifying information about his brother:

He's the biggest one of the lot.
Craig's 7 and I'm (pause) catching up by five.

Only five of the fourteen initiating comments explained to the adult why he was doing, or was about to do, something in the construction process:

Cos he's got one of he's got a (...) down there by his legs

The quickest way should be crayon. (Observer: Pardon?) The quickest way should be crayon.

(...) copy Ken's one. (Observer: Copy?) Ken's one.

He did not ask for specific assistance or for an opinion, nor did he outline any difficulty, ask questions, or instruct the adult. It was not in any sense a joint negotiation or a collaboration. This is a pattern that was characterised by child initiation and adult support, asymmetric in favour of the child. The responsibility was distributed across people at home as well as at kindergarten: home for the experts and the valued knowledge, kindergarten for adults to provide a safe harbour within which he could be engaged and concentrate.

6.3.2.4 *Summary of the learning narrative: making a dinosaur*

The dinosaur learning narrative looked like this:

Setting: Construction of object at kindergarten, self-chosen. Materials readily available, technology easy to use for a four-year-old (hole punch, scissors, cellotape dispenser). One child, one adult

Story line. Discourse(s): The construction (technology) discourse was nested within a privileged discourse called *being nearly five*. This discourse came from home, therefore the apprenticeship occurs at home although the skills can be practised at kindergarten.

Response to trouble: Strategies in response to trouble were to make an object that is familiar, the goal was clear, modifications were manageable without assistance. Solve problems by yourself (that's what *nearly fives* do).

Distribution of responsibility: The child made the decisions, the adult was recruited to provide an interested audience (and a safe space) Assistance or suggestions from the adult were not needed (see Figs. 6.3 and 6.4).

When the salient or privileged discourse is one that you can't change (age or gender) then unless a flexible view is taken of what it means to be four or to be a boy/girl a great deal of time can be spent displaying one's membership; perhaps this is what Martin was doing, as he 'copies Ken's one'. Other observations of Martin in other settings (see chapter 14, section 14.2.2 and Appendix 8) support the hypothesis that Martin was displaying his status as a nearly-five-year-old here.

6.4 MAKING A MONSTER

6.4.1 Introduction

In a very similar episode to the dinosaur one, a few days later, Tom made a 'monster' out of cardboard strips, small boxes, and beans (or seeds) during the period of the observations. The event was recorded from field notes, video notes, and audiotape transcripts.

The tools and materials were much the same: cardboard (in this case cardboard strips and boxes), cellotape, and, in this case, glue and staplers. Once again they were all readily available, and easy for four-year-olds to use without assistance. Whereas Martin began his construction with a cardboard roll, Tom began his construction with some seeds/beans that appeared to remind him of teeth, and some cardboard boxes. He commenced construction, and appeared to be having difficulty. This time the observer took the initiative:

Observer: What're you making Tom?
 Tom: What?
 Observer: What're you making?
 Tom: A monster
 Observer: A monster? Uh huh. Do you need a hand?
 Tom: Yes.
 (9/3PTA21.11-21.30)

Tom and the adult worked together on the construction for 22 minutes. He then said he would paint it.

6.4.2 Narrative story lines

6.4.2.1 *Discourse appropriation, construction and display*

Being a monster maker

It was not clear whether Tom had ever made monsters before (the observer asked him, but he didn't reply). He was wrestling with various problems associated with putting teeth on, where to attach the head, and whether the head should be cellotaped or stapled. One of the difficulties may have been created when he added the teeth (a line of five beans) before he attached the head. He was very much engaged with the problem; his discourse was about 'being a monster maker', a sub-group of the larger discourse *being a technologist*.

The topic was 'making a monster' and the processes were (i) *engineering* (changing the design to solve problems in reaching a goal) and (ii) *representation* (making something that stood for a monster; in this case the teeth appear to be central).

6.4.2.2 *Responses to trouble*

The adult and the child worked together to collaboratively solve the problems that arose from Tom's efforts to make a monster. An excerpt is included as Figure 6.5; the underlined section is coded for adult power and will later be graphed in Figure 6.7.

RESPONSE TO TROUBLE (TECHNOLOGIST): ADULT-CHILD COLLABORATION	
Tom:	Now. How'm I gonna stick that box to be its head? Hmm. OK. (to the observer) Do you know how to make monsters?
Observer:	Monsters? I've never made a monster. Have you ever made one before?
Tom:	Hmm. Mmm. I I had to staple that bit on.
Observer:	Yes. Stapled that bit on.
Tom:	Probly need to cut a bit off.
Observer:	Oh OK.
Tom:	There! Cut a bit off. I cut a bit off.
Observer:	Cut a bit off have you? Right OK.
Tom:	That's my big box there.(33.40) [Observer helps Meg with her cutting out for a screen print] . . . (Later, 37.44)
Observer:	How's the monster going?
Tom:	Good. But I can't make um the head go on.
Observer:	<u>How would we attach the head?*</u> (an initiating step about the next step: 9) <u>Any ideas?</u> (asking for an appraisal: 10)
Tom:	The teeth are too far over there. I can't put the head over there.
Observer:	<u>Can't you?</u> (seeking clarification: 5)
Tom:	I have to put the head over here (gestures).
Observer:	<u>OK</u> (acknowledgement: 4). <u>Put the head on that end</u> (seeking clarification: 5).
Tom:	Yes
Observer:	<u>You want to put the head here?</u> (asking for assessment of proposed action: 11)
Tom:	Nno. Cos then I I need to cut a bigger bit off
Observer:	<u>Where do you want to put the head ?</u> (12)
Tom:	I want to put it there.
Observer:	<u>You want to put it there?</u> (clarification: 5) <u>Right</u> (acknowledgement: 4) <u>Staple</u> (prompt: 9). <u>Oh, is that the head?</u> (5) <u>Right</u> (4).
Tom:	That's the head
Observer:	OK Right. Do you need to staple that on now? (Tom: Yes)
Observer:	This side too? (Tom: Yes)
Observer:	What do you think?
Tom:	Good. Well. Mmm. Well that has to be the mouth
Observer:	That has to be the mouth does it?
Tom:	This, this is the pull-up (...) (Uh huh uh huh. Right) The tummy's under there.
Observer:	Right OK. So what needs to be done next do you think?
Tom:	Now. Have to put the middle bit on. (Observer: The middle bit on) Mm. Cos this is all it's bone. (Oh that's it's bone?) Yeah but this is

**RESPONSE TO TROUBLE (TECHNOLOGIST):
ADULT-CHILD COLLABORATION**

cont'd

it's teeth. (Right right) 'K. This is the bone. (Yes) It's in it's tummy now. (Right Yep) Now what else. (What else do we need to do?) Put that middle bit on. (Put the middle bit on?) Yeah. (OK) Now. How're we gonna miss the teeth? (to Observer) Cut that bit off. [Adult cuts one of the 'bones' a bit shorter].

Observer: How about putting it on top like that? Would that do it do you think?

Tom: Yes. It'll need to be cello taped I think. (Do you think?) Ah no, I guess we could staple it. (OK) Oh we can't. Would you think that'll do? For now?

Observer: Wonder if you need another bit of cello tape. Down that side. Mmhm.

Tom: (cellotapes) That's enough. Hm. Now we have to paint it. (9/3PTA31.02-42.52)

* Underlined section is graphed in Figure 6.6

Figure 6.5. Being a technologist and adult-child collaboration: transcript from the monster-making episode

The observer moved away, and Tom painted the monster. As he painted the central section the cello tape loosened and 'the middle bit' fell off. There is no transcript for what happened next, but the video and field notes record that he went to find the observer, and told her 'it's rubbish now'. He was going to give up, but the observer responded by assisting with some further stapling; Tom wrote his name on it (carefully copying the letters from his name card), and the completed monster was put on the drying rack. Tom had already established a collaborative relationship with the adult, engaged her in shared responsibility when there was difficulty ('I can't make um the head go on'), and established a narrative that both explained the difficulty to the other person and engaged her in the search for solutions ('The teeth are too far over there', 'N-no. Cos then I I need to cut a bigger bit off', 'How're we gonna miss the teeth?'). She could also share with solving the more major trouble, because she had been party to the original goal; when part of it fell off she assisted in putting it right.

6.4.2.3 *Distribution of responsibility*

In this chapter, the data to describe the distribution of responsibility includes an analysis of the children's talk. The first part of this section analyses the adult talk, and describes this episode as an example of adult collaboration. The second part analyses Tom's purposes from his utterances. Together they describe a symmetric distribution of responsibility: joint negotiation with an adult to solve difficulties.

Adult collaboration

Unlike Martin's *being nearly five* discourse, the distribution of the responsibility for persistence was centred in the kindergarten. The bar graph of levels of adult power for the monster episode (89 adult utterances) are in Figure 6.5 (I: 13; II:55; III:21; IV:0) in comparison with the dinosaur episode. The level was similar to the dinosaur episode (about four-fifths of the utterances in both lay within Levels I and II), but it has shifted up a notch: relatively fewer utterances at Level I, and relatively more frequent utterances at Level III. The statistics are included in Table 6.3.

	Dinosaur Number adult utterances	Dinosaur % adult utterances	Monster Number adult utterances	Monster % adult utterances
LEVEL I (1-3, low)	13	29.6	13	14.6
LEVEL II (4-8)	25	56.8	55	61.8
LEVEL III (9-13)	4	9.1	21	23.6
LEVEL IV (14-25, high)	2	4.5	0	0
TOTAL	44	100.0	89	100.0

Table 6.3. Dinosaur-making and monster-making episodes compared: adult utterances by level of power

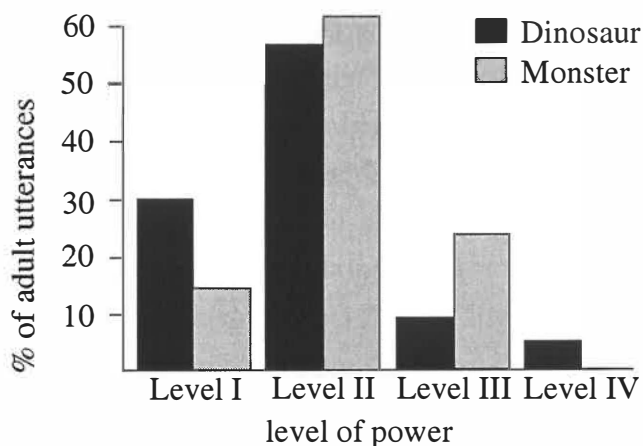


Figure 6.6. Dinosaur-making and monster-making episodes compared: distribution of adult power

For the monster construction, the initiative was the child's, and the adult initially responded in a similar way, offering support, assistance and a few suggestions. However, when Tom involved her by saying 'I can't make um the head go on', she increased her contribution, and the exchange became much more symmetrical with the adult taking some initiative and the child accepting or rejecting it, adding explanations

and reasons so that the partner would understand what was becoming a mutual goal (Adult: 'You want to put the head here?' Tom: 'N-no. Cos then I I need to cut a bigger bit off'). The underlined section from the transcript in Figure 6.5 is graphed in Figure 6.7, which compares the two patterns of responsibility: adult support and adult-child collaboration.

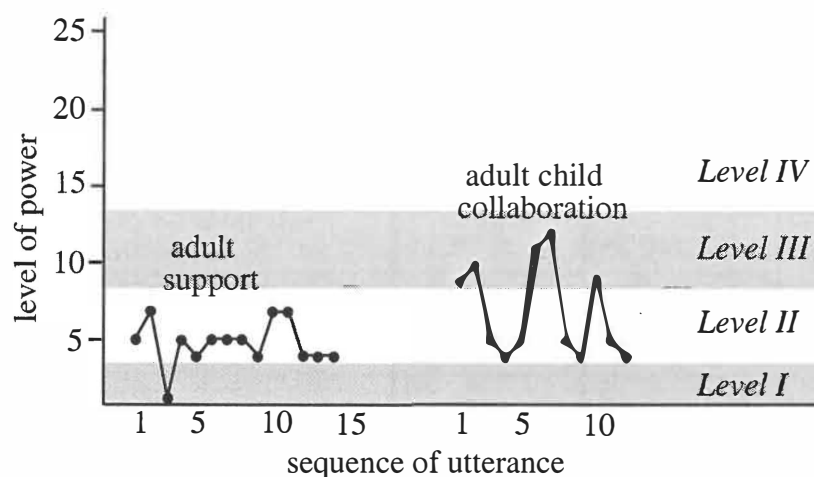


Figure 6.7. Adult support and adult-child collaboration: graph of transcripts from the dinosaur-making and the monster-making episodes

Purposes of child utterances

This time when the adult asked if he needed a hand, Tom said 'yes'. He also elicited the adult's help ('Do you know how to make monsters?') and asked her opinion. Tom was taking the initiative (49 of his total 95 utterances were initiating), but of the 49 initiating utterances, 31 were explaining the process of construction to the adult; 7 outlined difficulties ('I can't make um the head go on'; 'How're we gonna miss the teeth'), and two were instructions to the adult ('Cut that bit off'; 'That's enough'). Table 6.4 compares the purpose of the child-initiating utterances in the two episodes. Both children were engaged in problem-solving, but Tom engaged another to help, not just for technical assistance but also for decision making. The monster exchange was much more like collaboration. Unlike Martin, Tom had chosen an enterprise where he did not always know what to do, said so, and engaged the adult in the attempt to find solutions; when he finally gave up because he had made a poor decision about cellotaping or stapling, that engagement paid off: the adult felt involved enough and assisted him to put it right. The pattern was more symmetrical: adult initiative was combined with the child's explanation, instruction and requests for assistance.

Child utterances: non-collaborative and collaborative	Dinosaur episode Number child utterances	Monster episode Number of child utterances
Non-collaborative		
calls for attention	5	1
doesn't need help	2	1
clarifying information (not about the construction)	2	0
Collaborative		
explanations about the construction	5	31
questions about the construction	0	7
explanation of difficulty	0	7
instructions	0	2
Total collaborative utterances	5	47
TOTAL child initiations	14	49

Table 6.4. Dinosaur-making and monster-making episodes compared: purpose of child-initiating utterances

6.4.2.4 *Summary of the learning narrative: making a monster*

Tom's learning narrative is described as follows; the differences between Tom's and Martin's narrative are underlined. The major difference was to do with the interpretation of the topic, and from this initial choice came a story line that differed in its response to trouble and its distribution of responsibility:

Setting: Construction of object at kindergarten, self-chosen. Materials readily available, technology easy to use for a four-year-old (scissors, cellotape dispenser, glue, stapler). One child, one adult

Story line. Discourse(s): The topic was being a technologist (sub-category: being a monster-maker). This discourse came from kindergarten (maybe home as well), therefore the apprenticeship could occur at kindergarten.

Response to trouble: Strategies in response to trouble were to make an object that was difficult, the goal was clear but the details shift, modifications were manageable but assistance or suggestions from the adult were helpful.

Distribution of responsibility: Joint negotiation with the adult; the source of persistence was distributed across the reputation as a monster-maker, and a narrative that includes collaboration.. The child made the decisions, the adult was

. recruited to provide support, but also to provide advice and suggestions. (see Figures 6.1 and 6.2).

Tom had been a major player in the group butterfly episode (when he was part of the *being a boy* discourse), and he appeared in only one other episode in the construction area (see chapter 14, section 14.3.3), so it cannot be said that this narrative was 'typical' for him.

6.5 SUMMARY COMPARISON OF THE LEARNING NARRATIVES: MAKING A MONSTER AND MAKING A DINOSAUR TECHNOLOGICAL PRACTICE

Two very different learning narratives are illustrated here. The first (Martin's) can be summarised as **learning is about displaying your competence as a 'grown-up' nearly five-year-old.** The second (Tom's) can be summarised as **learning is about joint negotiation with an adult to explore difficulties.**

One of the essential differences in the story lines of these two episodes is that one was about discourse *appropriation* and *display* (*being nearly five*), and one was about discourse *construction* (in this case, using the processes of engineering and representation). The boundaries, characteristics and rules of *being a technologist* at kindergarten are poorly defined; they are flexible and the children are able to construct and adapt them for themselves. The characteristics and rules of *being nearly five* are, on the other hand, very much more clearly defined and may not be perceived to be flexible. When it was chosen as the discourse topic, it was more likely that discourse display would feature in the story line. But it was not, of course, a *necessary* corollary of the discourse choice.

The next chapters describe other examples of discourse appropriation, display and construction, in technological practices where the affordance of the materials and tools appear to have had more influence on the learning narratives.

7**TECHNOLOGICAL PRACTICE THREE:
MAKING A HAT****7.1 INTRODUCTION**

Butterfly making (in a group), monster making, and dinosaur making, were events or episodes that occurred only once in the construction area during the observation period. The next three technological practices describe frequently occurring products or processes: hat making (this chapter), marble painting (chapter 8), and screen printing (chapter 9).

There were 42 episodes of hat-making. This technological practice featured two discourses already introduced: *being a friend*, and *being nearly five*. In particular, it provided insights into the characteristics and rules associated with *being a friend*. Hat making was also an example of low adult power: adults provided social support and assistance in response to the children's requests, and were unlikely to take the initiative or instruct. This chapter outlines the narratives about learning that emerged from the hat-making technological practice. Section 7.2 describes the setting: the materials and the tools (analysing the affordance of the materials and tools in some detail), and the players (the social setting). Section 7.3 analyses the narrative story lines: the discourse appropriation, construction and display (7.3.1), the responses to trouble (7.3.2), and the distribution of responsibility (7.3.3). Section 7.3.4 summarises the learning narrative for this technological practice.

7.2 THE SETTING**7.2.1 The materials and tools**

The construction table and the materials available in the construction area were described as part of the analysis of the dinosaur and monster construction episodes, in chapter 6 (section 6.2). These materials were also used in this technological practice: the product, hats, differentiating this technological practice from dinosaur and monster

making (see chapter 4, section 4.7.2, for the defining characteristics of a technological practice).

Affordance: transparency

The term 'affordance' as it is used in this study was explained in chapter 3 section 3.4.4 (iii). Transparency as an affordance refers to whether the meaning or intention of the materials and tools (or what is to be constructed) within this technological practice is readily apparent. The idea of 'making a hat' had meaning of some kind to all the children. If children needed assistance (for instance with the fitting) it was immediately obvious to the assistant what help was appropriate. This was very different from Tom's monster, where the collaborating adult needed a great deal of verbal explanation from the technologist for it to be a shared goal (a condition of collaboration). Another aspect of transparency was whether the materials provided feedback to the participant about success. Hat making centrally included joining processes that provided immediate feedback about success. If the cellotape did not hold the join, then this was a measure of failure. Stapling was an alternative. If the hat did not fit, this too was a measure of failure. On the whole there were not very many ways for a hat maker to be 'wrong', and even the fit/does-not fit problem could be avoided by making hats for people who were not present to try them on. The strips of card afforded a basic cylindrical hat shape, and this reminded children of birthday hats, encouraging a *being nearly five* discourse.

Affordance: challenge

Challenge refers to the difficulty afforded by the materials and tools or the design of the construction. The process of making a hat could be acquired by observation: there were no hidden tricks or elaborate techniques, and children could, and often did, work at a collage or a roller painting at the construction table and carefully observe the hat makers; later they were able to make a hat without encouragement or tutoring. The shape of the cardboard depended on the surplus material and offcuts that were supplied to the kindergarten by local manufacturers. For a period the strips encouraged 'tiaras' because one side had a semi-circular shape. The very basic hat took a minute or so to make, but when the children gave some thought to modifying the basic design they persisted at the task for much longer: Molly's hat, described below, took 40 minutes, and Meg's hat, also described below, took 33 minutes. Most of the hats made were a standard 'basic' style. This design had been determined to a large extent by the artifacts: the shape of the cardboard and the staplers. Staplers provided the means to make strong joins (there were plenty of these, most of the time in good working order: their working order was valued, so if they didn't work they were quickly filled or

unjammed). The more elaborate hats (made by Molly, Meg, and Jason and described in this chapter) were still adaptations on this basic design. It was never abandoned.

By chance or design most of these strips were too short to go around a child's head. This meant that the *hat-maker* discourse included processes that could be called 'engineering': measurement, alignment, fitting, and joining. A basic hat did not demand too much in the way of cognitive effort; like the butterfly-making episode it left the mind free to engage in social discourse, in particular that of *being a friend*. And this discourse dominated the hat-making technological practice.

Affordance: accessibility

Accessibility refers to the form of participation enabled by the materials and tools (or constructions) in this technological practice. Measuring and fitting difficulties could often be solved only by eliciting help from an adult or a peer; this was accepted as legitimate help by both children and adults; unlike writing their names, children were not expected to measure and fit their hats by themselves although several children (Trevor's struggles are described later) tried very hard to do so and often succeeded. The technical process of making a hat, usually using cellotape or staples to join a strip or two of cardboard, meant that when completed it could immediately be worn or it went into the locker to take home. If it was not wet with glue or paint it did not need to be hung on the drying rack, which would have required it to be named. Naming often needed assistance, and writing your own name was valued, and carefully scaffolded, as part of the curriculum. A child who could not write her or his name could, however, complete a hat all by her- or himself. Children often did write their names or the names of their brothers and sisters on their hats, and they occasionally asked an adult to help them, but it was not a necessary part of the process.

7.2.2 The social setting

The 42 hat-making episodes are summarised in Appendix 2. In over half (24) of the 42 hat-making episodes children were working in groups of two or three, sometimes (on 12 occasions) assisted by an adult, who might come and go. Often the groups were girls only: of the 24 groups of children of two or more (both with and without an adult) 14 were girls only, 6 were boys only, and 4 were mixed boys and girls. This did not mean that children collaborated on any one hat; the products belonged to individuals, often designed to take home to others in the family. Twenty five children participated in hat-making episodes (usually, but not always, making hats), and the major players (children who participated more than twice) were Nell, Linda, Jason, Meg, Trevor, and Molly. This social setting data is summarised in Table 7.1.

SOCIAL SETTING	HAT MAKING
Social setting: one child alone (number of episodes)	7
Social setting: 2 children (no adult) (number of episodes)	2
Social setting: > 2 children (no adult) (number of episodes)	2
Social setting: adult(s) and 1 child (number of episodes)	11
Social setting: adult(s) and >1 child (number of episodes)	20
Total episodes	42
Total named children as participants	25
Total girls as participants	18
Major players: children who appear >2 times	Nell (7) Linda (4) Jason (4) Meg (3) Trevor (3) Molly (3)

Table 7.1. Hat-making technological practice: social settings

7.3 NARRATIVE STORY LINES

7.3.1 Discourse appropriation, construction and display

Being nearly five

Nine of the hat episodes produced hats that were designated as 'birthday' hats, and the topic of age and birthdays was never far away: birthdays, being four or being five, and other comments on age, appeared in 17 of the episodes. The comment has already been made (in chapter 6) about the significance in New Zealand of the fifth birthday, when most children start school. Many children were practising and preparing for being five years old. On March 8th, for instance, Tony started to prepare for his fifth birthday (an event that would take place in the middle of June): the transcript is Figure 7.1.

BEING NEARLY FIVE: HAT MAKING	
Tony:	Yoo hoo. Yoo hoo.
Amy (teacher):	Yoo hoo yoo hoo. Were you calling Tony? (Tony: Yeah) Calling me?
Tony:	I want you ta help me be a birthday hat.

BEING NEARLY FIVE: HATMAKING cont'd	
Amy:	A birthday hat?
Tony:	Yea.
Amy:	Whose birthday is it Tony?
Tony:	Mine. I just want to make it for June.
Amy:	For June.
Tony:	Yep. So I won't have to do it then.
(8/3TTA24.50-25.17)	

Figure 7.1. Being nearly five: transcript from the hat-making technological practice

Meg, whose birthday was six months away, was a little more sceptical:

Linda: What're you doing?
 Meg: Hat.
 Linda: I've got a five on mine. I'm just getting ready for my for my birthday.
 Meg: I don't think these will fit us when it's our birthday. It's a long way.
 Linda: They will.
 (28/2TTB45.40-46.31)

Rita spent about 35 minutes making herself a birthday hat assisted on and off by one of the teachers; Nell pointed out that Christmas hats were also possible. No-one made Christmas hats, although Rita said she was planning to.

Rita: (to Observer): I'n a give me a birthday hat.
 Observer: Making a birthday hat? Yep.
 Nell: They have Christmas hats.
 Observer: Christmas hats?
 Rita: And I donna make I donna make Matt (her cousin) a Christmas hat.
 Observer: Going to make Matt a Christmas hat?
 Rita: And I donna make me ah a birthday hat.
 (28/2TTB37.76-38.50)

Birthdays and birthday hats were also, for many children here, associated with parties. The *being nearly five* discourse included making birthday cakes with the play dough, and looking forward to a birthday celebration; for Rita it would be an occasion 'when my mum comes' (28/2TTB9.44), to join in with the singing and the special attention at the kindergarten. Making a dinosaur had signified *being nearly five* for Martin (see the previous chapter); for several of the children here, Linda, Tony and Rita for example, making a birthday hat signified *being nearly five* as well.

So it seemed that a lot of time was spent preparing to exit from 'being four' and enter 'being five'. The teachers were somewhat uncertain about this anticipation of the next birthday. It increasingly involved the borrowing of the teachers' 'special 5' template, kept in the office for genuine fifth birthdays. They questioned the discourse, and suggested 'four' as an alternative. This alternative was resisted, and the teachers were prepared to go along with the children's agenda, as the following transcript illustrates:

- Linda: (...) on this hat.
 Ann: What d'you need to do first then? Do you need it flat? To put your five on, or are you going to staple it first.
 Linda: Staple it first.
 Ann: Staple it first? Then it's tricky to put your five on. It's hard to trace around when you've already done it. But if you have it flat you'll find it easier.
 Linda: (...) five on mine.
 Ann: Are you five?
 Linda: No.
 Ann: Why're you putting a number five then? How old are you?
 Linda: Four.
 Ann: Wouldn't a number four be better then? (*Linda takes no notice*) (31.46) . . . (32.05)
 Linda: It's not our birthday yet.
 Ann: Are you getting ready for your birthday?
 Linda: Yeah.
 (28/2TTB31.03-32.12)

Being a friend

There were 20 episodes with *two or more children* for which there is a transcript. In 13 of them the children were giving each other support in some way. On five occasions this was advice or suggestions about what to do next; more often it was in the form of friendly affirmation (or requests for it). Examples included:

- Nice one eh?
 How's my hat Helen? (Reply: Good)
 Look at Myra's hat.
 We'll look beautiful eh?
 How does my tiara look? (Reply: Good)

This technological practice was particularly conducive to friendship discourse: the technical process of hat making didn't usually demand the children's complete attention so they could talk about other things while they made them, it was associated with another shared discourse (birthdays), and a helping pair of hands to hold the cardboard strip in place while the hat-maker did the stapling was often welcomed.

Discourse maintenance and construction was complex, flexible, and often subtle. There were several entry requirements to the discourse of *being a friend*, one of which has appeared in an earlier chapter: playing together, especially at a friend's house appeared during the group butterfly episode two chapters ago. Four main strategies emerged clearly in this technological practice:

- (i) action (playing together, going to another's house). Peter (to observer): 'Hey my, Robert's coming to my house tomorrow'.
 (ii) action: helping each other Samuel (to Nick): 'Why aren't you playing with me?'
 Nick: "I'm gonna make a hat" Samuel: 'Oh. Can I help you?'"

(iii) talk about action (a threat to withdraw an invitation to a birthday party, a direct comment about *being a friend* or not). Nell (to Laura): ‘ . . . we might invite you to my birthday’.

(iv) a sophisticated discourse (in the more restricted, linguistic, sense) style used here by some of the girls. This ‘friendship language’ or ‘girl-friend-speak’ was challenging; it included (a) demanding and holding each other’s attention (b) giving advice or assistance (perceiving or assuming a need on the part of the other) (c) asking for support or praise (d) responding in the way you assume the other intends (e) conspiring to exclude a third party and (f) telling stories that are of well-judged interest and length. Wendy and Rachel, Molly and Myra, Emily, Laura and Nell, were all experts at this language. I never heard the boys speak it in the construction area. Wendy and Rachel provided an example of this friendship talk in Figure 7.2; Myra and Molly in Figure 7.3.

**BEING A FRIEND:
GIRL-FRIEND-SPEAK (i)
Wendy and Rachel in a hat-making episode**

- (1) Wendy: Now d'you know what I'm going to do? I'm gonna staple this. Staple it. That can be like that. Now I need some (...) I need but this big piece to do this.
- (2) Rachel: I need to cut this bit off now. Gonna staple that bit on there. And then stick this bit like that on there.
- (3) Wendy: I like having holidays. And everythink, eh?
- (4) Rachel: I hate holidays. Know what I'm gonna do? I'm gonna put the cellotape on here and I'm gonna fix something on it.
- (5) Wendy: Oh I can use these (...) pieces man. Eh? These are all the things that I need.
- (6) Rachel: I need that. That's what you've done so you need that.
- (7) Wendy: You can use which ever you want.
- (8) Rachel: Yeah we can eh?
- (9) Wendy: Mm Hm. And d'you know what? We actually made this kindly. Made everything.
- (10) Rachel: Yeah
- (11) Wendy: Now I'm going stick this piece on. I'm gonna stick this little piece on. Now you stick it there like that.
- (12) Rachel: I'm sticking mine.
- (13) Wendy: All around it. This'll be a nice hat for someone eh? This'll be a nice hat for Tom.
- (14) Rachel: Yes
- (15) Wendy: So nice one eh? (3.49)
- (16) Rachel: Yeah
- (17) Wendy: It's my bestest
- (18) Rachel: Yees
- (19) Wendy: Guess what Rachel.(sings) Jingle bells, jingle bells. The people from Eketahuna they came for the holidays.(sings) Oh what fun it is to ride.
- (20) Rachel: I'm doing these bits first.
- (21) Wendy: That good enough. (pause) That be good enough?
- (22) Rachel: Yes.
- (23) Wendy: Those can be his ears eh? I'll write I'll do write my name. Oh where can I write my name on this. I'll write my name in

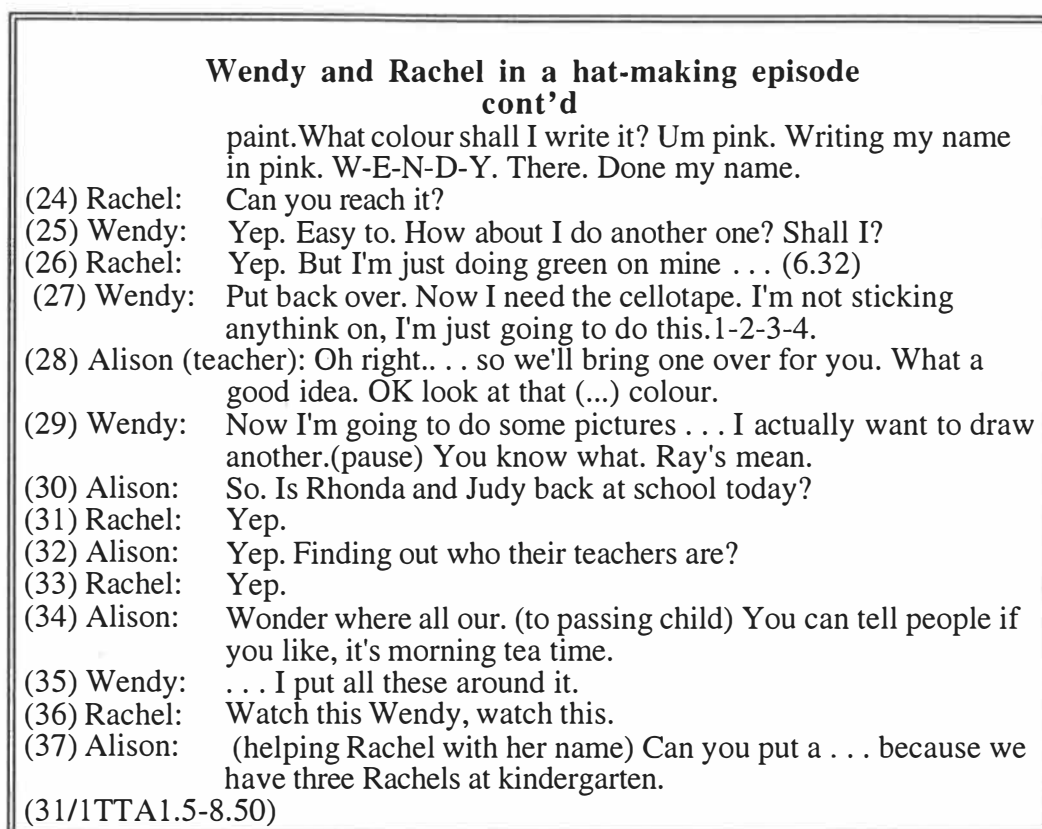


Figure 7.2. Being a friend: girl-friend-speak (i). Transcript of Wendy and Rachel from the hat-making technological practice

The strategies included (see Figure 7.2):

(iv)(a) *demanding and holding each other's undivided attention by:*

- using each other's names (turns 19, 36). Later in the research I asked Wendy and Rachel how they got to be friends; one of them replied "We just made friends didn't we?" "Yeah". "Asked each other's names". "Yeah cos she told me". (27/3ITA26.8-42.1)
- the use of 'eh?' (turns 3, 5, 8, 15, 23)
- more direct instructions to pay attention: 'Watch this'. (turn 36)
- invoking guessing and an understanding of the incomplete knowledge of the partner: 'D'you know what I'm going to do?' (turn 1), 'Know what I'm gonna do?' (turn 4), 'D'you know what?' (turn 9), 'You know what?' (turn 29), 'Guess what?' (turn 13).

(b) *giving advice or assistance: perceiving or assuming a need on the part of the other*

'you need that' (turn 6), 'you stick it there like that' (turn 11), 'can you reach it'? (Yep, easy to)' (turn 24).

(c) *asking for, or appearing to ask for, support and praise, and the friend giving it:*

'that be good enough? (yes)' (turn 21), 'so nice one eh? (yeah)' (turn 15), 'this'll be a nice hat for someone eh? (yes)' (turn 13), 'How about I do another one, shall I? (Yep)' (turn 25).

(d) *responding in the way you assume the other intends*:

- Positive phatics: 'Yes', 'yeah', 'yep', 'mmhm' (turns 8, 9, 10, 14, 16, 18, 22, 25).
- Following the topic: (turns 4, 12).

The Myra and Molly episode had similar features, rather more embedded in the (more complicated) task in hand (making a hat with a flashing light: Figure 7.3).

**BEING A FRIEND:
GIRL-FRIEND-SPEAK (ii)
Myra and Molly in a hat-making episode**

(1) Myra: Molly, this thing is the flashing light. (Molly: Yes) Look at my lovely thing. And I've got a lovely light. That shines golden. Gonna turn the shining light on. Look at the shiny light Molly. Look at that gold in the middle.

(2) Molly: Mine's even prettier 'n yours Myra. Got more stuff on it. This little bit's going to be the light.(9.59)....

(3) (10.38) Myra: Look at the golden light flashing on. The golden light goes on so I can see in the night. You should have a golden light to see in the night . Here's your flashing light. I'll get a little flashing.

(4) Myra (to another child): You can make a hat if you like. I'm making. What are you making? (Molly: I'm making a princess hat) I'm not. I'm making my Dad, a hat for George.

(5) Molly: Mine's pretty isn't it.

(6) Another child: Where are you going to stick that though?
(23/2TTA9.10 -12.28)

Figure 7.3. Being a friend: girl-friend-speak (ii). Transcript of Molly and Myra from the hat-making technological practice

Examples of the strategies (see Figure 7.3):

(iv)(a) *demanding and holding each other's attention*

- using each other's names (turn 1, twice; turn 2)
- the use of 'eh'? Here 'isn't it' replaces 'eh' (turn 5)
- more direct: 'watch this', 'look at this' (turn 1, four times; turn 3)

(b) *giving advice or assistance perceiving or assuming a need on the part of the other* (turn 3, twice)

(c) *asking for support and praise* (turn 5)

(d) *responding in the way you assume the other intends*. There are no examples here of mutual responding: when Molly said 'Mine's pretty isn't it?' Myra did not reply, perhaps because Molly had already said that hers was 'even prettier 'n yours'; this transcript had a more competitive edge, but the children still helped each other, and Myra later saved some of her precious gold paper for Molly.

Being a girl

It seemed that the more subtle conversational markers of *being a friend* were a feature of the talk, in particular, of seven of the girls. And when the children made hats, the observations indicated that the alliances were often along gender lines, suggesting that in this technological practice, *being a friend* may, for the girls, have overlapped with *being a girl*. However, this was partly because it was an activity preferred by girls: of the 25 children who made hats, only seven were boys. Where there were groups of two or more children working together (with or without an adult) 14 of them were girls only (six were boys only, three were mixed). There was nothing intrinsically gender-related about hats, although three were named as 'princess' hats or 'tiaras'. A hat was described as 'pretty' four times, once by Penny (3/2, 'I wearing prettier hat'n you Catherine'), twice by Molly (23/2, ' Mine's pretty isn't it?', 'Mine's even prettier'), and a teacher on one occasion commented to Molly that 'You put some pretty patterns on' (28/2). On six occasions the teachers commented on the 'girls'' activity: one referred to painting nearby, and one was ambiguous ('Good girl, good girl, well done. I knew you could. . .') in that it could have referred to name writing at the construction table. The other four were: 'Good girl' to an assisted and completed hat-maker, 15/2; 'I love those tiaras you girls have made' (to Emily and Laura, 17/2)', 'Fabulous cutting you girls' (to Molly and Myra, 23/2) and 'I'll leave you girls to help each other to measure and staple' (to Linda and others, 28/2). The teachers referred to 'boys' only once: when Ann told Peter that the name card he had found belonged to an 'afternoon boy'. Unlike during the group butterfly episode (when they talk about the girls' and the boys' side), the children never specifically referred to *being a girl* or *being a boy* while they were making hats, although this is presumably implicit in their comments about tiaras, princess hats and being pretty. In this technological practice, gender is another useful, but not a necessary, marker of friendship.

As noted earlier, friendship talk in this technological practice was a prerogative of the girls, forging a merger between gender and friendship. There is no reason why the boys could not learn the empathic and disembedded friendship discourse that the girls were practising, but the narratives about learning here did not provide ready models for them to do so.

Being a hat maker

Although 18 of the documented 51 hats (some episodes included more than one hat) did not have an ascribed purpose, 11 were made to take home for members of the family (including cats and babies), nine were birthday hats (only Jason made one for

his actual birthday), three were 'princess hats' or 'tiaras', and one was made for a complex purpose (Meg made a hat with a blue visor, made from cellophane, attached to the front). One of the hats for the fathers became very elaborate, and the children told me that the plastic bottle tops attached to it were 'flashing lights'. I asked what they might be used for.

Observer: What d'you think you might need the flashing lights for?
 Molly: So Daddy can see at night.
 Observer: See at night? Very handy.
 Molly: Yeah. If we forget the mail.
 Myra: Yeah.
 Observer: If you forget the mail.
 Molly: Late at night. Cos our Dad likes getting the mail.
 Observer: Oh right. You could go out with your flashing light.
 (23/2TTA17.26-17.53)

Nell, Emily and Laura had been developing creative and thoughtful responses to the challenges of *being a friend*, and there were four examples of non-standard creative and thoughtful responses to the challenges of being a hat maker. All four examples were from children who had spent a great deal of time in the construction area; they were experts in the technological processes involved, and they had each made numerous standard hats and products as well. Just as there appeared to be a number of strategies for the elaboration and exploration of friendship, so the following can be described as four thoughtful elaboration and exploration strategies in technology:

(i) transformation (Molly) (ii) redefinition of function (Meg) (iii) representation (Jason) and (iv) engineering (Trevor).

(i) *transformation*

Myra and Molly's transformation of cardboard offcuts and reject plastic bottle tops into 'flashing lights' hats (23/2) have been described. On another occasion Molly transformed a COMPLAN (trade name for a health food) packet into a hat, cutting out the pictures on one side of the packet and positioning a sun (denoting health to the manufacturer) as a light on the front. To an adult's eyes it does not seem too fanciful to compare these transformations with Picasso's transformations of a toy car into the head of a baboon ('baboon and young' in Read, 1964 p.234), or a bicycle saddle and handle bars into a bull's head (Arts Council of Great Britain, 1967 p.55). Transformation of manufacturers' cast-offs into other artifacts is a theme of a kindergarten's construction table.

(ii) *redefinition of function:*

Molly ingeniously redefined the function of her hat: to help her father see at night when he goes out to get the mail ("cos our Dad likes getting the mail"). Meg's hat too creatively changed the function of a hat. She worked on her own, and the only

transcript from this episode (9/3) was when she asked me half way through the process whether the hat is straight:

Meg: Is that straight?
 Observer: Straighten it. Yes.
 Meg: (to herself) Take it off and staple it. (9/3PTB7.00-7.48)

Video notes describe Meg's hat-making episode (Figure 7.4).

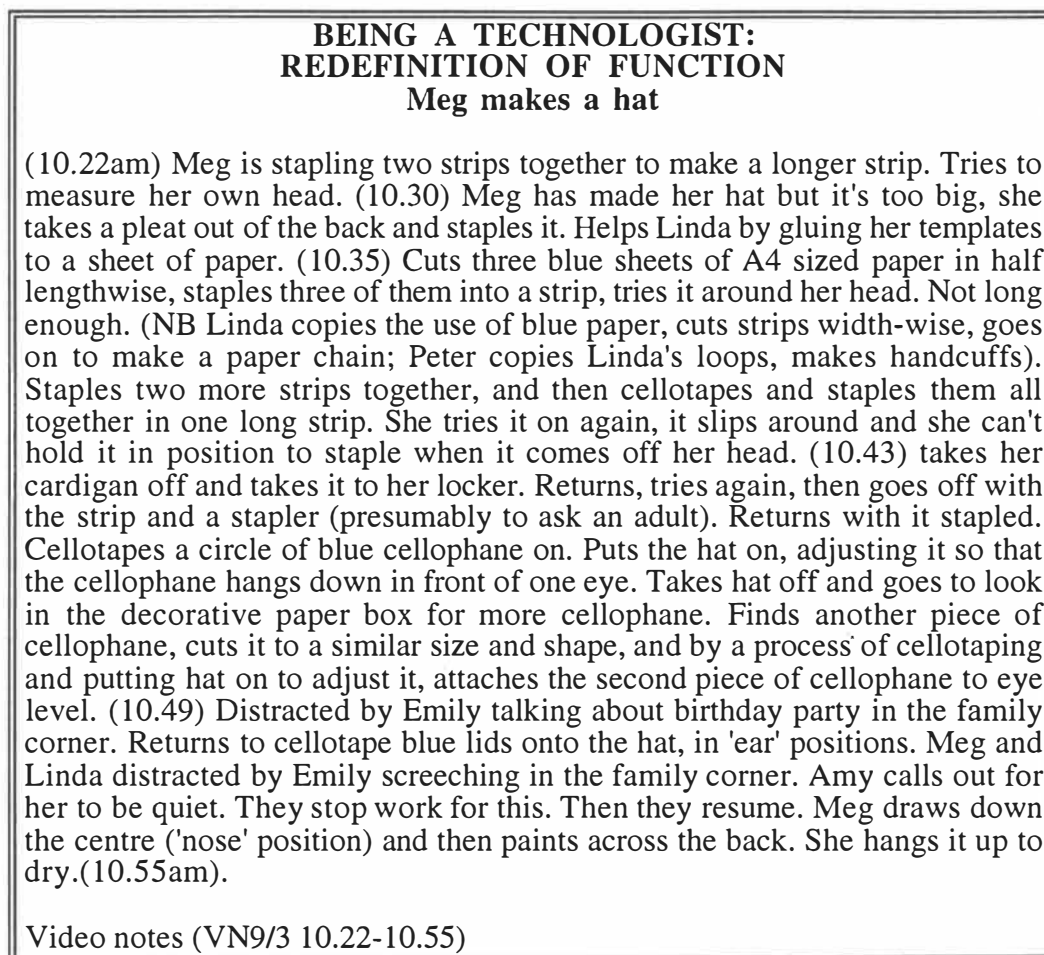


Figure 7.4. Being a technologist: redefinition of function. An example in the hat-making technological practice

Meg worked on her own for 33 minutes to complete an imaginative hat, with a function that included adding what is in effect a coloured visor, so that when she wears it she sees the world in colour. She interrupted it to help Linda who was making a screen print. She had solved the problem of adjusting the size by making the hat out of paper not card, and taking a pleat in it.

(iii) *representation*

Towards the end of the session on the day before his fifth birthday, Jason made a hat with long strips of paper attached that waved around as he moved. There were sketchy field notes on this:

Jason, back at collage table says: 'I'm going to make a hat'. (End of table tape). He cellotapes strips on then measures it onto his head, cellotapes it. Narrow strips are on table - he makes use of them. (FN16/2)

Jason appeared to be very interested in ways of representing and expressing movement (see chapter 14, section 14.3.6 and Appendix 10). On this same morning he had also made a kite by attaching a tail and a long string to a box and then ran about outside trailing it behind him; he also put dabs of paint onto painting paper on an easel and then blew the paint around the paper with a straw, commenting on the tracks it made. On another day he made a painting using a sponge dipped in paint to make footprint-like tracks across the paper. He was also interested in marble painting, where the 'painting' resulted from the movement of a painted marble over paper in the base of a cardboard box.

(iv) *engineering.*

Trevor worked away for 24 minutes with card and stapler, returning several times to his attempt to make and measure a hat the right size for his head (Figure 7.5). He used three methods: holding and adjusting the strip around his head, but he couldn't hold it in place for long enough to staple it; adjusting the strip around his waist (as a measure, perhaps, of his head), but he couldn't get it off his body to staple it; and placing it over Chris's hat, using Chris's as a model. This latter method would have been a good solution, but he didn't follow it through.

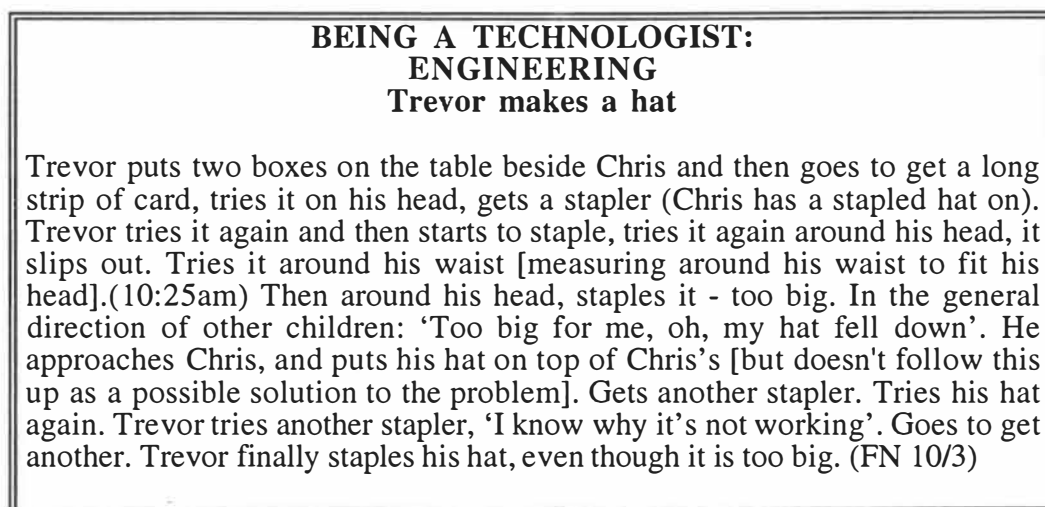


Figure 7.5. Being a technologist: engineering. An example in the hat-making technological practice

Trevor persisted, trying several strategies, to solve a difficult problem. On other occasions, observations indicated that he was interested in mathematical problems, counting the staples on a construction, counting the motors on a boat, and as I struggled to understand his language, he talked about the number of outboard motors he would need, manipulated numbers, and told me the horse power of his motor (see chapter 14, section 14.2.3 and Appendix 8).

7.3.2 Responses to trouble

The discourse was usually about (literally) displaying *being nearly five* or maintaining and constructing friendships. The first of these rarely got into trouble; mild resistance from the adults was ignored, and the discourse became part of pretend play. Comments in the previous chapter, however, about the high status of being five (and therefore the low status of being four) apply: 'fours' engaged with kindergarten tasks and took responsibility to resolve difficulties here; 'nearly-fives' did not.

The second discourse, constructing friendship, had become elaborate indeed. It was notable for the persistence with which the children tried a new strategy when there was trouble. On one occasion, when Nell was the brunt of Laura and Emily's exclusion techniques, she drew on her supply of strategies from other categories of friendship maintenance: she told a story, prompted Emily's story-telling, and offered a birthday party (Figure 7.6).

RESPONSE TO TROUBLE (FRIENDSHIP): FLEXIBLE STRATEGIES

- (1) Laura: (across the table to Nell, in an artificial 'special' voice) You're doing *lovely* (emphasis) work there.
- (2) Nell: Thank you.
- (3) Laura: It looks *so* beautiful. (Normal voice) Oh can I please have this pen here?
- (4) Nell: No, sorry I've already got a blue but we need them all in here.
- (5) Laura: (to Nell, artificial voice again) Oh you're doing lovely, lovely, *lovely* work.
- (6) Emily: (loud whisper: We don't like it really eh?
- (7) Laura: (loud whisper) Yeah, we just lying eh?
- (8) Nell: I heard that.
- (9) Laura: We love it eh Emily?
- (10) Emily: No we're only telling lies to each other.
- (11) Nell: I know that.
- (12) Emily: (...) do you know that?
- (13) Laura: (...) us eh. (she laughs) (to Nell) Did you hear us that time?
- (14) Nell: No.
- (15) Laura: Good, what a voice. (she laughs again).
(17/2TTB3.46-5.02) . . .
- (16) Laura: Actually my Dad knows how cicadas do hatch out at night (Emily: Yeah) because if you don't see them hatching in day, they hatch in night. That's always true.
- (17) Emily: That's the you're telling the truth to us eh?
- (18) Laura: Yeah. 'Cos once, he he's already done it and I saw him do it. He did it, once he took us down.
- (19) Nell: Did ya find some?
- (20) Laura: Yes. Once we even found a live one and we letted him go and didn't make a wish for you! He he. And we only made a, but we made a wish for you and me and my big brother that made,

**RESPONSE TO TROUBLE (FRIENDSHIP):
FLEXIBLE STRATEGIES
cont'd**

that only wanted a a pirate suit to scare me, a sword to hurt me, and a and a pool, and a big swimming pool, and a big pirate boat to float in, and a pretend floaty pirate boat. (Emily laughs). That's all he ordered. And then he was expecting it to float down our creet, creek and come up to him. And then he would grab it, then he'd jump in and grab it and float ashore.

(17/2TTB5.41-7.28)

Figure 7.6. Response to trouble (friendship): transcript from the hat-making technological practice

On the whole, friendship discourse maintenance and construction proceeded smoothly for many of the players, although there were signs that for some children it was a difficult business (see the synthesis in chapter 10, section 10.4.4).

It was the more rare hat-making discourse that seemed to get into the most trouble, as children found some of their more ambitious technical goals too difficult to achieve on their own. How did they respond to these difficulties? One way was to circumvent them. The materials and the physical process of making a hat afforded the development of measuring and fitting skills. Or so one might think. In fact, four children creatively avoided these difficult processes by making a hat with a very small diameter, using one strip only, and describing it as a hat for a baby or a cat. Eleven of the 51 hats for which there are notes were made for a baby, a cat, or someone at home. The measurement problem was avoided. Nell, Meg, Jinny and Linda all made hats for their cats, although Linda and Meg also made hats for themselves. Linda made three hats for herself and on each occasion she asked for assistance with the measuring and fitting from an adult. All of Nell's seven hats were for cats or for a baby. When I asked Nell if her cats really wear the hats, she replied 'on sunny days'. My field notes record that 'I talk to Nell about the hat she's making for her cat: she's not very pleased about my asking if the cat ever wears a hat, adds later "on sunny days". . . I ask her if she wants to make a hat for herself, and she says yes she will later, but doesn't (FN8/3)'. Nell also made hats for her 'baby', although she confided in Jason one day that she doesn't really have a baby at home. Field notes also make the comment:

Artifacts for hat-making: the strips are just a bit too short for a head. The children solve this in various ways: staple a bit on and get an adult to measure (Meg, yesterday, after refusing a peer's help), trial and error and then abandon (Nick today), make a hat for a baby (Nell today and yesterday). (FN14/2)

Later Meg made a hat out of paper, more flexible than cardboard, so that if she made it too big she could take a pleat in it by pinching it together with her fingers to get it to the right size while it was on her head, and then taking it off and stapling the pleat. She

stayed with the basic design, however, cutting strips out of sheets of coloured paper. Jason made hats for his family, but also for himself, and seemed to be able to fit two stapled cardboard strips around his head and then hold them in place to staple them off his head: he began by stapling the ends together on the outside (racquet shaped) but gradually came to be able to staple the hat into a circle.

Another alternative strategy for responding to trouble in the hat-making discourse was to abandon the task and decide that you 'can't make hats': Nick (14/2) tried to make a hat fit, and was assisted by Nell, but the effort of making his hat fit was too onerous and he abandoned it; on another occasion (20/2) he was called away to play with Samuel and readily agreed, saying 'I don't think I can make a hat'. Tony abandoned the task when Amy, the teacher, suggests that he decorate his strip before she would give him assistance (8/3) perhaps because it appeared to be getting too complicated. In one episode (28/2), Rita left a hat-making enterprise uncompleted, apparently because the next and crucial step (drawing the number 5), needed help. She was called back by a teacher, explained her problem, and was given the assistance she needed to finish it.

7.3.3 Distribution of responsibility

Responsibility for the coherence or the direction of the story line was distributed across adults and children in three ways. The first two were the most common: adult support and peer support. These are asymmetric patterns; a child initiated the project, did the decision making and then an adult or a friend provided encouragement and support. There were glimpses of a third, symmetric, pattern: peer collaboration, in seven episodes, although none of them were sustained.

Table 7.2 provides the statistics on the adults' level of power in this technological practice. Using those episodes for which there was a transcript (33 episodes, 428 adult speech turns, 731 speech utterances), the pattern of responsibility for hat-making when an adult is involved shows a high proportion overall (75.0 percent) for the two categories where adults are the least powerful. Adult evaluative comments (7.9% of total) were low (compare 18.7% in the butterfly episode). Adult praise or evaluation was replaced by the transparent nature of the enterprise: if the hat fitted, it was a success; if it did not fit anyone here, it could be for someone at home.

	HAT MAKING
Total episodes	42
Total speech turns	1225
Total adult speech turns	428
Adult speech turns as % total	34.9
Total adult utterances	731
Adult utterances per turn	1.71
Adult power as % of adult utterances	
Level I (low, categories 1-3)	27.8
Level II (categories 4-8)	47.2
Level III (categories 9-13)	13.0
Level IV (high, categories 14-25)	12.0
Levels I and II combined	75.0
Levels III and IV combined	25.0
Evaluation utterances (categories 10-17) as % of total	7.9

Table 7.2. Hat-making technological practice: adult speech turns as % of total, and adult utterances by level of power

Adult support

A common pattern was 'adult support'. In 13 of the episodes one child worked alongside an adult (on four occasions this was the observer, once it was a parent) for most of the time, with the adult giving technical assistance, usually requested, or making comments of support, also usually solicited by the child. A typical example was Peter making a hat, Helen watching, and the observer nearby:

Peter: How's my hat Helen?
Helen: Good.
Peter: I'm gonna. (to Observer) How's my hat? How's the hat?
Observer: It's very good. (7/2PTA6.18-6.28)

The adults were playing a similar role to the artifacts: providing the opportunity and some physical help, assisting children with their self-chosen goals. Another typical example of the discourse is as follows. It is very similar to the examples of *adult support* in the butterfly and the dinosaur-making episodes.

ADULT SUPPORT

Tony: Alison.
 Alison: Mmhm.(phatic, 1)
 Tony: I want to make one of these. A little little.
 Alison: Is that for you? (clarification, 5) Is that to go on your head?
 (clarification, 5)
 Tony: It's too little.
 Alison: Well, how do you think you could make it bigger? (focussing, 5)
 Tony: Get another piece of paper.
 Alison: OK (agreement, 4). You see if you can find another piece.(prompt,
 7)
 Tony: These?
 Alison: Right. Now. (keeping him going, 4) How are you going to join
 them up? (prompt, 7) Right. (agreement, 4)
 (23/2TTB29.34-30.25)

Figure 7.7. Adult support: transcript from the hat-making technological practice

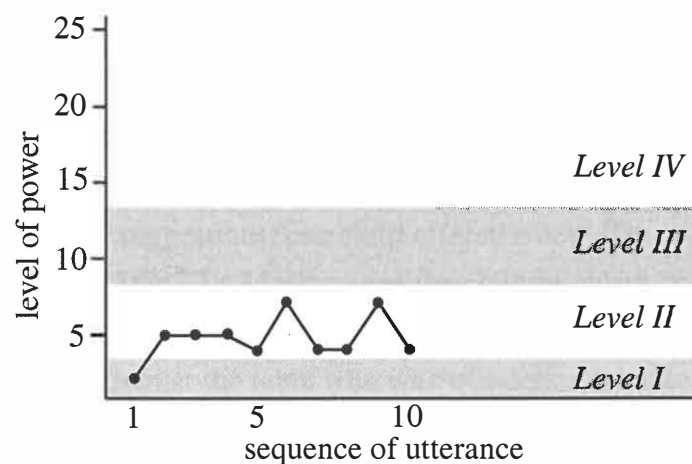


Figure 7.8. Adult support: graph of transcript from the hat-making technological practice

Adult tutorial

On only three of the 42 occasions did the adults appear to take the initiative with either the sequence, the measuring, or the choice of fastening. On one occasion a parent responded to a child's request for help by giving a series of instructions. For the other two, the teacher was making a deliberate, initiating, attempt to introduce a child who was new or an infrequent attender to a new activity that would be within her capabilities. In these two episodes the adult initiated, provided more initiating guidance, and her 'turns' were much longer than was typical for this technological practice. For example:

Ann: How are we going to measure this one? Is it for round your head? Shall we measure it again? Where's that glue? . . . There we go. OK. Let's see how much room we've got. OK. It's going to be joined together right at the back here. That's where you need to join it again. What are you going to join it with? I think, rather than the cellotape, I think maybe a stapler would be stronger? You know where we keep our staplers? OK.
(15/2TTB10.10-10.30)

This was not typical, however. The dominant apprenticeship type when an adult was present was one of child initiative, and adult support.

Peer support

When the discourse was hat-making, there were two other responsibility patterns. One was *peer support*. This was analysed as part of the friendship discourse: of the 20 episodes that included more than one child and for which there were transcripts, 13 could be described as examples of peers supporting and praising each other: peer support. Occasionally this support was stepped up to include technical assistance, and this was included as an example of peer collaboration.

Peer collaboration

A third pattern could be described as *peer collaboration*. There were no examples of sustained technological collaboration, but seven episodes included examples of technical assistance or suggestions: one child offered a new idea or suggested what to do next to another. On 8/2 (TTA24.07) one of the children asked Peter 'Are you going to paint your hat?' (Peter: Na-oo. It's not my birthday yet). On 13/2 (TTB5.35) Nell said to one of the children at the table who was wondering what to make: 'Hey, why don't you make a hat. For you.' (interesting, coming from Nell who never made hats for herself). On 15/2 (TTB23.00) Chris said to Jason: 'That wouldn't fit your head', prompting Jason's 'No. Haven't done it yet. Gotta measure it somewhere'. On 28/2 (TTB 46.35) Meg said to Linda that she didn't think the hats would fit them in six months when it would be their birthdays. On 8/3 (TTA 17.24) Nell suggested to Tony that he might like to make a hat for his cat. On 23/2 Molly asked 'Where did you get that gold?' and Myra replied 'Here you are, I got you some' (FN). On 27/2 Myra stapled Molly's work for her. Molly: 'Can you staple this?'; Myra: 'Yep. I will' (TTA14.22).

Hat making was an individual matter and technical collaboration was infrequent. Ann said on 28/2 'I'll leave you girls to help each other to measure and staple OK?', but substantive help, if needed, usually came from an adult. Three of the four children who made unusual hats or persevered with technical problems (Jason, Meg and

Trevor) worked on their own, without support, encouragement, or tutoring. Molly, the fourth, worked alongside Myra in a combination of friendship and technologist discourse.

When the discourse was *friendship* however, in a hat-making context, there were three episodes of sustained collaboration where the girls were becoming experts at a symmetric collaborative discourse (Figures 7.2, 7.3 and 7.6). The responsibility was shared, new strategies were being mutually developed and new rules constructed.

7.3.4 Summary of the learning narratives: hat making

The major learning narrative was as follows:

Setting: Flexible materials, making a readily recognisable (transparent) product with some measures of accuracy (joining and fitting). Children making individual products but working together, adults often helping.

Story line. Discourse(s): The discourse was either *being nearly five* (when the story line is one of display) or friendship. Friendship discourse was constructed and elaborated in four ways: action (playing with each other), action (helping each other), talk about friendship, and talking girl-friend-speak. This latter was a complex process involving six discursive strategies.

Response to trouble: For the friendship discourse: persistence and trying alternative strategies. In order to allow for concentration on the friendship discourse, difficulties with the technological aspect (in this case the hat making) were avoided by (i) keeping to a basic design (ii) avoiding measures of success by creative means (in this case, by making hats for babies, cats, and absent people).

Distribution of responsibility: When the discourse was *being a friend*, the distribution of responsibility was peer collaboration. When the discourse was *being a technologist* the distribution of responsibility was child initiative with adult or child support and encouragement.

The four examples that formed a sub-group of the hat-making technological practice (Jason, Meg, Trevor, and Molly) provided the following story line:

Approach technological difficulty, and individually explore and elaborate *being a technologist* by some or all of the following: transformation, redefinition of function, representation, and engineering.

The next chapter analyses another technological practice where the materials and tools also play an important role in permitting the direction and the coherence of the learning

narrative: marble painting. This time the materials and the tools appear to be more compelling than the alternative discourses.

8**TECHNOLOGICAL PRACTICE FOUR:
MARBLE PAINTING****8.1 INTRODUCTION**

This chapter describes another technological practice at the construction table, marble painting (painting by rolling a painted marble around in a cardboard box). Unlike any of the other technological practices, here the *being a technologist* discourse remained on centre stage for most of the time, with the children adding challenge by engineering and redefining the function of the materials (not by shifting to social topics, a strategy that characterised the previous technological practices). It also provides an example of a preferred narrative where the distribution of responsibility was one of peer tutoring and collaboration, as learning narratives were passed on from child to child. Section 8.2 describes the setting: the materials and the tools (analysing the affordance of the materials and tools in some detail), and the players (the social setting). Section 8.3 analyses the narrative story-lines: the discourse appropriation construction and display (8.3.1), the responses to trouble (8.3.2), and the distribution of responsibility (8.3.3). Section 8.3.4 summarises the learning narratives for this technological practice.

8.2 THE SETTING**8.2.1 The materials and tools**

On the table with the staplers, cellotape, paints and trays with roller paints, there was a rather battered looking shallow cardboard box, with two cups of paint that each contained a marble and a teaspoon. These were the ingredients of an activity called 'marble painting'. The process was as follows: a piece of paper was placed in the cardboard box, a marble was spooned in, and the box was moved about so that the marble does the painting. The effect was somewhat like a Jackson Pollock painting.

Affordance: transparency

The term 'affordance' as it is used in this study was explained in chapter 3 section 3.4.4 (iii). Transparency as an affordance refers to whether the meaning or intention of the materials and tools (or what is to be constructed) within this technological practice is readily apparent. The marble-painting process is transparent, with children able to see exactly what is happening: as Molly said, "the ball's making me do that" (21/2TTA9.30). As with hat making, children could observe marble painters carefully, understand what was going on, then carry out the process themselves. In its original form, there was not much that could go right or wrong. However, the children decided to make their own boxes, and a criterion of failure was introduced: if the marbles rolled out of the box this clearly indicated a design fault.

Affordance: challenge

Challenge refers to the difficulty afforded by the materials and tools (or the design of the construction) in this technological practice. At first glance this activity does not seem to provide challenging opportunities for those processes that were designated as 'mindful' during hat making: transformation, redefinition of function, representation, or engineering. The process was easy, with only five steps (writing your name on the paper before you paint, putting the paper into the box, putting the marbles and paint in, tipping, removing and hanging up to dry); even the first step (writing your name) could be omitted because no-one knows it has been omitted until it is too late. It would appear to be an activity, like making a hat, that didn't call for much concentration or effort, calling into play alternative discourses, like being a friend or being a girl. (Nick: 'Is it easy?' Nell: 'It is easy' 16/2TTA18.36). But, as will become apparent in the analysis, the discourse of 'being a marble painter', one of the sub-groups of *being a technologist* held its own. The children increased its complexity by introducing a redefinition of function and some engineering. In other technological practices (butterfly and hat making) the children had increased the level of challenge, introducing interesting trouble, by shifting the discourse to friendship or gender. But in marble painting what could be called the 'absorption factor' of the task was high: children had to concentrate on what they were doing, the process was fascinating and attention-grabbing. The children introduced challenge without shifting the discourse to a more social topic. They made the technological practice more challenging by adding more marbles (which Chris did on one occasion, trying out four) and by constructing their own boxes. The first box that Jason constructed added to the challenge and uncertainty a great deal because it had one side missing. The original tray was a battered cardboard box. If it was a custom-built plastic tray, it would not have so readily allowed or prompted the flexible approach that occurs when the original goes missing. The marble-painting equipment afforded marble painting, but perhaps

because it was not ‘custom-built’, the children also found a different purpose for the tray: finger-painting.

Affordance: accessibility

Accessibility refers to the form of participation enabled by the materials and tools (or constructions) in this technological practice. Certain qualities of the tools and materials in marble painting contributed towards the distribution of responsibility. Although it was mostly an individual process, collaboration was possible, with a clearly designated division of labour (one child spooned the marble on and off, one tipped the tray). It allowed genuine collaboration on one project, a pattern of responsibility that had not been common so far. Collaboration may be more compelling because the final product did not appear to be greatly valued as an individual enterprise (one marble painting looked much like another, and naming was not emphasised).

8.2.2 The social setting

	MARBLE PAINTING	HAT MAKING
Social setting: one child alone (number of episodes)	0	7
Social setting: 2 children (no adult) (number of episodes)	4	2
Social setting: > 2 children (no adult) (number of episodes)	3	2
Social setting: adult(s) and one child (number of episodes)	6	11
Social setting: adult(s) and >1 child (number of episodes)	4	20
Total episodes	17	42
Total named children as participants	17	25
Total girls as participants	11	18
Major players: children who participate >2 times	Nell (6) Nick (3) Jason (3)	Nell (7) Linda (4) Jason (4) Meg (3) Trevor (3) Molly (3)

Table 8.1. Marble-painting and hat-making technological practices compared: social settings

There were 17 episodes of marble painting. The 17 marble painting episodes are summarised in Appendix 3. On seven out of the 17 occasions children were working in pairs or small groups with no adult participating or nearby (in comparison, only nine of the 42 hat-making episodes did not include an adult at some point). It was more unusual for the social setting to include an adult, and the adults took little responsibility (see section 8.3.3). Five of the pairs or groups (with and without adults) were girls only, two were boys only, four were mixed boys and girls (compare four out of 42 for hat-making). There were three major players (children who participated more than twice): Jason, Nell and Nick. Jinny participated twice and on a third occasion watched when Nell finger painted in the marble box. The social setting data is summarised in Table 8.1.

8.3 NARRATIVE STORY LINES

8.3.1 Discourse appropriation, construction and display

Being a marble painter

The affordance of the artifacts and the way that adults typically framed their evaluative comments (by commenting on the work or the activity rather than the goodness of the child, see chapter 12, section 12.4) appeared to conspire together to privilege the discourse 'being a marble painter', a sub-group of *being a technologist*. The characteristics of 'being a marble painter' changed over time. It is presented here as a sequence of five events:

The sequence of events

(i) *Early marble paintings*. Marble painting first appeared three days after observations began, when Joan made a marble painting, watched by Nell. Nell then made one too. Almost two weeks later Lisa got out the marble box, and John and Jason gave her advice and assistance:

Lisa: Now shall I put the marbles in. There's only one marble. Hey, there's only one marble. There's some in here. Oh. There's some in here. Two more. Can't roll 'cos I only got one marble even. Only one marble in there.

John: And two. (he puts a second marble into the paint tray for her)

Lisa: Oh one fell out. Oh.

Jason: Looks like it needs more paint on that anyway.

(15/2TTA19.12-20.11)

I was alerted to the fact that the two nearby children were behaving rather differently here than in previous technological practices: they appeared to be engaged with Lisa's efforts. John actually put a second marble onto her painting (he did not just show her),

and Jason made an initiating recommendation ('needs more paint'). This looked more like peer tutoring or collaboration.

(ii) *Jason made a new marble box and taught Nell.* Jason went off to play in the family corner with Nick, Tony and Rachel; he returned about 50 minutes later and asked the observer if she knew where the marble box is. She did not know. He decided to do some engineering: 'What I could do is to use the other box' (make another box into a marble tray 15/2TTB25.05). Figure 8.1 continues the engineering story.

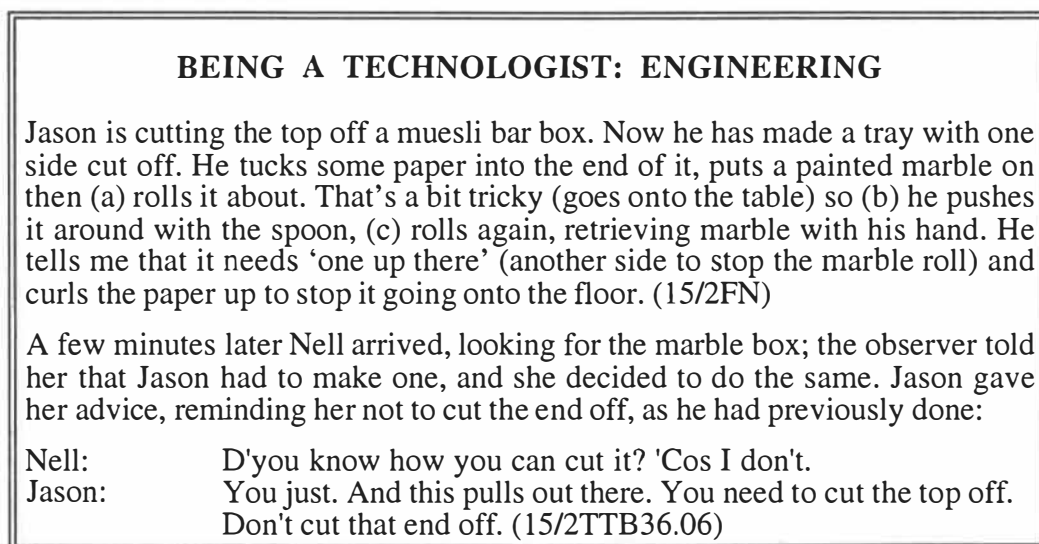


Figure 8.1. Being a technologist: engineering. An example in the marble-painting technological practice

Nell began to make a marble-painting box too, but it was tidy-up time, and she didn't have time to complete.

(iii) *Nell taught Jinny how to make a marble box and then Jinny taught Nick to marble paint.* The next day Nell was at the table with Nick, Jinny and Jason. Nell instructed Jinny about making a marble box, Jason added an instruction, and Nick watched, asked questions about the process, and then made a contribution to Jinny's painting: spooning in a painted marble and adding more paint while she tipped the box. Nick then did a marble painting, watched by Trevor. He asked Alison (teacher) to have a look at his marble painting and they talked together about the tracks the marbles had made especially as they turned the corner (FN16/2).

(iv) *Nick finger painted in the marble box.* A few days later Nick helped Molly to do a marble painting; then he did one. Then he decided to alter the function of the marble tray: he finger painted in it and took a print of the marks.

(10.38am) Molly is doing a marble painting, Nick is waiting for a turn. They talk then Nick takes Molly's painting out. Nick puts marbles in, hits the marble box with the paint spoon. (10.46) Nick is still rolling the marbles. Molly comes over and talks to him (then talks to Alison). Penny has finished a screen print and gives it to Alison to hang up. Nick has run his fingers in the marble tray, takes another piece of paper and makes finger prints. (10.53) Nick has put his finger-printed paper into the marble tray and is absorbed by the effect

when he continues to finger paint in it. He goes outside to show everyone his painted hands. He says "It's car grease". Later, outside, Amy asks Nick to wash his hands. He does so. Amy: "That's better, now I can give you a hug" (he doesn't want a hug; he strokes Thumper, the rabbit). (VN20/2)

(v) *Making a box and finger painting in it had become routine; friendship discourse appeared.* Several days later, both Meg and Sarah made their own marble boxes: perhaps this has now become so standard that the well-worn strategy of inserting uncertainty by shifting the discourse to friendship occurs (from Linda) to liven things up.

Linda: I'm not your friend any more (...) another friend.

Meg: Then I've got another friend. Diana.

Linda: Who? I'm gonna. I'll (...) I'm doing. I'm not telling which one I'm doing.

(2/3TTB19.30-19.43)

On the whole, the children kept the technologist discourse 'robust' and interesting in two ways. Firstly, they turned it into an *engineering* task to include making the box before painting. Jason began this, taught it to Nell, who taught it to Jinny, who taught it to Nick. In the final episode (2/3) both Meg and Linda made marble boxes. Secondly they *altered the function* by using it as a finger painting tray. Both of these processes were characteristic of creative hat-making episodes. The other two characteristics of creative hat-making, transformation and representation, did not appear here. The new function, finger painting, changed the affect: it added a frisson of excitement as questions were raised as to whether it was allowed or not. This encouraged one of the old favourite topics *being good*. Finally, the technological challenges were unable to compete with another favourite, *being a friend*.

Being a friend

The transcript of part (iv) of the sequence of events, when the discourse has changed to friendship, is included in full in Figure 8.2.

BEING A FRIEND: TALKING ABOUT FRIENDSHIP

Linda: Anyway. I've got a got a bangle on. I don't care. Silly dumb. I got this bangle for Christmas. Anyway you look funny like that.

Meg: You do as well. Funny.

Linda: Don't care. And I don't care. I'm not going to talk you any more. I'm not going to talk to you any more. Ever. So.

Meg: Got to talk nicely

Sarah: Yeah

Linda: You don't know how my (*emphasis*) name goes. You don't know how my name goes either.

Meg: You don't know how my name goes

Linda: Yes. I seen.

Meg: But you don't know how my next name goes.

**BEING A FRIEND: TALKING ABOUT FRIENDSHIP
cont'd**

Linda: I know everything. I'm clever. You don't know my name. You don't know my other name (...) write my name of this one. Don't know my other name.
 Meg: I know your other name. Carol.
 Linda: No you don't. Not gonna talk to you any more. I'm not your friend any more (...) another friend.
 Meg: Then I've got another friend. Diana.
 Linda: Who? I'm gonna. I'll (...) I'm doing. I'm not telling which one I'm doing.
 (2/3TTB17.03-19.43)

Figure 8.2. Being a friend: talking about friendship. Transcript of Linda and Meg from the marble-painting technological practice

The strategy here was the direct approach, to talk about being a friend, the time-worn 'I'm not your friend any more'; Linda was somewhat disconcerted that Meg (who worked and played with her most of the time) did not seem to care, and, even worse, had another friend whom she was prepared to name. The affective tone of this exchange was heated.

Finally, an imaginative flourish to the definition of a friend, also as part of 'talking about friendship', the most flexible category of friendship construction, was provided by Nell. She and Jinny were finger painting in the marble-painting box and Lisa was screen printing nearby, watching them carefully.

Nell (to Lisa who is screen printing and watching): Don't watch my friend Lisa. It's rude.
 Jinny: Yeah.
 Nell: But I'm allowed eh Jinny.
 Jinny: Yeah cos you're my friend.
 Nell: Only friends are allowed to look at the other friends.
 Jinny: Look that's all, that's all I'm gonna do. See. Cos I want it in a nice colourful circle.
 (21/2TTA41.18-41.53)

Lisa did not appear to be upset by this; she continued to watch Nell and Jinny, and later marble painted on her own (without permission, see *being good*, below).

Being good

Although it was not a salient discourse, this technological practice also provided several examples of a discourse that I have called 'being good'. So far it has only appeared in the butterfly technological practice, where it had become part of 'being a girl'.

On Nick's last kindergarten day (the day before his fifth birthday), he put paint and marbles in the marble box, rolling them around and moving them around with the

spoons. Danny watched him. Nick had spent a considerable part of the morning wandering around roaring at everyone, being a monster, not at all engaged in activities: he had already left being a 'kindy kid' behind. He then finger painted in the tray, ready to play the monster game again. Danny admired him:

Danny: What are you doing?
 Nick: I'm going to be the monster again.
 Danny: Eeh. Gosh.
 Nick: This one's squiggling, I'm going to getting my fingers all de dah. oooooaah. So I can scare the baby bird. I'm getting all, this is grease. I'm going to put some grease on my hands.
 Danny: I like you being the monster. Cos I like them when I won (*meaning unclear*).
 Nick: Ah.
 (21/2TTB12.40-13.40)

When, six days later, one of the girls (Penny) finger painted in the marble box, the discourse shifted for two of the other girls (Meg and Linda) to 'what is allowed' or *being good* (Figure 8.3).

BEING GOOD: DEFINING GOOD BEHAVIOUR

Meg: Look at hers. (Penny is finger painting in the marble tray)
 Linda: Are you allowed to do that?
 Penny: (...) to do.
 Linda: What?
 Penny: (...) to do (...)
 Linda: You're allowed to do that because um no the teacher said you're allowed to do that. (*does she mean not allowed?*)
 [Ann: Julie, what would you like to do].
 Linda: Oh, gross. Did the teacher said you could do that? Wow, look at her.
 Meg: (to teacher) She's doing it wiv her hands.
 Ann: Have you got the marbles in there Penny?
 Penny: Mm.
 Ann: That one's for marbling. Are you doing some finger painting? OK. That's all right. You can do the finger painting. But that's actually a special box for marbling. But we can make another one. You might like to draw some pictures in there and take a print.
 Linda: You're allowed doing that.
 Penny: Yes.
 (27/2TTA35.17-36.28)

Figure 8.3. Being good: transcript from the marble-painting technological practice

Meg and Linda focused the teacher's attention on Penny's behaviour because it deviated from what is usually done, and might not be 'allowed'. It was what Nick did before he went about roaring like a lion with painted hands. The teacher, pressured into making a ruling, was nicely equivocal (the teachers would prefer the children to sort out these matters for themselves): on the one hand 'that one's for marbling', and on the other hand 'we can make another one' and you *can* do finger painting 'but' the box is actually for something else. The 'but' may swing the cautionary advice towards

an interpretation that it is inappropriate, although Ann legitimised it by suggesting that it could be part of print making and Penny could take a print (she didn't). Certainly neither Meg nor Linda were at any stage during the observations prepared to finger paint in the marble box.

Sometimes the rules for *being good* included language itself becoming the subject for censure, a construction made during these observations not by the adults but by the children. The following example also provides further information on the use of 'eh?' and 'OK?', a speech mark that first appeared in friendship discourse. Myra and Molly were working together on a marble painting, and talking about the process; Molly used 'eh' at the end of her sentence, and Myra told her that there is a person (not at the kindergarten) who was not 'allowed' (often a marker of the 'being good' discourse) to use the word 'eh'.

Molly: You have to do two bits. (marbles)
 Myra: No, one at a time.
 Molly: Then the other one with the other one eh.
 Myra: Victor Smith's not allowed to say 'eh'. Victor Smith's not allowed to say 'eh'. But we are, OK? OK, Molly?
 Molly: Who cares? Who cares?
 Myra: Not me. Do you?
 (21/2TTA9.11-10.04)

This transcript was either about *being good*, or a closer examination of *being a friend*: in the latter case the implication was that friends came in sub-groups, the group that uses 'eh?' and the group that uses 'OK?'. It sits in the intersection between *being a friend* and *being good*, with the markers 'we are' attached to 'allowed' providing the cue.

Another way of indicating that the discourse may have been about what was allowed, and what was good behaviour, was when children seek permission. Lisa frequently sought permission on occasions when other children would not have bothered. Often she asked permission directly, but equally often it was with a raised voice and a look at an adult, as in the following:

Lisa: Guess what I want to do. Now I want to do marbles. Mmm. But where's the piece of paper? Where's the piece of papers?
 Jason: (gestures) There.
 Lisa: (raised voice, looks at Observer) Want to do marbles. Want to do marbles.
 Observer: Mmmhm.
 Lisa: But I don't know where the piece of paper is, eh.
 Observer: Over where the paper's kept Lisa.
 Lisa: What?
 Observer: It'll be over there won't it?
 Lisa: Yep. Here's one piece of paper.
 (15/2TTA18.00-18.58)

She raised her voice, asked where the paper was, looking towards the observer, apparently seeking permission. Jason directed her to where the paper was, but she waited until the observer indicated the available paper before she began. Two minutes later she called out 'Now shall I put the marbles in? (pause) Can't roll cos I only got one marble even' (John assisted) and a minute later she said, looking towards the observer, 'I haven't hung it up yet. I can't reach'. Almost two weeks later however, constrained by time (it's nearly tidy-up time) and in spite of not receiving ongoing adult permission she completed a marble painting on her own:

- Lisa: But you have to put the marbles in there. You have to put the marbles in there. (raised voice, looks towards the observer) Can I have a turn of this. I want a turn of this OK? I want to have a turn of this? Can I please have a turn of this. I want to have a turn of this. Can I please have a turn of this. I want to have a turn of this. Can I please. I can't do it. (no response from Observer. She goes to the jigsaw area to ask Ann's permission, returns and makes a marble painting) (30.45) . . . (31.25)
- Amy: Nearly time to tidy up everybody . . . Have you nearly finished Lisa? . . . Tidy up time now please.
- Lisa: Done my thing. I need to do my name.(34.06) . . . (writes name) (35.09) (to the observer) I did my name on my picture.
- Observer: You did do your name Lisa.
(27/2TTB29.19-35.06)

Perhaps this was because (undeterred by Nell's earlier injunction that she should not watch if she's not a friend) she had closely watched Nell and Penny, two of the experts, when they marble painted as well as when they finger painted. She could see exactly what had to be done; it was, as they have established, easy, and if she did not she would have had to tidy up. She was certainly not going to finger paint, that was a risk, but nevertheless to go as far as she did without permission was a big step for Lisa. She had modified her usual narrative (seek permission and wait for permission, tutoring, and approval, at each step), replaced it with one that said 'ask permission at the beginning and then choose the resources you need, and get on with it'. She could not yet omit the initial permission, but to manage without permission and approval throughout the process was a departure for her: the teachers had both been saying to her and demonstrating over the past weeks and, no doubt, months, that permission was not necessary. Lisa's definition of her salient discourse 'being good' (here) was being slowly modified by experience; the responsibility for the evaluation was occasionally shifting to herself. She was entering and perhaps adopting new narratives about learning that include learning without on-going permission from an adult.

The same process may have happened for Meg; her initial anxiety (while in Linda's company) about Nell's finger painting (telling the teacher 'She's doing it wiv her hands') turned to amusement a few days later (Linda is absent, Meg is with Jinny and Bridget):

Nell is finger painting in the marble box. Meg and Bridget chat to Nell and Jinny. Nell squidges her hands together. Meg and Jinny watch and smile. (2/3VN9.38-9.48)

These shifts for individual children, as they appeared to move out of narrative and part-narrative niches, will be summarised in chapter 14.

8.3.2 Responses to trouble

This technological practice was characterised by persistence when there was trouble. In the marble-painting (technologist) discourse, Jason's response to trouble (the marble tray is lost) was to make his own box, a response that caught the children's imagination, and considerably altered the affordance of the tools and materials. The finger painting could be interpreted as trouble as well. It appeared to be an only marginally acceptable deviation from the norm. Several children responded to it by turning for arbitration to the teacher (whose reply was ambiguous), and they did not try it themselves. But Jinny sought support from Nell - Nell finger painted in the box and Jinny then put a sheet of paper into the marble box - and turned the exercise into an excited request for support from Nell: should she finger paint? The tenor of the request was 'should I be a bit naughty like you were?'

Jinny: I've written my name. . . . Should I really do it Nellie? Should I really do it? (*meaning: should she put her hands into the paint*)

Nell: Yep.

Jinny: Should I really really really?

Nell: 'K.(they laugh).

(21/2TTA39.05-41.17)

The previous chapter illustrated the children's (in particular the girls') willingness to persist in friendship discourse when there was trouble; on the whole they relished the uncertainty and the excitement. One might imagine that when Linda was as 'mean' to Meg as she was in the episode in Figure 8.2, it would have been sensible for Meg to walk away (like Valerie in the group Butterfly episode: 'to wash my hands'). But Meg (like Nell in the previous chapter when Emily and Laura were 'mean' to her) persisted in trying to sort it out in some way.

8.3.3 Distribution of responsibility

Adults were present or nearby in twelve of the marble-painting episodes, but overall they contributed only a quarter of the speech turns (24.3% in comparison with 34.9% in hat making, see Table 8.2 below). The learning strategies that characterised this technological practice, illustrated above, were watching others and then doing it yourself, and peer collaboration and instruction.

Peer collaboration

In the hat-making chapter, collaboration and tutoring or negotiation by the children (except where the topic was friendship) had been scarce: there were only seven examples of children's utterances that came into this category. In this technological practice, it was very common, and the collaborative utterances were sustained enough to form a pattern that can be called *peer collaboration*. Figure 8.4 provides an example. Another marble painting example is included in chapter 12 (Figure 12.7).

The exchange in Figure 8.4, between Molly and Myra, is an example of socially shared exploration and collaboration. The discourse had moved from friendship to the marble painting (Myra had just completed a marble painting and Molly was in the middle of making one). When Myra made her marble painting the marble for the yellow paint was lost, and she had to make do with the purple only. Alison (the teacher) then found the yellow marble, and Molly then made a painting with the two marbles and two colours.

PEER COLLABORATION	
Molly and Myra marble painting	
(1) Molly:	Yuk. <u>Hey the ball's making me do that*</u> (laughs) (explanation of process). <u>Now. Now we take it out and put some more paint, then we put it back.</u> (instruction, perhaps to self)
(2) Myra:	Mine is purple as the.
(3) Molly:	<u>Where's yours?</u> (question)
(4) Myra:	Just in there.
(5) Molly:	<u>Where?</u> (question) <u>Show me.</u> (instruction)
(6) Myra:	(from a distance) Here.
(7) Molly:	Oh yeah. Come on ball Ah see. (laughs) . . .
(8) Myra:	<u>Why're you doing it again Molly?</u> (question)
(9) Molly:	Cos I want to. (12.32) . . . (14.04)
(10) Myra:	<u>Now you'll be able to do the yellow, won't you Molly?</u> (explanation of process)
(11) Molly:	(to Myra and Alison) <u>See what squiggles that made?</u> (explanation of process)
(12) Alison:	Oh, look at that.
(13) Molly:	There. <u>Purple and yellow.</u> (explanation of process)
(14) Alison:	Oh, what's it (...).
(15) Molly:	Look. <u>Colour.</u> (explanation of process)
(21/2TTA9.30-15.46)	
*initiating utterances are underlined	

Figure 8.4. Peer collaboration: transcript (i) from the marble-painting technological practice (see Figure 12.7 for transcript (ii))

Mutual engagement with the process was indicated by questions or comments about the work to each other, underlined. Explanation of the process occurred five times (turns 1, 10, 11, 13, and 15); 'genuine' questions appeared three times (turns 3, 5 and

8); and there were two instructions (turns 1 and 5). Some of the ingredients of friendship discourse were still present here: keeping the attention by using names (twice, turns 8 and 10, from Myra) for instance. But some of the ingredients of friendship discourse that were so apparent when Molly and Myra chatted together during hat making (see Figure 7.3) were *absent* here: (i) use of 'watch this' or 'guess what' to mean watch *me* rather than the work, and (ii) questioning to gain support and praise (questions that asked for a reassurance or admiring response: 'that be good enough?' 'so nice eh?').

The questions in the marble-painting technological practice were likely to be 'authentic' (Nick didn't know the answers and wanted to know; Myra appeared to genuinely want to know why Molly was doing another painting, although she interrupted Molly to provide an answer for her - so she would be able to 'do the yellow', add another colour). The discourse was about marble painting.

Calculation of adult 'power' in the four categories indicates that when the adults were present they too had 'raised their game'. Although adults talked less, 34.6% of their utterances were in the two highest categories, in comparison with 25.0% during hat making. The statistics for the two multi-episode technological practices documented in this study so far are as follows (Table 8.2):

	HAT MAKING	MARBLE PAINTING
Total episodes	42	17
Total speech turns	1225	317
Total adult speech turns	428	77
Adult speech turns as % total	34.9	24.3
Total adult utterances	731	142
Adult utterances per turn	1.71	1.84
Adult power as % of adult utterances		
Level I (low, categories 1-3)	27.8	24.6
Level II (categories 4-8)	47.2	40.8
Level III (categories 9-13)	13.0	26.1
Level IV (high, categories 14-25)	12.0	8.5
Levels I and II combined	75.0	65.4
Evaluation utterances (categories 10-17) as % of total	7.9	12.0

Table 8.2. Marble-painting and hat-making technological practices compared: adult speech turns as % of total, and adult utterances by level of power

Adult-child collaboration

When the adult was involved, she was engaged in initiating and instructing as well as supporting: an *adult collaborative* pattern. An example of this is given in Figure 8.5, graphed in Figure 8.6:

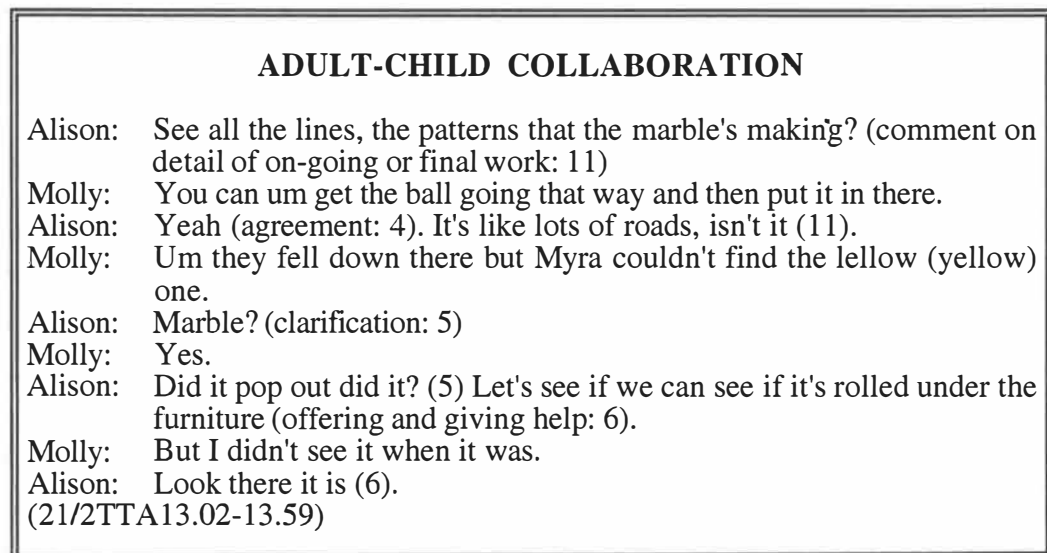


Figure 8.5. Adult-child collaboration: transcript from the marble-painting technological practice

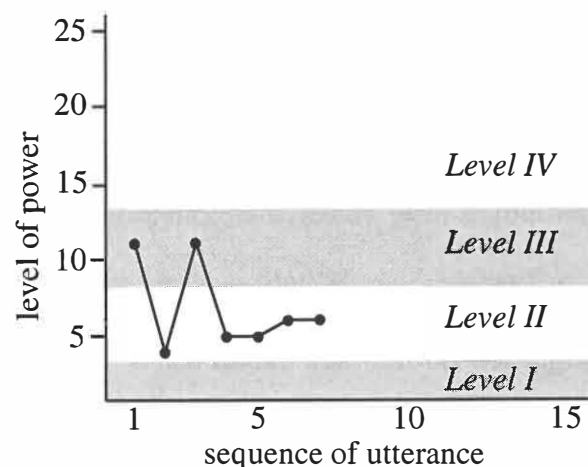


Figure 8.6. Adult-child collaboration: graph of transcript from the marble-painting technological practice

The teacher alternated between support, clarification of the children's purpose, and new suggestions. It was a collaborative process. It was noted earlier that the individual ownership of the product was not greatly valued (very seldom did adults ask children if they had remembered to put their names on them). They did not have a stamp of the individual on them: one marble painting looked very similar to another. This fact may have contributed to the cooperative effort when Nick and Jinny made one together. New (1994) reported from the collaborative sociocultural environment in Reggio

Emilia that children will often add to each other's constructions and drawings. In this early childhood setting it was unusual.

8.3.4 Summary of the learning narratives: marble painting

The major learning narrative was as follows:

Setting: Small group activity, art or construction. The process was of interest, the product not highly valued, the goal clear. Children were characteristically in small groups, occasionally with an adult.

Story-line. Discourse(s): The dominant narrative was being a technologist, and persistence and challenge were achieved by two processes of elaboration and exploration: engineering and change of function. Children instructed each other and negotiated the direction together. Adults took an interest and would become engaged in the activity, not just provide support.

Response to trouble: When part of the equipment went missing, the children worked out how to make their own. When doubt was cast on the legitimacy of a change in direction, the children usually assessed the strength of the resistance and persevered if at all possible.

Distribution of responsibility: Children took the initiative on how to begin and how to cope with trouble. Other children took an initiating collaborative role, giving advice and assistance (not just a supportive affirming role).

Two other narratives appeared briefly:

(i) Linda's narrative (the difference underlined), went as follows:

Setting: The same as above

Story-line. Discourse(s): Initially the same as the above.

Response to trouble: When doubt was cast on the legitimacy of a change in direction or the process was not the one set down, shift to a discourse about *being good*, and reassure yourself and the adults that you were not going to step over the limits of good behaviour.

Distribution of responsibility: Same as the above.

(ii) Lisa's narrative (which appeared in hat making as well) was as follows:

Setting: Same as above.

Story-line. Discourse(s): Same as above.

Response to trouble: When doubt was cast on the strategy by others changing the discourse (friends don't watch friends) ignore them.

Distribution of responsibility: The strategy was to observe others very closely, then copy what they do without any help.

Summarised, the dominant narrative was as follows: small group activities were opportunities for collaborative learning in which listening to and learning from peers, and teaching and assisting peers, were appropriate and helpful strategies. The next chapter describes the final technological practice; familiar discourses reappear, and new narratives emerge.

9

TECHNOLOGICAL PRACTICE FIVE: SCREEN PRINTING

9.1 INTRODUCTION

This chapter investigates the final technological practice, screen printing. Like the others, this technological practice had some unique features. The materials and tools had a more consistent influence on the complexity of the task than in previous technological practices. Adults took more responsibility: there were 58 episodes, 46 of them included an adult and adults took 44.6% of the speech turns (this figure was 24.3% for marble painting and 34.9% for hat making). A common discourse was *being a kindergartener*, a discourse that appeared during the butterfly technological practice (described in chapter 5). Section 9.2 describes the setting: the materials and the tools (analysing the affordance of the materials and tools in some detail), and the players (the social setting). Section 9.3 analyses the narrative story lines: the discourse appropriation construction and display (9.3.1), the responses to trouble (9.3.2), and the distribution of responsibility (9.3.3). Section 9.3.4 summarises the learning narratives for this technological practice.

9.2 THE SETTING

9.2.1 The materials and tools

Beside the construction table was a screen printing table, and screen printing featured on 19 of the 25 observation days. The process of screen printing has the following sequence:

- (i) take two pieces of paper, write your name on one and turn it over: this is the paper for the print, sheet A
- (ii) draw a shape or a picture on the other and cut it out: this is the template
- (iii) raise the screen (it is on a hinge) and put newspaper on the tray underneath, then sheet A
- (iv) place the cut out template on the top of sheet A, lower the screen

- (v) spoon paint on, and screen (or 'squeer', a word coined by Jason 8/2TTB25.17) up and down and across with the blade provided until the paint covers most of sheet A
- (vi) raise the screen, remove sheet A, the screen print, and hang it up.

Affordance: transparency

The term 'affordance' as it is used in this study was explained in chapter 3 section 3.4.4 (iii). Transparency as an affordance refers to whether the meaning or intention of the materials and tools (or what was to be constructed) within this technological practice was readily apparent. A 'good' screen print was recognisable to the adults: paint all over the surface except for clearly defined islands of shape. For many of the children however, a 'good' screen print was recognised by an evenly painted template, carefully saved and glued onto another sheet of paper. In terms of its place as a medium in art and craft, screen printing has the following three capacities:

- (i) *positive-negative transformation*. It turns a positive shape (the template) into a negative shape (the unpainted 'hole' in the print); in particular it can turn a found shape into its negative (like a leaf),
- (ii) *duplication of image*. It provides the possibility of repeating exactly the same image over and over again on either the one picture or as different pictures, and
- (iii) *silhouetting*. It turns a drawing into a 'shadow' or a shape only.

The first two capacities were never exploited by any of the children during the observation period (although Ann suggested to Emily that as a simpler process she might like to use some leaves for printing: 'You just want to do the printing part?' 1/2PTA11.31). No-one screen printed the same image more than once, perhaps because at the beginning of the year it was a popular activity and there was a certain amount of queuing at the screen: one picture per turn kept an efficient flow of screen printers. No-one said you could not make two or more prints either, but that would have needed even more planning, because the printed paper had to be named before the printing was done. Experimenting was difficult when there was a queue, and a queue-generated routine (one person, one image, one picture) was established during the early part of the year.

Even the third 'affordance' or meaning passed many of the children by: three children kept the template and threw away the print (even Danny, who later did exploit this capacity, was much more interested in the template on his first two attempts). The children almost always kept the template as well, peeling it off the screen and gluing it to a third sheet of paper, writing their name on that and hanging it up to dry. On six occasions there was no template: often an uncut drawing was screened. Samuel on both occasions that he made a print screened an uncut drawing, and many of the

children only made a cursory attempt at cutting around a drawn shape (Bridget for instance told Amy that her print is a picture of herself, but the shape that emerged was a rectangle with a 'bite' cut out of one corner, VN8/3). Most children interpreted the instruction to 'cut out a shape' as a request for circles, rectangles or triangles, or miscellaneous and unidentifiable (and not expected to be identified) shapes. Teachers often reminded children that the detail was important because 'that's the shape you're going to see'. However, on only one occasion out of the 58 were the unique affordances of screen printing commented on by adults or children: on 8/3 Danny told Joan that he was 'going to do the shadow of it'.

One aspect of the screen printing process that was transparent, imbued with meaning, was name writing. Since, like a painting, a screen print was not able to be taken home until it was dry, the author's name needed to be added. On 29 occasions out of the 58 episodes of screen printing name writing either occurred spontaneously or it was a feature of the conversation as an adult tutored the child. Name-writing lessons began with the children recognising their name (on magnetised card) on the name board, taking it back to the construction table, and copying as many letters of it as they could. Teachers helped with this, often prompting and pointing letter by letter. On only one occasion did I see a child help another child with her name: Meg helped Phoebe after she had done a painting, assisted her to find her name card and then pointed to the letters one at a time (Field notes 21/2). Being a screen printer and being a writer therefore closely overlapped, and perhaps two thirds of the children could write their own names.

Affordance: challenge

Because there was one right way to make a screen print, to execute the whole process by themselves, the children had to be able to remember the sequence, use scissors, and preferably write their name. 'Good cutting' was a necessary part of the process. Here are teacher comments that illustrated this:

- 31/1: Alison: Oh, looking good Linda. Good cutting.
- 1/2: Ann: (to Kiri and Kay) Oh, lovely cutting. (later in the episode Kiri says to Kay "Good cutting Kay")
- 14/2: Amy: Good cutting Danny.
- 16/2: Alison: (to Lisa) You've done that really well, you've been cutting right on top of the line.
- 22/2: Alison: You're so good at your cutting there Meg.
- 28/2: Ann: Lovely cutting around the edge there Sarah.

When Rita told Alison that she couldn't cut (8/2TTA39.28), Alison replied: 'You can't cut? Well we'll have to see about that (she sat down with Rita and paper and scissors) . . . OK. Look at that. You're cutting'. Other skills or processes afforded by the technology are planning and sequencing (Sylva, 1980, includes sequencing - with perseverance and transformation - in her list of qualities of complex play; the

High/Scope programme with its sequence of plan-do-review emphasises planning as an important skill; Hohmann et al., 1979). It was not easy to bypass any of the stages, unless the children took an imaginative view of it. Nell did that when she used the screen and screener as a painting device: she used the screen-printing equipment on four occasions, never cutting out a template, always screening paint onto something else: a hat, a collage, a construction. She was still planning and sequencing, but for her the process was more serendipitous, and she avoided the most cognitively demanding part of the screen-print-making process: the making of the template (just as she avoided the more complicated part of hat making, the fitting and measuring, by the imaginative process of always making hats for cats and babies).

Affordance: accessibility

Although many children (13 of the 30) only made one screen print, those who made several were able increasingly to complete them on their own. The distribution of responsibility could shift from one adult tutoring a child in the complex processes, to adult prompting, and finally to completion without assistance. However, even when the screen printer was becoming an expert adults were often still involved, as the episodes (Figure 9.1) with Danny will illustrate.

9.2.2 The social setting

Although there were conversations between children as they cut out or queued at the screen-printing table, 32 of the 58 screen printing episodes were about one child working with one adult (55%; compare 35% for marble painting and 26% for hat making). The 58 screen-printing episodes are summarised in Appendix 4. Table 9.1 compares the social setting information for marble painting and hat making. Six children were involved with screen printing on more than four occasions: Lisa, Meg, Danny, Linda, Joan and Bridget.

	SCREEN PRINTING	MARBLE PAINTING	HAT MAKING
Social setting: one child alone (number of episodes)	13	0	7
Social setting: two children (no adult) (number of episodes)	1	4	2
Social setting: > two children (no adult) (number of episodes)	0	3	2
Social setting: adult(s) and one child (number of episodes)	32	6	11
Social setting: adult(s) and >one child (number of episodes)	12	4	20
Total episodes	58	17	42
Total named children as participants	30	17	25
Total girls as participants	21	11	18
Major players: children who participate >2 times for marble painting and hat making, >4 times for screen printing	Lisa (8) Meg (8) Danny (5) Linda (5) Joan (5) Bridget (5)	Nell (6) Nick (3) Jason (3)	Nell (7) Linda (4) Jason (4) Meg (3) Trevor (3) Molly (3)

Table 9.1. Screen-printing, marble-painting and hat-making technological practices compared: social settings

9.3 NARRATIVE STORY LINES

9.3.1 Discourse appropriation, construction and display

Being a screen printer

As indicated, the capacity for the materials and tools to develop a 'screen printer' discourse was not exploited. Danny was an exception. Perhaps because of his interest in drawing, he became interested in the 'being a screen printer' discourse. There were five episodes where he made screen prints, and by the fourth and fifth he was beginning to exploit the silhouetting affordance of this medium. The sequence is described in Figure 9.1.

BEING A TECHNOLOGIST: REPRESENTATION.

Danny screen printing

(i) Adult tutorial

In the first episode, on the first day of term, (31/1), Alison taught Danny how to fold and cut his face shape so that "we can see the eyes and the mouth. There's a trick. I'll show you the trick. You fold the piece of paper in half, I'll show you something you can do. When you draw a mouth, and some eyes, and you want the screen print to show it. You see what's going to happen. It comes out that way. Shall we do the eyes? Now we'll have to fold it a different way, this time, oh no. Fold it this way. ..Like that..Like that. That's one eye. Fold the piece of paper and cut it just where you drew. Look. You can start to see the face, and that's what it's going to look like on the screen print". (31/1TTA17.47-18.34)

(ii) Consults adult: screens the template

In the second episode (3/2) he discussed with the Observer which way up his cut out drawing should go, did not appear to be convinced when she said it didn't matter. He put his pictures of 'ants' drawing side up, and was much more interested in the template than in the print. Danny has drawn and cut around two figures: one big and one small, and is making a screen print of them. Which side up? he asks, doesn't like my suggestion that the drawn side goes down, puts them face up, and makes a print. But is more interested in preserving the cut out figures and we later protect them on a sheet of card. I ask him if they are people. They're ants he says. This one is the Tennis Ant (?) He writes his name on it. (FN3/2)

He throws away the print and hangs up the cut out figures. The Observer rescues it and explains that 'that's the actual print'.

Child: Why did he throw it in there?

Observer: We didn't mean to. I don't think he meant to, I think he got so busy putting the other one on. So I'll hang this one up. Danny, shall I hang this one up for you? That's the actual print.

Danny: Right.
(3/2PTA8.50-9.31)

(iii) Adult tutorial

In the third episode (14/2), he drew and cut out a whale. This was not his choice of subject, and the initiative to make a screen print was the teacher's. Danny and Bridget were together and Amy said 'Do you want to make something to take home today? Danny. Danny and Bridget. What about a screen print Bridget?' She suggested a screen print of a whale (a topic introduced at mat time) and when Bridget said 'I don't know how to' she said 'Well I can help you'. They got the book, and Danny joined in too. Amy reminded him that if he didn't cut out the eye it wouldn't appear on the screen.

Amy: Hey, look at this. He's beautiful. Good cutting Danny. Well done. You stuck it out and you finished it. Excellent. Cut the eyes out, 'cos that's all you're going to see, you see. Oh he's beautiful. So you fold it over. And you just cut in here. Like that. So you can see it the eyes on the screen print. Isn't that neat Bridget. (28.50) There, see there's one eye. You may need to do the same the other ... now. It's coming to the inside. There you go. Let's have a look. Oh. That's what you're going to see on the screen. He's beautiful. (Raises her voice) Have a look at this whale everybody. Look at Danny's whale. (14/2TTA27.51-29.00)

**BEING A TECHNOLOGIST: REPRESENTATION
cont'd**

Although it was not initially his choice of occupation and topic, he was learning more of the craft of screen printing.

(iv) Screens the silhouette: keeps the print

In the fourth episode (8/3), he put his drawing upside down on the screen, and indicated that he was exploiting the silhouette-forming affordance of a screen print.

Joan: You putted that on the wrong way.

Danny: Going to do the shadow of it. Oooaah (8/3TTA16.16-16.29).

(v) Screens the silhouette: keeps the print

In the fifth episode (9/3), assisted by the teacher, he also did the 'shadow of it', a rabbit. He had become a screen printer, adding it to his modes of representing his favourite topics, small animals. His expertise was developed over a period of time, and several prints. Only Linda Meg and Lisa completed more prints than he did: they were developing expertise in different discourses, as will be discussed below.

Figure 9.1. Being a technologist: representation. An example in the screen-printing technological practice

Being a kindergartener

The fact that technological affordances were not generally taken up suggests that the preferred discourse was not 'being a screen printer'. For the children screen printing may signify 'morning kindergarten': 'kindergarten' because it is unlikely that they do this anywhere else (most other activities are possible if not probable outside the kindergarten), and 'morning' because this activity is not available to the younger 'afternoon children'. This would also be an explanation for the routine, non-experimental format. In terms of the national early childhood curriculum framework (Ministry of Education, 1996) the activity is sitting in the 'belonging' strand, not 'communication' (representation) or 'exploration'. Some of the characteristics of *being a kindergartener* were outlined in the butterfly chapter. Here the definition can be extended to include the skills that four-year-olds should acquire before they go to school: writing their names, using scissors, remembering a sequence, planning ahead, and carrying out a sequence of events without too much prompting and help.

Sub-discourse: Being a writer

Where children are also writing their names (noted in 29 out of the 58 episodes), the sociocultural occasion was one that encourages a very special discourse that could be called 'being a writer of my own name', a sub-group, perhaps, of 'being a writer' but also a sub-group of 'being me'. I observed Phoebe one day, the day that Meg assisted

her to write her name, carefully pointing out the letters to her and helping her to form them. When Phoebe brought her name card back from the board she cradled it lovingly in her hands, smiled at it, and clasped it to herself as a precious signifier. When children wrote their names, the goal was clear, the process and the product were valued by child teacher and family alike, and because every name was different 'getting it wrong' did not have the same normative implications that being a poor user of scissors might have. The evaluative feedback came from seeing that a name looked like the model on the name card, and a teacher and a family member who could read it.

Being good

Apart from Nell's unique approach (to avoid making a template), the planning and sequencing for screen printing was about a correct plan, a correct sequence. The goal was clear, and so was the pathway. Being a kindergartener included doing things correctly, and there was therefore considerable overlap with the discourse about 'being good'. The two children who screen printed the most (9 and 8 screen prints respectively) were children who often indicated an interest in the rules, what was allowed, what was correct: Lisa and Meg. Meg's concern for correct behaviour was also introduced in the last chapter when Penny finger painted in the marble painting box.

BEING GOOD: SEEKING PERMISSION AND APPROVAL

The beginning of a screen printing episode with Lisa as the major player:

Lisa: (to Ann): I did my name. I already did my name

Ann: . . . Great. You did it.

Lisa: (to Ann): I'm going to draw another circle. I'm doing another circle. I'm doing another circle.

Ann: OK.

(28/2TTA 3.46-4.26)

The end of a screen printing episode with Lisa as the major player:

Lisa has run out of room on the page for writing her name on the sheet of paper on which she has saved the template shapes; the teacher's comments have been altered to fit with Lisa's pseudonym.

Lisa: I can't do my name. I can't do my name. I can't do my name. I can't do my name. Oh my I can't get my. I can't get the name to go on.

Ann: Pardon Lisa?

Lisa: Can't get my name to go on.

Ann: The name to go on? You've got your L and your I and your S, you just need the A on it Lisa. There's room just there at the end for it.

(28/2TTA11.12-11.49)

Figure 9.2. Being good: seeking permission and approval. Transcript of Lisa from the screen-printing technological practice

Figure 9.2 is a part of a transcript of Lisa's sixth screen printing episode, illustrating *being good*, seeking approval. Lisa made nine screen prints, and became increasingly able to complete the activity without asking permission. The change was slow: in this example her quests for approval and reassurance when trouble appeared ('I can't . . .') were still directed towards the nearest adult.

The video notes for her final screen print (five days later) however record that she accomplished a carefully executed print all by herself; telling Amy at the beginning what she was going to do, and finding Amy at the end to tell her that she had done it. At one point she said to herself: 'You have to cut a shape out' (3/3TTA9.11). The warm support and reassurance from the teachers was providing her, over time, with internal tools with which to direct herself, and the beginning of a new narrative about learning.

Sub-discourse: being right

For some four-year-olds it seemed that another discourse was 'splitting off' from being good. This was a discourse that I have called *being right*. Emily decided not to try what was apparently a long pre-planned and correct sequence:

Emily: You can do it any way you want eh? (pause) Can I do one?
 Ann: Emily, you've got to come and get a piece of paper first and draw a picture and then you can do your print
 Emily: Doesn't matter. Doesn't matter.
 (1/2TTC7.20-8.30)

Emily's first comment indicated her interest in the fact that 'you can do it any way you want', i.e. you couldn't do it wrong. Later however, when Ann had explained the three-stage process, she said 'it doesn't matter'. She never did do a screen print during the observation period. On another occasion, when the observer was helping her to write her name:

Emily: Just a little mistake. (pause) That doesn't matter, eh? (sounds anxious)
 Observer: No, that doesn't matter.
 Emily: (a short time later) Oh. Mistake.
 Observer: That's the 'i'. That's good. Yep.
 (1/2PTA31.07)

This new discourse was reflected in Emily's language on other occasions (see Appendix 7), but it could also be traced through the children's actions, in particular their frequent avoidance of opportunities where they may have been potentially judged to be right or wrong: Nell avoided making a template here, just as during the hat-making episodes she avoided the measuring and fitting part of the process. The emergence of this new discourse, and the significance of this for learning, is discussed

in the chapter that summarises the children's responses to difficulty (chapter 11, section 11.4).

Being a friend

Although *being a friend* is not a privileged discourse in this technological practice (children are more likely to interact with adults than with other children), friendship maintenance was occasionally going on here too. One episode (excerpt in Figure 9.3) was characterised by the discourse markers of *being a friend* that were outlined as friendship talk in the hat episodes. Kiri and Kay were cutting out drawings; only later did they decide that these would be good for a screen print.

BEING A FRIEND: GIRL-FRIEND-SPEAK

(Excerpt)

(1) Kiri: Your Mum's going to like that Kay. Is my Mum going to like mine Kay?

(2) Kay: Yeah 'cos I like yours. It's cool.

(3) Kiri: Yeah. It got a little cat. You have to be a cat. Flying up in the sky. A cat flying in the sky. Have you ever heard of a cat flying in the sky Kay?

(4) Kay: Yep.

(5) Kiri: I have too, funny eh?

(6) Kiri: Yeah and you can get rides on them. Yeah. And that cat's pointing to his tummy button with his paw. Look at his tummy button Kay.

(7) Kay: Yeah.

(8) Kiri: He's pointing with his paw to his tummy button. Good cat eh? (1.37)

(9) Kay: Look Kiri . Cool. I'm missing some bits out 'cos I can't get round to them.

(10) Ann: How are you getting on there?

(11) Kay: Good.

(12) Ann: Oh lovely cutting. That's a lovely picture.
(1/2TTA0.48-2.05)

Figure 9.3. Being a friend: girl-friend-speak. Transcript of Kiri and Kay from the screen-printing technological practice

They asked each other for praise (1, 8), responded appropriately to the request (2), demanded attention by asking questions (3) turned statements into questions by the use of 'eh?' (5, 8) and 'look' (6, 9).

On other occasions the queue also provided a venue for some social interaction, and occasionally a group would gather around the screen as one child screen printed: in the following episode (Figure 9.4), Meg and Freda were chatting to Bridget as she screened, and the topic was friendship:

BEING A FRIEND: TALKING ABOUT FRIENDSHIP

(Excerpt)

- (1) Bridget: Freda.
 (2) Freda: What?
 (3) Bridget: This is Meg. My g. My other friend.
 (4) Meg: Anyway I got.
 (5) Bridget: She doesn't know where I live though. She.
 (6) Freda: I'm not even playing with you. I'm playing with Joan.
 (7) Bridget: What?
 (8) Freda: I'm playing with Joan, not you.
 (9) Joan: And I'm playing with Danny.
 (10) Bridget: We need heaps of friends, don't we Meg?
 (11) Meg: Mm.
 (12) Bridget: And Joan. And Linda isn't playing with us is she?
 (13) Meg: She said she would.(4.15) . . . (4.26)
 (14) Linda: Meg.
 (15) Meg: What?
 (16) Linda: I don't have to if I want to.
 (22/2TTB3.32-4.30)

Figure 9.4. Being a friend: talking about friendship. Transcript from the screen-printing technological practice

Friendship was defined in terms of action, who played with whom (turns 6, 8, 9 and 12). Bridget's 'we need heaps of friends' (turn 10) was a reference to discussions that the children had had with the teachers about not depending on one friend, a response to high levels of distress from Emily when Laura wanted to play with someone else. In turn 5, Bridget invoked her 'theory of mind' when she said of Meg '*she doesn't know* where I live though' (my emphasis): this relied on an understanding of what other people might know, need, believe and desire (categories of friendship talk that will be described in detail in chapter 10). Linda used the same technique in a marble-painting episode when she said to Meg 'you don't know how my name goes'.

9.3.2 Responses to trouble

Thirteen of the 30 children who were involved in screen printing only made one screen print, and on these first attempts adults were usually closely involved, prompting and assisting children with the correct sequence. True to the 'kindergartener' discourse, one completed screen print signified a 'morning kindergartener'.

Many children didn't try to solve problems or tackle difficulty. Thirty seven of the 58 screen print episodes did not end up with a screen print of a figure: most of the prints were of non-representational shapes, often randomly cut. Bridget and Rita screened a face or figure, but Rita's was uncut, and Bridget's was minimally cut. For these children, screen printing appeared to be a morning kindergarten routine. Nell never cut

a template; she used the screen for painting. Tania made a print from cutting up the perforated edges from computer paper, creating a pattern from the cut out squares/rectangles and the holes that the paper comes with; on another day she planned to repeat this, but when there was no newspaper readily available on the shelf for part of the process she didn't know what to do, and abandoned the enterprise.

Although children seldom tackled difficulty or ran the risk of error in the screen printing part of the process, an earlier step, writing one's name, did run the risk of error, and many children persevered with this in spite of its difficulty. Name-writing was specifically recorded in 29 of the 58 episodes (and probably featured in more than that). Nathan for instance seldom appeared at the construction table, but on 21/2 he made a screen print (Alison to Nathan: 'You can do a shape, any kind of shape'), and Alison helped him to write his name. She emphasised the need to get it right (underlined, although 'right' is also used by Alison as a general encouragement, see the transcript for Figure 9.7).

- Alison: (to Nathan): OK then, we're going to use this paper to do the print. What I'll need you to do Nathan is write your name on there for me OK so I'll know it's your picture. Can you do that? Write your name on that piece? Well, you go and find your name, off the name board. You go and find your name off the name board. OK . . . There . . . (45.58) We'll just pop it there Nathan. That corner up there. No. Up the right way. Which way does the name go. Can you see your name that way? That's right. And now you need a crayon. You hold your crayon. How do you hold your crayon? You show me how you hold it. That's it. Right. Now you do the first letter in your name, which is N. See. Just the same as that. A. a T. An H. An A. Are you watching Nathan? . . .
- Nathan: Nathan. That spells Nathan.
- Alison: That spells Nathan. . . . Now Nathan we turn that over and bring it over to the screen.
- (21/2TTA43.40-47.14)

Alison showed him the right way up for his name, the right way to hold a crayon, and he wrote his name. Unprompted he made the assessment: 'That spells Nathan', and Alison agreed.

On other occasions, children were writing words. On the same morning Jinny was writing on a card, and says to Alison:

- Jinny: How do you write 'love'?
- Alison: If I say the letters, can you write them down? Do you know them if I say them? If I say 'L'?
- Jinny: Yep. There's an L in Nell's name.
- Alison: (to Nathan: Look at that) Yes Nell's got an 'L'. (to Nathan: OK Can you hang that up Nathan?) L.O. (Jinny: O, yeah) V. Yes. E. (*Video notes: she writes the letters in the air*) That's it. Do you want to do the word 'from'?
- Jinny: Yeah.
- (21/2TTB8.00-9.00)

Name writing and word writing had a right and wrong way, it had great meaning for a number of the children, and with assistance from an adult they persevered with its completion.

9.3.3 Distribution of responsibility

Of the 589 conversational turns in all the 48 episodes for which there is a transcript, 44.6% were adults' turns (compare 24.3% in the marble painting, and 34.9% in hat making). Typically the social interchange at the screen printing was between an adult and one, two or three children, and the format was in the nature of a tutorial. In an adult tutorial style, adults were controlling the direction and the level of persistence by using a high level of power: suggesting an activity, giving instructions and information, asking questions, and praising. Figure 9.5 provides an example. On the first day of term, Alison, one of the teachers, was assisting Danny, Linda, Penny and Meg. The instructions and instruction questions are underlined.

ADULT TUTORIAL screen printing (i): Alison

- Alison: Can you write your name on it?* That's a good idea. And then we just turn it over, Danny. And now the paint won't cover up your name. Have you cut out your picture? For a screen print? You need to draw a picture and cut it out and stick it on there to do a screen print. Stick it on and then you can put that down. You need to do that bit first. Cut out . . . And. Meg. Come over here. You need a crayon and some scissors. O.K.
- Meg: I can't do my name.
- Alison: You need to start practising, don't you. OK. Have you got your crayon?
- Linda: Cos I don't need my name anymore, I can write myself. (11.6)
- Alison: Wow! You must have been practising.
- : I can as well. You know I can write my own.
- Alison: What you do now for a screen print is you draw a shape. And you cut it out. OK? I'll show you what happens to that shape after you've cut it out. That's right. That's the 'P'.
- : You can draw your name first.
- Alison: No you don't need to do your name on that one Linda, I'll show you. This piece, just draw a pattern or a picture on there Linda and cut it out, and then I'll show you what we do with it OK? E-N-E (*instructing Penny with the letters of her name, Penelope*). The crayons are over here Linda.
- Meg: Done it.
- Alison: OK now. Cut that shape out Meg. Um L. That one there. OK. Then a circle. then an P and an E. Look, you've got another E in your name, right at the end.
- Penny: There. (13.19)
- Alison: OK. Penelope. There we go and that can go back on the name board.
- Penny: Yep

ADULT TUTORIAL screen printing
(i): Alison
cont'd

Alison: And the crayons can go away and you can hang up the painting (pause) cos my hands are full. You can show me if you can hang that up. You can start putting that up yourself, OK.

Penny: Alison I done it.

Alison: Right. Where's a pair of scissors? [Talks to adult: 'That would be wonderful!'] Try these scissors Linda. OK. (14.37)

Meg: Mine's a fishy.

Alison: O.K. You've done a fish. Just take this out cos that's Danny's. What I'll get you to do is write your name on the back of this piece of paper. Can you write your name? Write on there.[Have you had morning tea Nathan? Bring some morning tea?]

Alison: Oh, whose face is that? Looks like someone who's got a who's had a fright.[Field notes: Danny is cutting out a face he has drawn] You can cut around that shape for me there Linda, that big shape there. We'll screen print that one. You get the scissors and cut along that line, all around there, that'd be a really good shape to cut . . .

Linda: I can't um keep um seeing where it is.

Alison: OK. Just put an. Do you want to do an L shape? We've got a Meg and. We've got two Megs at kindergarten. And then that goes in the middle. Like that. Now I'm gonna show you. This bit comes down. This bit comes down. And you get the spoon. And you fill it up with paint and dribble it in the middle (16.19). . . . Put it back in the bowl. This is the scraper. Piece of paper under there. Scrape it and it makes it go all over the paper. See if you can make it move? Now we've run out, so we need some more paint. Bit more paint. Pop it back in the bowl. Now scrape that paint up and down, up and down. That's right. Push it over and pull it down. Over here. Cover up the white paper underneath.... Right up to the top, right down the bottom. Up the top, down the bottom. Up the top, down the bottom. Down the side. That way. (31/1TTA10.24-17.46)

*instructions are underlined

Figure 9.5. Adult tutorial (i): transcript of Alison from the screen-printing technological practice

This tutorial style was only slightly modified as time went on perhaps because the children seldom became experts (13 of the 30 made just one screen print). But even with two of the more expert screen printers (Danny and Joan, who were each making their fifth print), the teacher (Amy this time, interspersed with some guitar playing) took a tutorial role (Figure 9.6). Amy also used this as an opportunity to make links with a tutorial programme on safety that had been part of mat time earlier in the day. Once again the instructions have been underlined.

ADULT TUTORIAL screen printing

(ii): Amy

(Excerpts)

- Amy: That's the shape you're going to see. So you'll need to cut all this out.^{*} So that you actually see. So now you'll see that shape Danny, you see. There you are Danny. Might be a bit better. Try that . . . [Sings *Tutira mai* very loudly] And. How are you doing with yours? You'll need to cut it out John.
[She starts playing guitar and singing with the children]. (30.06)
- Amy: Dan. That's wonderful Danny! Look what he's just produced. (9/3TTA26.14-30.06)
- Amy: Oh Oh that's just super
- Jinny: It's a dinosaur.
- Amy: Oh Danny is it a dinosaur? Tell Jinny Dan.
- Danny: A rabbit.
- Amy: A rabbit Danny?
- Danny: (...) (*indistinct; I presume from the following that Danny may have decided that it can't be a rabbit because it has five legs, but later he decides that one of the 'legs' can be the tail*) (9/3PTA28.54-29.30)
- Amy: (to another child): Can't be a rabbit? Why not?
- : It hasn't got two feet.
- Amy: It's got more legs. Danny said it can't be a rabbit cos it's got too many legs.
- Danny: (...) a tail.
- Amy: Oh there you go. Has it got long (...) . . . Wait a minute wait a minute Joanie I'll show you something. This is the shape you're going to get. So you won't see the legs and arms and the hair cos it's (...) drawing Joan. (31.22) . . . Tell me about him. Who's in charge of your tummy button? (*a reference to a programme running in the kindergarten at mat time on the children being 'in charge' of their bodies*)
- Child: Us.
- Amy: Exactly. Who's in charge of your body?
- Child: Me.
- Amy: Yes. Exactly.
- Amy: . . . Why don't you draw a person John? Why don't you draw a person for the for the screen printing. I think it's a super idea. You've done really well here. Now I'll show you the shape that you'll be able to see. We'll just have to cut around the line . . . so you'll see the tummy and the legs. (*She does some cutting on Joan's template*) OK. Try that. Better put your name on first. . . . you can get on with your screen print. There you go. Actually I'm just going to put a little bit more paint in, here, make it a bit darker pink. (9/3TTA30.47-32.38)

*instructions are underlined

Figure 9.6. Adult tutorial (ii): transcript of Amy from the screen-printing technological practice

**ADULT TUTORIAL screen printing
(iii): Ann**

(Excerpt)

Ann: Yep. That's it. Lie it in longwise. Let's move it down and then put your picture in the middle. There. Right. Tell you what, you've got it twisted there . . . Don't tie (?) it up too much . . . see all you're going to get is that bit there. That's all you're going to get 'cos you haven't cut around there. Did you want to get a bit more of the shape in there? What you've got to do, if you want a bit more of the shape in there you've got to actually cut round here . . . OK? Otherwise you've got to spread it out a little bit to get the shape like that. Then you get all the lines in. Let's see if it will fit in for you. That's going to fit nicely. See and then it all fits inside the screen. Put lots of paint on. You've got to go back and forth to each side. I think we're going to have to use a little bit more paint 'cos when you spread it out it's got to come right in the corners. That's it.
(1/2TTC8.40-9.45)

Figure 9.7. Adult tutorial (iii): transcript of Ann from the screen-printing technological practice

It is not that these teachers were usually tutors. They changed their style for different technological practices. Compare Ann's interactions of support in the butterfly technological practice (chapter 5), and Amy and Alison in typical exchanges within hat making where the initiative was the child's and the adult was responding with technical assistance or prompts:

Amy using adult support (hat making):

Linda: Can you help me? Cos I can't.
Amy: What do you want to do Linda? (5)
Linda: I want to staple that on there.
Amy: That onto there? (5)
Linda: Yeh.
Amy: Well, I'll hold it with the stapler. (6)
(13/2TTA25.51-26.13)

Here the pattern is one of *adult support*:

5 (clarifying child's statement or question) 5 (clarifying child's statement or question)
6 (providing technical assistance).

Alison using adult support (hat making):

Tony: Alison.
Alison: Mmhm.(1)
Tony: I want to make one of these. A little little.
Alison: Is that for you? (5) Is that to go on your head? (5)
Tony: It's too little.
Alison: Well, how do you think you could make it bigger? (7)
Tony: Get another piece of paper.
Alison: OK, you see if you can find another piece. (7)
Tony: These?
Alison: Right. (4) Now, how are you going to join them up? (7) Right. (4)
(23/2TTB29.34-30.25)

Again the pattern is *adult support*:

1 (phatic (Mmhm)), 5, 5 (clarifying child's statement or question), 7, 7 (prompts), 4 (acknowledgement: right), 7 (prompt), 4 (acknowledgement: right).

The difference is clear from the statistics (Table 9.2). The proportion of adult utterances that were 'powerful' (categories III and IV) was 63.7% for screen printing (it was 25.0% in hat making, 34.6% in marble-painting, and 50.0% in the butterfly-making episode). The adults' turns were longer as well. In the screen printing episodes for which there are transcripts there were 1401 adult utterances within 589 turns: an average of 2.38 per turn (hats 1.71; marble painting 1.84; the butterfly episode was even higher: 3.14).

	BUTTER-FLY	HAT MAKING	MARBLE PAINTING	SCREEN PRINTING
Total episodes	1	42	17	58
Total speech turns	312	1225	317	1321
Total adult speech turns	63	428	77	589
Adult speech turns as % total	20.2	34.9	24.3	44.6
Total adult utterances	198	731	142	1401
Adult utterances per turn	3.14	1.71	1.84	2.38
Adult power as % of adult utterances				
Level I (low, categories 1-3)	10.1	27.8	24.6	11.8
Level II (categories 4-8)	39.9	47.2	40.8	24.5
Level III (categories 9-13)	21.7	13.0	26.1	40.9
Level IV (high, categories 14-25)	28.3	12.0	8.5	22.8
Levels I& II combined	50.0	75.0	65.4	36.3
Levels III & IV combined	50.0	25.0	34.6	63.7
Evaluation utterances (categories 9-16) as % of total	18.7	7.9	12.0	18.7

Table 9.2. Butterfly-making, hat-making, marble-painting and screen-printing technological practices compared: adult speech turns as % of total and adult utterances by level of power

The following example of an adult tutorial is graphed in Figure 9.8:

Alison in the final stages of teaching Rita to do her first screen print:

Alison: Go back up to the top and make that paint come down to the bottom (25: instruction, purpose not yet clear to child). OK. (4: approval of ongoing work: 'that's right') Down again, down again, there you go, you've covered your piece of paper up . . . so we'll put this back, lift this up again (25: instruction, purpose not yet clear to child). Lift it up (25: instruction, purpose not yet clear to child). That's it. (4: approval of ongoing work: 'that's right') Come around here Rita, and we're going to pull the piece of paper down (25:

instruction, purpose not yet clear to child). Start from the top (25: instruction, purpose not yet clear to child) . . . There you go, there's your picture! Alright, look at that. (14: approval and enthusiasm about the product)

Rita: Yep.

Alison: Yeah! (14: general approval and enthusiasm)

Rita: Wait til I show Mum it.

Alison: That's a screen print. (20: information, giving the label)
(13/2TTA45.06-46.18)

Pattern: *adult tutorial*

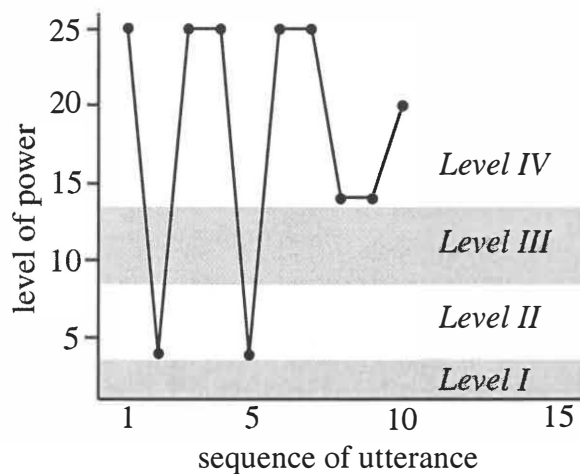


Figure 9.8. Adult tutorial: graph of transcript from the screen-printing technological practice

This technological practice was characterised by an adult tutorial style, or genre. Adults controlled the direction and the level of persistence through instructions and evaluative comments. It is in contrast to adult support, where the children controlled the direction and the level of persistence, and the adults supported and provided technical assistance on request. This latter pattern was common in the hat-making technological practice.

Adult-child collaboration

An *adult-child collaborative* pattern, where the power was more symmetrical, was common during marble painting when the adults worked with the children. It is described by Rogoff (1990) as an apprenticeship pattern (observation and later doing it all on your own is another, asymmetric, apprenticeship pattern). In the screen printing episodes it sometimes occurred when children requested help with writing. In Figure 12.5, in chapter 12, a transcript is included of Alison and Jason as Jason was about to make a screen print for John (who has requested it), and he asked Alison how to write John's (last) name. It is graphed as part of Figure 12.2.

Peer collaboration

Earlier in this sequence, Jason was using the same adult genre to apprentice John (and himself).

- John: You do it for me.
 Jason: Draw out the shape you want, and then (19: initiates instruction on next step)
 John: You do it for me?
 Jason: What kind of shape do you want? (5: clarifies purpose)
 John: Ah, a circle.
 Jason: 'K (4: reassuring comment). Have to go round (7: prompts himself)
 Oh right. (11: gives himself approval)
 (8/2TTA11.02-11.20)

Applying the adult power scale to Jason's utterances the pattern is: 19, 5, 4, 7, and 11.

Peer collaboration and instruction like this were rare in screen printing (it was much more common in marble painting). The responsibility, constrained by the technology, and generally interpreted as a 'kindergartener discourse' by all, belonged with the adults. The product, unlike a marble painting, was named, valued and personal. The following two examples show Bridget refusing advice from others because her screen print is 'my picture' or 'my painting'.

- Child: The other way. Dum-dum (laughs)
 Bridget: No. I'm choosing. That side's the black. See that's the blue side. See I'm just getting the paint out . . . You don't know. It's my picture. Don't cha know I've been. I've been here longer'n you've been here. (*It's not clear whether she means she has been longer at kindergarten or at the screen*)
 (22/2TTB15.05-16.15)

On another day Bridget was screening and two girls were talking to her, once again offering advice and help, most of which was, once again, rejected (although the others were later allowed to assist with the saving of the template onto a piece of paper and hanging both pictures up to dry):

- No give it. (Bridget: No) Don't put it there. You put it on there.
 - -: Spread it now OK. Should spread.
 Bridget: No! I spread it. It's my painting.
 OK. You can spread it. (laughter)
 Ooh yuk. It's squooshy wooky isn't it. Oooh
 Finished?
 Bridget: No a little bit of more. Only pink now. How does that look?
 Good.
 Let's do it up to have a look.
 (8/3TTA30.59-32.00)

9.3.4 Summary of the learning narratives: screen printing

The major learning narrative was as follows:

Setting: Adult-initiated craft and writing activity with a complex sequence. One adult to one child.

Story-line. Discourse(s): The discourse was about *being a kindergartener*; skills in cutting, name-writing and following instructions were valued. The discourse was not about being a screen printer, so transformation, change of function, representation, and engineering were not called for.

Response to trouble: Trouble came mostly in the form of getting it wrong. This was avoided by following the instructions to the letter and not attempting difficult templates, or avoiding the cognitive part of the process by not making a template.

Distribution of responsibility: Adult tutorial where teachers instruct.

However, when children were struggling to get the figure cut out accurately (especially those children who made several prints: Meg, Linda, and Danny during their later episodes), and when children were writing their names, the narrative included being a technologist, persistence with difficulty, and adult-peer collaboration:

Setting: Adult-initiated craft and writing activity with a complex sequence. One adult to one child (after several attempts, sometimes a child on her or his own, or one child with another).

Story line. Discourse(s): The discourse was about *being a technologist*, a screen printer or a writer, so transformation, change of function, representation, and engineering were called for.

Response to trouble: Very specific technical difficulties (name writing and getting the figure accurately cut) provided challenges that children persisted in overcoming.

Distribution of responsibility: Adult-peer collaborations. The children could see clearly when they had got it right.

The previous five chapters have analysed the data for five technological practices. Part 3 of the study, Analysis and Conclusions, follows. The next five chapters gather up the data from these five technological practices, occasionally adding observational data from outside these five, and data from interviews with the children, to answer each of the five research questions that were asked in chapters 2 and 3. The conclusion to the thesis is chapter 15.

**PART THREE :
ANALYSIS AND CONCLUSIONS**

10

DISCOURSES

10.1 INTRODUCTION TO PART THREE OF THE STUDY

Part 3 of this thesis uses the data in Part 2 to provide answers to the research questions. Additional data from outside the construction area and from interviews with the children is added when needed. Five research questions, introduced in chapters 2 and 3, framed up this study. The next five chapters will summarise the findings for each of them as follows:

Chapter 10. Discourses

Research question 1: Were there (socioculturally or historically based) goals that children inclined towards and that influenced their learning here?

Chapter 11. Responses to difficulty

Research question 2: Did there appear to be key learning orientations and strategies (dispositions) associated with responses to difficulty?

Chapter 12. Distribution of responsibility

Research question 3: Did there appear to be key learning orientations and strategies (dispositions) associated with responsive and reciprocal relationships?

Chapter 13. Technology and learning narratives

Research question 4: In this setting, was an activity characterised by a particular clustering together of dispositions in event structures or learning narratives i.e. could it be described as a 'dispositional milieu'?

Chapter 14. Individual children: narrative and part-narrative niches.

Research question 5: In what way could the learning environment in this early childhood setting be described as a set of learning *niches*: i.e. were individual children constructing their own learning environments by 'inhabiting' familiar and comfortable learning narratives? In the short time frame of the observations, was there any evidence that children's learning dispositions and narratives shifted at all?

Chapter 15 concludes the study, and highlights the implications for early childhood and for further research.

10.2 INTRODUCTION TO CHAPTER 10

This chapter summarises the data on the first research question:

- Were there (socioculturally or historically based) goals that children inclined towards and that influenced their learning here?

In chapters 3 (section 3.4.2) and 4 (section 4.7.3.1) socioculturally or historically based goals were described as *privileged discourses*: 'discourses' because these are subjects for which the children are constructing definitions and boundaries (Fairclough, 1992, p.128) and displaying their membership (Gee, 1992, p.20), and 'privileged' because they are viewed by the children as 'being more appropriate or efficacious than others in a (this) particular sociocultural setting' (Wertsch, 1991a, p.124). It was argued that discourses are dispositional and may be a key domain of learning disposition and a key 'engine' for a transactional model of learning. In section 10.3 of this chapter, the multiple discourse world of the four-year-olds in this study is analysed, a world in which the goals are continually shifting as discourse topics compete for privileged positions, children position themselves differently within a discourse, and children re-define the rules and the boundaries of discourses. Section 10.4 outlines the major discourse topics, and describes how they were defined and re-defined during the course of the study. The process of discourse invasion and merger is discussed in section 10.5, and some conclusions about the central location of discourse appropriation and construction are outlined in section 10.6. It was explained earlier (chapter 4, section 4.7.3.1) that the term 'appropriation' was used in this study, following Rogoff (e.g.1990), in preference to 'acquisition'. It implies a transactional process, in which the children are interpreting the occasion, selecting and adapting an available discourse. Section 10.7 summarises the influence on the children's learning of these socioculturally or historically based goals.

10.3 THE MULTIPLE DISCOURSE WORLD OF THE FOUR-YEAR-OLDS

The analysis of technological practices in the previous five data chapters identified six socioculturally or historically based goals that appeared to be influencing the children's learning orientation and their learning strategies. There were six major sub-discourses to the umbrella discourse 'being a four-and-a-half-year-old kindergarten learner'. They were: 'being a kindergartener', 'being good', 'being a girl or a boy' (being gendered), 'being a nearly-five-year-old', 'being a friend', and 'being a technologist'. A subsidiary to 'being good' appeared to be splitting off as 'being right', and this process will be analysed in the next chapter because it is central to the analysis of the second research question about responses to difficulty. Previously, early childhood

research on the sociocultural environment from the child's point of view has focused on the characteristics and construction of one or two (and, on one occasion, three) discourses (section 3.4.2 summarises the literature). This study however has highlighted the multiple and interwoven discourse world of the four-year-olds as they sought full social membership in the kindergarten. This world is illustrated in Figure 10.1. In the discussion that follows, the inverted commas around the discourse titles have been left behind.

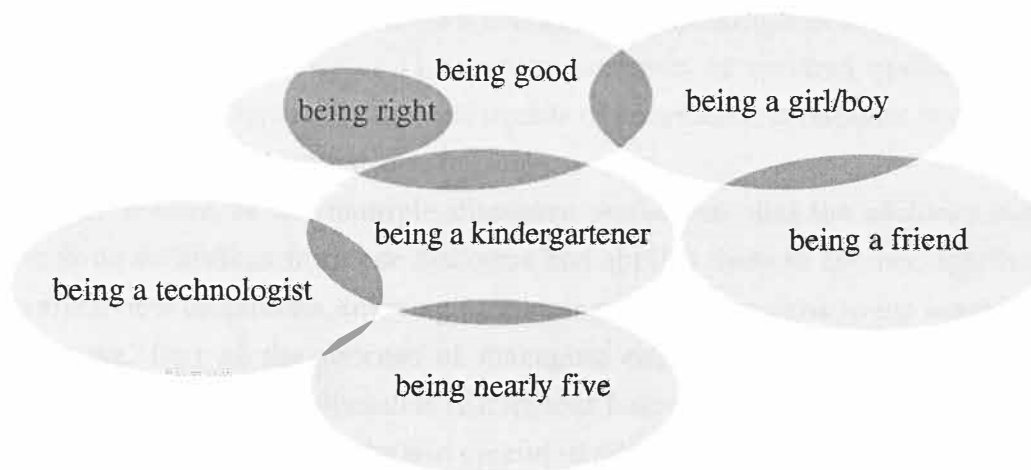


Figure 10.1. The multiple discourse world of the kindergarten

Three major processes underpin the multiple discourse world in Figure 10.1:

(i) *Discourse intersection, merger and invasion*

Figure 10.1 illustrates the intersections of *being good* with *being gendered*; *being a friend* with *being gendered*; *being nearly five* and *being good* with *being a kindergartener*; and *being right* with *being good*. These intersections are described in the discussions on each discourse below. Section 10.4.2 will describe in detail one of these intersections as the emergence of a new language that I have called 'girl-friend-speak'. The diagram does not convey the movement, however: the dynamic nature of invasion and merger that appeared to be a central feature of discourse development in this setting. Two of these dynamic processes will be analysed in section 10.4.1 (*being good* invading many of the other topics) (see 10.4.1 below), and section 11.4 in the next chapter (*being right* splitting off from *being good* but retaining the alliance).

(ii) *Discourse shift*

The diagram points out that there were at least six major discourses available. The children shifted from one to another for a number of reasons. The two major reasons appeared to be to establish an optimal level of excitement or to avoid trouble, but the adults introduced topics as well, and technology also had a part to play (see chapter 13). Children learned to construct and use discourse definitions to reposition themselves: from the periphery to the centre, from less powerful to more powerful, from uncertainty to certainty, and from certainty to the more exciting uncertainty.

Sometimes the search appeared to be for optimal uncertainty or excitement, as when in the butterfly episode the discourse shifted from the teacher's *kindergarten* discourse to *friendship*, where it was established that everyone had been to someone's house to play (perhaps a boring state of affairs), and it then shifted again to a new discourse where uncertainty was raised by who spilled the paint (*being good*). Katz (1995c) wrote about the pattern of mobilization of energy in an early childhood programme from excitement through responsiveness to depression or disinterest. Here the children appeared to be managing their own energy levels, making discourse shifts towards greater uncertainty. Chapter 11 provides examples of children making a shift to another discourse apparently to avoid trouble or uncertainty in response to difficulty.

(iii) *Discourse construction and redefinition*

Another feature of the multiple discourse world was that the children not only borrowed definitions from one discourse and applied them to another, but they also invented new definitions, enjoying positioning themselves close to the boundary of a discourse. Part of the process of managing the energy level was to introduce uncertainty to a current discourse (Emily told Laura 'It's too late for you . . . I aren't your friend now', although she was careful to alleviate Laura's anxiety by adding 'It's so funny that we've got to laugh, eh' (15/2TTB12.57)). At kindergarten, a group context away from home, where all the children were the same age, the definitions and boundaries of discourses altered in various ways. For instance, the definition of *being a friend* may have started for many of the children here as playing at someone else's house and being invited to their birthday party. In the group setting, being a friend took on new qualities, because of new opportunities for friendship-forming as well as new anxieties about inclusion and exclusion. Some children worked hard at friendship maintenance and display and many of their strategies were to do with language: talking about who was a friend of whom for instance.

10.4 THE DISCOURSES

The major discourses were *being good*, *being a kindergartener*, *being nearly five*, *being a friend*, and *being a girl/boy*. Although the discourse titles often appeared to have been appropriated from elsewhere (see section 10.6 in this chapter), further maintenance and adaptation work went on at kindergarten. The children's appropriation construction and/or display of each of these discourses follows.

10.4.1 Being good

Being good was a salient discourse in butterfly-making (Figure 5.3) and screen-printing technological practice (Figure 9.2), but it also appeared in marble painting

(Figure 8.3). It was mostly about reassurance and display, and the key phrase was 'being allowed', or following the rules. It intersected with several other discourses (see Figure 10.1), introducing moral precepts to domains that, to an adult, did not necessarily warrant a moral dimension ('who spilt the paint?' for instance). A common intersection was between 'good' and 'kindergartener' (being good *here*). Ann commented: 'Sharing, good' (28/2TTB0.10). Often there was an intersection between 'good' and 'friend'. Amy commented to Meg that she was a 'good friend' when she interrupted her hat making to assist Linda with her screen printing. And Nell imaginatively told Lisa that it was 'rude' to watch somebody else's friend: 'Only friends are allowed to look at the other friends' (21/2TTA41.50). There was also an intersection between being good and being a girl: the players in all the examples of this discourse were girls. Children may aspire to be a good kindergartener, a good friend, and girls to be a good girl.

Being good was defined and constructed by the children in two ways: (i) defining good behaviour, and (ii) seeking permission and approval. The first of these provided some opportunities for creative discourse adaptation, the second was about entry qualifications and display. Each of these is now discussed.

(i) *defining good behaviour*

The children were continually creating new mini-rules about good behaviour. These rules were seldom introduced or sanctioned by the teachers. In the butterfly episode, being good meant not spilling the paint (Figure 5.3), and doing neat work (cutting up material into small pieces for collage). In the marble-painting episodes (Figure 8.3) it meant using the equipment for the normal purpose (not finger painting in the marble tray).

- Meg: Look at hers. (Penny is finger painting in the marble tray)
 Linda: Are you allowed to do that? . . . Oh gross. Did the teacher said you could do that? Wow, look at her.
 Meg: (to teacher) She's doing it wiv her hands.(27/2TTA35.14)

Linda provided an example of an unusually high level of anxiety about correct behaviour. Here are four examples:

- 13/2 (to the Observer about a child nearby, while she is making a hat): She put um heaps staples on.
 16/2 (to Nell or Nick who appear to be going to marble paint without a paper in the box): You'll be naughty.
 27/2 (to Penny at marble painting): You're not allowed to do that.
 1/3 (to Valerie who is putting material onto the group butterfly): You're not allowed to do that. You have to cut it up.

Although attempts were made by some children to construct rules, other children clearly ignored them: Valerie did not cut up her material, Nick and Penny continued to finger paint in the marble box, and children fired staples into their constructions

without censure. The teachers were often at pains to point out that many of the rules were flexible and rational. Ann indicated that it didn't matter who had spilt the paint ('Well, won't matter, we can easily wipe it up'), and that a flexible use of the marble-painting box was acceptable; on an earlier day when the children asked her if it was morning tea time she said 'No, ten minutes to morning tea', but after discussion said 'If you're hungry you have to eat' (FN7/2).

Two examples of constructing (or discovering) rules about good behaviour related to language. Discussions about good and bad language appeared in the marble-painting episodes. Myra told Molly that there was somebody she knew who was not allowed to say 'eh'.

Myra: But we are, OK? OK Molly?
 Molly: Who cares? Who cares?
 Myra: Not me, do you? (21/2TTA9.50)

Another discussion occurred during an episode of crayoning and collage at the construction table (not part of the technological practices analysed in the previous chapters). It illustrated this aspect of 'being good' (this time with the context added, 'at kindy'). The identity of the speakers was uncertain.

-: Ah. Shit.
 -: You're not allowed to.
 -: You're not allowed to swear.
 -: You're not allowed to say swear words at all at kindy eh Sue?
 - (presumably Susie): No.
 -: You're allowed to say 'blow'.
 -: Yeah.
 -: But not swear words. (pause) And you're allowed to say shuddup.
 -: I know.
 -: You're allowed to say shuddup.
 -: I know.
 -: But not swear words.
 -: I know.
 (9/3TTA7.07-0.16)

Here was discourse appropriation (being good and not swearing were linked, a discourse frame appropriated from home perhaps), discourse intersection (it was about being 'good 'at kindy'), discourse construction (which words might be designated as swearing, and which might not be), and discourse maintenance (this was an example of how good we are).

The implicit motive behind much of the rule creation was to seek adult approval. But with its shifting definitions it was also an interesting game. Harris (1989, p.46), writing about the value of early childhood experience for moral and emotional development, maintained that the 'novice arrives at preschool with a considerable excess of moral baggage' and that experts have learned to cast off some of this excess baggage. Children were becoming metacognitive about the culture's rules about

language and about 'being good'. Some firmly held rules (using 'eh' perhaps, or 'shuddup') could be questioned in a new setting.

(ii) *seeking permission and approval.*

Closely linked to defining good behaviour was seeking permission and approval. Being good was also about being 'allowed' and approved of by the adults. Lisa appeared at times to be entirely guided by this (Figure 9.2). She almost always sought permission before embarking on an activity. This may have been why screen printing was favoured by Lisa, because in this technological practice prompts and encouragement from adults were legitimate (they were not so frequently resisted by the adults as it was a lengthy process with many complex steps).

In her early studies Dweck (1989) replaced 'being right' with 'being good' when she looked for the reference point for performance goals amongst very young children because she did not find 'being right' at this age. Being good works just as well as a benchmark for performance and display; it appears to be only marginally 'incremental' or able to be changed. The children here wanted to be seen as 'good' and the purpose of this discourse was to display this defining characteristic of the self (if necessary creating new rules to do so).

10.4.2 **Being a kindergartener**

The second discourse was *being a kindergartener*. The group butterfly episode (Figure 5.1) and the screen-printing episodes described discourse maintenance at work (by both teachers and children) for *being a kindergartener*. Although children were creating some often fanciful rules of their own to bolster their display of 'being good kindergarteners', the rules and definitions of this discourse were probably mostly established by the teachers at the early morning group mat time, when matters to do with appropriate behaviour at kindergarten were discussed. But the discourse was also displayed and maintained in the construction area. The features that were maintained in this study come into three headings: (i) personality and social behaviour (the 'being good' section of being a kindergartener), (ii) skills, and (iii) routines and activities. Each of these is now discussed.

(i) *Personality and social behaviour*

In *personality*, a kindergartener was busy, helpful, nice to others (Meg: Got to talk nicely. Sarah: Yeah. 2/3TTB18.20) and didn't swear. Social behaviour included picking up rubbish, waiting for your turn, managing without an excessive amount of approval or attention from the adults, and 'using your words' during conflict or

negotiation. Ann, a teacher, said 'Sharing, good. And it's nice that you use the words that ask and then Rita knew what you wanted' (TTB28/2 0.10).

Jason, about to leave for school, took a light-heartedly flexible view of kindergarten rules. Alison was teaching him to write John's name and they were interrupted by Rachel who complained that someone was chasing her.

Rachel: Alison.

Alison: Yep.

Rachel: Somebody want to chase us.

Alison: Ooh. What do you need to do about that?

Rachel: I don't know.

Jason: Run quickly and get away. (referring to his name writing) I done it.

Alison: Is there anything you can say to them?

Rachel: Go away!

Jason: I, I, I trip, I trip them up. I trip them up and run.

Alison: There's another, there's something else you can do instead. You can tell them. You can tell them to stop it and go away. That's another way.

Jason: Yep.

8/2TTA23.31-24.08

The teachers were encouraging the children to be in charge when other children were mean to them. The instruction for children was 'You say "stop it I don't like it" when someone does something you don't like' (Alison 7/2TTA4.39).

(ii) *Skills*

Being a kindergartener was also defined by the skills they are expected to have. Kindergarteners' skills included writing their names, using scissors, and managing an increasing number of technical processes by themselves (stapling, cello taping, and so on). These skills were of central concern in the screen-printing technological practice, and many of them were a feature of construction processes. They were part of the affordance of the tools, and whereas mastering the tools and joining the materials were of interest to many of the children, for others this was an area to stay away from for most of the time because a skill, name-writing for instance, could be assessed. The physical tools in a construction area were also *accountable*, in the sense that there was a right or a wrong way to work with them, and failure of goal was apparent. In the monster construction the cello tape would not hold when paint was added, so the construction collapsed. Failure was apparent. A staple was called for. Children like Emily, when the teacher suggested she did a screen print, said 'it doesn't matter', interpreted here as an example of her interest in not being wrong in other contexts. Susie (in the next chapter) very specifically told the observer that she would not do another screen print because she might have made a mistake.

(iii) *Activity*

Activities and routines were also part of *being a kindergartener*. The *activity* of the butterfly episode was part of a sequence that characterised the current kindergarten programme: activities linked together (in the case of the butterfly theme: science activities with cocoons and caterpillars, stories, folded symmetrical paintings, reference books, constructions), and large murals or pictures may be constructed to put on the wall for parents and children to see. Other *routines* associated with being a kindergartener would include attending mat time, having morning tea when the other children have it, and helping at tidy-up time. There was a sub-discourse to being a kindergartener, and that was being a morning-kindergartener. Being a *morning* kindergartener, in most New Zealand state funded kindergartens, means that you are even closer to being five, as children start in the afternoons and then 'graduate' to the morning. A morning-kindergartener is often four-and-a-half years old, and is closer to school than an afternoon-kindergartener. One activity reserved for morning kindergarten children was screen printing. Screen printing signified the intersection between being a kindergartener and being nearly five years old. It included in one task the skills that children may need when they go to school: using a pen or pencil, name writing, using scissors, remembering a sequence, planning ahead, and carrying out a sequence of events without too much prompting or help.

10.4.3 **Being nearly five**

A third discourse was *being nearly five*. This was a very robust discourse during the making of the dinosaur (Figure 6.1) and during hat making (Figure 7.1), and it appeared throughout all the transcripts at the construction table, suggesting that it was never very far from the children's minds. It had two characteristics, mostly for display rather than for construction or elaboration: (i) being big, and (ii) being four-and-a-half and nearly at school, a discourse that merged with being a kindergartener. Each of these is now discussed.

(i) *being big*:

Diana told me one day: 'I don't sleep in the little bed any more' (28/2PTA), and Freda: 'Guess what (pause) I need new slippers cos all the others..see, my old ones are too small, the other little ones are too small for me (...) (they) fit me when I was three years old' (20/2PTA). The dinosaur episode (Figure 6.1) was an example of Martin's aspiration: to be big like his brothers. Like gender, the reference point for an age discourse was something that the learner could not change; unlike gender, however, one could look forward (as Martin does) to the day when you would be five- or seven-years-old, and would (perhaps) have caught up with older siblings.

(ii) *being nearly at school.*

Martin associated being nearly five with school-type work as well as with making dinosaurs: presumably copying from his brothers as he made a book and 'wrote' in it. The best examples of this aspect of the being nearly five discourse were described in the hat-making technological practice. The children made birthday hats in preparation for their fifth birthdays.

Amy: Whose birthday is it Tony?

Tony: Mine. I just want to make it for June (*it is March 8*).

Amy: For June.

Tony: Yep. So I won't have to do it then. (8/3TTA25.10)

The connection between being nearly five and being at school was a connection forged and strengthened in the home and the wider community. The meaning of being-nearly-five (and therefore being nearly at school) was a feature of New Zealand cultural practices. It was a powerful connection, and resistance to it from the kindergarten was usually unsuccessful. Two transcripts from other activities, one recorded on Nick's last day, as the teacher prepared his goodbye card from the kindergarten, and one from a discussion between Alison and the children, illustrate the connection. In the first transcript, individual children were not identifiable on the transcript.

-: How old are you?

-: I'm four and a half.

-: I'm four and a half.

-: I'm four and a half.

-: I'm four and a half now.

-: I know, but we're still bigger 'n you.

-: I'm going to school in May.

-: I'm going to school next year.

-: I'm not to school (...) not tomorrow but the next day.

-: I'm going to school this year.

(8/2TTB16.28-17.16)

Child: I'm four and a half

Alison: Four and a half. That means.

John: I'm four and a half

Alison: That you're very close to.

Jason: No you're not John. (at the same time) You're four.

Alison: (at the same time) turning five.

(13/2TTB47.24-47.50)

Being a *morning* kindergartener in this kindergarten means that you are four-and-a-half, quite different from being four.

-: I'm four and a half.

-: So. Cos everybody's four and a half here.

-: Everybody?

-: Yeah.

-: We used to be just four. Yeah.

(8/2TTB32.48)

10.4.4 Being a friend

Being a friend was a fourth discourse. It was analysed in some detail from within the hat-making technological practice (Figures 7.2; 7.3 and 7.6); it also featured in the butterfly-making technological practice (Figure 5.2), in marble painting (Figure 8.2), and in screen printing (Figures 9.3, 9.4). I noted that this discourse was characterised by a remarkable persistence when trouble loomed, and some imaginative construction and elaboration work. There were four ways of adapting and maintaining the discourse: (i) action: playing together often at each others' houses, (ii) action: being helpful and anticipating the needs of others, (iii) talk about friendship and birthday parties (I won't be your friend; I won't invite you to my birthday party), and (iv) speaking the language (a language that included using each others' names and indicated a response to the perceived needs, desires and beliefs of the other, an increasingly sophisticated and pragmatic theory of mind).

Examples included:

(i) *action, playing together, often at each others' houses (Figure 5.2)*

(in the hat chapter)

Peter (to Observer): Hey my, Robert's coming to my house tomorrow.

(in the butterfly chapter)

Susie (to Nathan): I'll come back and get you when you've finished.

(ii) *being helpful and anticipating the needs of others*

(in the hat chapter):

Meg was making a complicated hat. She paused in the middle and helped Linda by gluing her templates to a sheet of paper.

(in the butterfly chapter)

Meg was often helping others. She assisted Phoebe to write her name, and in the butterfly chapter 'Meg finds some yellow cellophane and brings it over, puts it beside Linda and gives her some scissors "Here's some scissors"'.⁴

(in the hat chapter):

Samuel: Why weren't you playing with me?

Nick: I'm gonna make a hat.

Samuel: Oh. Can I help you?

Nick: No. I don't think I can make a hat.

(iii) *talk about friendship and birthday parties (Figures 8.2 and 9.4)*

(I won't be your friend; I won't invite you to my birthday party)

(in the marble painting chapter):

Linda: I'm not your friend any more (...) another friend.

Meg: Then I've got another friend. Diana.

(2/3TTB 19.30-19.43)

Nell: But I'm allowed to, eh Jinny?

Jinny. Yeah cos you're my friend

(iv) *speaking the language (Figures 7.2, 7.3, 7.6 and 9.3): girl-friend-speak*

The characteristics of this language are outlined in section 10.5.2.

Speaking the language (category (iv)) was the most challenging of the ways in which children maintained and constructed this discourse: it was a strategy at the intersection of *being a friend* and *being a girl*. Talk about friendship (category (iii)) was the most labile, and creative (c.f. Nell's imaginative 'only friends watch other friends'), often associated with a raised affective tone, and enjoyed enormously by many of the children. It seemed to be accompanied by an understanding that if someone was not your friend today, she or he would probably be your friend tomorrow. Although Emily appeared to be often devastated by rejection by a best friend, an event frequently accompanied by an emotional outburst, the following interchange (15/2TTB12.57) indicated that, verbally at least, she took a flexible viewpoint and enjoyed the game.

Laura: I'm I'm only your friend. I just gaved into him, but I'm but I'm still only your friend.

Emily: It's too late for you. I'm you I aren't your friend now. (pause) It's so funny that we've got to laugh, eh.

In the context of hat making, Lisa appeared to have only two linguistic friendship strategies (commenting on her work, telling stories). However, occasional observations of Lisa in other areas revealed her ability to employ some of the more challenging friendship strategies when the social interaction was firmly embedded in the action of collaborative pretend or block play: perceiving or assuming a need on the part of the other and giving advice or assistance for instance. In the block area, with two boys, Lisa could 'do friendship': engaging with the others, making suggestions and holding their attention with the discourse markers 'guess what' and 'eh?'.

Lisa: . . . guess what want me to make want to make a cave for that? . . . This could be the street (?) eh? That could be the road eh? . . . That could be for the walking across eh. Hey that could be the walk across it eh? (10/3TTB0.12-1.36)

The boys responded, and played with her. In this episode, Lisa was listening to and watching the others and seeing how she could contribute to the play ('want me to . . . make a cave for that?'), skills that she never used at the construction table. For her, the blocks afforded social strategies (as family, pretend, play also did for many of the children) that the technology and individualised process of hat making did not. When *being a friend* was taken out of those contexts that supported it with plenty of physical affordance and mediation, many four-year-olds may have been at a loss as to how to play the rules. And, indeed, the rules may well have been constructed and practised elsewhere, when Peter went to Robert's house, or Wendy to Rachel's.

10.4.5 Being a girl, being a boy

Being a girl or *being a boy* was a central discourse in the butterfly-making episode (Figure 5.4). In that technological practice, playful definitions of *being a girl* or *being*

a boy were introduced to liven things up: boys worked in one place, girls in the other; boys used the blue materials, girls the yellow. When the boys started to 'horse around' and use the materials and the tools carelessly, the girls left. Their reputations as 'good girls' were at stake. For the boys however, it was appropriate to be a 'bit naughty'. Later they described the task as 'hard work'. 'Marginal naughtiness' for boys appeared elsewhere, but on only a very few occasions. On 24/2 Brian came to tell the Observer that the boys were being naughty in the block corner. He laughed (they are using the animals as hammers) (24/2FN). Field notes for 27/2 include the comment that 'Mark and Nathan giggle and push each other. Mark paints and then talks with a paint brush in his mouth. Nathan says: "You naughty, we saw you did that" Laughs' (27/2TTA17.15). On 28/2 video notes record Nathan and Mark again, bashing the staplers and watching the adults to see what their reaction will be.

There were many examples of girls chatting together as they worked, and at the intersection of *being a friend* and *being a girl*, category (iv) of friendship discourse, the language has been described as girl-friend-speak. Girl-friend-speak is analysed in some detail in section 10.5.2. There were seven episodes of complex friendship talk in the three largest technological practices (see Table 12.5, chapter 12), and none of them included boys (boys participated in 38 of the 117 episodes in these three technological practices). Except in the butterfly-making technological practice there were very few sustained transcripts of the boys talking together (without an adult) in the construction area. On one occasion Trevor used a gesture to represent male solidarity: he was working alongside Brian, screwing up small pieces of paper, looked over to Brian and took a 'kung fu' body stance with a foot raised as if for kicking. Brian smiled (27/2FN). One of Trevor's popular activities was to take on the role of a wolf, wearing a 'wolf' tail from the dressups.

(Howling noises) Brian: Being a dog Trevor?
 Trevor: No. A wolf.
 Brian: Come on, wolf. (28/2TTA17.21-17.29)

Eighteen episodes (out of the 117 in screen printing, marble painting and hat making) included transcript of peers giving each other technical assistance (see Table 12.5 in chapter 12), and ten of these included boys. Examples were in the butterfly chapter (Figure 5.4), and when Jason prepared a screen print for John.

When an adult was present, the gender discourse appeared to subside. It is explicit appearance was infrequent in all the technological practices except for the butterfly construction; however, girl-friend-speak and *being good* ran through all the technological practices, and *being good* was a prerogative of the girls. As Fernie et al. (1993, p.103) comment on gender in an American preschool classroom: 'children show remarkable flexibility in their reinvention and maintenance of a rigid structure'.

The children found inventive ways to re-establish rigid structures, even when the teachers challenged them. Ann asked if it matters when the girls stake out territory in the butterfly construction, and the girls replied that it did not matter. But it did. And the teachers provided ambiguous messages as well, as the high incidence of 'good girl' evaluations in the screen-printing technological practice indicated.

10.4.6 Being a technologist

Being a technologist (sub-groups: being a dinosaur-maker, being a monster-maker, being a marble painter, being a hat maker, being a screen printer) was the sixth discourse. It was often a subsidiary discourse, frequently giving way to the others when activities looked as if they might become difficult.

In the dinosaur-making episode, *being a technologist* was nested within another discourse, *being nearly five*, and the narrative about learning came from the combination (Figure 6.1). *Being a technologist* was the salient discourse in the monster-making episode (Figure 6.5) and the marble-painting episodes (Figure 8.1). It was also the main discourse in sub-groups within hat making (Jason, Meg, Molly and Trevor's efforts; Figures 7.4 and 7.5) and screen printing (Danny's series of screen prints, Figure 9.1, for example). It was characterised by engagement with materials and the technological processes of (i) transformation, (ii) representation, (iii) change of function, and (iv) engineering. Each of these is briefly discussed.

(i) transformation

Molly transformed a food packet into a hat. Nick transformed a cardboard tube into, successively, a gun, a telescope, a microphone, and an alligator. One of the themes of the construction area of any early childhood centre was that manufacturers' cast-offs were being transformed into different artifacts: hats and dinosaurs for instance.

(ii) representation

Martin's dinosaur and Tom's monster were models. For Martin, the wings were a central feature, for Tom it was the teeth. Danny discovered an interest in making a cut-out drawing into a silhouette, adding to his representational repertoire.

(iii) change of function of an artifact

The function of the marble-painting box was changed when Nick, Penny, Jinny and Nell finger painted in it. Molly ingeniously described the function of the hat she had made for her Dad: to see at night when he goes to get the mail; Meg made a hat with a blue visor.

(iv) *engineering*

When the children decided to make the marble-painting box themselves, they introduced engineering into marble-painting. Jason gave engineering advice to Nell:

Nell: D'you know how you can cut it? 'Cos I don't.

Jason: You just. And this pulls out there. You need to cut the top off. Don't cut that end off.(15/2TTB36.06)

Nell admitted that she did not know how to proceed, asked Jason, and he gave advice. When the discourse was *being a technologist*, making a mistake was frequently part of the process of completing the task. Out of Tom's 95 utterances in the monster construction, seven were explanations of difficulty (implying that he did not know). They were a means of creating a collaborative learning environment, involving another person and clarifying the problem for himself and his partner. Martin (in 27 utterances during the dinosaur construction, where the discourse was to display *being nearly five*) never said he didn't know how to proceed (see Table 6.4 for an analysis of the purpose of Tom and Martin's comments). Tom was changing the design of his monster as he went along, wrestling with difficulties associated with putting teeth on, deciding where to attach the head, and whether the head should be cellotaped or stapled. Fitting and measuring hats called for engineering skills. Meg solved this by finally making a hat out of paper, not card, so it became easy to take a pleat in it; Jason's first design allowed him to easily hold the hat in place on his head before stapling, and he progressed to an ability to fit it using a cylindrical design as well. Trevor worked hard at trying to measure his hat: at one point he wrapped the cardboard strip around his waist to find the right size, running into difficulty when he tried to move the 'hat' to his head; on another occasion he held it over another hat (this was a good intuitive solution that he didn't follow through).

10.5 DISCOURSE INVASION

One of the features of the the discourse appropriation, construction and display, the socioculturally and historically based goals that the children inclined towards, was the process of invasion or merger of one discourse with another. There was considerable intersection between the discourses (see Figure 10.1) but there appeared to be two major invasions or mergers going on that influenced the learning here: *being good* was invading many of the other topics (outlined in 10.5.1), and a language that I have called girl-friend-speak was for some of the children a feature of the merger of *being a friend* and *being a girl* (outlined in 10.5.2).

10.5.1 The invasion of *being good*

The boundaries of *being a kindergartener* and *being good* intersected, in the sense that there was a situated form of being good: being good *here*. There were other sections of being a kindergartener however: participating at mat time, independently managing your own morning tea, 'using your words' when there was a conflict, sharing and waiting for your turn, becoming competent at cutting and writing, and making your own decisions about activities. Lisa found it difficult to differentiate between the two: she asked permission to make her own decisions about activities, and she would inform the teacher that she was going to have morning tea (Figure 9.2). For Lisa, *being good* had encroached onto *being a kindergartener*. One would have expected this when children first entered a new early childhood setting, with unknown adults and uncertain rules. These children however 'knew the ropes'; they had been 'afternoon kindy kids' and now they had graduated to the morning, where the programme was similar. With consistent attitudes from the teachers, as they had here, they have been increasingly able to separate out *being a kindergartener* from moral and personal judgements about 'being a good person'.

One process that has been of interest in this study was the tendency for *being good* to invade other discourses. It was not just that two discourses were being maintained in parallel, but rather that one was taking its meaning from the other in significant ways. In particular *being good* and its corollary 'being a bit naughty' appeared to be merging with *being a girl* and *being a boy*. This process conspired to make inflexible a potentially flexibly defined discourse (being gendered) by nesting it inside a discourse that had been designed for performance and display (see the next chapter for further discussion of the allocation of discourses in this way). Discourse invasion was particularly apparent in the butterfly episode, but in all the technological practices, maintenance work on *being good* was being carried out by girls. In the screen-printing technological practice, where the responsibility pattern tended to be an adult tutorial and adults kept up a supply of evaluative and encouraging comments to keep the children on track and persistent, 'good girl' appeared 13 times, was overheard nearby three more times - at a colour matching game and addressed to a child who was helping with the adults' morning tea. There were nine boys and nineteen girls screen printing, but 'good boy' was never heard in that technological practice. (It was heard occasionally elsewhere: Amy commented 'good boy' when Danny did a drawing. Danny was one of the boys for whom 'being a bit naughty' was so satisfactory in the butterfly episode, and he told Nick that he liked the way he painted his hands and roared like a monster; when the researcher asked Danny 'Do you do drawings here much?' he answered 'Not much').

Although the boys formed almost half of the morning kindergarten children (46%), boys formed a much smaller percentage of the major players in the three larger technological practices: 28% in hat making, 33% in marble construction, and 32% in screen printing. The aspect of *being a boy* that appeared in the butterfly episode, doing 'hard' work, was more commonly attributed to the sandpit, climbing equipment, or dramatic play outside. During the butterfly construction, for instance, Peter said to Carl : 'Cos it's hard work. It's hard work isn't it Nathan?' Peter usually wore a police hat during the entire session, and appeared in the construction table area seven more times. Once he made 'hand cuffs' (side-stepping some of the kindergartener discourse by tearing the paper into strips rather than cutting), once he was 'making a sword', and on another occasion he was giggling with Nathan and Mark. Nathan came twice in to the construction table to 'horse around' and to be a 'bit naughty' by using the tools inappropriately (bashing the staplers for instance) just as the boys did in the butterfly episode.

As previous discussion has indicated, these gender definitions were no revelation; they disadvantage the boys *and* the girls if the curriculum aim is exploration. But the aim, for the children, is also belonging, and one of the communities or collectives that the culture has ready for them is gender.

10.5.2 The merger of *being a girl* with *being a friend*: girl-friend-speak

There were some characteristic features of the intersection of two discourses - *being a friend* and *being a girl* - that have implications for collaboration and intimacy. A small group of girls appeared to be developing a characteristic language that I have called girl-friend-speak, because in this setting it was the prerogative of the girls. Examples were Figures 7.2 (Wendy and Rachel), 7.3 (Molly and Myra), 7.6 (Nell, Emily and Laura) and 9.3 (Kiri and Kay). Here is another example, part of Myra and Molly's talk as they marble-paint:

Myra: D'you know what Molly?
 Molly: What?
 Myra: I knew that girl and her name was Penny
 Molly: I knew her too
 Myra: I know her 'cos she played with me um at day care but now I go to
 kindy.
 Molly: Did she?
 Myra: You didn't know that I went to day care.
 Molly: When?
 Myra: Um. The other year. But I'm here now.
 (21/2TTA3.51)

Molly prompted Myra to keep the story going: 'Did she?' and 'When?'. Myra said that Molly 'didn't know' that she used to go to day care, putting herself into the other's shoes.

The features of girl-friend-speak were the following:

(a) *demanding and holding each other's undivided attention*

Strategies included: using each other's names, 'eh?' at the end of a speech turn, direct instructions to pay attention e.g. 'watch this', and invoking an understanding of the incomplete knowledge of the other e.g. 'D'you know what I'm gonna do?'.

(b) *giving advice or assistance, perceiving or assuming a need on the part of the other*

Examples included: 'you need that', 'can you reach it?'.

(c) *asking for, or appearing to ask for, support and praise, and the friend giving it*

Examples included: 'that be good enough?' (yes); 'this'll be a nice hat for someone eh?' (yes).

(d) *responding in the way you assume the other intends*

Strategies included positive phatics (yes, yeah, yep, mmhm), and following the topic (initiation: 'I like having holidays. . .', response: 'I hate holidays'; initiation: 'she played with me um at day care', response: 'Did she?').

(e) *conspiring to exclude a third party by mutual attempts to deceive the third child*

For example, to a third child, 'you're doing lovely work there' and to friend 'we just lying eh?' (Figure 7.6).

(f) *telling stories, prompting the stories of others*

A final linguistic strategy in girl-friend-speak was telling stories and responding to the stories of friends. It appeared to be mastered by only four girls: Emily, Jinny, Laura and Nell. These stories, as part of the flow of conversation, had to be well-judged: not too long, and either to the point or have a dramatic quality that holds the audience. The delicate balance between truth and fiction will be traversed, and some artistic license will be invoked. One of the rules of friendship may be particularly to do with how a friend responded. Many children spoke 'in parallel', not listening to or engaging with the other's story. In the transcript in Figure 7.6, however, Laura told a story, and Nell and Emily took some responsibility for the telling: Nell prompted her (Did ya find some?), and they laughed at the appropriate moments. Lisa (like Emily, Jinny, Laura and Nell) often told stories about events at home, but she never responded to the other children's stories, and only the teachers responded to hers. In the following episode Myra and Molly were helping each other make their flashing light hats, Lisa was at the same table doing a collage picture on a circle and she told them a story from home. They took no notice:

Molly: Oh that one wouldn't fit. Myra, can you do this one? Is that your light?

Myra: Yeah.

- Lisa: I'm doing another circle (*Video notes: She is doing a collage on a circle of cardboard*) (*no response from Myra or Molly*). We played at the kindy teacher, we played when when the babysitter came. We played when the babysitters came last night. We played when the babysitters. (*no response from Myra or Molly*).
- Molly: (to Myra) Can you staple this?
(28/2TTA13.28-14.22)

Girl-friend-speak involved an ability to

- talk about *needs*: (in the hat chapter)
Rachel (to Wendy about materials or tools for decorating her hat): That's what you've done so you need that . . . (to Wendy about hanging up her collaged hat to dry) can you reach it? (Wendy: Yep. Easy to).
- talk about *desires*: (in the marble painting chapter):
Myra (to Molly, who likes painting with yellow but the marble for the yellow was temporarily lost): Now you'll be able to do the yellow won't you Molly?
- talk about *knowledge* (in the marble painting chapter):
Linda (to Meg): You don't know how my name goes. You don't know how my name goes either.
Meg: You don't know how *my* name goes.

(in the screen printing chapter)
Bridget: This is Meg. My g. My other friend . . . She doesn't know where I live though.
- talk about *beliefs*: (in the hat chapter)
Emily: We don't like it really eh?
Laura (loud whisper) Yeah, we just lying eh?

Laura (telling a story about her brother): And then he was expecting it to float down our (...) creek.

Some features of this complex friendship language were used occasionally by the boys when they played in the sandpit and in dramatic play (see Appendix 12), but in the construction area only the girls used it. Sheldon (1992) called it 'double-voice discourse', (using 'discourse' to mean a linguistic style), and suggested that it is a particular feature of the language of three- and four-year-old girls (her examples are from a middle class population, but her analysis does not suggest that class is necessarily a contributing factor). She outlined how in 'double-voice discourse' one of the speaker's orientation is towards her own agenda, and the other orientation is toward the other members of the group. Some of the girls here - Rachel and Wendy, Molly and Myra, Emily and Laura, Bridget and Nell - were experts at this language. Sheldon suggested that this double-voice talk has strengths and weaknesses: it 'can make it harder for girls to present and hear themselves (or be heard by others) with the obvious clarity and authority of single-voice discourse that boys often use' (p.112) The strength is that this girl-friend-speak is collaborative and supportive, especially when they tell (and prompt each other's) stories. Its emergence supports Dunn (1993) who found that

gender differences in talk about feelings and self-disclosure with friends are evident even among five-year-olds . . . we do not yet know whether

boys lag behind girls in developing intimate friendships or never develop friendships that are on average as intimate as girls' friendships. (Dunn, 1993, p.73)

These girls were setting up some subtle rules, and many of them called on a 'theory of mind' (Wellman, 1990; Astington, 1993; Dunn, 1993; Lillard, 1993; Bartsch and Wellman, 1995), an understanding of the influence on action of another person's beliefs attitudes, and feelings. Emily, Laura and Nell's interest in the fact that people could tell lies and deceive others (see the transcript in chapter 7, Figure 7.6) was a particularly good example. The Bartsch and Wellman (1995) data came from everyday conversations sampled from ten children between the ages of two and five years. The children in their study were (like Sheldon's) predominantly middle class. Bartsch and Wellman did not in any way explore the influence this might have on children's interactions, or their learning, but they suggested that this would be a fruitful direction for further research. In the construction area in this study, the girls were practising and developing a collaborative friendship language that invoked a theory of mind (especially during hat making where the cognitive demands of the activity could be reduced), while the boys were more likely to interpret *being a boy* as being a bit naughty or to participate in a *being a technologist* discourse. The development of the language was cementing a discourse merger that separated the girls from the boys, and provided opportunities for the girls to practise collaborative and mutually supporting skills.

10.6 LOCATION OF DISCOURSE DEFINITION

This list of discourses was found in one location in this particular kindergarten. Others would be found in other areas in this setting, and in other early childhood programmes and settings. *Being Māori* for instance, would be a salient umbrella discourse in *ngā kohanga reo*, framed perhaps by *āhuatanga* (interrelationships and interactions), *tikanga Māori* (values, traditions and customs), and *te reo Māori* (Māori language) (Royal Tangaere, 1996a, 1996b). Discourse titles (and definitions) from home might be more salient in a parent cooperative setting where a child's parent and siblings were frequently present. Many home discourse titles (being a sister, for instance) only make a shadowy appearance at kindergarten (when a sibling stays for the morning for instance, or when a child tells stories about home), but many of the kindergarten discourses have an equivalent at home, especially in homes where some aspects of school culture have been adopted (Tizard and Hughes, 1984; Walkerdine and Lucey, 1989). Some discourse titles however may be met for the first time at kindergarten. *Being a kindergartener*, *being a technologist* and *being right* (discussed in the next chapter) may be appropriated at kindergarten more readily than at home, and although for children *being a girl/boy* is a familiar label, for some it may not describe a social

community with entrenched entry characteristics. It might be expected that children will start at kindergarten by interpreting situations in terms of familiar discourses (being good for instance), and then become captured by or interested in different discourses and their different goal structures.

Even in this setting, some of the discourses were perceived by the children to be 'housed' elsewhere; the skills might be practised at kindergarten, but the difficulties would be struggled with in another place. *Being nearly five* is an example. The value of *being nearly five* was originally constructed outside the kindergarten, in the home and the wider community. It is a feature of New Zealand cultural practices; children begin school on their fifth birthday, and being at morning kindergarten in most New Zealand kindergartens means that you have climbed the final rung towards the dream of *being five*. For Martin it meant that he would be closer to 'catching up' to his brothers. For Rita this would be the day that her 'Mum will come' to the kindergarten. Does this discourse, documented in the dinosaur-making episode and in hat making (Figures 6.1 and 7.1), contribute to a considerable dissatisfaction with being four? Some children, like Martin, appeared to be immersed in *being nearly five*, and to be interpreting kindergarten as primarily a time of waiting, waiting for the 'real' world of five upwards, and school. It may be a particular hazard of sessional kindergarten, especially when waiting lists are high and children attend for a short time.

Further evidence for the perception that valued knowledge was housed elsewhere came from interview data (the interview with the children, about their responses to difficulty, was introduced in chapter 4, and the data is included in chapter 11). When children were asked what they did or aspired to do that was difficult, 12 of the 36 responses referred to activities or locations away from the kindergarten. Only eight responses referred specifically to kindergarten activities. This data is analysed in detail in section 11.3.

10.7 CONCLUSION

'Technological practice' is not necessarily about technology education. Each activity was characterised by a unique pattern of discourse allocation and privilege and these patterns were only partly, if at all, determined by the materials and the tools (see chapter 13, section 13.2 and Table 13.2 for a summary of the influence of the materials and the tools on the discourses chosen, especially the *transparency* of the technology). The multiple discourse world of the four-year-old was revealed to be complex. Six socioculturally or historically based goals that the children inclined towards were analysed in this chapter, and two major features of them influenced their

learning: discourse invasion, and the location of discourse definition. The discourses intersected (they shared characteristics), they competed with each other for attention, and were all vulnerable to a powerful goal called *being good*. Discourse construction and definition was often seen as the province of home. *Being a technologist*, however, was for many children a new discourse. The activities that established it - a group butterfly construction, dinosaur- monster- and hat-making technological practices, marble painting, screen printing - are often a feature of an early childhood setting but not of home. *Being a technologist* was defined in this study as engineering, designing, changing and adapting the function of an artifact, transforming materials, using them to represent something, and gaining competence with tools. All of these characteristics were a feature of the creative hat-making described in chapter 7. If an early childhood programme values them, and the learning narratives that have been associated with them - tackling difficulty, and collaboration - then it has to work hard to keep them on the agenda. All the other discourse titles and topics are appropriated, constructed and maintained elsewhere as well as at the kindergarten. They constitute strong competitors for *being a technologist*.

11**RESPONSES TO DIFFICULTY****11.1 INTRODUCTION**

Chapter 10 set out the five research questions that framed up this study, and answered the first. This chapter outlines answers to the second:

- Did there appear to be key learning orientations and strategies (dispositions) associated with approaching difficulty?

It was argued in chapter 2 that the children's response to difficulty was a key domain of learning disposition: this emerged in particular from the work of Dweck and her colleagues (e.g. Smiley and Dweck 1994) on orientation to performance or to learning. The data chapters described difficulty and uncertainty as 'trouble', a word adopted by Bruner (1990, 1996) to highlight the part it plays in a *narrative*. The discussion of responses to difficulty in this chapter brings together the observation data (section 11.2) and the interview data (11.3, the children's perceptions). Section 11.2 finds connections between discourse topics and whether the children interpreted the discourse as being for performance or learning. When the discourse was interpreted as being for performance, difficulty was avoided or ignored; when it was interpreted as being for learning, difficulty was perceived as interesting and intriguing. This section outlines the three major ways in which difficulty or trouble appeared, and how the children responded to it. Section 11.3 describes the interview procedure and the results, including a detailed analysis of the perceived location of interesting difficulty (signalled in the last chapter, section 10.6). Section 11.4 describes what appeared to be a newly emerging discourse, *being right*, associated with the performance and display of being right and the avoidance of being wrong. The chapter concludes in section 11.5 with a summary of two key features of the learning dispositions and orientations associated with approaching difficulty: performance and learning goals are enmeshed in sociocultural and historical goals, and the new discourse *being right* is splitting off from *being good* rather than being part of a learning goal (within *being a technologist* for instance) that includes risking being wrong.

11.2 RESPONDING TO DIFFICULTY: THE OBSERVATION DATA

The observation data indicated that some discourse topics were more inclined to be explored and changed, while some were perceived as being only for performance and display. Although all of the discourse topics could be explored, their rules and boundaries changed, and their definitions challenged, it appeared that the children had very clear ideas about which would be used for display, and which would be explored and changed. The conflict and tension between the desire for 'correct being' (Davies, 1990, p.346) or 'belonging' (Ministry of Education, 1996, p.15), and the desire for exploration (Ministry of Education, 1996, p.16) and 'agency' (Davies, 1990, p.343) was being solved by allocating them to different discourses.

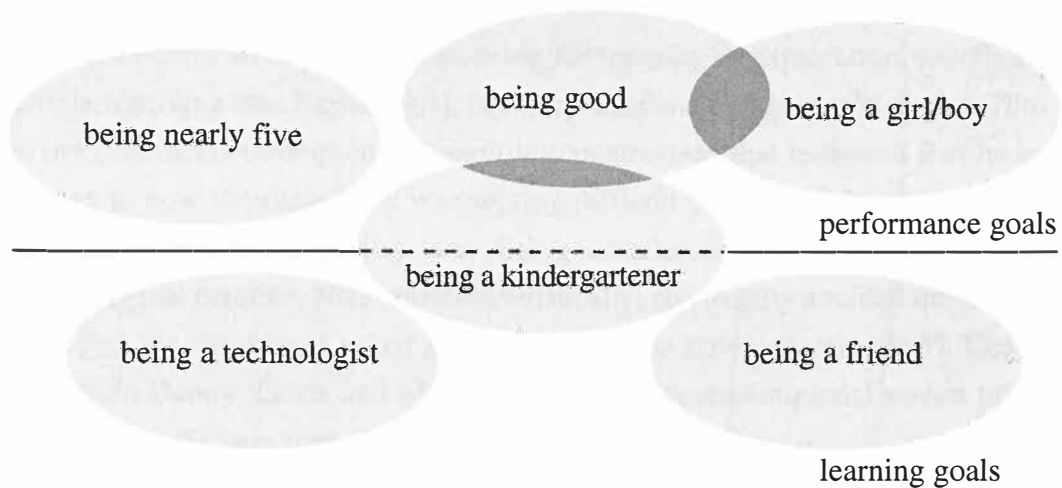


Figure 11.1. Discourse topics: performance or learning

Figure 11.1 illustrates the relationship between discourses and performance or learning goals. When discourses were for performance and display, definitions went unchallenged and the response to difficulty was either to ignore it, avoid it, or retreat from it. These were characteristics of the learning narratives associated with gender alliances, *being good*, and *being nearly five*. When difficulties occurred in the butterfly episode, and the girls' reputations as 'good' were threatened, they retreated. Martin did not brook any difficulties with his dinosaurs because nearly-fives don't make mistakes. When the teachers challenged the children's definitions (Ann asked Valerie: 'What would happen if one of the boys painted where one of the girls wanted to paint?'; told them 'it won't matter' who spilt the paint; and asked Linda 'Are you five? (No) Why're you putting a five on then?') it didn't dent the structure.

The teachers made it clear that many of the rules of being a kindergartener were negotiable and reasonable: morning tea time was flexible, finger painting in the marble painting box was (just) acceptable, and reasons were given for socially appropriate behaviour. Jason took a 'tongue in cheek' flexible attitude to kindergarten rules when

he recommended to Rachel that she should 'Run quickly and get away. . . I trip them up and run'. Alison took a relaxed view of such a suggestion ('There's another way'). In contrast, Linda insisted on checking that what others do was 'allowed', and Lisa almost always asked for permission to engage with the activities, because both Lisa and Linda had merged *being a kindergartener* with *being good*, and *being good* was perceived to be judged by adult fiat. In fact, in this kindergarten the programme and the rules were to a certain extent negotiable. The children were reminded that they could use any of the materials set out, and at the construction table their agenda was their own. So although the teachers were trying to encourage exploration and flexibility, the children often saw *being a kindergartener* as closely allied to the discourses for performance and display: *being nearly five*, and *being good*.

Two discourses were perceived as being for learning or exploration, redefinition and problem solving (see Figure 11.1): *being a friend* and *being a technologist*. Tom made seven comments throughout the monster construction that indicated that he was at a loss as to how to proceed: he was solving difficult design problems with the help of the adult, and the discourse was 'being a technologist'. In the marble-painting technological practice, Nell (uncharacteristically; she usually avoided difficulty except in friendship discourse) asked Jason 'D'you know how you can cut it? 'Cos I don't', and when Danny, Linda and Meg made complex representational screen prints, they elicited specific help from an adult.

When the discourse was about friendship, the research has indicated that the children were developing and practising a range of strategies which served as both maintenance and coping mechanisms: action (playing together, and being helpful: Meg helped Phoebe to write her name, Samuel said to Nick: 'Can I help you?'), talk about action (Peter: 'Robert's coming to my house tomorrow'), and talk that indicated an awareness of the other's needs, knowledge and beliefs. Nell for instance used two strategies when Laura tried to exclude her: 'We might invite you to my birthday' and (when Laura told a story about seeing cicadas hatching in the night) she prompted 'Did ya find some?' indicating to Laura that she was participating in a collaborative conversation.

Dweck's research (Dweck, 1989) suggested that performance and learning (exploration) goals (observed in contrived situations) emerge in connection with entity beliefs (ability is fixed, connected to performance goals) or incremental beliefs (ability is increased by effort, connected to learning goals). The implications of her research are that these beliefs are general, across domains. This study suggests that for four-year-olds these beliefs may be discourse-specific: the belief held that 'collectives' (Davies, 1990) or 'communities' (Lave and Wenger, 1991) of girls/boys, nearly-five-

year-olds, and good people, have fixed boundaries and definitions, set elsewhere; but that technologists and friends can explore and redefine their communities. Four-year-olds are juggling the two aims of belonging and exploration, and it seems a reasonable assumption that for some children, on some occasions, for some discourses, belonging and display will be the privileged agenda. On other occasions discourse construction adaptation and exploration (learning) will win the day. As Davies and other feminist writers have pointed out (e.g. Davies, 1993), the definitions and boundaries of gender discourse are indeed appropriate topics for discussion and reconstruction: so are *being good* and *being a kindergartener*. But sociocultural imperatives, both inside and outside the kindergarten, made this unlikely.

The children's approach to difficulty was analysed as 'the responses to trouble', following Bruner (1990, 1996). In this study, trouble appeared, and had to be responded to, in the following three major ways:

- (i) an attempt by a peer or an adult to increase the difficulty or introduce a challenge
- (ii) a questioning of a child's right to belong to a discourse
- (iii) the accepted rules or canons of behaviour that define a discourse were threatened.

(i) *an attempt by a peer or an adult to increase the difficulty or introduce a challenge*

Difficulty rejected: In the group (butterfly-making) episode, trouble first came when Meg (twice) tried to introduce difficulty to the task, to turn it into a representational problem (making antennae) (see chapter 5, section 5.3.2). The response by the children was to shift to a friendship discourse. Linda's 'Meg I'm going to your place today' and Valerie's 'Do you know what, did you tell your mother I'm coming over' both followed Meg's initiatives. In the dinosaur-making episode (see chapter 6, section 6.3.2.2) the adult suggested an addition to Martin's design on two occasions: 'Are you going to be able to make legs?' and 'You don't want to paint it?'. He said 'Na' to the first, and adapted the second: 'The quickest way would be crayon'. When the wings didn't flap symmetrically he adjusted the cellotape. Martin was perfecting a model that came from his older brothers at home, and it appeared that difficulties in design would be solved at home. When the discourse was about hat making (see chapter 7, section 7.3.2), difficulties were avoided in imaginative ways: measuring and fitting was avoided by making hats for cats, hats for babies, and hats for absent family members. A basic design was never changed. Three children abandoned the task when it looked as if it was getting difficult; Rita was called back by a teacher, explained her problem, and was given the assistance she needed to complete.

Difficulty pursued. In the monster-making episode, on the other hand, Tom indicated on nine occasions that he didn't know how to proceed, and was clearly willing to

persist with the difficulties and to search collaboratively for solutions (Figure 6.5). He was specific enough for an adult to be of assistance: 'I can't make the head go on', 'The teeth are too far over there', 'How're we gonna miss the teeth?'. Difficulty was an integral part of the task, and he involved the adult collaboratively in solving it. In marble-painting too, a difficulty was interpreted by Jason as an interesting challenge: the box was lost, so he would make another. Finally, in the screen printing episodes, when for those children who pursued the process - Meg, Linda, and Danny - the discourse shifted from *being a kindergartener* to *being a screen printer*, representational difficulties were tackled and overcome, often with the assistance of the adults (see Figure 9.1). Difficulties also arose with name-writing (in at least 29 of the 58 screen printing-episodes), and for most children the difficulties were responded to with enthusiasm: they were assisted by adults, they had magnetic names to copy, and they recognised success.

(ii) *a questioning of a child's right to belong to a discourse*

Sometimes the right of one child to 'be a friend' was questioned by another. One of the strategies within the *being a friend* discourse was to raise the difficulty and uncertainty level (and the emotional level) by excluding other children. Many of the children, especially the girls, were experts in this discourse, and relished the challenge. They responded, not by retreating, but by introducing new strategies and new definitions. In a hat-making episode, Nell was excluded by Laura and Emily; she responded by telling a story of just the right length and interest, prompted and showed interest in Emily's story, and offered Laura a birthday party invitation (Figure 7.6). Meg handled friendship difficulty in a marble-painting episode: when Linda told her she was not going to play with her ever again she said she had another friend, and named the new friend (Figure 8.2). Not all the children were as adept as this, however. When Nell excluded Lisa (during a marble-painting episode) by saying that 'only friends are allowed to look at the other friends', Lisa did not have a response (section 8.3.1 in chapter 8). Lisa could 'do' friendship in the blocks (see chapter 10, section 10.2.4), with the boys, but the rules might have become too complex for her in the construction area, with the girls. She usually played with the boys, or, at the construction table, looked to the adults for support.

(iii) *the accepted rules or canons of behaviour that define a discourse are threatened*

This usually happened when the discourse *being good* or *being a good girl* was hovering in the wings. In the butterfly episode, when the boys arrived and started to 'horse around', using the materials and the tools carelessly the girls retreated and ceded the space to the boys (Figure 5.5). The implication was that the girls did not

want to be part of the silly behaviour, but nor did they remonstrate with the boys in more than a half-hearted fashion. A similar response to difficulty had been observed earlier, in block play. On 23/2 a group of girls (Catherine, Bridget, Myra and Molly) were building roads and buildings and two boys (Brian and Chris) came and broke it up. Catherine led the retreat, saying 'Don't worry about it. We can make it another day' (23/2FN). This time the teacher was nearby and called them back, and the girls rebuilt their construction with Brian helping. In a marble-painting episode (Figure 8.3), a change of function to (messy) finger painting, is interpreted by Linda and Meg as trouble, an unacceptable deviation from the norm: they shifted the discourse to *being good*, and told the teacher.

11.3. THE CHILDREN'S PERCEPTIONS

11.3.1 *The Interview*

During the observations 'response to difficulty' became an aspect of children's learning of some interest. I decided to supplement the observational data with data from a semi-structured interview, about difficulty, with individual children. In the methodology chapter (chapter 4 sections 4.3.3 (ii) and 4.5.2 (ii)), the methodological process and pitfalls associated with interviewing four-year-olds were discussed.

The work on orientation towards failure and difficulty by Smiley and Dweck (1994) used a contrived situation (specially constructed jigsaws) to find out whether children would repeat a task that they had already succeeded at, or whether they would choose a difficult task that they had already failed at. I wanted to focus on this aspect of the children's response to difficulty as well, mindful however that experimental cognitive tasks are 'special kinds of culturally mediated social interaction and not privileged windows on the mind' (Cole, 1991, p. 408). In this study, the experimental nature of the task was modified by (i) using a picture book in the everyday setting of the kindergarten, and (ii) devising a picture book that reflected the activities and context that I had observed during the study so far. It also provided the stimulus for an unstructured interview.

As outlined in the methodology chapter, section 4.5.2 (ii), I wrote and illustrated a picture book that reflected the activities and context that I had observed during the study so far. It had an incomplete ending, and after reading it to each child I asked for advice on the final part of the story. The illustrations were an adaptation of the illustrations in a picture book 'Emma goes to nursery school' with an apology to Gunilla Wolde (Wolde, 1976). I read the boys a version where the main player was

male ('Jason goes to kindergarten') and the girls a version where the main player was female ('Linda goes to kindergarten'⁸).

The story summary (the full text is in Appendix 5):

Linda arrives at kindergarten and is greeted by her friends. After mat time she wants to make a hat that will be difficult (a sun hat). Teacher and friends attempt to persuade her against this difficult path, offering alternatives to do with: (a) doing something easy that she's often done before (a birthday hat), (b) making something the teacher wants her to make (a folded butterfly painting), (c) working with her best friend (doing a screen print), (d) pretending only (putting on a dressup hat). Question: what should she do?

I was, in effect, giving back to the children the stories they had been playing out in the previous few months. This was familiar ground, ground in which I (the observer) had participated for some time. All the children except one (who said 'I don't know') readily chose an alternative.

I interviewed 38 children over five days. I read the story to children either on their own or (five times) in pairs. When children listened to the story in pairs, on only one occasion (Trevor and John) did they choose the same option. We moved around, from story reading area to store room, to a cushion outside, to the sandpit, wherever the children chose. The story line question then introduced a more open-ended interview about the children's perception of difficulty.

11.3.2 *Choosing or avoiding difficulty*

The details of the responses for all 38 children are given in Appendix 6. Table 11.1 summarises the children's responses to the first question, how to finish the story. The options are described as the *difficult*, *best friend*, *teacher*, *easy*, *pretend*, and *don't know* options.

Option chosen	Number of children
Difficult	9
Best friend	11
Teacher	7
Easy	5
Pretend	5
Don't know	1
TOTAL	38

Table 11.1. Interview data: completing the story line

⁸In the observation data, 'Jason' and 'Linda' are pseudonyms.

The most frequent response was to work with a best friend, but nine children (six boys and three girls) chose the 'difficult' option.

All of the girls who were interviewed had worked at the construction table at least once during the observations. Three of the boys interviewed (Todd, Matt, and Patrick) had never worked at the construction table. These three boys attended regularly, and spent their time outside, mostly in the sand pit. One of them, Matt, persuaded by an adult to do a screen print and assisted to put shapes onto the screen, screened for a short time and then disappeared outside again. When these three 'sand-pit' boys were interviewed, Todd chose 'pretend', Patrick said 'all of them' and when I asked him to say which first he said 'pretend'. Matt chose the easy option. Only one of the boys gave a reason for their choice: Todd explained that 'you can buy them' (the difficult sun hats). For these three boys the context did not appear to be interesting or engaging: they had not been participants.

Two of the three children who described a possible design and procedure for making a difficult hat were also articulate about their difficulties in another domain: drawing. Danny elaborated on the specific difficulty he was having with his drawings:

- Observer: What about some of your drawings that you've been learning to do. Are they sometimes a bit difficult to do, drawing?
 Danny: Um. Cars.
 Observer: Cars are difficult are they?
 Danny: Yes.
 Observer: Yeah. Are you working on cars at the moment? What are you working on at the moment?
 Danny: Cars.
 Observer: Cars. Right. Right. What's the difficult aspect of doing cars?
 Danny: Um. The um the windows. (Observer: The windows). 'Cos um you have to do those triangle ones (Yes) and the for the um for the back windows and then those, you know those um triangle windows?
 Observer: Yeah. The triangle windows. That's right. So they're a bit tricky are they?
 Danny: Yes.
 Observer: What about the wheels. Are the wheels easy?
 Danny: Yes.
 Observer: Right. Right. So. Do you do drawing here much?
 Danny: Not much. (He has already told the observer that his favourite activity here is digging in the sand pit).(29/3PTB28.53)

Valerie explained her difficulty with drawing cats:

- Valerie: I draw at home and I. And it's difficult because it's difficult to do a cat I can't properly do a cat and a tail and I al- I al- I al- I can't manage the pen to do it straight.
 Observer: Oh. You can't manage the pen to do the tail straight?
 Valerie: No.
 Observer: Right. Right. So do you think you'll get better at doing that?
 Valerie: Yes, I think so. (30/3PTB33.45)

Both the observation data and the interview data indicate that when the topic was technological, these two children had a disposition to engage with difficult problems. Although they mostly saved their *drawing* challenges for home, in screen printing and construction activities they had good opportunities to practice these dispositions (and their associated abilities) at the kindergarten. The teachers encouraged them to do so.

Some children specifically indicated that as a general rule they did *not* want to try anything difficult. Susie said 'I don't do anything that's hard for me . . . If my big sister does something really hard, I won't do it'. Laura said 'I do the things I know how to do', Trevor said that if you made a mistake you should 'just leave it'. Martin told me that his constructions never go wrong:

- Observer: Do you ever make mistakes?
 Martin: No.
 Observer: When you make dinosaurs, does it ever go wrong? (Martin and the Observer have earlier discussed his dinosaur constructions)
 Martin: No.
 Observer: Never goes wrong?
 Martin: No. (29/3PTA11.05)

In the following transcript Susie told the Observer that she had done one screen print but was not going to do another because it was too hard. She was quite firm that she did not want to risk making a mistake 'ever again'.

- Susie: (asked what difficult things she does here) I do some drawings, some paintings. But I don't know how to do a screen print.
 Observer: Don't you know how to do screen prints? (Susie shakes her head) No. Right. Are you going to have a go at that? Or not?
 Susie: No
 Observer: You're not going to have a go at that? (Rachel interrupts: 'I know how to do it'). Why not?
 Susie: 'Cos. (Further interruption from Rachel or Wendy). . .
 Observer (brings focus back to Susie) Why, Susie? Why don't you want to have a go at screen printing?
 Susie: It's too hard. I don't know how to cut out things. I don't know what to cut out.
 Observer: Right.
 Susie: But I've done one when Alison (a teacher) was here. But I can't remember how I wanted to do it.
 Observer: Right.
 Susie: I did a girl with two (pause) eyes. And Alison cut out the eyes. It looked really good but I don't know how to do it any more.
 Observer: Right. Right. So you don't want to have another go at it?
 Susie: No.
 Observer: Mmhm.
 Susie: 'Cos I might make a mis a mistake.
 Observer: You might make a mistake. And then what would happen?
 Susie: It, um, 'cos sometimes when somebody can put the paint on I actually even put too much on. So I don't want to do that ever again.
 Observer: Right. So you don't want to do that ever again. (31/3PTB12.12-23.29)

11.3.3 Perceived location of interesting difficulty

I asked the children some questions about why they had chosen their particular option, to ascertain whether they had understood the point of the story, and to seek some elaboration. Fifteen children gave a reason (see Table 11.2). Three of the nine children who chose the difficult hat-making option - Valerie, Tom, and Danny - had been major players in one or more of the five technological practices analysed in this study, and all three had been observed persisting with difficulty when the discourse was *being a technologist*. The learning dispositions of the seventeen major players are discussed in chapter 14. Valerie (14.2.1 and Appendix 8) appeared to be likely to adopt a technological discourse and to tackle difficulty when it arose; Tom (14.3.3) participated on three occasions, in one of which he had persisted with difficulty as he and an adult worked together on his monster; observations on Danny (14.3.4 and Appendix 9) indicated that when the discourse was being a technologist (especially when screen printing) he was intrigued by and persisted with difficulty. Not one of the nine children who chose the difficult hat-making option had been a major player in *hat-making* episodes. In the interview, three of the nine went on to elaborate on the design. Joseph suggested he could 'stitch, sew, put needles in there'.

Reasons for choosing the difficult option	Reasons for not choosing the difficult option	Reasons for choosing another option
Get teacher to help	She hasn't got the right material	She's made them before (birthday hats)
Describes how to do it	Cos she's too little, the teacher would have to help her	You cut around (screen print)
Describes design: adapt a birthday hat	You can buy them	Cos her best friend is doing it (screen print)
Describes how to do it: stitch, sew . . .		Because it's easy (birthday hat)
		He doesn't want to make a hat
		What the friend wanted him to do (screen print)
		Because it's the best of all (pretend)
		Because the teacher wants her to (folded painting)

Table 11.2. Interview data: reasons for choosing a particular story line

Danny said (at the end of Joan's interview) 'cardboard, a bit of paper, cardboard, and a bit of 'terial', pointing to where on the hat these items would be deployed. Valerie didn't wait until the questions at the end.

Observer: (reading) She decides she would like to make a sun hat.

Valerie: Ooh. I know what you could make. You could make a round cardboard and go like that (gestures) and then you could put some um cardboard around and then make and then cut it out to do that (points to peak) and then put a thing down the back. (30/3PTB29.22)

Later, when she chose the difficult option, she clearly explained that the child in the story could start with the basic, easy, birthday hat design and turn it into a sun hat with some additions. During the observations, Joseph never worked with the sewing materials and tools, Danny did not construct with card and material (he was a screen printer), and Valerie never made a hat. So the experience that led the children to an interest in and an ability to suggest a design for a complex hat did not necessarily come from the kindergarten. However, evidence from the three key players suggests that the experience of tackling and persisting with difficulty in other technological practices may have set up a learning disposition to recommend such a course of action on this occasion.

Follow-up questions (often not answered as children chatted about other topics or waited politely to go and do something more interesting) asked children about what they perceived as difficult. The questions were 'what do you find difficult?', 'what sort of things are you getting cleverer at?' 'what can you do now that you couldn't do when you were a baby', and/or 'what will you be able to do when you are five years old?'.

There were 36 responses from 23 children to these supplementary questions. The summary in Table 11.3 includes the names of the children who gave more than one response and sets out the children's responses in four location categories: (i) those responses that probably referred to kindergarten activities (ii) those responses that could be both kindergarten or away-from-kindergarten activities (iii) those responses that could refer to kindergarten as the location, but the surrounding discussion indicated that the learning was perceived as 'housed' elsewhere, and (iv) those responses that referred to activities certainly located outside the kindergarten.

	At kindergarten	At and away from kindergarten	Could be at kindergarten, but discussion indicates that the learning is perceived as located away from kindergarten	Away from kindergarten
Number of children	8	5	9	10
Number of responses	8	6	10	12
Actual responses	Castles (Matt) Sand pits (?) Playing with blocks Write my name by myself (Valerie) Drawing noses properly (Freda) A picture of my Dad (here, in paint) Drawing a house or a butterfly Swinging	Build houses Running (Martin) Jumping (Martin) Jumps (Linda) Climb up trees (Sarah) Swinging from one branch to another	Writing letters like 'a' and 'e' (Mum teaching me) (Freda) Telling X I don't want to play with her (Mum is teaching me) (Laura) Write (when I'm five) (Wendy) Cartwheels (Wendy) Handstands Drawing different things (cats) (Valerie) Painting (Do you do any painting here? No) Forward flip (Samuel) Drawing cars (like Y, big brother) (Danny) Making a big dinosaur (like big brother) (Martin)	Going to school Go to school (Rita) Go up the street and get the eggs (by myself) (Matt) Learning to whistle (Dad is teaching me) Short tennis (Laura) Doing flips on the trampoline Trampolines (Sarah) Hard puzzles (100 pieces) (Samuel) Do vacuum (Rita) Diving under water (Sarah) Dive (Linda) Learning how to ride a two-wheeler (Danny)

Table 11.3: Site of valued knowledge, skill or difficulty

(i) *those responses that probably referred to kindergarten activities*

Eight responses referred to kindergarten activities, and five children gave this category as their only response: (playing in the) sandpit, playing with blocks, painting a picture of my Dad (here); drawing a house or a butterfly, and swinging.

(ii) *those responses that could be both kindergarten or away-from-kindergarten activities*

Six responses referred to activities that could be at kindergarten or elsewhere. Two children gave this response only: build(ing) houses, and swinging from branch to branch.

(iii) *those responses that could refer to kindergarten as the location, but the surrounding discussion indicated that the learning was perceived as 'housed' elsewhere* and (iv) *those responses that referred to activities certainly located outside the kindergarten*

Ten responses referred to kindergarten-type activities where the discussion indicated that the reference was to activities outside the kindergarten, and twelve responses referred to non-kindergarten activities. Ten children gave these two categories as their

only response: telling X I don't want to play with her (Mum is teaching me) and short tennis; forward flips and 100 piece puzzles; drawing cars (like a big brother) and ride a two-wheeler; write (when I'm five) and cartwheels; handstands; painting (but not here); going to school; go to school and do vacuum; learning to whistle (Dad is teaching me); doing flips on the trampoline.

Summary

In summary, 22 of the 36 responses refer to difficult skills that the children perceived that they were learning or practising mostly at sites away from the kindergarten. Although children *were* tackling difficulties at kindergarten, they often didn't perceive the kindergarten to be the site of the learning. Six children (Freda, Linda, Martin, Matt, Sarah and Valerie) gave more than one response and located difficulty both at kindergarten and elsewhere; seven children located difficulty at or possibly at kindergarten only; ten children (out of the total of 23) located difficulty elsewhere only (categories (iii) and (iv)). Many drawing and writing skills were perceived as being learned at home. When Valerie talked about the difficulties she has with drawing; she said she draws at home and has difficulty drawing cats. Danny too talked about his difficulties with drawing cars, and indicated that he mostly drew at home. Freda said her Mum was teaching her to write her letters. Simon said he was 'all right' at painting but he didn't paint here. Social skills too are sometimes attributed to home: Laura said that her Mum told her how to tell Emily when she didn't want to play with her, although when questioned further she agreed that the teachers here were helping her with this as well.

This interview data adds to the observation data on responses to difficulty. Although some children enjoyed and persisted with challenge (especially when the topic was friendship), many changed the topic or avoided challenge and uncertainty. There was evidence (Figure 6.1: Martin in the dinosaur making episode for example) that a popular discourse topic *being nearly five* was associated with waiting until the age of five (and school) when the real challenges would begin. Martin cited as difficult tasks: making a big dinosaur (like his big brother), running, and jumping. Almost two thirds of the children's responses indicated that interesting challenge was perceived to be elsewhere. Some children, like Danny and Valerie, appeared to perceive that when they are learning they are overcoming difficulties and making mistakes. Other children, like Emily and Susie, preferred to choose activities and tasks where there is little challenge; when they do make a mistake they either 'just leave it', or, like Susie, they make a mental note never to try that again (even although it 'looked really good' at the time). They were, in effect, making decisions not to learn.

11.4 BEING RIGHT

A newly emerging discourse, *being right*, appeared to be splitting off from *being good* rather than being embedded in another discourse (*being a technologist, being a friend, or being a kindergartener* for instance). This new discourse was associated with the performance and display of being right and the avoidance of being wrong. It had become a self-categorisation, a possible self, rather than a step on the way to task completion. The research found evidence for this in the following three areas:

(i) *Being right* was the implicit discourse in several technological practices, in those situations where

- (a) children chose easy options when more difficult ones were available: avoiding the possibility of failure and getting it wrong (when Nell was confronted with a potentially difficult measuring problem she made a hat for her cat)
- (b) children shifted discourse when difficulties arose (when Meg suggested they try to get the butterfly model accurate, they shifted to a friendship discourse) and
- (c) children avoided those activities and technological practices that looked as if they had a right and a wrong path (Emily avoided screen printing).

(ii) *Being right* appeared to be the explicit discourse, a topic of great interest (and concern), for one child, Emily. Although she was not one of the 'major players' in the five technological practices, she appeared occasionally: in a hat-making episode with Laura where they made 'tiaras' and tried to exclude Nell (17/2), and again in a hat-making episode when she and Diana made hats quickly at tidy-up time (9/3). She decided not to attempt a screen print when it appeared to be too difficult (section 9.3.1). In a hat-making episode (17/2), described in detail in that chapter, Emily said to Laura when they pretended to admire Nell's work 'We're only telling lies to each other'. Later she told a story and indicated that, in friendship discourse, she could laugh at her mistakes: 'I saw a girl that looks like Christina and I said, Hello Christina, 'cos I thought you was a, 'cos 'cos I thought she was Christina, but she was another girl. Oh mistake' (17/2TTB10.02 see Figure 7.6). Emily appeared at the construction table six more times (see Appendix 7). She was sociable and articulate, working and talking at the edge of her cognitive ability: devising complex pretend play, and having conversations where the story line depended on thoughts and beliefs being attributed to others. She was interested in the role of the internal state called 'being right' or 'being wrong' (to have correct or incorrect knowledge, to believe and say something that is true or not true), and this was part of her conversations as well. When making a mistake appeared within friendship discourse it was interesting and amusing. But

when it appeared elsewhere, it was for Emily closely attached to *being good*, and was a site for anxiety. *Being right* had become, like *being good*, for display.

(iii) In this study, talk about other people's beliefs, knowledge, desires and needs has been identified as a common feature in many of the girls' friendship conversations (section 10.5.2: girl-friend-speak) and indicated an understanding about other people's mental states. Perceptions about *being right* are also to do with understandings about mental states (the person who is 'right' knows the right answer and believes correctly that it is right). These understandings involve young children's emerging ability to interpret other people's behaviour *and to judge their own* (Wellman, 1990; Astington, 1993; Barsch and Wellman, 1995) in terms of matching beliefs and perceived knowledge with the real world. Bartsch and Wellman (1995, pp.123-124) found references in the speech of their four 'primary' children (those for whom they had transcripts throughout the early childhood years) to 'right' 'true' and 'mistake'; they conclude that disputes about thoughts and beliefs (being wrong, making a mistake) begin to appear from about three years of age. This study found evidence for the appearance of beliefs about being right and wrong amongst four-year-olds, certainly amongst the girls who were practising girl-friend-speak. It does not necessarily mean that the capacity to interpret other people's behaviour in terms of their beliefs and judgements about right and wrong was absent at an earlier age, but the new educational environment away from home - and the discourses available in it - may provide, for some children, a fertile sociocultural environment for this capacity to be now inserted into dispositions about taking risks and tackling challenge.

11.5 CONCLUSION

The work of Carol Dweck and her colleagues in the United States (e.g. Smiley and Dweck, 1994; Dweck, 1989) suggested that children were developing inclinations to respond to difficulty, uncertainty and challenge in certain ways before they enter school: This study confirmed that hypothesis in one setting, and for one group of four-year-olds. Dweck's research with contrived tasks indicated that children were inclined towards performance or learning goals at an early age, and that *performance goals* were at school associated with being right and at preschool associated with being good. This research takes Dweck's work a step further.

Firstly, this study suggests that performance and learning goals are themselves enmeshed within sociocultural and historical goals, or discourses, and that interpreting an activity or an occasion in terms of a discourse *precedes* the decision about whether to risk mistake or error. In those activities where the privileged discourses were being a friend (hat making) or being a technologist (making a monster, marble painting,

some screen-printing episodes) the children were more likely to tackle and persist with difficulty. The data on the children's response to trouble or difficulty confirmed the influence of *discourse* and location or *place*. Although the choice of discourse was influenced by the transparency of the materials and tools (see chapter 13, section 13.3) and the children's response to difficulty was influenced by the challenge embedded in the materials and tools (section 13.4), it was the discourse and the place that determined both the perception of difficulty and the disposition to engage with it. Privileged discourses were distributed across (at least) two places, and for some children problem-solving and exploration was reserved for home. This supports research cited in Harris (1989 p.46) and Langsted (1994 p.32) that indicates that children can shift from one behavioural disposition at home to a different one at preschool or nursery. It could work both ways: in an early childhood setting, new discourses like *being a technologist* can provide a dispositional milieu where opportunities for tackling difficulty are part of learning, provided being wrong or mistaken has not already taken its value from the discourse *being good*.

Secondly, this study suggests that *being right* was emerging as a topic of interest to the four-year-olds here, and that it was splitting off from being good rather than being an embedded part of another discourse: being a technologist for instance. *Being right* then takes on some of the characteristics of a performance goal (it is to be aimed for only when success is certain) rather than as an interesting and inevitable part of the process of learning.

12**DISTRIBUTION OF RESPONSIBILITY****12.1 INTRODUCTION**

This chapter considers the following research question:

- Did there appear to be key learning dispositions associated with responsive and reciprocal relationships?

In order to answer this question, the study investigated the distribution of responsibility, part three in a learning narrative (see chapter 4, section 4.7.3.3), a domain of learning disposition (see chapter 2), and a key element in the transactional model outlined in chapter 3. Patterns of responsibility were investigated in several ways: the different patterns of levels of adult power distribution and adult involvement across technological practices were illustrated in figures and bar graphs, sequential patterns of adult-child responsibility were summarised as three graphed styles or 'genres', and evaluative patterns were investigated for different technological practices. Section 12.2 summarises the pattern of responsibility across technological practices, provides examples of three styles of responsibility in adult-child interactions, and analyses the adults' evaluative comments. Peer collaboration, a fourth style that does not include adults, is described in section 12.3. Section 12.4 summarises the notion that technological practice forms a 'responsibility milieu', concludes with some comments about the different types of 'scaffolding' that emerge from this analysis and outlines the implications of this for learning dispositions.

12.2 PATTERNS OF RESPONSIBILITY: ADULT-CHILD

Teacher talk was analysed in four ways to summarise the adult-child patterns of responsibility: levels of power, levels of involvement, pattern or style of exchange in an episode, and the pattern of evaluation. The findings from these analyses are outlined in the following sections.

12.2.1 Levels of power and levels of involvement

Each adult utterance in each episode was coded for adult power (see chapter 4, Figure 4.6 for details of the coding). Level one codes (1-3) were described as 'social support'. They included phatics, personal contributions, polite responses, and appeared to be designed to keep a social interaction going. Level two codes (4-8) were summarised as adult assistance in response to the child. They include comments that clarify the adult's understanding of the child's intent, offers of assistance, prompts, and giving information on request. Level three codes (9-13) describe a more initiating role for the adult, but it is still the child's enterprise. Comments include making new suggestions about what to do next, asking for the child's assessment of the work, and evaluative comments that refer to the work. Level four, the highest level, codes (14-25) refer to adult instructions and judgements. They include unsolicited shifts in topic: giving instructions, offering information, or asking questions, when the topic appears to the observer to be outside the child's intent. They include reminding children of the rules, and evaluative comments or praise that refer to the person or goodness (not the task). The aim of this chapter is not to judge whether these levels of responsibility were appropriate for the occasion, but to search for those examples of *reciprocal* patterns of responsibility and joint attention that the literature in both chapters 2 and 3 highlighted as key components of learning and transaction.

These codings were gathered together for each technological practice as patterns of four levels of power. Figure 12.1 provides a visual display of those patterns.

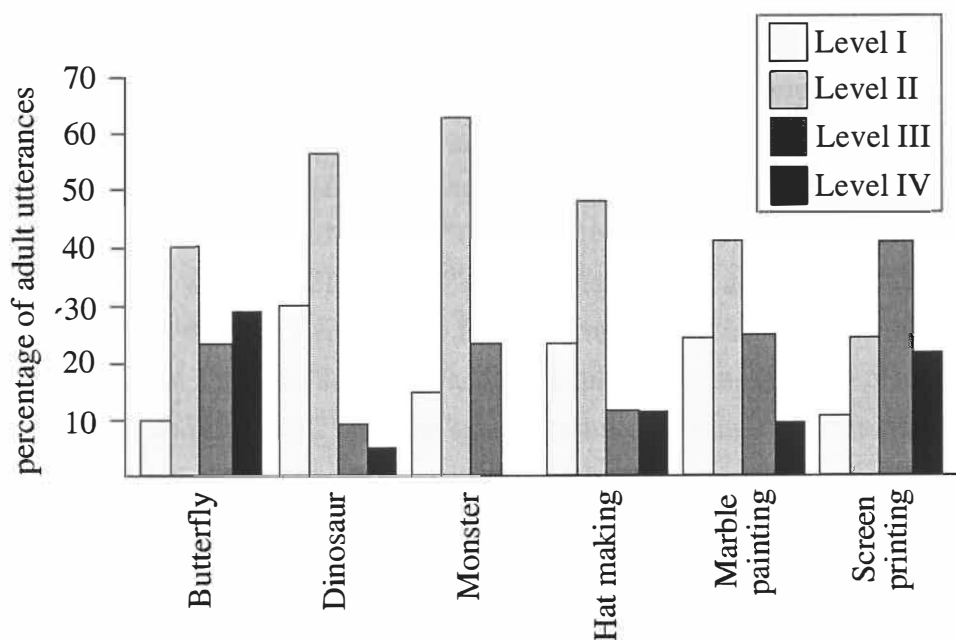


Figure 12.1. All technological practices: distribution of adult power

Table 12.1 summarises the statistics from the data chapters, providing one measure of adult power (the proportion of adult utterances at Levels III and IV), one measure of adult involvement (adult speech turns as a % of the total) and one measure of adult initiative (adult utterances at Level III). Given the interpretive nature of the coding (see section 4.7.3.3), and the small numbers of utterances for some of the technological practices, the statistics are illustrative. More details were given in Tables 6.3 and 9.2.

TECHNOLOGICAL PRACTICE	Butterfly	Dinosaur	Monster	Hat making	Marble painting	Screen printing
ADULT POWER LEVEL (Levels III & IV as % of total adult utterances)	50.0	13.6	23.6	25.0	34.6	63.7
ADULT INVOLVEMENT (speech turns as % of total)	20.2	50.0	50.0	34.9	24.3	44.6
ADULT INITIATIVE, CHILD'S ENTERPRISE (Level III adult utterances as a % of total)	21.7	9.1	23.6	13.0	26.1	40.9
TOTAL ADULT UTTERANCES	198	44	89	731	142	1401

Table 12.1. Adult power levels, adult involvement, and Level III adult involvement, for all technological practices

Each technological practice was characterised by a slightly different pattern (note that the number of utterances for the dinosaur and monster episodes is very small: 44 and 89 respectively). Screen printing and the butterfly construction were characterised by a generally high level of adult power. These activities were usually adult initiatives. Marble painting was characterised by a moderate level of adult power, and dinosaur monster and hat making a low level. In the butterfly making technological practice however, once an adult had set up the activity adults were absent for much of the time: adults contributed only 20.2% of the speech turns, returning occasionally to provide assistance, praise and resources, to keep the children engaged.

The patterns reflected the privileged discourses and the responsive and reciprocal, transactional, nature of the learning narratives. In the marble-painting technological practice for instance adult contributions were relatively infrequent in comparison with the other technological practices except for the butterfly-making episode (they contributed a quarter of all the speech turns), but when adults did make a contribution

it was more often at Level III (26.1% in comparison with 13.0% for hat-making or 9.1% for the dinosaur episode). Marble painting was characterised by the discourse *being a technologist*, and adults were more inclined or encouraged to offer initiating ideas and suggestions. Hat making and the dinosaur-making episodes were characterised by low levels of adult initiative. Within these technological practices the children had privileged *being a friend* and *being nearly five* discourses, and in these discourses adults did not have a part to play. The difference between the dinosaur and the monster episodes especially illustrated the influence of the privileged discourse topic. This was a similar activity with the same adult but Level III was much higher for the monster episode (23.6% in comparison with 9.1%) as Tom and the adult collaborated to solve difficulties within a *technologist* discourse, while in the dinosaur episode the adult contribution shifted to social support because Martin, *being nearly five*, resisted help with difficulty.

12.2.2 Adult-child responsibility patterns

Sequential patterns of adult power in typical episodes were graphed as three styles or 'genre' (Wertsch, 1991 p.111): (i) adult tutorial, (ii) adult support, and (iii) adult-child collaboration. Each of these will be discussed. The first two patterns describe asymmetrical patterns of power; the third was symmetrical. The butterfly episode was characterised by three phases: adult tutorial (high power, setting up the activity) followed by adult support (low power) followed by high power as the adult tried to keep the children on task. The graph of these different styles was displayed in chapter 5 as Figure 5.7. Screen printing was characterised by an adult tutorial pattern and an adult-child collaboration pattern, hat making by adult support or peer collaboration (in friendship discourse); dinosaur construction by adult support, and the monster construction by adult-child collaboration. A common pattern in marble painting was peer collaboration, a style discussed in section 12.3. Examples of the three adult-child patterns or styles are included in Figure 12.2, and the transcripts are included within the text as Figures 12.3, 12.4, and 12.5. The adults changed their pattern for different technological practices, as the dinosaur- and monster-making episodes illustrated, and these three examples all involved the same adult.

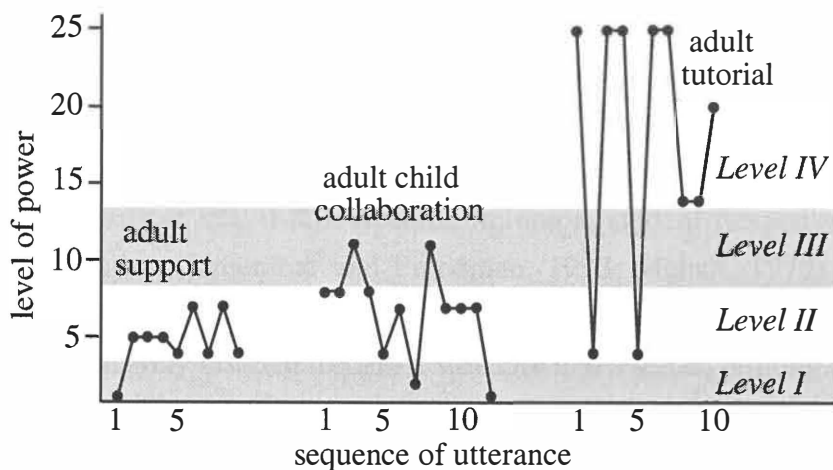


Figure 12.2 Three patterns of responsibility: graphs of transcripts.
 (i) adult support (Alison and Tony from the hat-making technological practice)
 (ii) adult-child collaboration (Alison and Jason from the screen-printing technological practice)
 (iii) adult tutorial (Alison and Rita from the screen-printing technological practice)

(i) *Adult tutorial*

An adult tutorial pattern was characteristic of early screen printing experiences for children; it remained high over all the episodes usually because for many children it was their first experience of screen printing.

ADULT TUTORIAL

Alison teaches Rita to screen print

Here is Alison in the final stages of teaching Rita to do her first screen print:
 Alison: Go back up to the top and make that paint come down to the bottom (instruction, purpose not yet clear to child, 25). OK (approval of ongoing work: "that's right", 4). Down again, down again, there you go you've covered your piece of paper up ... so we'll put this back, lift this up again (instruction, purpose not yet clear to child, 25). Lift it up (instruction, purpose not yet clear to child, 25). That's it (approval of ongoing work: "that's correct", 11) Come around here Rita, and we're going to pull the piece of paper down (instruction, purpose not yet clear to child, 25). Start from the top (instruction, purpose not yet clear to child, 25). There you go, there's your picture! (comment on end-product, 11). Alright, look at that (approval and enthusiasm 14).
 Rita: Yep.
 Alison: Yeah! (general approval and enthusiasm, 14).
 Rita: Wait til I show Mum it.
 Alison: That's a screen print (information, giving the label, 20)
 (13/2TTA45.06-46.18)
 Coding: 25 4 25 25 11 25 25 11 14 14 20

Figure 12.3. Adult tutorial: transcript of Alison and Rita from the screen-printing technological practice

Other research has documented a distinctive discourse/responsibility tutorial pattern at 'circle time' (Kantor, Elgas and Fernie, 1989; Reich, 1993), where children learn the 'school' oriented (initiation from the adult, response from the child, and evaluation from the adult) tutorial pattern. The adult tutorial follows closely the structure of traditional classroom talk: I-R-E (teacher Initiation, student Response, followed by teacher Evaluation; Greenleaf and Freedman, 1993; Mehan, 1979). In this early childhood setting, the student usually responds with an action, not a comment or answer although Amy inserted the I-R-E structure into a screen printing episode:

Amy: Who's in charge of your body? (*teacher initiation, referring to a mat time discussion on this topic*)
 Child: Me. (*student response*)
 Amy: Yes. Exactly. (*teacher evaluation*)

It parallels her

Amy: Along the line. (*teacher initiation or prompt*)
 Child begins to cut along the line (*student response*)
 Amy: That's the story. (*teacher evaluation*)

Screen printing was a 'rite of passage' for morning kindergarteners, and children usually only participated once. However, for the few children who persevered with this technological practice, and became interested in the process, the responsibility pattern became more collaborative: adults reduced their power, and children taught other children.

(ii) *Adult support*

Adult support was a very common pattern. It was evident in a low proportion of adult contributions at Levels III and IV. This pattern characterised the entire dinosaur episode, good examples occurred during hat making, and in sections of the predominantly collaborative monster-making episode. The following example, graphed in Figure 12.2 as adult support, is the transcript of Alison (the teacher) and Tony when Tony decides to make a hat. Alison's strategy is to clarify Tony's intent, focus his efforts, and provide prompts and encouragement.

ADULT SUPPORT	
Alison and Tony when Tony makes a hat	
Tony:	Alison.
Alison:	Mmhm.(phatic, 1)
Tony:	I want to make one of these. A little little.
Alison:	Is that for you? (clarification, 5) Is that to go on your head? (clarification, 5)
Tony:	It's too little.
Alison:	Well, how do you think you could make it bigger? (focussing, 5)
Tony:	Get another piece of paper.
Alison:	OK (agreement, 4). You see if you can find another piece.(prompt, 7)
Tony:	These?

ADULT SUPPORT cont'd

Alison: Right. Now. (keeping him going, 4) How are you going to join them up? (prompt, 7) Right. (agreement, 4)
(23/2TTB29.34 - 30.25)

Coding: 1 5 5 5 4 7 4 7 4

Figure 12.4. Adult support: transcript of Alison and Tony from the hat-making technological practice

The adult role was at Levels I and II, providing social support, assistance, protection, and prompts. Seldom does the adult contribution shift to Level III, a characteristic of adult collaboration and initiative.

(iii) *Adult-child collaboration*

In adult-child collaboration the pattern of responsibility is symmetrical, particularly characterised by sequences with a high proportion of adult contribution at Level III. The following transcript, Figure 12.5, was graphed in Figure 12.2. In an exchange with 12 adult utterances the adult twice makes a contribution at Level III, in this case an evaluation clearly attached to the child's action (he writes the letters correctly). Three adult contributions are coded high up in Level II: giving information requested by the child. This adult is much more a partner in the interaction, and the direction is a product of joint attention. They exchange information about the 's' in each of their names; Jason sometimes asks for help ('How do you write...?') and sometimes states that he knows how to do it.

ADULT-CHILD COLLABORATION
Alison and Jason: writing John's (sur)name

Jason: (to Alison) How do you write John's name? (Alison writes it down for him and they go through it letter by letter as Jason writes).....

Alison: This is called an 'n'. (gives information, requested by child, 8) My lips don't come together when I say that one.(gives information, requested by child, 8)

Jason: See.

Alison: OK. (that's correct, 11) Now, the very last letter of the alphabet: he has a 'z'.(gives information requested by child, 8)

Jason: Like a squiggly, like a squiggly 's'.

Alison: Yes.(agreement, 4) A very sharp one (prompt for next part of process, 7).

Jason: I've got a squiggly s.

Alison: I have too (personal contribution, 2).

Jason: Like that.

Alison: That's right yes.(approval: that's right, 11) It's a bit like an S but it's got much it's much sharper lines. (prompt for next part of process, 7) (Jason: Yep) Doesn't curve. (prompt for next part of process, 7) Now that one there (prompt for next part of process, 7).

Jason: I know how to do that.

Alison: Know how to do that one? (conversational oil, repetition, 1).
(8/2TTB12.44-12.50; 18.10-23.00)

Coding: 8 8 11 8 4 7 2 11 7 7 7 1

Figure 12.5. Adult-child collaboration: transcript of Alison and Jason from the screen-printing technological practice

I did not measure the children's responsibility from *their* utterances in detail, because there were too many gaps and ambiguities, but in the two episodes in chapter 6 (making a dinosaur and making a monster) I investigated the child's utterances to illustrate the reciprocal and responsive nature of adult style with child style. In these episodes, when the adult style was one of adult support, Martin's contributions were not collaborative; when the adult style was one of collaboration, Tom's contributions reflected the joint attention to difficulty. Table 6.4 presented the statistics, and that table is repeated here:

	Monster	Dinosaur
	Number child utterances	Number child utterances
NON-COLLABORATIVE		
calls for attention	1	5
doesn't need help (I know)	1	2
clarifying information (not about the construction)	0	2
COLLABORATIVE		
explanations about the construction	31	5
questions about the construction (asking for information opinion or advice)	7	0
explanation of difficulty (implying 'I don't know')	7	0
instructions given by a child	2	0
other (not initiating)	46	13
TOTAL UTTERANCES	95	27

Table 6.4. Dinosaur-making and monster-making episodes compared: purpose of child-initiating utterances

Initiating comments that indicated collaboration were: explanations about the construction, questions about the construction, explanation of difficulty, and instructions. Forty-seven of Tom's 49 initiating comments came from this group; 5 out of Martin's 14 initiating comments were collaborative. Adult style and children's contributions are interwoven in a transactional system.

Adult-peer collaborative exchanges were rare. In the construction area during the observation period, joint collaboration occurred between adults and children in the

monster construction and in some of the screen-printing and marble-painting episodes. Figure 8.6 in the marble-painting data chapter provides an example from marble painting. The teacher alternates between support, clarification of the child's intent and understanding, and new suggestions.

12.2.3 Evaluative comments

Another way that adults take responsibility and retain power and control is through evaluative comments. In screen printing, evaluative comments by the adults were common, often as approval when the child followed an instruction correctly, but also as generally enthusiastic comments. Comments like 'perfect', 'great', 'excellent', 'that's it', 'right', 'OK' were deployed to keep the child focused and motivated. Here is Alison:

Alison: That's going well Jinny. I love your patterns Jason. Colourful. And look I'll show you what happens. If I turn it over. Even though we can't see the colours, we can see the shapes. Oh. fantastic. Oh this is going to be exciting. (16/2TTA32.38-33.35)

I sorted the evaluative comments into Level III (codes 10-13, see Figure 4.6) and Level IV (codes 14-17, see Figure 4.6). At Level III the comments were attached to the work or the action ('good cutting', 'does that fit better?' 'they're lovely shapes', designed to keep it as the child's enterprise and the responsibility with the child) whereas at Level IV the comments were more general, or attached to the person ('Good girl', 'That looks fabulous', 'I like that hat', shifting the power and the responsibility for evaluation towards the adult). Table 12.3 gives examples. The pattern of evaluation is included in Table 12.2 and in Figure 12.6.

TECHNOLOGICAL PRACTICE	Butterfly	Dinosaur	Monster	Hat-making	Marble-painting	Screen printing
Adult evaluative comments (codes 9-16) as % of adult utterances	18.7	4.5	12.4	7.9	12.0	18.7
Adult evaluative % at Level IV	9.8	0.0	0.0	3.0	0.9	6.2
Adult evaluative % at Level III	8.9	4.5	12.4	4.9	11.1	12.5
Total adult utterances	198	44	89	731	142	1401

Table 12.2. Patterns of adult evaluation across technological practices

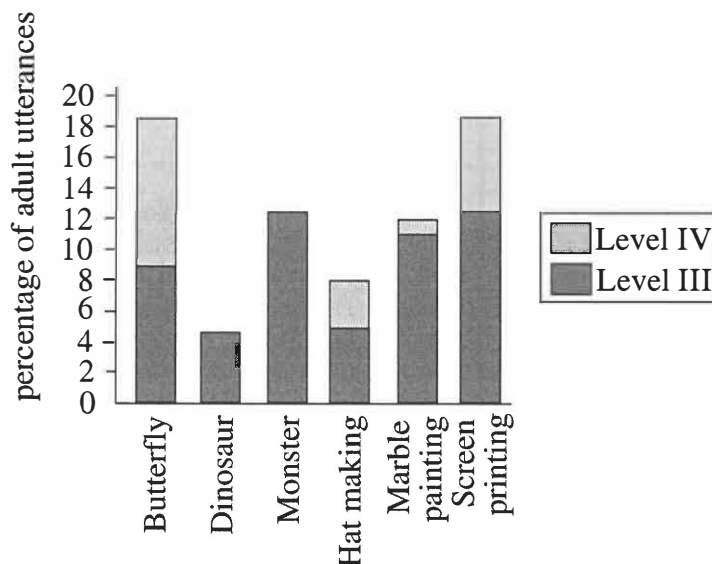


Figure 12.6. Evaluative comments by technological practice

In the dinosaur episode the overall evaluative percentage was 4.5 in comparison with the monster episode where it was 12.4, reflecting the different levels of collaborative engagement by the adult. Examples from the technological practices with more than 100 utterances are in Figure 12.3:

Technological practice	Level III Evaluative comments	Level IV Evaluative comments
Butterfly	<p>Do you think that would be a good idea?</p> <p>Good cutting</p> <p>I see some nice flowers being put on</p> <p>Gosh how busy you've been with all the different colours and paints you've used</p>	<p>That's great Valerie</p> <p>Oh neat</p> <p>Good boy</p> <p>Hey, this looks like fun</p> <p>Oh girls!</p> <p>Look at this beautiful butterfly's wings</p> <p>That looks fabulous</p> <p>Mm lovely</p> <p>What busy people we've got in here</p> <p>I think it looks fabulous</p>

Technological practice cont'd	Level III Evaluative comments cont'd	Level IV Evaluative comments cont'd
Hat-making	<p>Oh look at that colour You look like you've got your head in the clouds with that hat on That looks like Sarah's name to me Lots of different colours you've used Now is that joined together? How's that? What do you think you'll need? Oh, it's a wee bit small Does that fit better?</p>	<p>Great, Meg That's looking great Oh, excellent Good girl, good girl I knew you could You're a nice big brother I love that tail you're wearing Laura I like that hat Fantastic, what a fabulous crown</p>
Marble-painting	<p>What a good idea Do you think you could do that? That might do the trick, do you think? (follows: 'I can see a big one' (box)) Oh, that went high It's like lots of roads, isn't it? You can decide when it's nearly finished</p>	<p>Fabulous work We'd better put some names on Doesn't it look good</p>
Screen printing	<p>What do you think? Pleased with it? Wow, you must have been practising That's right, that's the 'S' Can you write your name? Oh, whose face is that: looks like someone who's had a fright Good cutting How did you get on Kay? That print turned out very well They're lovely shapes Where did you learn to do that? You're onto it, you've been thinking You can tie up your shoe laces, well done Do you know what to do now?</p>	<p>Busy girl Have a look at this whale everybody, look at Danny's whale [I'm] dying to see what magic you're making in here Bridget Let me have a look Isn't she clever Looking good Linda Where's your picture, love? That's neat Kay. Very good work. You're getting a really big school girl eh? (following: you can tie up your shoe laces, well done) Good going, good girl That looks fabulous Meg (precedes: do you know what to do now?) That was fantastic Good girl, good girl, well done</p>

Table 12.3. Evaluative comments at Level III and Level IV: examples

In both the butterfly-making episode and the screen-printing episodes the evaluative content was 18.7% as the teachers tried to keep the children on track. One third to a half of these evaluative comments were at Level IV, mostly attached to the person (the adult or the child), and often therefore about performance or *being good*. Over half of the evaluative comments in the hat-making episodes were also at Level IV. The discourses in these three technological practices were frequently characterised by performance or display goals. In the monster-making and marble-painting episodes, where children were more often seen to be tackling difficulty and therefore pursuing learning goals, the evaluative comments were usually at Level III: attached to the task, encouraging self-evaluation and exploration. In the dinosaur episode, characterised by *being nearly five* discourse and adult support, the evaluative level was low (4.5% of the 44 utterances), all at Level III.

The adult-child responsibility patterns can be summarised as follows:

	Adult power	Adult evaluative level	Child initiation
Adult support	LOW	LOW	HIGH, especially in non-collaborative category
Adult tutorial	HIGH	HIGH, especially at Level IV	LOW
Adult-child collaboration	MODERATE	MODERATE, especially at Level III	HIGH, especially in collaborative category

Table 12.4. Adult-child responsibility patterns

Adult support is characterised by low adult power, a low level of adult evaluation, and a high level of initiating talk from the children, especially in the non-collaborative category (calling for attention, clarifying information, indicating that no help is needed). *Adult tutorial* is characterised by high adult power, a high level of adult evaluation, especially at level IV, and a low level of initiating talk from the children. Adult-child collaboration is characterised by moderate adult power and evaluation (focused at level III), and a high level of initiating talk from the children, especially in the collaborative category (explanations of intent, questions, explanations of difficulty, and instructions to the adult).

12.3 PEER COLLABORATION

Although most of the data on distribution of responsibility comes from transcripts of adult talk, the transcripts were also scanned for examples of peer collaboration, negotiation, or tutoring. When the children were practising or constructing definitions for being a friend, categories (ii) being helpful and anticipating the needs of others, (iii) talk about friendship and (iv) speaking the language, provided many examples of peer collaboration (see chapter 10, section 10.4.4). So did dramatic play. When the topic was technological however, peer collaborations were not common, except in hat making and marble painting. The summary data on the 117 episodes of hat making, marble painting and screen printing in Appendices 2, 3 and 4 identify those episodes that included transcript that indicated (i) peer support and praise (ii) peer assistance and technical support (iii) complex friendship talk. These are summarised in Table 12.5.

Technological practice	episodes including transcript of peer support and praise	episodes including transcript of peer technical assistance and support	episodes of complex friendship talk	TOTAL EPISODES
screen printing	1	4	2	58
marble painting	3	6	2	17
hat making	13	8	3	42

Table 12.5. Episodes including transcript of peer collaboration in screen-printing, marble-painting and hat-making technological practices

In the hat-making chapter, eight episodes (out of the 42) included examples of one child suggesting a new idea or direction - technical assistance - to another. Six (out of 17) marble-painting episodes and four (out of 58) screen-printing episodes included peers giving each other technical assistance.

Figure 8.4 (chapter 8) provided an example of sustained technical assistance in marble painting. Indications of peer collaborations were the same as indications of child-adult collaboration: explanations about the construction and the intent, questions, explanations of difficulty, or instructions. Another marble-painting example is included here (Figure 12.7). The example occurred when Nell taught Jinny to construct a box and Jinny taught Nick to make a marble painting. The apprentice (Nick) asked about the process and then took on some of the responsibility, spooning marbles in for Jinny:

PEER COLLABORATION	
Nell Jason Nick and Jinny marble painting	
(1) Nell:	I (you?) can't do one yet, Jinny, 'cos <u>you've got to make a box.</u> *(explanation) <u>You've got to get some of these scissors.</u> (instruction) <u>Go and get a box.</u> (instruction) <u>As big as this prob'ly or like that.</u> (instruction) <u>And then you can cut it.</u> (instruction)
(2) Jason:	Ah, <u>only off the tops.</u> not these.(pinpointing difficulty)
(3) Nell:	<u>No, not the sides.</u> (pinpointing difficulty)
(4) Nick:	<i>Where did you get that box from? *(Question)</i>
(5) Nell:	I don't know. <u>On the shelf.</u> (explaining process)
(6) Nick:	<i>Is there two balls in there? (Question)</i>
(7) Nell:	Yep.
(8) Nick:	<i>What are those, do those, balls do that</i>
(9) Nell:	Marbles. (same time).
(10) Nick:	<i>painting?(same time) (Question).</i>
(11) Nell:	Yeah. <u>They make it.</u> (sound of marbles rolling about) (explanation of process)
(12) Jinny:	Green in there.
(13) Jason:	Is it windy outside Trevor? (Trevor?: Mm) (Jason has earlier made a kite)
(14) Nell:	And <u>put some of that colour into the green.</u> (sound of marbles rolling about) (instruction)
(15) Nick:	<i>Is it easy? (Question)</i>
(16) Nell:	It is easy.
(17) Nick:	<i>Can I've a turn now? (Question). . .</i>
(18) Nick:	<i>Do I put a bit of this in? (Question). . .</i>
(19) Nick:	<i>Shall I put the ball in? (Question). . .</i>
(20) Nick:	<i>Shall I put a bit more paint in? (Question). . .</i>
(21) Alison:	(sound of marble dropping) Ooh that went high.
(22) Nick:	Well. <u>It landed in the box.</u> (explanation of process)
(23) Alison:	Uh huh.
(16/2 TTA16.42-21.34)	
* initiating utterances are underlined; questions are in italics	

Figure 12.7. Peer collaboration: transcript (ii) from the marble-painting technological practice (transcript (i) was Figure 8.6)

All 18 of the initiating utterances by the children in Figure 12.7 (out of 27 utterances in total) were explanations about the construction, questions, explanations of difficulty, or instructions. Nell took the lead giving Jinny an explanation about why she could not do a marble painting straight away (she has to make a box), and then gave her four instructions (turn 1). Jason warned of possible difficulty (turn 2), a warning confirmed by Nell (turn 3). Nick then shared the responsibility by asking questions about the process (turns 4, 6, 8/10), asks if he can have a turn (turn 17), then did some of the work for Jinny (checking with her that it is all right: turns 18, 19, 20). The field notes record that 'Nick now does one, absorbed by it. He asks Alison to look at it, and they talk about the tracks the balls have made, where they have turned a corner'. Table 12.6 describes the structure. The pattern of peer collaboration here is similar to the child's contribution in the monster-making collaboration episode: comments in the

collaborative category of initiating comments include explanation of meaning and process, pinpointing of difficulty or possible difficulty, asking questions, and giving instructions.

	Marble painting episode
	Number of child utterances
NON-COLLABORATIVE	
calls for attention	0
doesn't need help (I know)	0
clarifying information (not about the construction)	0
COLLABORATIVE	
explanations about the construction	4
questions about the construction (asking for information opinion or advice)	7
explanation of difficulty (implying 'I don't know')	2
instructions given by a child	5
other (not initiating)	9
TOTAL UTTERANCES	27

Table 12.6. Collaborative comments from the children in a marble-painting episode

Within peer collaboration, children teach each other. Figure 12.8 provides an example in a screen-printing episode as Jason assists John. Jason's comments can be categorised in the same way as the adults: he is initiating instruction on the next step (line 2), clarifying John's purpose (line 4), making a reassuring comment, prompting himself, and giving himself approval (line 6).

PEER COLLABORATION	
Jason teaches John	
John:	You do it for me
Jason:	Draw the shape you want and then
John:	You do it for me?
Jason:	What shape do you want?
John:	Ah, a circle
Jason:	'K. Have to go round. Oh right. (8/2TTA11.02-11.20)

Figure 12.8. Peer collaboration: transcript from the screen-printing technological practice

Later in the sequence, when Jason has given instructions to John about how to do the screening, another child comes up and says to John 'I'm gonna do it after you'. John, now the teacher, says 'You gotta cut little pieces out' (8/2TTB 26.3 5).

Symmetrical and collaborative patterns were common between peers when the discourse was about *being a friend*. They are typically found in dramatic play, where the outcome is a joint one and the scripts are familiar. In construction episodes, the outcome is usually an individual one and collaborative scripts are not familiar. Bridget reminded the others when they gave her advice at the screen-printing table: 'You don't know. It's my picture'. In examples of peer collaboration children took the initiative: asking each other questions, giving instructions, in a reciprocal and responsive fashion. Damon (1991, p.390) describes collaboration between peers as characterised by an optimum degree of conflict, a high degree of mutuality and equality, and a balanced or symmetrical pattern of reciprocal discourse. It occurred occasionally when the discourse was *being a technologist*. During marble painting (Figure 12.7) for example, Nell instructed Jinny; then Nick asked Jinny about the process; then Nick took on some of the responsibility, spooning marbles in for Jinny.

12.4 CONCLUSION

The key learning dispositions associated with responsive and reciprocal relationships identified in this study were responsibility patterns to do with adult power. Technological practices provided contexts that inclined adults towards certain responsibility or evaluative patterns, and in turn these provided dispositional milieux for the children: to take responsibility and evaluate their own activity, or to expect the responsibility to be taken by the adult. Edwards and Mercer (1987 p.10) had commented that

structures which typified the talk in secondary classrooms . . . can be seen emerging in the talk of infant classrooms, with the implication that children are very quickly socialized into fairly rigid pupil roles which they act out for the rest of their school careers. (Edwards and Mercer, 1987 p.10)

This research has indicated that a range of 'pupil' or learner roles were being established in the construction area of this kindergarten, but to say that children 'are socialized' underestimates the complexity of the transactions between adult and child, child and child, and child and activity. Within each technological practice, the children's dispositions to privilege certain discourses set up a succession of transactions to do with favoured responsibility patterns and preferred responses to difficulty.

The most common pattern in the observational data was adult support, where the child took the initiative and the adult provided assistance and approval usually on request. It was an asymmetric pattern, where the power was in the children's hands. The tasks here were usually self-chosen and self-directed. These are criteria that Dweck (1989) indicated were prerequisites for learning goals, and this study identified self-chosen activities as those in which children were more likely to retain responsibility, as adults provided support and kept their evaluative level low. They were not necessarily characterised by learning goals however, as chapter 11 indicated. The children here were deciding what they would make, do, and talk about; the sociocultural environment in the construction area was designed for this purpose. The teachers reminded children that they could make whatever they liked, and use whatever resources are available, and they readily provided assistance and approval.

Symmetrical co-construction and collaborative exchanges occurred during episodes of joint attention and negotiation about difficulty, usually within technologist and friendship discourses: the monster-making episode, name and word writing episodes, friendship discussions, and peer collaboration and tutoring during marble-painting episodes. Rogoff, Mistry et al. (1993) suggested that different patterns of responsibility would characterise different communities:

We expected communities to differ in patterns reflecting whether children or adults are responsible for children's learning (Rogoff, Mistry et al. 1993 p.3)

They describe two patterns: one where adults structure the learning and organize children's attention motivation and involvement, and another in which children take the primary responsibility by managing their own attention motivation and involvement. This study found both patterns within one setting. When the goals here were adult-oriented (*being a kindergartener*, acquiring the skills embedded in screen printing for instance) then the responsibility shifted towards the adults. But when the goal was about *being a friend, being good, being appropriately gendered* - also values and knowledge of the community - the responsibility stayed with the child. Adults did not involve themselves with these topics in the construction area; nor did they change the topic. When the goal was *being a technologist*, responsibility varied from adult tutorial (where the adult has the responsibility) to a symmetrical pattern of peer collaboration or adult-peer collaboration. Petrova (1996) also found both symmetrical and asymmetrical patterns of adult turn distribution within the same early childhood setting, but in different tasks. The tasks themselves, the materials and the tools, have a part to play. This is the topic of the next chapter.

This study indicates that technological practices can form what might be called 'responsibility milieux', environments that dispose children to expect and engage in

symmetrical or asymmetrical responsibility patterns. In the early childhood literature the word 'scaffolding' is often applied to the role of the adult in collaborative enterprises (Wood et al. 1976; Wood et al. 1980). It is worthwhile differentiating adult tutorial, adult support and adult collaboration because the responsibility is differently distributed. In the latter the adult is called upon to provide ideas and offer suggestions, and the children for whom this responsibility pattern has become a habit are inclined to explain their intent, ask questions, offer and seek explanations and clarification, and admit that there is difficulty. All three patterns of responsibility can describe working within the 'zone of proximal development' (Vygotsky, 1978), where children are assisted to do things they cannot do by themselves, but in a collaborative enterprise adults or peers assist children and peers by transactions, giving and receiving knowledge and ideas (as well as supportive physical assistance and reassurance). Different ways in which adults focus their evaluation of the children and/or their work are a kind of 'scaffolding' as well. Research with school children in the United States has indicated that children as young as first graders perceive subtle differences in the kinds of praise that teachers give to 'high achievers' from 'low achievers' (Weinstein, 1989). Praise and evaluation strategies that focus on the child and on *being good*, afford performance goals and an off-loading of responsibility to the adult. Salomon (1993a p.132) differentiated between adult tutorial and adult collaboration when he suggested that there are (at least) two classes of distributed cognitions. In the first group of distributed cognitions one off-loads the 'cognitive burden' onto a tool or onto human partners (the teacher guides the student in lieu of the student's self-guidance). Cognitive demands are circumvented or done away with:

By affording off-loading of (sometimes) crucial skills and knowledge, such tools or social arrangements afford higher-level accomplishments but few opportunities for the cultivation of the crucial cognitions so off-loaded. (Salomon, 1993a p.133)

In the second group, cognitions are distributed as a shared activity, as 'when two individuals plan together or solve a problem jointly'. Salomon called the latter *qualitative scaffolding*. Symmetrical, collaborative interactions over a joint task or topic are what Damon (1991) described as 'socially shared cognition', and Rogoff (1990) Moore and Dunham (1995) and Smith (1996c, 1997) as 'joint attention'. The research literature indicates that they are rich contexts for learning, enhancing language development as well as strategies for shared understandings, affect, respect, and responsibility (Melhuish, 1991; Ratner and Stettner, 1991; Sylva, 1992; Cannella, 1993; Rogoff, Mistry et al. 1993; Moore and Dunham, 1995; Smith, 1996c, 1997; Broberg et al., 1997) and transfer of learning (Perkins and Salomon, 1989). Bruner (1996 p.84) says that learning is at its best when it is 'participatory, proactive, communal, collaborative, and given over to constructing meanings rather than receiving them'. The literature already discussed in this study (see chapter 2) suggests

that reciprocal relationships and responsibility are pivotal to the first messages that children learn about the self as a learner, messages received in early childhood settings. Smith's study of under two-year-olds (Smith, 1996c, 1997) documented 236 episodes of joint attention. Seventy of the 200 children in the study, observed for 20 minutes each, experienced no joint attention episodes. Joint attention for the under twos occurred most frequently in object- and toy-related play (20% of the joint attention episodes), rarely occurred in construction activities (defined in Smith's study as puzzles, duplo and Lego, 5%), and moderately frequently occurred in creative and messy play activities (13%). This study suggests that episodes of joint attention (including peer-peer collaboration) for this group of four-year-olds were associated with technologist and friendship discourses. These two discourses were typically part of learning narratives that included persisting with trouble or difficulty: this clustering of dispositions together as learning narratives is the topic of the next chapter.

The last three chapters have analysed the privileged discourses, preferred responses to difficulty, and favoured patterns of responsibility that have been characteristic of individual technological practices. The next chapter summarises the clustering together of these dispositions into learning narratives, and investigates whether the materials and the tools have had a part to play in this privileging, preferring, and favouring.

13**TECHNOLOGY AND LEARNING
NARRATIVES****13.1 INTRODUCTION**

Chapter 10 set out the five research questions that framed up this study, and answered the first. Chapter 11 answered the second and Chapter 12 the third. This chapter responds to the fourth:

- In this setting, was a technological practice characterised by a particular clustering together of dispositions in event structures or learning narratives which could be described as a ‘dispositional milieu’?

Dispositions were defined in chapter 2 as an interconnection between goal, orientation, and strategy (Figure 2.2). The previous three chapters - and the five technological practice chapters - described each technological practice as characterised by one or two learning narratives: privileged goals or discourses, preferred orientations towards difficulty, and favoured responsibility and evaluative patterns. Privileging, preferring, and favouring, are dispositional, and technological practices have begun to emerge as ‘dispositional milieux’. Section 13.2 in this chapter summarises the learning narratives and analyses the role of the technology - the materials, the tools, and the tasks themselves - in affording those learning narratives. Three major kinds of affordance were outlined in chapter 3: transparency, challenge, and accessibility. Section 13.3 analyses the relationship between transparency and discourse appropriation; 13.4 the relationship between challenge and responses to difficulty, and 13.5 the relationship between accessibility and the distribution of responsibility. The chapter concludes with section 13.6, which summarises the connection between technological practice and narrative.

**13.2 LEARNING NARRATIVES AND TECHNOLOGICAL
AFFORDANCE**

In the observations of activities in the construction area, six learning narratives appeared:

Narrative One (group butterfly construction): Privileged discourses are *being a kindergartener*, *being a girl/boy* and *being good*. Difficulty is avoided by shifting from one discourse to another; adults alternate between tutorial (setting up and praising) and support.

Narrative Two (screen printing): Privileged discourse is *being a good kindergartener*. Difficulty is avoided by following instructions and participating only once; typically the adult responsibility pattern is an adult tutorial.

Narrative Three (making a dinosaur and hat making): Privileged discourse is *being nearly five*. Technological difficulties are avoided in imaginative ways or are being solved elsewhere; adults give support.

Narrative Four (making a monster, and the second narrative in screen printing): Privileged discourse is *being a technologist*; difficulties are articulated and clarified; adults and children collaborate, children tutor each other.

Narrative Five (hat making): Privileged discourse is *being a friend*; children work alongside each other, difficulties and conflicts are solved by discussion and negotiation; peer collaboration and tutoring.

Narrative Six (marble painting): Privileged discourse is *being a technologist*; children work with each other; difficulties are solved by peer tutoring or observation or discussion; peer collaboration.

In the first three narratives, discourses were *being a kindergartener*, *being gendered*, *being good*, or *being nearly five*; difficulty was avoided or being solved elsewhere, and responsibility patterns were asymmetrical, characterised by either adult support or adult tutorial. In the second three narratives, the discourses were *being a technologist* or *being a friend*, difficulties were tackled within symmetrical adult-child or peer-peer collaborative responsibility patterns. Only in narrative six were there joint enterprises where the discourse was *being a technologist* and children worked collaboratively on the same task.

The narratives were closely associated with technological practice, but some technological practices were characterised by two narratives (hat making and screen printing). This chapter investigates the influence of the technology - the materials, the tools, and the task itself - on these narratives. The materials tools and task or product afforded the choice of discourse, the design and difficulty, and the distribution of responsibility. The term 'affordance' as it is used in this study was explained in Chapter 3 section 3.4.4 (iii). *Transparency* as an affordance refers to whether the meaning or intention of the materials and tools (or what is to be constructed) within this technological practice is readily apparent. *Challenge* refers to the difficulty afforded by the materials and tools (or the design of the construction) in this technological practice. *Accessibility* refers to the form of participation enabled by the

materials and tools (or constructions) in this technological practice. *Transparency* influences two of these, but it is centrally involved in the choice of discourse. For example, making a hat was interesting and meaningful to a number of the children, encouraging a being a hat maker (a sub-category of *being a technologist*) discourse. But if the task is transparent to others as well, it encourages collaboration and assistance. *Challenge* is involved in all three parts of the learning narrative, but the task challenge centrally influences the response to difficulty. When the technical task has the capacity to be interestingly difficult it will afford a technologist discourse, while if the task is particularly easy (like the butterfly task in chapter 5) it will afford a friendship or gender discourse and it will not need a collaborating peer or adult. *Accessibility* is centrally involved in the distribution of responsibility: if a hot-glue gun was part of the equipment for instance, then adults would need to be involved. If the product had to be named, an assistant might be needed. The affordances *permitted* rather than *compelled*, however. The final designs, levels of difficulty and responsibility patterns were determined to a large extent by the children's interpretations. The discourses were the compelling forces. Table 13.1 describes the relationship between the affordance of the materials tools and product on the privileged discourse, preferred response to difficulty, and favoured distribution of responsibility.

NARRATIVE → AFFORDANCE OF MATERIALS TOOLS AND PRODUCT ↓	DISCOURSE	RESPONSE TO DIFFICULTY	DISTRIBUTION OF RESPONSIBILITY
TRANSPARENCY	HIGH LEVEL OF INFLUENCE		some influence
CHALLENGE	some influence	HIGH LEVEL OF INFLUENCE	some influence
ACCESSIBILITY			HIGH LEVEL OF INFLUENCE

Table 13.1. The relationship between affordance and learning narrative

13.3. TRANSPARENCY AND DISCOURSE APPROPRIATION

Each technological practice was strongly characterised by a different cluster of discourses. The kindergarten setting provided a range of possible discourse topics, and children bring and construct privileged discourses. But materials and tools also afford discourse topics. The hat-making episodes provided a clear example of this. In (most of) these children's cultures, birthdays are associated with birthday hats, and the typically cylindrical style of a birthday hat was afforded by the strips of card available

for construction in the construction area. Nine of the 42 hat-making episodes produced birthday hats, and the topic of age and birthdays appeared in 17 of the hat-making episodes. The materials inclined the technological practice towards a *being nearly five* discourse. Because the 'basic' hat design was extremely simple: staple the strip into a cylinder, the making and decorating could be associated with conversation and friendship-formation or maintenance. The materials and tools *permitted* more difficult designs and functions - measuring, representational, and other imaginative functions but did not *compel* them. On only four out of the 42 hat episodes did the design or process become complex - Jason's hat appeared to be an expression of his interest in representing movement, Trevor persevered at trying several strategies to make a hat fit his own head, Molly made a hat for her father to 'see in the night', and Meg made a hat that included a blue cellophane visor - and it could be said that then the discourse shifted to 'being a technologist'. Table 13.2 describes this link between the technology and the discourses chosen.

TECHNOLOGICAL PRACTICE	AFFORDANCE (TRANSPARENCY) OF THE MATERIALS AND TOOLS	PRIVILEGED DISCOURSE
Butterfly making	Large sheets of corrugated cardboard encouraged a wall display (initiated by the teacher) and an easy group project inclined the children towards familiar social goals	Being a kindergartener Being good Being a girl, being a boy
Making a dinosaur	Materials (cardboard tube, paper, and cello tape) were the same materials as used at home to make dinosaurs. Martin recognised them and copied the model established at home (by older brothers)	Being nearly five
Making a monster	Materials (seeds or beans) looked like teeth to Tom (who is presumably interested in monsters); he incorporated teeth into a representation of a dinosaur; the design was not pre-ordained, but inspired by the materials: cardboard boxes, seeds, cello tape, glue, and paint	Being a technologist (sub-group: being a monster maker)
Hat making	The materials inclined the children to make cylindrical (birthday) hats; the easy design of a basic hat allowed for friendship conversation and maintenance	Being a friend Being nearly five
Marble painting	Physical process was novel interesting and highly transparent. The battered nature of the box encouraged children to construct their own boxes when the original went missing	Being a technologist (sub-group: being a marble painter)

TECHNOLOGICAL PRACTICE cont'd	AFFORDANCE (TRANSPARENCY) OF THE MATERIALS AND TOOLS cont'd	PRIVILEGED DISCOURSE cont'd
Screen printing	<p>The package of physical skills embedded in this activity was associated with morning kindergarten, especially drawing cutting and writing names. Many of these processes are 'accountable' (an aspect of transparency), inviting judgements (being good at...)</p> <p>After a number of trials, the representational potential of the equipment became transparent to (and was spontaneously explored by) Danny</p>	<p>Being a good kindergartener</p> <p>Being a technologist (sub-group: being a screen printer)</p>

Table 13.2. The influence of materials and tools on discourses

Transparency increases with familiarity. As screen printing became more familiar to Danny, its affordance became more 'transparent': in particular its capacity to 'do the shadow' of a drawing. He shifted to a narrative that included exploring this aspect of the technology.

The feedback that the tools and materials give to the learner are part of transparency. Tools that fasten and connect material together provide feedback that indicates clearly whether success has been achieved or not: things are attached or they are not. During the monster-making episode, Tom discussed whether to use a stapler or cellotape: he ran into difficulty when he chose cellotape for part of the task, because when he painted it the cellotape came away, and the construction collapsed. The measure of success was apparent. Difficulty is often about being right and wrong; when the artifacts are accountable, they tell the child whether he or she is right or wrong: Tom did not have to be told by an expert that he had made a wrong decision to choose cellotape. Jigsaws are good examples of materials that are accountable or 'autotelic'. Children can practise being wrong without the ever-encroaching discourse *being good* if the materials rather than an adult provide the evidence.

In the butterfly construction episode, the group nature of the project encouraged social goals and discourses; in another context this social setting could have encouraged collaborative problem-solving, but the goal had been established as a wall display. It became a display in two senses: displaying one of the themes of the kindergarten activities over the previous month, and displaying friendship, *being good*, and gender alliances. In the monster construction episode, the materials (beans or seeds) reminded Tom of teeth, this combined with his presumed interest in monsters and encouraged him to make a monster. However, his design was not pre-planned, and he had difficulty incorporating the head (because he had put the teeth on first): these design

problems were absorbing, and inclined him towards a technologist discourse. Martin on the other hand recognised the ingredients of the dinosaurs his brothers make at home: he worked to a pre-planned design that was conceived at home; he was fine-tuning it here but was mainly reminding himself that he makes dinosaurs like his older brothers do. Marble painting is easy (Nick: 'Is it easy?' Nell: 'It is easy'), and could be expected to afford social chit-chat; but two events conspired to change its affordance: the box goes missing (and its battered cardboard nature suggested that another could be made, so box construction was incorporated into the process) and Nick (whose interests in his last few days before he goes to school included being a monster and frightening others with paint all over his hands) saw a new function for it (so a choice of function was included too). The process was transparent and absorbing: Molly said 'Hey the ball's making me do that'. The product was not particularly valued (naming did not appear to be central) and a nice division of labour (one spoons in the marble, one tips the box) inclined children towards collaborative activity (and thus away from the more individualistic *being good* and *being nearly five*). Screen printing included many of the skills associated with being a kindergartener: cutting with scissors, remembering a sequence, name writing. For many of the children the representational function passed them by, because they only tried it once. They had negotiated the 'rite of passage' that indicated their status as a 'morning kindergartener'. As commented above, the physical characteristics of the materials and tools - in particular their transparency - permitted and encouraged certain topics and discourses to be taken up. They didn't compel them however, and often a peer would try to shift the focus of interest. In the butterfly chapter, Meg tried unsuccessfully to shift the discourse to a challenging technologist one ('You forgot about those. . . the things what go up like that'); later Molly successfully shifted it to gender ('Hey, that can be the boy one and this can be the girl one'). Jason often shifted the discourse towards a challenging technologist focus, and the children took it up (his making of a new box in the marble-painting chapter was a good example). Adults provided the materials and the tools (and therefore introduced, often unwittingly, certain topics), but once the children began work the adults seldom changed the topic.

13.4 CHALLENGE AND RESPONSES TO DIFFICULTY

In the book interview context, 28 of the 38 children decided that it was appropriate to avoid a difficult task (Table 11.1). Some technological practices enable children to avoid difficulty; some provide opportunities for discourses that favour difficulty and for dispositions towards engagement with difficult tasks. Some technological practices, like hat making, provide an 'easy' technological task as a good venue for

disembedded story-telling and friendship discussion. The materials and the tools influence the level of challenge and the approach to difficulty.

TECHNOLOGICAL PRACTICE	AFFORDANCE (CHALLENGE) OF THE MATERIALS AND TOOLS	LEVEL OF CHALLENGE
Group butterfly construction	Not very difficult or uncertain; product and design decided at the beginning	LOW, although challenges introduced when discourse shifted to gender
Making a dinosaur	Some difficulty, but the procedure was to repeat design set at home by older brother	LOW
Making a monster	A difficult task, procedure uncertain; emerging and probably flexible design; final product not completely clearly defined	HIGH
Hat making	Basic hat was easy; measuring raised the difficulty level; a range of potential designs, but basic design adhered to	LOW, except during friendship discourse
Marble painting	Very low level of challenge until procedure changed to include making the box and a change of function (finger painting) became an alternative	HIGH
Screen printing	Remembering correct sequence, cutting out a clear picture, were challenges	HIGH

Table 13.3. The influence of materials and tools on the level of challenge

Children engage with activities and materials when they are optimally challenging, and they altered the level of challenge by ‘upping the ante’ or changing the topic to a more interesting one. The butterfly construction was not challenging, and other discourses took its place. The monster construction was optimally challenging (in collaboration with an adult), and the challenge level of marble painting was increased by the children. Many activities have a range of difficulty to choose from: in hat making one could choose an easy design and avoid measuring, or one could persevere with the problem of fitting the hat to the wearer, and changing the nature of the hat. In this study, the children never changed from the basic hat design, partly because the strips of card afforded the cylindrical design (circles of thin card might have afforded a

conical design). The fact that often the strips of card were too short to go around a head provided a challenge for some children (Jason Meg and Trevor for instance) and the invention of strategies to avoid difficulty (Linda Jinny and Nell all made hats for cats).

Adults were more likely to introduce difficulty than to change the topic, particularly within a kindergarten discourse where they encouraged accurate cutting, and assisted with correct name writing.

13.5 ACCESSIBILITY AND DISTRIBUTION OF RESPONSIBILITY

The research describes a rich mix of patterns of responsibility distribution, and different technological practices were characterised by different responsibility patterns. To a large extent this reflected the accessibility of the materials and the tools. The accessibility of technology relates to the form of participation enabled by its use. Some enable collaboration by providing a clear division of labour (marble painting - one to tilt the box, one to spoon in the marble - for instance). Some enable collaboration by establishing a group project from the beginning (the butterfly construction for instance). Some technology affords responsibility in the hands of the adult if the tools are difficult to use (the traditional egg-beater-style carpentry drill for instance; Carr, 1987) or dangerous (a glue gun, or an oven).

TECHNOLOGICAL PRACTICE	AFFORDANCE: ACCESSIBILITY OF THE MATERIALS AND TOOLS	RESPONSIBILITY PATTERN
Group butterfly construction	Group activity, affording discussion and negotiation; parallel tasks (decorating sections each) allowed for individual (and easy) products within the whole	Adult support %of adult utterances in highest two levels of power: 50.0 adult 'evaluative' utterances as % of total: 18.7
Making a dinosaur	Design conceived elsewhere, no help needed	Adult support %of adult utterances in highest two levels of power: 13.6 adult 'evaluative' utterances as % of total: 4.5

TECHNOLOGICAL PRACTICE	AFFORDANCE: ACCESSIBILITY OF THE MATERIALS AND TOOLS	RESPONSIBILITY PATTERN
Making a monster	Design emerging during task; coordination of large sections difficult for one person, assistance was helpful	Adult-child collaboration %of adult utterances in highest two levels of power: 23.6 adult 'evaluative' utterances as % of total: 12.4
Hat making	Help needed with measuring and fitting (when measuring and fitting included), product individually owned	Adult support %of adult utterances in highest two levels of power: 25.0 adult 'evaluative' utterances as % of total: 7.9
Marble painting	Collaboration afforded by division of labour and low value	Peer collaboration %of adult utterances in highest levels of power: 34.6 adult 'evaluative' utterances as % of total: 12.0
Screen printing	The sequence needed adult input for completion at first, could be completed without help once it was mastered; children who has mastered the process could tutor each other	Adult tutorial Peer tutorial %of adult utterances in highest levels of power: 63.7 adult 'evaluative' utterances as % of total: 18.7

Table 13.4. The influence of materials and tools on the responsibility pattern

In the butterfly episode, the group nature of the project afforded discussion and negotiation; the task could be divided into individual sections, precluding collaboration. The pattern of responsibility in the dinosaur and the monster-making episodes was different because in the former the design came from elsewhere, and the adult was only required to admire the product; in the latter the design was emerging as problems were being solved, and the pieces were unwieldy enough to warrant a collaborative effort. The hat-making product was by definition an individual artifact, assistance from an adult or a peer was useful for fitting and measuring, although many children tried to do it on their own. A marble painting is not individually highly valued, and a clear division of labour encouraged collaborative efforts. Screen printing needs an adult tutorial at first, to assist children through the complex sequence; once

mastered however, children can complete screen prints on their own and teach each other.

13.6 CONCLUSION

The connection between technological practice and narrative is summarised in Table 13.5. The source of these distinctive narratives is undoubtedly a combination of the affordance of the materials and the tools, the discourses that the children have decided to privilege, the learning orientation (display or exploration) that characterises the discourse, together with preferences about strategies of response to difficulty and favoured distribution of responsibility.

TECHNOLOGICAL PRACTICE	LEARNING NARRATIVE Part one: discourse appropriation construction or display	LEARNING NARRATIVE Part two: response to Trouble	LEARNING NARRATIVE Part three: distribution of responsibility
<p>Group butterfly construction</p> <p>Social setting: Group construction project</p> <p>Players: mostly children on their own, adult involved at the beginning and occasionally throughout</p>	<p>Privileged discourses: Being a kindergartener Being good Being a girl, being a boy</p> <p>Discourse shifts from kindergartener to being good to being a girl/boy. Some signs that being a kindergartener is merging with being good. Being a girl also merging with being good. Being a boy is defined as doing hard work</p>	<p>When the task looks as if it might get difficult, the discourse shifts to something more sociable: being a friend, being good, or being playful about gender. If the girls' reputations about being good is threatened, they leave</p>	<p>Responsibility for initial direction belongs with the adult. After this the responsibility for persistence and direction rests with the children. Adults provide assistance and resources. Children decide the rules and changes of discourse as a group</p>
<p>Making a dinosaur</p> <p>Social setting: Self-chosen and individual construction of object</p> <p>Players: one adult and one child</p>	<p>Being nearly five Being a technologist (sub-group: being a dinosaur maker)</p> <p>Being a technologist is nested within being nearly five. Story line for being nearly five is one of display</p>	<p>Construction task is to make an object that is familiar, the goal is clear, modifications are manageable without assistance</p> <p>Problems are solved at home, skills practised at kindergarten</p>	<p>Discourse and discourse rules come from home</p> <p>Child makes decisions, adult recruited to provide an interested audience and a safe space</p>

TECHNOLOGICAL PRACTICE cont'd	LEARNING NARRATIVE Part one: discourse appropriation construction or display cont'd	LEARNING NARRATIVE Part two: response to Trouble cont'd	LEARNING NARRATIVE Part three: distribution of responsibility cont'd
<p>Making a monster</p> <p>Social setting: Self-chosen and individual construction of object</p> <p>Players: one adult and one child</p>	<p>Being a technologist (sub-group: being a monster maker)</p> <p>Being a technologist discourse is developed as problems with positioning and securing are solved. Being a monster maker centres on the position and the nature of the teeth (representation and engineering problems)</p>	<p>Decision by child to make something difficult, the final goal declared but the design uncertain</p>	<p>Discourse centred in the kindergarten (unlike for the dinosaur)</p> <p>Initial decision is child's, process includes joint negotiation with adult. Because the final design is uncertain, explanations are necessary</p>
<p>Hat making</p> <p>Social setting: Self-chosen and individual construction of object</p> <p>Players: sometimes an adult; children, often in groups, working on individual projects</p>	<p>Being a friend Being nearly five</p> <p>When the discourse is being nearly five, the story line is one of display.</p> <p>When the discourse is being a friend, the discourse is developed in three ways: action, talk about friendship, and (merged with gender) learning to talk girl-friend-speak.</p>	<p>Technological difficulties are kept to a minimum by staying with a basic design and avoiding measures of success (making hats for cats for instance)</p> <p>When the discourse is friendship, difficulties are managed by persistence and trying alternative strategies</p>	<p>Child initiative with adult or child support.</p> <p>When the discourse is friendship, the pattern is one of peer collaboration</p>
<p>Marble painting</p> <p>Social setting: Self-chosen and sometimes group construction</p> <p>Players: sometimes an adult; children, often in groups</p>	<p>Privileged discourse: Being a technologist (sub-group: being a marble painter)</p> <p>Persistence and challenge are achieved within the technologist discourse by engineering (making the box) and change of function (finger painting)</p>	<p>Response to difficulty (lost box) is perseverance and engineering. Response to doubts by others about the legitimacy of the change of function was to assess the opposition as unimportant and carry on. (alternative: shift to conservative view of being good discourse)</p>	<p>Children take the initiative</p> <p>Peer collaboration and peer tutoring</p>

TECHNOLOGICAL PRACTICE cont'd	LEARNING NARRATIVE Part one: discourse appropriation construction or display cont'd	LEARNING NARRATIVE Part two: response to Trouble cont'd	LEARNING NARRATIVE Part three: distribution of responsibility cont'd
Screen printing Social setting: Both adult- and child-chosen, individual construction Players: usually one adult, one child	Privileged discourses: Being a good kindergartener Being a technologist When the discourse is being a good kindergartener it is elaborated as mastering the processes of cutting, screen printing, writing one's name (transformation, change of function, representation, and engineering are not called for) When the discourse is being a technologist (sub-group: being a screen printer) representation is explored	Instructions carefully followed, making difficult representational templates usually avoided (even using a template may be avoided) Difficulty pursued	Adult tutorial Peer tutorial Children take the initiative

Table 13.5. Technological practice: discourse appropriation, construction or display, response to trouble and distribution of responsibility

I argue that within the transactional model of the relationship between learning disposition and dispositional milieu the technological affordances *allow and permit* certain narratives, while it is the discourses and their interpretations that *encourage incline or compel*. Roth et al. (1996 p.1009) described how a particular computer display 'affords a *possibility* for constructing a coherent conversation' (my emphasis). This supports the research of Langer (1989) who emphasised the role of mindset in affordance, and of Perkins (1992 p.144) who described the 'fingertip effect': just because a tool or a material could be used in a certain way, it does not mean that it will. Chapter 10 outlined the characteristics of the discourses, and chapter 11 described one of the tensions in a four-year-old's learning world: between belonging and exploration, between displaying one's membership in a collective and risking the uncertain or the difficult. This chapter has described the second tension in the learning environment: between affordance and sociocultural practice. When the technology affords difficulty and challenge, as screen printing and hat making did, in practice this is often not taken up. The children bring influential dispositions of their own, and these are the topic of the next chapter.

14

INDIVIDUAL CHILDREN: NARRATIVE AND PART-NARRATIVE NICHES

14.1 INTRODUCTION

The previous chapters have explored the individual-in-action through technological practice, narrative, and discourse. In these chapters it has been argued that technological practice provided a dispositional milieu, characterised by distinctive narratives about learning. This chapter returns to the individual learner, asking in what sense individual children can be described as 'disposed' learners: privileging, preferring, and favouring certain narratives or part-narratives. The data has already made reference to Nell's preference for avoiding difficulty across several technological practices, and Martin's apparent privileging of a *being nearly five* discourse in more than one technological practice, but this chapter systematically inspects the data to search for individual learning dispositions and learning narratives. Dispositions and narratives (unlike episodes and story lines) imply robust and enduring qualities: as Katz has said (1993 p.16), dispositions are 'exhibited frequently and in the absence of coercion'. They are reflected in patterns of behaviour. This chapter searches for those patterns in the observation data (sections 14.2 and 14.3), and then seeks confirmation for the patterns in the interview data (14.4). Occasional episodes from dramatic play episodes in the block area and the 'family corner' are examined to see if there is any evidence that the patterns transfer across from 'real' to dramatic activity (section 14.5). The chapter sets out to answer the fifth and final research question, which is in two parts:

- (a) In what way could the technological practices in this early childhood setting be described as a set of learning *niches* of familiar and comfortable learning narratives?
- (b) In the short time frame of the observations, was there any evidence for shifts in children's learning dispositions and narratives?

Section 14.6 looks at any evidence that the children were trying out new narratives (the second part of the question).

To answer the first part of the research question, the data on individual children is searched for any evidence that

- (i) those children who appeared as major players in only one technological practice were playing out the same narrative elsewhere in the construction area (section 14.2),
- (ii) those children who appeared in more than one technological practice were consistently working within the same narrative across technological practices (sections 14.3 and 14.4), and
- (iii) observations of response to difficulty were consistent with interview data collected two weeks after the observation period (section 14.5).

Table 14.1 gathers together the 17 major players for the technological practices analysed in chapters 5 to 9. Ten children were major players in one technological practice. Seven children were major players in more than one technological practice.

Butterfly making (one episode)	Dinosaur making (one episode)	Monster making (one episode)	Hat making (42 episodes) >2 episodes	Marble painting (17 episodes) >2 episodes	Screen printing (58 episodes) >4 episodes
Children who were major players in more than one technological practice					
Molly Tom Meg Danny		Tom	Molly (3) Meg (3)		Meg (8) Danny (5)
Linda			Nell (7) Linda (4) Jason (4)	Nell (6) Jason (3)	Linda (5)
Children who were major players in one technological practice					
Valerie Myra Nathan Peter	Martin		Trevor (4)	Nick (3)	Lisa (8) Bridget (5) Joan (5)

Table 14.1. Major players: all technological practices

14.2 EVIDENCE FOR NARRATIVE NICHEs FROM PREFERRED TECHNOLOGICAL PRACTICES

Ten children participated as major players in only one technological practice: Valerie, Myra, Nathan, Peter (butterfly making); Martin (dinosaur); Trevor (hat making); Nick (marble painting); Lisa, Joan, and Bridget (screen printing). They appeared therefore to have a preferred technological practice, although for the butterfly construction group and for Martin this constituted only one episode. They all appeared at least once in other transcripts at the construction table, and these transcripts or observations were inspected to see whether what appeared to be a favourite narrative here was reflected in other activities as well. Details of individual children's participation over several episodes may be found in Appendix 8.

14.2.1 Major players only in butterfly-making technological practice

Butterfly making (a group construction activity) was a technological practice characterised by social and gender discourses. Four of the eight children who appeared in the butterfly construction were not *major* players anywhere else. This section investigates the transcripts of those children to see whether the narrative characteristic of the butterfly episode appeared in their transcripts elsewhere as well.

Valerie

Valerie led the girls' retreat in the butterfly-making episode. She appeared in the construction area on three more occasions. In these three episodes her interest was in the technological nature of the tasks. There is no evidence here that the interaction in the butterfly episode was 'typical' for Valerie in the construction area; friendship or gender discourse did not appear again and in the other three episodes she appeared to be likely to adopt a technological discourse and to tackle difficulty when it arose.

Myra

Myra appeared with Molly in the hat-making chapter, honing her friendship skills and girl-friend-speak. She appeared on six further occasions, four of them with Molly. She had a social agenda, especially from within her close friendship with Molly. She was developing skills in the complex friendship language that girls used but boys did not (in the construction area at least), see chapter 10, and was practising the intersection between *being a girl* and *being a friend*, a characteristic of the butterfly episode, in four of the six further episodes.

Nathan

Nathan appeared three more times. In one of them (21/2) Alison taught him to do a screen print and helped him to write his name. In the other two he was 'horsing

around', giggling and 'being a bit naughty': 'boy' behaviour. The gender discourse, 'being a boy', in the butterfly episode was a characteristic of Nathan's activity in two out of three further episodes.

Peter

Peter appeared seven more times. At the butterfly construction he said to Carl: "Cos it's hard work. It's hard work isn't it Nathan?". He usually wore a police hat during the entire session, and appeared in the construction table area seven more times. Once he made a hat ('not a birthday hat') and discussed David's playing at his house with the observer (7/2TTA0.26); another time he watched Linda make a paper chain and then made two linked circles as 'hand cuffs' (side-stepping some of the kindergartener discourse by tearing the paper into strips rather than cutting VN9/3). He appeared briefly on 23/2, telling Trevor's mother that he was 'making a sword'. 'Being a boy' (if one can include 'making a sword' as 'being a boy') and 'being a friend', a feature of Peter's interactions in four of these seven further episodes, were a defining characteristic of the narrative in the butterfly episode. He also took part in another narrative: on one occasion he worked with a teacher to draw a whale, cut it out, and turn it into a puppet.

14.2.2 Major player only in dinosaur- and monster- making technological practice

There were two similar activities that comprised the dinosaur- and monster-making technological practice. One of them, dinosaur making, was an episode characterised by *being nearly five* discourse and not being wrong. One child, Martin, was the major player in the dinosaur-making episode and was not a *major* player anywhere else. This section investigates his transcripts elsewhere to see whether the narrative characteristic of the dinosaur episode appeared in other places as well.

Martin

Martin's work outside the dinosaur-making episode has already been described in the dinosaur chapter. He appeared five more times, three of them working in a *being nearly five* discourse, doing 'school work' and, on one occasion, making a hat with a '5' on it. On two occasions Martin was part of a different narrative however: he made a musical 'shaker' by cellotaping two yoghurt pots together with cut-up pieces of heavy card inside to make a sound. On this occasion he was part of a more collaborative pattern of responsibility with the teacher (Ann) than in the dinosaur episode, as they discussed what he should put inside to make a noise, and Ann made some suggestions. He was also part of a peer collaboration episode when he needed assistance to attach some 'wings'. On three further occasions the *being nearly five* discourse with its associated links with school-type activities was in evidence.

14.2.3 Major player only in hat-making technological practice

Hat making was a technological practice characterised by two different narratives: (a) friendship discourse and low level of difficulty or (b) technological discourse and persistence in solving difficulty (Jason, Molly, Meg, and Trevor). One child, Trevor, who was a major player in the hat-making technological practice was not a *major* player anywhere else. This section investigates his transcripts elsewhere to see whether the narratives characteristic of hat-making episodes appeared in other places as well.

Trevor

Trevor appeared at the construction table ten more times. He was interested in boats and motors, and numbers: when he was not making hats (he made three) he often folded and stapled advertisement sheets, counting them or, on one occasion, counting the staples. He didn't collaborate with others using language, was most absorbed when making and fitting hats (three episodes), and stapling folded 'envelopes' (four episodes, often from advertisement sheets which he told the observer he puts on the wall at home) or making boats with motors (two episodes). His discourse on those occasions was one of being a technologist, and only when he worked with his mother did he collaborate with an adult. When he worked alongside a peer (Brian) his discourse was (once) to make guns and (once) to play a 'kung fu' role: perhaps 'being a boy' overlapped with being a technologist when Brian was with him. When he pursued the fitting of his hat for so long and in such an inventive fashion (10/3FN and TTA35.02), outlined in the hat-making chapter, this response to difficulty was unusual: on an earlier occasion he abandoned a construction enterprise when things went wrong (21/2FN). Preferred narrative in the construction area: *being a technologist*, low levels of difficulty (folding and stapling sheets of paper, except on the one hat occasion when measuring and fitting was interesting), and working on his own.

14.2.4 Major player only in marble-painting technological practice

Marble painting was a technological practice characterised by technological discourse, finding difficulty, and collaboration. Nick was a major player in the marble-painting technological practice but was not a *major* player anywhere else. This section investigates his transcripts elsewhere to see whether the narrative characteristic of marble-painting episodes appeared in other places as well.

Nick

Nick transformed the marble-painting box into a finger-painting tray and he worked with Jinny to make a collaborative marble painting. He appeared six more times, once working collaboratively (asking Jinny and Nell questions as they collage together), once repeating his transformational technological narrative (he transformed a cardboard tube into a telescope then a microphone then an alligator). But twice he started to make a hat and then abandoned it ('I don't think I can make a hat'). In an episode in dramatic play (see Appendix 12), Nick was forging compromises and listening to others in a collaborative narrative. He went to school on the 22nd of February (so was not part of the book interview). Nick provided an example of a collaborative disposition - he spent much of his time in elaborate dramatic play in the family corner - carried across from dramatic play to construction activities (twice). His challenges were more imaginative (transforming) than technically difficult: when technical difficulty arose he abandoned the task. Preferred narrative: friend/actor, transforming activities but not other kinds of technical difficulty (like engineering), collaborative contexts.

14.2.5 Major players only in screen-printing technological practice

Screen-printing was a technological practice characterised by (a) adult tutorial, kindergartener discourse or (b) adult-child collaboration, technological discourse. Three children were major players in the screen-printing technological practice but not elsewhere. This section investigates the transcripts of those children to see whether the narratives characteristic of screen printing appeared in their transcripts in other places as well.

Lisa

Lisa's privileged narrative has already been described in the marble-painting chapter, as an example of the intersection between a *being good* and a *being a kindergartener* discourse. Although Lisa was modifying this narrative (see Figure 14.2), she kept close to adults for reassurance and approval.

Joan

Joan did not attend kindergarten very regularly, and stayed close to adults when she came. Towards the end of the observation period however, she made friends with Danny, and her animation and independence from adults increased. They (she and Danny) then mostly played outside. Her only other appearance at the construction table was when she did a marble painting and showed it to the teacher (2/2TTA8.48) who helped her to write her name on a separate piece of paper and attach it to the top. She typically sought teacher approval (a characteristic of screen-printing discourse), but in the marble-painting episode she did not seek approval or permission.

Bridget

Bridget was also a friend of Danny. Her first screen print was completed alongside Danny, he helped her to make a musical 'shaker' (see the description in 14.2.2) on 3/3 (3/3TTA27.14), and she appeared in the construction area three more times: to make the 'shaker', to do a table painting and write her name on it (17/2TTB22.43), and to make a folded painting (2/3TTA12.33). She did not appear overly captured by a kindergarten discourse or adult approval: she was often overheard nearby as a leader in dramatic play (assigning roles to others), and the screen-printing chapter described her *being a friend* discourse as a group of children gathered around while she screened (the screen printing product was of little interest to her). When Amy suggested that she and Danny do a screen print of a whale she said to Amy 'Can you draw it? . . . I don't, I don't know know how to um draw whales' (14/2TTA12.01). (Amy suggests that she draw the body first, and she does. Amy: 'Good girl. You said you couldn't do it. Then the head').

14.2.6 Conclusion: evidence for narrative niches

There is, then, evidence that the work of seven of the ten regulars or 'experts' in one technological practice was often characterised by similar narratives elsewhere, that narrative niche-forming was part of the complex pattern of learning here. Myra's narrative about learning included Molly and collaborative friendship conversations elsewhere; Nathan and Peter sought opportunities to display their membership of the 'friend' and 'boy' discourses; Martin was practising *being nearly five* in other activities; Nick enjoyed transformational and collaborative activities in his favourite technological practice and elsewhere; Lisa looked for a technological practice that would secure approval from the adults, although she was increasingly managing without that approval; Joan liked to keep close to adults. The match is *not* close for three of the ten children: Trevor (who on other occasions liked to do easy tasks), Bridget (who was very sociable elsewhere), or Valerie (who was involved in technological discourse on other occasions, leaving the friendship and gender discourses behind).

Frequently only part of the narrative was evident elsewhere. Nick's marble painting may have connected with his interest in transformation and collaboration, although in another domain he avoided the difficult problems (he abandoned efforts to make a hat fit, for instance). Often it was the *discourse* that connected the children's apparently privileged narratives with their work elsewhere. Lisa was interested in the intersection between *being good* and *being a kindergartener*. Myra was interested in friendship skills. The connection between Peter's other work and the butterfly construction was

his interest in friend and gender discourse. Trevor was interested in *being a technologist* (especially the mathematics) elsewhere although he avoided difficulty. Martin was concerned with the status of *being nearly five* elsewhere as well.

14.3 EVIDENCE ACROSS TECHNOLOGICAL PRACTICES FOR PREFERRED DISCOURSES, RESPONSES TO DIFFICULTY OR DISTRIBUTION OF RESPONSIBILITY

Seven children worked frequently across more than one technological practice, and the observations were inspected for privileged discourses, favourite responses to difficulty, or preferred distribution of responsibility patterns. The chapters on each technological practice feature the work, play and transcripts of these children, but here their work play and talk are summarised across all the five technological practices, in other activities in the construction area, and occasionally at dramatic and block play nearby. See Appendix 9 for the data.

14.3.1 Meg

Meg was a major player in the group butterfly making episode, hat making (three episodes), and screen printing (eight episodes). She appeared in the observation data on 29 occasions. She spent much of her time in the construction area, often working alongside Linda with whom she played at home as well. She and Linda often worked beside each other on the same activity (only once on a joint task). Her conversations with Linda were not collaborative girl-friend-speak, they were often competitive, but Meg provided assistance to Linda and reminded listeners that she was Linda's friend. Both Meg's and Linda's mothers stayed occasionally and helped out for part of the morning, usually giving a hand at the construction table. Meg was perhaps the only child who worked intensively in three discourses (as well as, or perhaps linked to, three technological practices): *being good*, *being a friend*, and *being a technologist*. She was the first to be anxious when children finger-painted in the marble box (*being good*). She was always on the look out for opportunities to help others (*being a friend*): interrupting her hat making to help Linda save her screen-printed template, and on another occasion assisting Phoebe to write her name. She made a hat with a blue visor, recorded in detail in the hat-making chapter (*being a technologist*). Although she often indicated that she did not like adult or peer help (she went to great lengths to try to fit her own hat), on 9/3 she asked the observer for help to cut out a complicated drawing of a rabbit that she wanted to screen print.

Summary: Privileged discourse: *being a friend* (by being helpful and anticipating the needs of others) but *being good* (and the intersection between *being a kindergartener*

and *being good* 'you gotta share') comes a close second. Preferred response to difficulty: perseverance (when Linda excludes her it did not appear to worry Meg, she bounced back with a response). Technological difficulty on the other hand was often avoided (she makes hats for her cat, often copied Linda), except for three occasions: she persevered with the screen print of a rabbit, makes a complex hat, and suggests challenging directions for play (doing the antennae, categorising the wild animals). Favourite distribution of responsibility: working on her own, or helping someone else (when she was interviewed she gave as her reason for not choosing the difficult option: "Cos she's too little. The teacher would have to help her").

14.3.2 Molly

Molly was a major player in the group butterfly episode and hat making (3 episodes). She appeared in 13 episodes in the data. Often with Myra, she talked in girl-friend-speak. Her capacity to collaborate conversationally was also seen when she admired Meg's work. Technological discourse was also often evident: she made a hat with 'lights' on it (see chapter 7), printed from a painting onto a hat that she presented to the teacher, made small figures into puppets, and made a camera (no details on this).

Summary: Privileged discourses: *being a friend* and *being a technologist*. Preferred response to difficulty: find and solve problems in both friendship (through girl-friend-speak) and technologist discourses. Favourite pattern of responsibility: collaborative with Myra.

14.3.3 Tom

Tom was a major player in the group butterfly episode and in the monster-making episode. In the group butterfly construction Tom was part of the boy/naughty/hard work discourse, and in the monster construction he collaborated with an adult (the observer) to solve problems within a technological discourse (representing and engineering). He participated in only one more episode in the construction area, when Amy assisted him to make a screen print of a whale (14/2TTA34.12 and 14/2FN). He watched closely while Amy cut out the eye on Bridget's whale. There is not enough additional data to track narrative components across activities.

14.3.4 Danny

Danny was a major player in the butterfly episode and in screen printing. His screen printing episodes have been described in chapter 9. He became an increasingly expert screen printer, seeing the representational affordance of the tools: he became interested

in.'making the shadow of it'. He was accomplished at drawing, although he seldom drew at kindergarten, and the screen printing nicely supplemented his range of representational media. His alliance with the boys in the butterfly construction is described in chapter 5.

Summary: Privileged discourse: *being a kindergartener*, learning to screen print and to marble paint; but he becomes increasingly engaged over the observation period by the screen-printing process. Preferred response to difficulty: an emerging interest in problem finding and solving within technologist discourse; not enough information on friendship discourse (this is mostly outside). Favourite pattern of responsibility: being taught a new process by an adult (adult tutorial in screen printing and marble painting), collaborating with a peer.

14.3.5 Nell

Nell spent much of her time in the construction area. She was a major player in hat making (7 episodes) and marble painting (6 episodes); altogether she features in 34 construction episodes. In hat making and screen printing she carefully avoided the difficult parts of the process by (a) making hats for (toy) babies and cats and her sister Sandra and (b) never making a template, using the screen-printing equipment as a painting tool. When she was marble painting however, she asked Jason how to make a box and told him she did not know how to do it. And in friendship discourse she persevered with a range of strategies (telling a story, prompting Emily's story, offering Laura a birthday party) when Laura and Emily tried to exclude her. She was an expert in the girl-friend-speak collaborative language. A transcript example (see Figure 7.6) included 'cos' nine times. She prompted both Emily and Jinny's story telling, and invoked a theory of mind understanding to strike up a conversation with Emily ('Margie (her sister) thinks your brother's Bobby') and to say to Laura and Emily 'Tell me truth'. She chatted to the observer (telling her about her special dress for birthday parties, the video of Bananas in Pyjamas, and her cat coming home from the holidays), frequently linking events at home with activities or conversation at kindergarten.

Summary: Privileged discourse: friendship. Preferred response to difficulty: tackles difficulties in friendship discourse with a range of strategies and imagination; uses imagination to avoid technological difficulties in hat making and screen printing (but does engage with difficulty in marble painting). Favourite pattern of responsibility: collaborative discussions with peers and adults.

14.3.6 Jason

Jason was a major player in marble painting (3 episodes) and hat making (4 episodes). He appeared in a range of activities in the construction area; it was he who decided to make the marble box when it was lost, introducing a new set of difficulties for that technological practice. He often tutored or provided help for the others, even with skills he had barely mastered himself (writing his name for instance was very difficult for him, and he usually only wrote the first few letters, but on one occasion, with Alison's help, he laboriously writes John's name for him, Figure 12.5). There were eight more episodes with Jason as the key figure. They are presented in detail in Appendix 10. In episode (1) he was part of a collaborative interaction with a teacher as she helped him to write John's name (at his request, Figure 12.5); he was also teaching John how to make a screen print (Figure 12.8) In episode (2) he imaginatively decided to make a new marbling box when the old one went missing. Nell copied him. Later (episode (4)) Nell instructed Jinny about making a box, and Jason gave advice as well. He appeared to be interested in ways to represent movement: marbling, a 'dab' painting (episode 3), a painting made by blowing paint around with a straw (episode 8), a hat that reminded me of a Len Lye kinetic sculpture (episode 5), and a kite (episode 7).

Summary. All of these episodes are characterised by a similar narrative about learning: technological discourse and finding and solving difficulty. Often they included collaborative patterns of responsibility.

14.3.7 Linda

Linda appeared in the butterfly-making episode and was a major player in hat making (4 episodes) and screen printing (5 episodes). With Meg and Nell she also spent much of her time in the construction area: 35 episodes cite her as a major player, and she put in an appearance in another one to comment to Nell "You'll be naughty" when Nell and Nick implied that they would marble paint in the marble-painting box without putting paper in. 'You'll be naughty' and 'Are you allowed' were chorus lines for Linda; her salient discourse was 'being good' and she carried this into technological practices (marble painting and hat making) where they did not usually appear. Her screen prints were often ambitious, representational rather than miscellaneous shapes, and she elicited adults to help her with them. Linda's 'being good' discourse, her competitive relationship with Meg, and her dependence on adults, are themes throughout her work and play in the construction area. On 9/3 however, when the adults were busy elsewhere, she completed a detailed template for a screen print, and made the print, without adult assistance; on the same morning she worked away,

utterly absorbed, making a paper chain for 43 minutes, with no help (Peter watched her, and copied her to make 'handcuffs').

Summary: Privileged discourse: *being good*. Preferred response to difficulty: usually avoiding difficulty (making hats for cats, copying Meg) but where she could elicit help from an adult, in screen printing, she worked on representation problems with some persistence. Favourite pattern of responsibility: being told what to do by an adult.

14.3.8 Conclusion: evidence for preferred discourses, responses to difficulty or distribution of responsibility

Six of these seven children appeared to have preferred narratives or part-narratives: they preferred certain discourses, certain responses to difficulty, and certain patterns of responsibility. Meg preferred *being a friend* as a topic, and persevered with this when there was difficulty. She did not like adults to help her. Molly inclined towards both being a friend and being a technologist; usually in collaboration with her best friend she tackled difficulty in both domains. Danny enjoyed the tutorials associated with being a kindergartener. Nell, like Meg, inclined towards friendship as a topic, and tackled difficulty with imagination. Like Meg too, she avoided technical difficulty, but unlike Meg enjoyed consulting with adults. Jason's work was characterised by technology discourse, pursuing difficulty, and collaboration. Linda had privileged *being good* and seeking adult approval.

14.4 EVIDENCE FOR CONSISTENCY BETWEEN OBSERVATIONS AND INTERVIEW DATA

An interview with the children, held two weeks after the observations, sought information about their responses to difficulty. That data was summarised in chapter 11. In the first instance, children were asked to choose an option for the hero/heroine of the story: to try to make a difficult hat, to make an easy hat that he or she has often made before, to do what the teacher suggests, to do what the best friend suggests, or to pretend rather than construct. The following section inspects the replies of the 17 major players listed in Table 14.1 for matches with their observation data, to provide additional findings on individual children's *dispositions* to respond to difficulty in different ways. Of the 17 major players, Nick and Jason had gone to school, and Molly was away for an extended period so was not interviewed. Table 14.2 compares the predicted choices with the actual choices for the fourteen major players who were interviewed. The predicted choices were derived from the observation data on individual children already documented in this chapter (sections 14.2 and 14.3; Appendices 8 and 9). Appendix 11 provides the reasoning behind those predictions.

Name	Predicted choice (derived from observation data)	Actual choice
Meg	difficult teacher friend	friend
Myra	friend	teacher
Valerie	difficult friend	difficult
Tom	difficult friend	difficult
Danny	difficult friend	difficult
Nathan	friend	teacher
Peter	friend	friend
Martin	pretend	pretend
Nell	friend	friend
Linda	teacher	teacher
Trevor	easy friend	friend
Lisa	teacher	teacher
Joan	teacher friend	friend
Bridget	teacher friend	pretend

Table 14.2. Response to difficulty in interview data: match between predicted and actual

For 11 out of the 14 children the observational data predicted options that included the actual response. For two children, Bridget and Nathan, the chosen response was not predicted from the observation data. Bridget chose 'pretend' against the odds; I looked back to my summary of her interactions outside the construction area (14.2.5) and am reminded that she is a leader in dramatic play: in this interview, as in kindergarten activity outside the construction area, that interest possibly outweighed the rest. Nathan's response (do what the teacher suggests) could not have been predicted from the observation data, although the observations described one extended episode where he worked closely with Alison, one of the teachers.

Only three of these 'major player' children chose the 'tackling difficulty' option, and all three had been predicted to do so from the observation data. (All three were involved in the butterfly episode, not noted for its difficulty and challenge; perhaps the novelty and potential for collaboration attracted them). The data predicted the difficult option for only one other child, Meg; Meg chose the 'best friend' option (also revealed as a possibility from the observational data). For no other 'major player' children did

the observations suggest a disposition to approach difficulty, and no other 'major player' children made that choice in the interview.

14.5 ISSUES OF TRANSFER:

DRAMATIC PLAY TO CONSTRUCTION PLAY

When there was no activity in the construction area, the adjacent 'family' and block areas were observed. These occasional episodes provided further anecdotal material where the children were involved in dramatic play, although 'pretend' was sometimes a component of construction play, especially during hat making. In dramatic play, greatly valued by early childhood educators and researchers for its imaginative decontextualized and story-making qualities (Fein, 1981; Pellegrini, 1982; Klugman and Smilansky, 1990; Paley, 1979, 1984, 1986a, 1986b, 1990, 1992), collaborative enterprises are the norm. They include the co-construction of cohesive texts, a mutual understanding by all participants of (i) what the goal (topic) is (ii) who will be involved (iii) how the story line might progress (iv) what constitutes difficulty or trouble and (v) what role or responsibility is expected from each player. They involve collaborative language. Often a key marker is 'because' or the shortened "'cos'. In one dramatic play episode (see Appendix 12) one of the children explained to Emily that Jinny should be the mother "'cos she's got the wedding dress on'. In another example (Appendix 12), Nick explained to Tony that he couldn't be involved with food preparation "'Cos these are just for us for the party'. When difficulties arose (Rachel tried to exclude Tony from the game) Nick combined two viewpoints to achieve a compromise that was satisfactory to all parties.

In construction activities "'cos' or 'because' also often indicated collaboration. In the monster construction, when the observer asked if this is the right place for the head Tom says 'no 'cos then I I need to cut a bigger bit off'. In the marble-painting episode where Nell teaches Jinny and Jinny collaborates with Nick, Nell explains the process to Jinny: "'cos you've got to make a box'. In the many episodes where name writing was proposed, the adults often added 'because otherwise we won't know whose work it is'. Children's collaborative language also included questions about the construction, explaining (and expressing) difficulty, and instructions (see section 12.4).

The data on Nick in this chapter (14.2.4) indicated that he was summoning a collaborative disposition in both dramatic play and construction activities. But collaborative narratives and skills developed in dramatic or pretend play were not necessarily transferred to construction activities. In the butterfly episode, for instance, the girls retreated when the boys made trouble; and before that the major exchange was

an argument entitled 'who spilt the paint'. Here is part of the transcript of three of the same girls; this time their activity was dramatic play in the block area. In the butterfly episode the discourse was about goodness, friendship, and gender. When Meg took an initiating role (suggesting that they make antennae) it was ignored. Here, in the blocks, they were making enclosures; once again Meg took an initiating role, upping the cognitive 'ante' by suggesting that they separate out the 'wild ones' from the others. This time the others accepted and took up her direction and leadership:

- Linda: We've still got (...) many more eh Meg?
 Meg: Yes. Those are all the wild ones OK?
 Linda: Yes.
 Moouoo. Moouoo.
 This one's the mother, this one's the baby OK?
 Can you help me get these?
 I will.
 Everyone help me get them . . .
 Linda: (unsure about the category of one of the animals) What's this one for?
 Molly: Warthog. This is for the warthog. (the 'warthog' is put into the 'wild ones" enclosure) (24/2TTA 1.36-4.47)

So it was not that these girls could not collaborate and jointly problem-solve on a task (and Molly could certainly collaborate in friendship talk); when they worked together on the butterfly they did not see the task as an occasion to use their abilities. The dispositional milieu was very different.

In the construction area, Lisa sought approval from adults, and the only way she 'did friendship' was to comment on her actions and tell stories that the other children ignored. However, in the block area (and with boys) she could 'do friendship' by engaging with others, making suggestions, explaining ('cos) and holding their attention with the markers 'guess what' and 'eh'.

- Lisa: .. Hey guess what want me to make want to make a cave for that?
 David: Yeah. But we're making a boogie ba bubba ba bubba.
 Lisa: Yah we can have this? This could be the street (?) eh? This could be the road eh? Yes can that be yes 'cos the animals can walk across.
 Samuel: What's this? What's this everybody?
 Lisa: That could be for walking across eh. Hey that could be the walk across it eh. (10/3TTA0.12-1.35)

Other comments from Lisa in this episode included: 'You're not allowed to play with here. 'Cos that's with 'cos that's the conc that's the concrete!' . . . 'That's the bridge. You can go on it 'cos that's the bridge' . . . 'No don't, you're bashing everything' . . . 'It's night time Mark. Just pretend it's night time eh? Just pretend it's OK. How about you drive in the night eh?'

This study suggests that the reasons why dramatic play was characterised by collaborative narratives, but construction activity was not, were not necessarily to do with the fact that adults were more likely to be absent in pretend play, but were to do with the perceived affordance of the activities.

The affordance of dramatic play activity

Dramatic activity is usually about constructing a story line, and although the basic framework of the stories are usually familiar to all the players, when several children are involved it affords collaborative resolution of difficulty. Researchers have commented on four-year-olds' ability to co-construct cohesive texts in dramatic play (Pellegrini, 1982; Paley, 1990). The children are writing new scripts, or new forms of the old scripts, and play cannot continue until difficulties are jointly resolved. Either Emily leaves or a role is found for her; if Tony insists on being part of the action, the script must be changed to include him (see the examples in Appendix 12). In the butterfly episode, the children were, initially, not writing any changes to the old (kindergartener) script; in the monster-making collaborative episode Tom and the adult were writing a new script (design) together. The 'product' is a communal one in dramatic play, the story by definition a joint story constructed by children.

The affordance of construction play activity

In the construction area, the products were usually individual. There is no reason why technological practices should not include collaborative patterns of responsibility within joint tasks (the Reggio Emilia early childhood programmes in northern Italy are characterised by demanding collaborative projects: Edwards et al. 1994), but in this study collaborative tasks or projects in the construction area were rare. When a collaborative task (making a butterfly) was introduced by the teachers the goal was never to do with *being a technologist*. It shifted from *being a kindergartener*, to (briefly) *being a friend*, to *being good*, to *being a girl/boy*, and collaborative problem-solving opportunities were ignored. In the construction area, the children's collaborative goals were typically achieved by shifting the discourse to friendship (negotiating about friendship during hat making for instance). It was the marble painting that provided the site for peer collaboration within a technologist discourse. Unlike in dramatic play, the new collaborative scripts in construction episodes, set in a technology discourse, have yet to be written; everyone is a novice. The butterfly episode, potentially one of collaboration, was early in the year; it was only the second such enterprise: two weeks earlier (7/2TTA1.13-17.20) Meg and Linda had worked together on a mural of the sea, gluing cut out shapes to signify whales dolphins stingrays and sharks onto a blue background. They used reference books for the animals and their shapes. It was Meg who two weeks later suggested a 'technological' direction (putting on the antennae) for the butterfly construction, one that might have involved collaborative decision-making; it was suggested earlier that perhaps for Meg a collaborative learning narrative was developing, as yet fragile and vulnerable to collapse when she didn't get support from others. Collaborative learning narratives, joint attention and negotiation, on a *non-pretend* task, are less familiar than

collaborative pretend stories; they do not happen 'naturally' in a sociocultural climate that values independence and individual achievement.

What this study indicates is that the children's ability or disposition to co-construct cohesive tasks texts or stories in one context does not necessarily transfer over to the co-construction of learning narratives in a very different dispositional milieu, construction activity.

14.6 EVIDENCE FOR CHILDREN TRYING OUT NEW NARRATIVES

Thirteen of the seventeen children whose experiences were documented in 13.2 and 13.3 were playing out familiar learning stories across a range of activities in the construction area of this kindergarten. This section documents ten examples where the same children were trying out new narratives too.

Although three out of four of Nathan's episodes appeared to be about *being a boy*, he concentrated while a teacher taught him to screen print and helped him to write his name. Peter too worked hard with a teacher to draw a whale, cut it out, and turn it into a puppet, an unusual narrative for him. Martin usually left difficulty at home, but twice was involved with a collaborative narrative (once with a peer, once with a teacher). Trevor on one occasion pursued technological difficulty (he usually settled for easy tasks). Although Lisa still looked towards adults for guidance in the construction area, she was finding that being a kindergartener is not the same as being good, and she was increasingly tackling tasks without asking permission (see Figure 14.2). As Joan settled into the programme, and made friends, her *being a kindergartener* discourse, associated for her with seeking support and approval, gave way to a friendship interest and one episode indicated that she could work in a technologist area (marble painting) without approval. Although Meg usually avoided technological difficulty, on two occasions she did tackle it. She achieved great satisfaction from her perseverance in completing a screen print of a rabbit (when she also unusually asked for help from an adult) and in making a complex hat. It was Meg who suggested a 'technological' direction (putting on the antennae) for the butterfly construction, one that might have involved collaborative decision-making; perhaps for Meg a collaborative learning narrative was developing. Danny became captured by the screen-printing process, adding it to his repertoire of ways to represent small animals. Nell unusually asked Jason for help and admitted that she didn't know how to do something. Linda abandoned her *being good* discourse on one occasion of sustained work.

Danny's shift in focus was described in detail in chapter 9 (Figure 9.1). In this chapter, Figure 14.2 charts Lisa's progress over seven kindergarten sessions, a progress that is marked by seeking permission being increasingly replaced by seeking approval (telling an adult) and asking for help, and an increasing number of episodes where she managed without either. The comments related to seeking permission or approval are underlined.

**AN EXAMPLE OF A CHANGING NARRATIVE
FROM: KINDERGARTENER AND BEING GOOD
DISCOURSE, TOWARDS TECHNOLOGY DISCOURSE
AND AN INCREASING ABILITY TO TACKLE
DIFFICULTY**

LISA

- (1) 28/2 Screen print, no permission sought*. She writes her name by herself and tells Ann 'I did my name. I already did my name'. Later during the same episode (when she is writing her name on the sheet of paper on which she has saved the template) she asks for help 'I can't do my name. I can't do my name. I can't do my name. I can't do my name. Oh my I can't get my. I can't get my name on'. (Ann reassures her that there is room on the paper for the last letter).
- (2) Hat. On the same morning she makes a hat and asks permission: 'Can I make a hat? Can I make a hat?' (Ann replies that she can make whatever she would like to make) and asks for help: 'I need a stapler' (Ann: Well, where're you going to find the stapler?). Later she asks for help again, to do the 'number five' ('I can't do it').
- (3) 1/3 Screen print, no permission sought. She tells Ann 'Look at it now. I got a bigger paper and did it'. (Ann: 'Right').
- (4) 2/3 Screen print, she gets a sheet of computer paper, draws circular shapes and cuts them out. No permission sought. She tells Ann 'I can't do my name. I can't always do my name'. (Ann: Why not?) Then she writes her name by herself (field notes record 'even though Ann is near').
- (5) 2/3 Morning tea. Later on the same morning she appears to be asking permission when she says 'I want to have morning tea' (Ann: OK. Wash your hands?).
- (6) 3/3 Construction. She paints some egg cartons; no adult present, says to another child at the table: 'Brian don't touch these. They're mine. They're painted . . . Don't never open that up cos there's paint inside them'. No permission sought.
- (7) 3/3 Construction. Paints a long tube with black paint (time taken: 23 seconds). No permission sought.
3/3 Screen print. She asks permission (Amy: You know what to do first) then works away for 20 minutes completing a very accomplished screen print without any on-going approval. Tells Amy she has done so (Amy's reply not recorded).
- (8) 8/3 (a weekend and two strike days later): Lisa not at construction table.
- (9) 9/3 Lisa not at construction table. Some notes at the sandpit where she is playing with two of the boys: Lisa gets a container and looks at the Observer, asking permission 'We're playing with this OK?' (Chris tells her 'Don't matter').

<p>LISA cont'd</p> <p>(10) 10/3 Lisa not at construction table. Notes on the block area record that Lisa is very absorbed with setting out enclosures, tucking animals into the corners and carefully lining up soldiers along the edge of one of the enclosures. Video notes record 'The game appears to have great significance for her'.</p> <p>* Underlined are references to asking permission or seeking approval</p>
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Figure 14.2. Lisa's shift in preferred narrative

Lisa's privileged discourse *being good* (here) was being slowly modified by experience; the responsibility for the evaluation was occasionally shifting to herself. She was entering and perhaps adopting new narratives about learning that include learning without on-going permission from an adult and technological discourses. The progress may look slow, but even over the six weeks of observations, the patient and consistent responses of the teachers appeared to be modifying the learning narrative that Lisa brings to the environment. She would not be five years old until the end of August, time enough for considerable change.

14.7 CONCLUSION

The data in this chapter confirm Smiley and Dweck's comment that

Children appear to have developed a mechanism for selecting learning opportunities, prior to formal school experience. (Smiley and Dweck, 1994 p.1741)

This study suggests that the mechanism for selecting learning opportunities is learning narratives.

There was strong evidence for dispositions and narrative niches. Evidence from their work and play elsewhere indicates that those children who participated in only one of the technological practices studied here appeared to be attracted to that practice because of the narrative embedded within it (they were playing out the same narratives in other activities). Children who participated as major players across several of the technological practices appeared to be inclined towards at least part of the narrative, often the discourse. The contrived interview data were consistent with the observation data in terms of the children's disposition to engage with difficulty. The term 'niche' is useful here (Scarr and McCartney, 1983; Gauvain, 1995; Broberg et al., 1997; see the discussion in chapter 3, section 3.5). Broberg et al.'s (1997 p.67) longitudinal study (section 2.2.2) suggested that children's later development (closer to age eight) is driven by the 'child's ability to choose her or his own environment', but this study

confirms Smiley and Dweck's suggestion that the process begins early. The description here of learners actively selecting and interpreting the environment in order to set up familiar niches confirms the transactional model of learning outlined in section 3.5.

Scarr and McCartney (1984; section 2.2.2) pointed out that a genotype→environment effect is not only the result of *active* 'niche-picking and niche-building' (selective attention and active participation by the learner), it is also created by what they call *passive* processes (in this case, the affordance of tools and materials provided), and *evocative* processes (responses or evaluations elicited from others). The transactional model of distributed cognition outlined at the beginning of this study (section 3.5) included active, passive, and evocative processes, and it included what Salomon (1993) called 'cognitive residues'. In that model, distributed cognition interacts with "solo" cognition in a reciprocal manner, and activities can cultivate cognitive residues not necessarily tied to the environment. In terms of the units of analysis in this study, *new dispositions are formed*, or old ones modified. Evidence, outlined in section 14.6 in this chapter, indicates that children were trying out new narratives here, and adapting the old. Even over the short period of the observations, the examples of children moving outside their usual narrative within the same or a similar technological practice, or clearly shifting from one narrative towards another, indicate that the kindergarten programme was nudging some children out of their comfortable niches to try new experiences and narratives.

When the dispositional milieu is very different, however, children may retain one narrative for one milieu, and change it when they shift to a different 'place': Linda Meg and Molly behaved very differently in dramatic play than they did in the group construction episode; Lisa too could 'do' friendship in dramatic play but not in construction activity. The notion that learning dispositions are *distributed* (the discussion in chapter 3) explains why dispositions and narratives evident in dramatic play might not transfer to construction activity. Previous chapters have pointed out that the narratives appeared to be distributed across materials and tools, discourses, and relationships. Anecdotal evidence from dramatic play transcripts suggested that for individual children collaborative and risk-taking strategies and orientations in dramatic play, so evident in the literature and in the occasional observations here, did not necessarily carry over to construction activities. Dramatic play activity tended to follow a familiar pattern: friendship, gender, and actor discourses, and peer co-construction or collaboration on scripts; adults tended to stay away. In construction activity on the other hand, the discourse appropriation included a range of discourses that were usually associated with performance goals (*being nearly five*, and *being good*, as well

as the gender discourse that features so prominently in dramatic play), products could be right or wrong, adults were available to evaluate in various ways, and the story lines and products tended to be an individual matter. This analysis suggests that when children go to school, dispositional milieux in early childhood will have taught them to select from, interpret, and construct their learning environment in particular ways; and it will have taught them to view themselves as actual and possible learners in characteristic ways. The continuity of that learning will depend in part, but not entirely, on dispositional milieux in the school classroom: individual learning dispositions may have become robust and enduring in ways that will enhance, or constrain, their later learning.

CONCLUSIONS AND IMPLICATIONS

15.1 INTRODUCTION

This, the final chapter of the thesis, sets out the major conclusions of the study and the implications for early childhood and for further research. The conclusions are in four parts: section 15.2 summarises the finding that the children were selecting and constructing *learning narratives*; section 15.3 describes a set of *learning dispositions* that have emerged from the research, and positions them within narrative and technological practice. Section 15.4 returns to the *transactional model* introduced in chapter 3, adapting and elaborating it in the light of the research; and section 15.5 summarises the answers to the *five research questions* that framed up the study. The final two sections of the chapter, 15.6 and 15.7, discuss the implications of the study for early childhood and for further research.

15.2 STORIES AND NARRATIVES

The story-line that has emerged from this study was about learning dispositions in one place at one time with one group of four-year-olds. Although the literature had provided discussion and definition of dispositions in early childhood, the connection between the psychological notion of orientation or disposition, and an historically or socioculturally derived dispositional milieu had not been researched. This study located learning dispositions at the interface between the individual and the environment in discourse, narrative and technological practice. It has described the learning environment in five technological practices in the early childhood centre as a sociocultural world in which multiple discourses jostle for privileged positions, children make decisions about whether discourse membership is for display or for exploration, they tackle difficulty with enthusiasm or avoid it in imaginative ways, and they engage with others in a range of positions of power and responsibility. These sequences of events were described as learning narratives: historically and socioculturally co-constructed event structures about goals, challenge, and agency. Early in the thesis, two kinds of children's narrative were described: explanatory

narratives and learning narratives. Polly's and Merophie's stories about growth and development with which the thesis began were examples of explanatory narratives, working theories through which we make sense of the world. Learning narratives as defined in this study are about learning, and include a view of the self as a learner. The two kinds of narrative develop at the same time. One provides the context for the other. While Tom was clarifying his ideas about what a monster looks like and how to make one, he was at the same time engaged in a narrative about learning that included joint attention with an adult and persistence when things went wrong. The study suggests that children in early childhood programmes are selecting and constructing learning narratives, views about a learning self, that may be robust and enduring.

15.3 LEARNING DISPOSITIONS

Technological practices were characterised by distinctive learning narratives: consistent combinations of privileged discourse, preferred responses to difficulty, and favoured distributions of responsibility. This nested system was established in chapter 3, Figure 3.1, and provided the framework for this study.

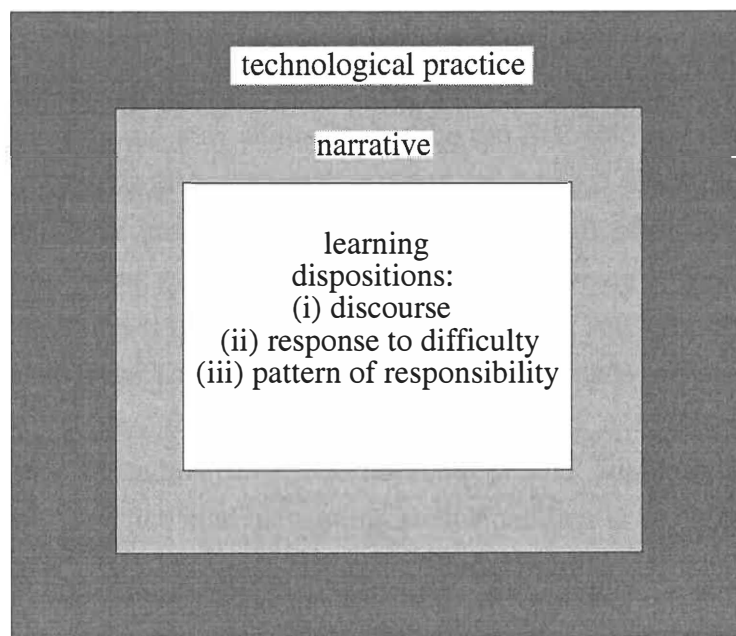


Figure 3.1. Technological practice, narrative and learning disposition

The learning dispositions were about that privileging, preferring, and favouring. The narratives provided learners with four key decision points (see Figure 15.1, and the similar structure proposed in chapter 2, Figure 2.2): they made decisions (often by default, selecting a traditional narrative blueprint) about (i) what discourse would be privileged (ii) whether the occasion called for display or construction (iii) which

response to difficulty uncertainty or challenge would be preferable and (iv) a favoured pattern of responsibility.

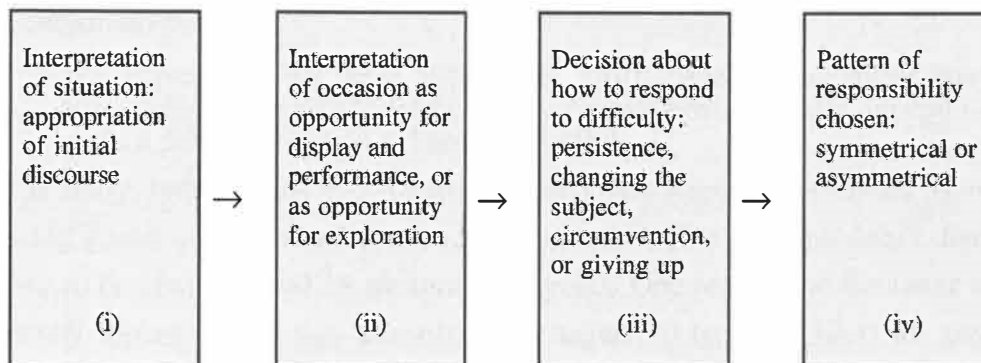


Figure 15.1. A learning narrative

Thus, in response to Lilian Katz's (1993) question about which dispositions merit attention in early childhood, this study sets out the following tentative list of four: I have labelled them *being courageous*, *being mindful*, *being persistent*, and *being responsible*.

(i) to choose new discourses (being courageous)

The disposition to choose new discourses has been labelled as being courageous. It is of particular interest in a setting where young children may be asked to confront new activities, new peers, and new adults; it may be the first setting in which they will spend sustained periods of work and play away from home. The research indicated that when they arrive at a different place, children will often privilege the old discourses (*being good, being a friend*) over the new (*being a technologist*). One reason for this decision is that they are familiar blueprints and templates, established outside the kindergarten. The second reason is that maintenance and construction work in the old and familiar discourses is never completed, a new setting provides opportunities for boundary and rule adjustment and adaptation. Transparent technologies however, like marble painting, incline children to be courageous enough to try something new. This disposition is about a sense of belonging: finding meaning.

(ii) to interpret the discourse as an opportunity for exploration (being mindful)

'Mindfulness' is about creating new categories and definitions, just as 'mindlessness is the rigid reliance on old categories' (Langer, 1989, p.63). The disposition to be mindful is a disposition to interpret a chosen discourse as an opportunity for exploration. Mindfulness as it is used here is associated with creative responses and learning goals; mindlessness with activating familiar scripts and performance goals. Children's sense of belonging inheres in activating the familiar, but questioning and criticism are central to learning in early childhood as well as at school. Writing about

the role of 'mindfulness' in the acquisition and transfer of knowledge, Salomon and Globerson (1987, p.631; their use of the term is more closely associated with metacognition) conclude:

We appear to face here a paradox. Instructional procedures may potentially evoke mindfulness, but its evocation may greatly depend on one's a priori inclination to become mindful.

In this study, technologist and friendship discourses were characterised by mindful learning goals; gender, kindergartener, *being nearly five*, and goodness discourses tended to be characterised by performance goals. One reason for the latter was the tendency towards what was described in chapter 10 (section 10.4) as 'discourse invasion', as *being good*, for instance, merged with *being a girl*. The analysis of *being a technologist* described exploration within that discourse: transformation, engineering, change of function, and representation. The analysis of *being a friend* described the four categories of exploration within that discourse. Children tended not to question the definition of *being good* (as receiving permission and approval from adults, a performance goal), although the children did construct some new rules: Linda tried to establish that you're not allowed to finger paint in the marble-painting tray or use too many staples, and Valerie and Myra that you're not allowed to spill the paint. Smiley and Dweck (1994) linked these decisions about learning versus performance goals to incremental versus entity beliefs, suggesting that one chooses learning goals in the belief that intelligence (or goodness) will change with effort, but one chooses performance goals in the belief that a person's level of intelligence (or goodness) remains unchanged. This research has suggested that these beliefs may in turn have a sociocultural referent; they may be different for different discourses. Gender, age and goodness favour entity beliefs. Friendship and technologist discourses favour incremental beliefs. Dweck (1991) could not find attitudes towards right and wrong to explain her 'helpless-prone' three- and four-year-old children, and assumed that their orientation was explained by an attitude towards being good. This study certainly found that *being good* was invading other discourses, but attitudes towards being right and wrong *were* developing during this fifth year, with the potential to have them seen as entities, attached to anxiety, or incremental qualities, attached to interest. In this study, Emily's comments and the avoidance strategies of other children imply that for some children an entity belief may already be attached to *being right*. A disposition towards mindfulness and incremental beliefs is a disposition to learn. However, children have personal goals to do with belonging as much as they have goals to do with being curious and exploratory. They are balancing the two. Considerations will include which discourse titles are familiar, which discourses are on offer, and how they will be interpreted. Flexible technologies, like gluing and stapling cardboard boxes, will afford mindfulness. Another word for 'mindful' is 'playful'. This disposition is about imagination, playfulness, and exploration.

(iii) *to persevere when difficulty uncertainty or challenge occurs (being persistent)*

The third disposition is to persevere when difficulty uncertainty or challenge occurs. Central to learning goals, and central to this study, is the way children approach difficult tasks and uncertainty. Difficulty or challenge throughout an episode was tackled in various ways: persistence, changing the subject (shifting to another discourse), circumvention, giving up, and sometimes anxiety. Examples are as follows.

Persistence: Within the friendship discourse, children usually responded to difficulty by persistence: they repositioned themselves by responding in kind (Meg: "I've got another friend"), or changing strategy (Nell: "You might be invited to my party"). Meg and Jason persisted in attempting to solve their hat-fitting problems (Meg changed to paper; Jason began with a simpler design); and Jason persisted in finding a solution when the marble box was lost (he made his own). Sharing the responsibility is another strategy for persistence in times of trouble: when Tom's monster fell apart, within an episode in which he had established joint responsibility, he consulted the adult partner who stepped in to help (in contrast, Martin saw a problem as something to be solved by an older, expert, brother at home). In technologist and friendship discourse, it was often interesting and enjoyable to 'not know', 'be wrong': experience had taught children that these were temporary states of affairs, not threatening one's reputation or self-concept in any serious way.

Changing the subject: Shifting to another discourse sometimes occurred in response to conflict or trouble. In the butterfly episode the discourse shifted three times; the first and the third shifts were because of conflict. The first shift, from kindergartener to friend, occurred when Meg raised the possibility of doing something difficult (representing the antennae). The second shift, to being good ('who spilt the paint?') occurred when being a friend ran out of steam. The third shift occurred when the boys arrived and the girls' reputations as good were threatened. When Penny finger painted in the marble-painting box, an unusual deviation from the norm, Linda tried to shift the discourse to *being good*.

Circumvention: Nell creatively (and always, in technological discourse) circumvented difficulty when she made hats that fitted babies and cats, and screen prints without a template.

Giving up: When the boys arrived to help make the butterfly and the girls' reputations were at stake, they left. When friendship talk became complex and challenging during hat-making, Lisa withdrew. Nick decided "I can't make a hat".

Anxiety: Emily made a mistake when writing her name, and sought reassurance from the observer in an anxious tone ('That doesn't matter, eh?'). Trusting that the

environment is a safe place to risk being wrong is an important condition for this disposition.

The levels of challenge provided by the technology were relevant here. Writing one's name was a difficult activity that children (if they had the courage to try it) persisted with. Feedback from the materials and tools (rather than only from the grown-ups) assisted too: children could match the finished written name with the magnetic model. The interview data indicated that nearly three-quarters of the children did not feel inclined to advise the heroine or hero of the uncompleted story to tackle a difficult task that she or he had never tried before, and that significant difficulties were conceived elsewhere.

(iv) to take responsibility (being responsible)

The final disposition is to take responsibility for learning. Symmetrical or collaborative patterns of responsibility, where children and adults both took responsibility for the direction of the learning, were defined and documented in this study. Collaborative enterprises facilitate language development, shared understandings and affect, respect, responsibility, and the transfer of learning (Perkins and Salomon, 1989; Melhuish, 1991; Ratner and Stettner, 1991; Sylva, 1992; Rogoff, Mistry et al. 1993; Smith, 1996c, 1997; Broberg et al., 1997). Rogoff, Mistry et al. (1993, p.160) recommended that school practices move from dyadic relationships (where teachers 'give' children knowledge) to 'complex group relationships among class members who learn to take responsibility for contributing to their own learning and to the group's projects'. Being responsible is defined here as participating in symmetrical patterns of power. These patterns included the children imagining another point of view, negotiating a solution, helping others, jointly attending, being responsive. They were usually linked to narratives about learning that were characterised by engagement with difficulty and persistence, although for some children like Emily a well-developed capacity to imagine the beliefs needs and desires of others was associated with a concern about being judged, 'being right', and a reluctance to risk being wrong. The accessibility of the technology was relevant here: an activity where children could take some responsibility and where there were clear divisions of labour facilitated collaborative enterprises. In the Reggio Emilia early childhood programmes, in another culture and another place, debate argument and negotiation over constructions are highly valued, and four-year-olds debate argue and negotiate changes to each other's constructions and drawings. Collaborative scripts in construction areas have become familiar. New (1993 p.219) described the strong group orientation:

As they [the children] share and debate their ideas, they are encouraged to listen and to critically evaluate one another's thinking rather than to "be nice and mind your own business". This "social education" - in which they have frequent opportunity to hear multiple points of views

(sic), as well as to express and clarify their own - is not seen as cancelling individual differences, but as a means of identifying them.

New (p.219) commented that the 'strong orientation to the opinions and needs of others as demonstrated in Reggio Emilia classrooms is contrary to American values of independence and individuality'. The infrequency of collaborative technological episodes in this research suggests that in this New Zealand early childhood centre independence and individuality are highly valued as well. This disposition is about communication and contribution.

This list of dispositions reflects the five strands of the New Zealand early childhood curriculum (Ministry of Education, 1996): belonging (being courageous, finding familiar discourses and feeling comfortable enough to tackle new ones), exploration (being mindful, exploring, questioning), well-being (being persistent, trusting the environment enough to persist with difficulty and not to give up), communication and contribution (combined as being responsible: symmetrical patterns of power, expressing ideas and listening to others). The affordances of the materials, tools and activities as analysed in this study - transparency, challenge and accessibility - sit alongside these dispositions. Transparent technologies encourage courage and mindfulness, and when transparency includes providing feedback to the learner they encourage perseverance. Challenging technologies encourage perseverance with challenge, and when challenge includes flexibility they encourage mindfulness. Accessible technologies encourage responsibility.

Given the underlying four-part structure of a learning narrative, this list conforms to Perkins, Jay and Tishman's (1993) criteria for a list of dispositions. They suggested that a list of dispositions must be (a) *individually necessary and indispensable* (the narrative cannot proceed unless these decisions are made) (b) *collectively comprehensive* - nothing is left out (all the steps in the narrative have been included) (c) *normatively appropriate* - fitting with strong cultural intuitions, generating prescriptions and providing advice (the list is consistent with the five strands of learning and development in the national early childhood curriculum) (d) *functionally balanced* - for instance Perkins et al. (1993) pointed out that to be broad and adventurous all the time does not favour good thinking, it must be balanced with being intellectually careful (the list reflects the individual, local and cultural tensions between 'belonging' and 'exploration' goals).

Although this research found that certain dispositions were characteristically woven together as narratives, and connected to technological practice, the dispositions do provide decision points as suggested in Figure 15.1. Unlike a community of practice viewpoint, this study supports a view that the early childhood setting can provide

genuine alternatives at each step. Although most children interpreted *being good* as a discourse for performance and display, Jason was prepared to question received notions about how to handle annoying peers. Opting for *being a girl* does not necessarily mean that display must follow, as Davies (1987) and other feminist researchers have pointed out. But discourse place and technology, history geography and culture, have conspired to construct consistent patterns (niches) of convergence. Technological practice has therefore been described as a dispositional milieu, characterised by one or two privileged learning narratives.

15.4 A TRANSACTIONAL MODEL

To a considerable extent, the narratives were determined by the *meaning* (the discourses) that children had given to the technological practices or activities. Many of these meanings had been determined historically, by cohorts of morning kindergarten children and by their families over time. *Being nearly five* was always ready to attach itself to an activity; so was *being a kindergartener*. Other meanings were determined locally: the learning was distributed or 'stretched over' a network that included the materials and tools, the discourses, and the relationships. Individual children's abilities and dispositions could also make a difference for the others: in the marble-painting episodes, Jason turned an easy task into an interestingly difficult one and other children took up the challenge: his interest in challenge and difficulty influenced Nell, who in turn transmitted it to Jinny. Danny took up a learning narrative that included persevering with challenge (afforded by the materials) in screen printing, and this may have encouraged Meg to do so as well. The learning was a complex interplay between people, places and things.

The findings here have provided an example of the viewpoint that learning is about transactions between a disposed learner and a dispositional milieu. A reciprocal transactional and spiral model of learning, similar to the spiral model of distributed cognition described in Salomon (1993a) and outlined earlier in this study (section 3.4.5) is a useful way to describe the children's learning. The model links individuals' learning dispositions to the sociocultural system via narratives about learning, and describes activities as leaving a 'cognitive residue' or a 'dispositional residue' in the form of altered inclinations and strategies: to tackle new discourses, to retreat into old discourses, to approach challenge and responsibility in different ways. The components

interact with one another in a spiral-like fashion whereby individuals' inputs, through their collaborative activities, affect the nature of the joint, distributed system, which in turn affects their cognitions such that their subsequent participation is altered, resulting in subsequent altered joint performances and products. (Salomon, 1993a p.122)

In this study, the focus was not on cognition but on the notion of ‘learning disposition’, which integrates cognitive with social and affective or motivational aspects of learning. Salomon’s diagram can be redrawn replacing cognitions with learning dispositions and narratives, and distributed cognitions with dispositional milieux as in Figure 15.2.

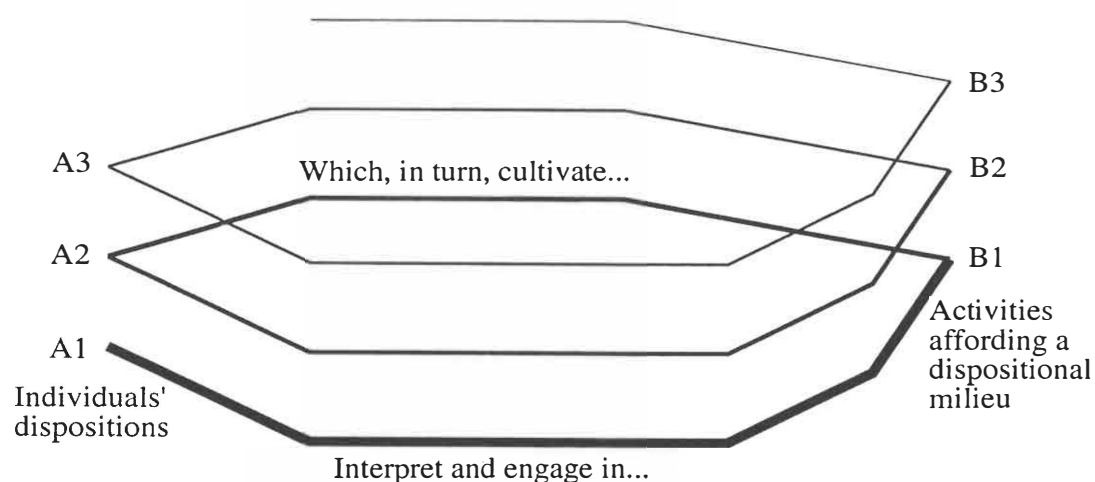


Figure 15.2. Learning as reciprocal transactions between individuals’ dispositions and narratives and a dispositional milieu (adapted from Salomon, 1993a)

The process for a four-year-old attending kindergarten is as follows:

1. Here is the dispositional milieu (in the four-year-old's case, let us say it is at home).
2. Out of the experience provided for her within this dispositional milieu, through passive, evocative, and active interpretive processes the four-year-old begins to crystallize a set of dispositions about learning. Active processes include ‘niche picking’ and ‘niche building’: selective attention and active participation by the learner. Passive processes include the affordance of the materials tools and activities. Evocative processes include responses and evaluations elicited from others (Scarr and McCartney, 1983; section 3.4.5 in this study).
3. That set of dispositions in its turn disposes her to spend more time in particular activities, to attend to certain kinds of events rather than others, to interpret them in a certain way, to judge certain things negatively and certain things positively, and to spend more time with certain people and to avoid others (she actively constructs a narrowed and selective dispositional milieu).
4. She brings this set of dispositions about learning to the early childhood centre, a different dispositional milieu. She will initially actively re-construct the familiar dispositional milieu by searching for, interacting with, or creating the familiar. Others in the new environment will respond to her interests, interpretations and selections. She will have changed the dispositional milieu.

5. At the same time, she may begin to participate in new activities, attend to unfamiliar events, interpret both the familiar and the unfamiliar in ways that her teachers or peers appear to be interpreting them, judge different things negatively or positively because of the dispositional climate, and interact in what appears to be appropriate ways with a range of people and materials. In this case she has been nudged out of a privileged niche and her effective dispositional milieu has changed. The process continues like a spiral.

When Danny was first introduced to screen printing he politely went along with the *being a kindergartener* discourse. It involved abilities that were familiar to him - drawing and cutting. He was not interested in the print, just in the painted template. Finally, after several episodes of screen printing he became aware of the representational qualities of a print, and he shifted to a *being a technologist* discourse, puzzling over the difficulty of 'doing the shadow of it'. Danny was shifting from a privileged boy/friend discourse to a technologist discourse as he became interested in the representational qualities of the screen printing process. Many of the girls were merging *being a girl* with *being good*; the boys were merging *being a boy* with being a bit naughty. Martin inclined towards a niche discourse (and narrative) to do with displaying *being nearly five*, although he also experienced a new narrative where the difficulties are being tackled collaboratively at kindergarten. Linda was displaying *being good*, usually taking her cue from an adult or from Meg, but on the second to last observation morning she spent 43 minutes making a paper chain, referring to no-one, and totally absorbed within a busy group. Lisa was repositioning herself within the intersection of *being a kindergartener* and *being right*, taking more responsibility for her actions. Meg was becoming more flexible about *being good*. Nell, who avoided technological difficulty in hat making and screen printing and kept to friendship discourse, was prepared to admit to Jason in a marble-painting episode that she didn't know how to make a marble box, and to seek his advice. The learning experience may also confirm and support old and familiar learning dispositions. Linda still interpreted most learning experiences as an opportunity to display her goodness; Martin's determined stance was to display his nearly-five status. For the children there is always a tension between belonging and exploration, between displaying or confirming one's membership in a community and tackling difficulty, uncertainty and challenge.

At the same time the children's dispositions and narratives change the learning environment. For instance, their inclinations to interpret a situation as being about gender and good behaviour undermined the teacher's representational agenda in the butterfly episode, and Meg's attempts to introduce technical challenge to do with accurate representation of a butterfly were similarly ignored. Martin's decision to

associate *being nearly five* with performance goals changed the adult's role in the dinosaur making episode. Jason altered the difficulty level of marble painting. The narratives revealed that the discourse topic chosen encouraged certain patterns of responsibility and determined whether challenges in the environment would be taken up. But some children, like Jason, sought difficulty and challenge everywhere, and encouraged other children to do so.

15.5 THE RESEARCH QUESTIONS

Five research questions framed up the study. A summary of the conclusions are as follows:

1. Were there (socioculturally or historically based) goals that children inclined towards and that influenced their learning? Chapter 10 summarised answers to this question.
 - Socioculturally and historically based goals that influenced children's learning here were a central part of the construct of a discourse. Privileged discourses were described in the following way: *being nearly five*, *being good*, *being a girl/boy*, *being a kindergartener*, *being a friend*, and *being a technologist*. Children's experience in early childhood was described as a complex interplay of conflicting and overlapping discourse frames, jostling for privileged positions.
2. Did there appear to be key learning orientations and strategies (dispositions) associated with approaching difficulty? This question was the topic of Chapter 11.
 - Even at age four, it appeared that children were making quite firm decisions about whether it was appropriate to tackle difficulty and to risk error, confirmation in a natural setting of Dweck's experimental research in the United States (e.g. Dweck, 1989). Although Dweck identified children as having a general orientation towards performance or learning goals, this study suggests that a mediating factor is the discourse: performance goals were associated with *being nearly five*, *being good* and *being a girl/boy* (and the latter two often appeared to have merged), while *being a friend* and *being a technologist* were more likely to be associated with learning goals. The decision about whether to tackle difficulty also appeared to be sensitive to *place* (supporting Bronfenbrenner's ecological framework). For many children difficulty was not deemed to be a feature of the early childhood setting: difficulties were tackled at home. Perkins, Jay and Tishman (1993) wrote about thinking dispositions being sensitive to occasion; in this study the disposition to persist during difficulty appeared to be sensitive to discourse and place.

3. Did there appear to be key learning orientations and strategies (dispositions) associated with responsive and reciprocal relationships? Chapter 12 summarised the findings for this question.
 - During interactions between the people in this setting, four major patterns of responsibility distribution were identified: two were asymmetrical (adult tutorial and adult support), and two were symmetrical (adult-peer collaboration and peer-peer collaboration). The symmetrical patterns - identified as joint attention in Rogoff's (Rogoff 1990) and Smith's (1996a, 1996c) research - were less common; they were usually associated with perseverance when in difficulty and with children admitting that they didn't know, explaining their difficulty to another, asking questions, taking advice, and giving instructions: the ingredients of a *learning* experience.
4. In this setting, was a technological practice characterised by a particular clustering together of dispositions in event structures or learning narratives which could be described as a 'dispositional milieu'? This question was the topic of Chapter 13.
 - Six learning narratives were identified. These were to a certain extent, but not entirely, associated with activity or technological practice.

Narrative One (group butterfly construction): Privileged discourses are *being a kindergartener*, *being a girl/boy* and *being good*. Difficulty is avoided by shifting from one discourse to another; adults alternate between tutorial (setting up and praising) and support.

Narrative Two (screen printing): Privileged discourse is *being a good kindergartener*. Difficulty is avoided by following instructions and participating only once; typically the adult responsibility pattern is an adult tutorial.

Narrative Three (making a dinosaur and hat making): Privileged discourse is *being nearly five*. Technological difficulties are avoided in imaginative ways or are being solved elsewhere; adults give support.

Narrative Four (making a monster, and the second narrative in screen printing): Privileged discourse is *being a technologist*; difficulties are articulated and clarified; adults and children collaborate, children tutor each other.

Narrative Five (hat making): Privileged discourse is *being a friend*; children work alongside each other, difficulties and conflicts are solved by discussion and negotiation; peer collaboration and tutoring.

Narrative Six (marble painting): Privileged discourse is *being a technologist*; children work with each other; difficulties are solved by peer tutoring or observation or discussion; peer collaboration.

The affordance of the tools and materials was identified as influential, in that it allowed or encouraged a certain narrative. Physical affordances were not the

compelling factors however (they suggested rather than dictated: Salomon and Globerson, 1987 p.631). Once again the discourse chosen was a strong mediating factor.

5. (a) In what way could the technological practices in this early childhood setting be described as a set of learning *niches* of familiar and comfortable learning narratives?

(b) In the short time frame of the observations, was there any evidence for shifts in children's learning dispositions and narratives?

Answers to these questions were in Chapter 14.

- There was evidence that many of the children were inclined towards certain narratives about learning: they only worked within one technological practice and one narrative, or they took privileged narratives or dispositions across technological practices.
- At the same time, some children who favoured certain discourses, responses to difficulty, or patterns of responsibility, were also experiencing alternatives. A few of these children, even in the short time of the observations, appeared to be modifying their preferred narratives: discovering interesting technological challenges in the early childhood setting, or redefining their definition of *being a kindergartener*, for instance.

15.6 IMPLICATIONS FOR EARLY CHILDHOOD

This research has provided one way of looking at the complexity of learning in one place in an early childhood setting. Other interpretations are probable and possible, but what is certain is the complexity. Learning trajectories and endpoints are described not as a biological or developmental unfolding, facilitated or constrained by the environment, but as complex reciprocal constructions and transactions. These constructions and transactions are influenced by every setting in the child's life, and an early childhood setting away from home can play a significant role. The implications of the research for early childhood settings are in three areas: the paradigm shift associated with seeing learning in terms of learning narratives, the notion of establishing dispositional milieux, and the responsibility of curriculum when a critical perspective is taken.

(i) *Learning narratives: a paradigm shift*

The literature on learning has provided considerable evidence that the context is crucial, that developmental trajectories are not universal, and that we need to go beyond the idea that teaching in early childhood is the teaching of fragmented skills

and knowledge. It has become clear that relationships are central. We are closer to identifying facilitating environments, but what we may be in danger of losing in these discussions is some way or ways to frame *direction* for individual children - without succumbing to an instrumental view of early childhood. This study provides one way of tackling this education question, by analysing children's learning in terms of learning dispositions and narratives. The transactional model outlined here suggests that children are constructing and appropriating learning narratives at the same time as they are constructing and appropriating explanatory narratives. It is the children's conceptions of themselves as learners that is at issue: they choose activities because of the meanings they ascribe to them, and they may well settle in niches in the dispositional milieu. The implications of the new paradigm for assessment procedures in early childhood are immense. Most assessment procedures work on a list of knowledge and skill, and take an explicitly or implicitly deficit, fragmented, and quantitative view of a child's progress. This study suggests that we should be experimenting with other ways of doing assessment, ways that document the establishment, construction, and elaboration of learning narratives.⁹

(ii) *Establishing dispositional milieux*

This research has described four-year-olds' learning in an early childhood setting in terms of the relationship between the sociocultural environment and the individual. It set out to document the process whereby 'cultural traditions and social practices regulate, express, transform, and permute the human psyche' (Shweder, 1990 p.1; Wertsch, 1991a p.7), where the 'human psyche' was defined as learning dispositions to be courageous, mindful, persistent, and responsible. Discourses are learned through enculturation (Gee, 1992 p.114). So are dispositions and narratives (Tishman Jay and Perkins, 1993; Katz, 1993). Katz (1993, p.19) says 'dispositions are not likely to be acquired through didactic processes'. They are more likely to be mutually appropriated when they are visibly present. In this study, those aspects of the learning environment that have been highlighted as influential were: the affordance of the activities, the topics or discourses on offer, the interpretation of those discourses by the community, and the established patterns of responsibility (including the ways that children are evaluated). Writing about middle-class children learning literacy at home Gee says:

It is crucial to stress that these social practices are *not* a magic set of "methodologies". What is happening is that the child is being socialized into certain ways of being in the world, ways intimately connected to the sociocultural identity of the child's group, as well as to their power and status in the world. These children are not learning and their

⁹ As this study is being written up, the author is working with a number of early childhood centres, from a range of services, to trial 'Learning Stories' as one way to document children's learning (Carr, forthcoming).

parents are not teaching *skills*, though the children are most certainly picking up skills as a concomitant to the apprenticeship process...[the parent is introducing] the child into a characteristic (socially and culturally specific) *way of doing things*, into a particular *form of life*, in this case, how people "like us" approach books (talk about, read, value, use, and integrate them with other activities). (Gee, 1992 p.124; emphasis in the original)

In early childhood programmes children are being introduced to literacy, numeracy, music, art, technology, dance, and drama, and other *ways of doing things* or representing experience. At the same time they are being introduced to *ways of learning things*, in this case how people 'like us' (nearly-five-year-olds, girls, boys, kindergarteners) approach learning and difficulty. One way of evaluating an early childhood programme therefore is to look at it as a dispositional milieu: materials, tools, activities and interactions in the early years would be designed to provide opportunities for children to be courageous, mindful, persistent, and responsible. Enterprises would be transparent (like marble painting), accessible (like hat making), and challenging (like screen printing). Technological practices would encourage the finding and tackling of transformation, representation, and engineering or design difficulties (like the monster construction episode). The findings here accord with the recommendations of Dweck and Bempechat (1983 p.252) for 'challenging long term tasks that require planning and persistence in search of resolution' where 'coping with uncertainty becomes intriguing rather than threatening'.

The research found that different narratives appeared in different technological practices, and that collaborative and risk-taking strategies characteristic of dramatic pretend play were not necessarily transferred to construction activities - where there was often a product, a right and a wrong way of doing things, and an adult monitoring progress. The latter context is more like school. Therefore children's progress into school will be connected to the educational or dispositional climate there as well. This study has suggested that particularly vulnerable at this age is the disposition to tackle difficulty, uncertainty, and challenge away from the safety of home. Although at the moment there are in the first year of school in this country no high stakes associated with failure, error, or mistake (the retention in class or assignment to special classes identified as influential in American studies), the transactional model outlined in this study would suggest that currently planned five-year-old literacy and numeracy tests may become self-fulfilling prophecies. What a five-year-old test does is to establish expectations, and the research we have available on teacher expectations is consistent with the view that children who have literacy and numeracy skills when they arrive at school will do well not because stepping onto that educational rung at that age gives them a leg up or a 'headstart' (the hierarchical model), but because they raise the expectations of the adults who work with them (the transactional model). Higher

expectations make a difference to the relationship between teacher and child: children for whom the teacher has high expectations are given more challenges, spoken to with greater respect for their intelligence, asked to perform more often and evaluated more generously (Tizard and Hughes, 1984; Woodhead, 1988; Blatchford et al., 1989; Weinstein, 1989; Sylva, 1994a). Their dispositional milieu is different, and they perceive it as different. Early childhood programmes will introduce knowledge and skill in a range of domains, but expectations of content in a few of these on arrival at school must be viewed with caution, especially if failing the tests will affect the dispositional milieu and put at risk dispositions to be courageous, mindful, persistent, and responsible. It was impressive that so many of the children in this study could identify and articulate the difficulties *they* value and spend time on solving. Bruner (1996 p.36) commented:

Success and failure are principal nutrients in the development of selfhood. Yet we may not be the final arbiters of success and failure which are often defined from “outside” according to culturally specified criteria. And school is where the child first encounters such criteria - often as if applied arbitrarily.

This study argues that it is at the early childhood centre that children first encounter implicit attitudes to success and failure, and that from these encounters they begin to develop learning dispositions and possible selves.

(iii) *A critical perspective: breaking mindsets and changing niches*

This study confirms, in an early childhood setting, the notion that mindset and social practice affects affordance (Langer, 1989). The study suggests that one of the roles of adults in early childhood settings is to become aware of and to question these mindsets and preferred narratives. In early childhood, adult-child ratios, group sizes, and the education level of staff affect the adults' abilities to question received narratives dispositions and discourses associated with such topics as *being gendered*, *being good* and *being nearly five*. This research indicated that for the four-year-olds in this study these discourses were associated with performance goals and display; they were not topics for redefinition or question, and their interpretation influenced the children's approach to learning. A critical perspective calls such givens to account. Paley wrote of her attempts to make the rules of friendship problematic ('By kindergarten, a structure begins to be revealed and will soon be carved in stone'):

Turning sixty, I am more aware of the voices of exclusion in the classroom. "You can't play" suddenly seems too overbearing and harsh, resounding like a slap from wall to wall. How casually one child determines the fate of another . . . By kindergarten, . . . a structure begins to be revealed and will soon be carved in stone. Certain children will have the right to limit the social experiences of their classmates . . . Must it be so? This year I am compelled to find out. Posting a sign

that reads YOU CAN'T SAY YOU CAN'T PLAY, I announce the new order and, from the start, it is greeted with disbelief. (Paley, 1992 p.3)

Loughran and Northfield (1996) wrote about a secondary teacher's attempts to 'break set', defining 'set' in this case as the classroom's teacher-centred script about teaching and learning. The teacher concluded (p.41) that breaking set is difficult for the students and 'the demands of the school environment make it difficult for the students to make the transition in learning style'. It needs, in particular, commitment and understanding from the teacher. In the new New Zealand early childhood curriculum, a critical perspective is implicit in the strand 'contribution', which includes the following outcomes for children, to do with being both mindful and responsible (Ministry of Education, 1996):

- an understanding of their own rights and those of others
- the ability to recognise discriminatory practices and behaviour and to respond appropriately
- some early concepts of the value of appreciating diversity and fairness
- the self-confidence to stand up for themselves and others against biased ideas and discriminatory behaviour
- a perception of themselves as capable of acquiring new interests and abilities.

We need to respect the children's need for belonging at the same time as we encourage exploration and risk. This study highlights the notion that 'free' play is never free, because the guardians of belonging can be very stern. This indicates that *interference* by the teachers with the 'natural' course of events will be in order, because the 'natural' course of events will often be inimical to learning: characterised by exclusion, avoidance of difficulty, and the off-loading to others, or other places, of responsibility for learning. The idea of establishing a dispositional milieu, and of interference, in an early childhood setting reverberates with the notion of education as a moral activity (Dewey, 1909). Curriculum statements about what is worthwhile knowledge, what are worthwhile learning narratives, and what are worthwhile experiences, are moral political and cultural statements (Buzzelli, 1996). The four learning dispositions outlined in this chapter can be described as a 'metanarrative' (Ben-Peretz, 1997, p.442) over and above local stories and narratives; they describe a curriculum deemed to be 'worthwhile'.

There is another sense in which curriculum can be described as a moral activity. In early childhood *moral* implications are closely associated with whether the aim of early childhood education is 'being a good learner' or 'being a good person'. Katz (1995d) has written about the complementary but distinctive roles of mothering (parenting) and teaching: for instance, parents' commitments include 'optimum irrationality', they are prejudiced in favour of (partial to) their own child, and responsible for a limitless area of the child's life. The differences become less clear when the setting provides all day

educare for infants and toddlers, but there are good arguments for suggesting that the domain of interest to do with 'being a good person' belongs essentially with the parent, family, whanau, or guardians. This research has argued that 'being a good learner' includes caring and being responsible, but it has provided evidence that even in a sessional programme for four-year-olds both the children and the adults may be inclined to skew the curriculum towards an interest in 'being a good person' and therefore an interest in performance goals. Katz (1995e p.12) also writes critically about a widespread commitment in early childhood to the 'self-esteem industry'. The children in this research allowed *being good* as a discourse to invade *being gendered*, *being a kindergartener* and *being right*, and the adults frequently provided informal assessments and feedback in terms of the person ('good girl', 'your Mum will be proud of you') rather than the work. The power scale used here might provide a way of assisting practitioners to reflect on this practice, by separating those informal evaluative comments that focus on the person from those that focus on the work. There is no golden rule that says that all informal assessment should focus on the work - close personal relationships are also embedded in comments that focus on the person - but reflective practice could identify possible dispositional trade-offs.

15.7 IMPLICATIONS FOR FURTHER RESEARCH

The observations here took a 'snapshot', although changes were observed even within the six weeks. Nevertheless, if this sociocultural viewpoint is useful, it would be of interest to apply it to a cohort of children at the beginning of their experience in an early childhood setting, tracking them as learners-in-action through to school entry and perhaps beyond. There is evidence that learning dispositions are enduring (Dweck, 1989; Sylva, 1994a), but even robustly flexible and persistent learners will be vulnerable in classroom cultures that do not provide the opportunity for courage, mindfulness, perseverance and responsibility, and further research is needed.

The research described the complexity in a narrowly defined context: four-year-olds in the construction area in the morning sessions of one kindergarten. A wider lens would describe greater complexity, and a different setting might find different labels for the discourse frames. Here, in the construction area, the mediational means were language and physical materials and tools; in another setting they might be dance, drama, music, art, or colour. An interest in the affordance of the mediational means, and specifically of the physical nature of the activities, may be helpful. Activities can be assessed for their transparency, challenge, and accessibility: all of these qualities have been closely linked in this study to learning. The research suggests that activities and tools should be designed in such a way as to cultivate partnerships (with materials or people) that

are characterised by desirable learning dispositions and narratives. This research could be repeated with different activities, technology and tools.

The methodology employed here has implications for further research. An intensive analysis of the children's texts was beyond the scope of this study. The transcripts of four-year-olds are something of a nightmare because the children mumble, leave words out, and take an idiosyncratic view of word order, negatives, and pronouns. They are also inconsistent. Lisa says to Brian "I hate you" and 40 seconds later says "I like you Brian, I like you" (3/3TTA9.3). Brian smiles and seems unmoved; my rational mind is confused. However, the children appear to understand what is going on. If the researcher wants to gain some insight into young children's perspectives, this study confirms that listening to what the children say (Paley, 1986b) and becoming familiar with the context are crucial. Participation in that context and observation of the same group of children over a period of time was an invaluable addition to the transcripts. Older children might be more readily interviewed about their intentions and goals; the younger the child the more the adults must interpret and make informed guesses at meaning. Gathering an interpretation of the observations together into a picture book as a focus for interviewing the children - retelling their experiences as a story - worked well; as a tool for researching children's perspectives this could be further explored. The adult power scale that emerged from the data (and owed much to Wood and Wood, 1983) was useful for identifying and illustrating patterns of responsibility; this could be adapted and explored further as a tool for action research. In particular, since American research has indicated that children as young as first graders perceive subtle differences in teachers' responses and praise (Weinstein, 1989), using a power scale to investigate the evaluative content of adult talk would be worth pursuing.

The implications of Dunn and Sheldon's comments on gender differences in the early years in intimate relationships and 'double voice discourse', together with the observations here of girl-friend-speak (Sheldon, 1992; Dunn, 1993; section 10.3.2) might mean that a closer look at what *being a friend* means for boys in an early childhood setting would be worthwhile. There were not enough friendship exchanges between the boys to do more than speculate on this. It was clear from the elaboration of friendship discourse, the approaches to possibilities of being right or wrong, and the nature of collaborative language, that four-year-olds' emerging understanding (or their bringing into play of an already established understanding) that 'thoughts and beliefs are crucial to explaining why people do things' (Bartsch and Wellman, 1995 p.144) is of interest to a researcher seeking to understand their skills and dispositions as learners. Whether the mind is 'elastic and unbounded' (Bartsch and Wellman,

1995) and these understandings are totally mediated by the sociocultural environment, as pretend play examples would suggest, or whether they include developmental constraints as the characteristics of autism would suggest (Harris, 1989), being a four-year-old seems to be accompanied by paying attention to the fact that other people's thoughts and beliefs influence their interactions and their judgements. For the girls, their skills in this area may have been enhancing their capacity for intimate relationships but may also have been encouraging them to avoid the risk of being judged wrong, unable, or not good. Most research on young children's theories of mind has been on small samples of middle class children, usually with their parents (who are often language researchers). Missing from the research, except for Dunn's work on children's relationships with family members and friends, is an investigation of the influence of these understandings on learning. This study suggests that being a four-year-old may be a time of great significance for emerging attitudes towards being right and wrong and for the dispositions to take responsibility for learning, to risk error, and to persevere with challenge.

APPENDIX 1

ADULT POWER SCALE
DINOSAUR AND MONSTER EPISODES

(a) Adult Power Scale applied to dinosaur episode

Part 1: chatting to the observer about home.

- Martin: Margaret do you know what I got for Christmas? It's some books. And there's something else.
- Observer: Some? (asking for clarification of child's comment: 5).
- Martin: 'laddin. There's one 'laddin book.
- Observer: Aladdin ball (repetition, mistaken as it happened: 1).
- Martin: No 'laddin book.
- Observer: A book (repetition: 1). An Aladdin book (1). Yes (phatic: 1). And what else (asking for further clarification: 5).
- Martin: Um. I think I got. What was it again? Yo yo. And a, a ball.
- Observer: A ball (1).
- Martin: Ha. That's only of another stocking in my one last Christmas?
- Observer: Mmhm? (interpreted here as a request for clarification because of the rising inflection, and Martin interprets it in the same way: 5).
- Martin: There's a another stocking.
- Observer: Another stocking (1).
- Martin: Mmm.
(23/2TTA37.40-38.42)

Part 2: constructing a dinosaur

- Martin: (to himself): This should be fine for me. Fold it that way. (41.46) (to himself): This'll look better 'n last time I bet. (42.51) Oh, where's some cello tape. Cellotape where are you? (to Observer) You know what I'm making? D'you know? A dinosaur. Look at my dinosaur.
- Observer: Pardon? (phatic: 1).
- Martin: My dinosaur.
- Observer: That your dinosaur? (5).
- Martin: Yes.
(23/2TTA37.40.56-43.54)

Part 3: fine tuning

- Observer: (to Martin) It's a flying dinosaur? (a reference to what looks like wings, an interpretation: 10)
- Martin: Yes.
- Observer: What kind of dinosaur is a flying one? (asks for label: 23) (pause) Pterodactyl is it? (gives information, not requested by child: 20)
- Martin: Yeah probly is.
- Observer: Might be (agreement with child: 4).
- Martin: Cos he's got one of he's got a (...) down there by his legs.
- Observer: There's legs as well? (5). Are you going to be able to make legs? (question about the next step: 7).
- Martin: Na. I just making.
- Observer: Mmhm (1). So you're not going to make legs? (5) Mmhm (1). So this which is this part here?(5) This part here (5). That's the (5).
- Martin: Eyes.

Observer: That's where the eyes go (4). Whoops (referring to an unexpected complication, and anticipating the next question: 7). (one wing flaps over onto the other side) Is that a problem? (question about the next step, in this case asking if any next step needs to be taken: 7).

Martin: Hmm. I know what to do.

Observer: You know what's wrong (4). Uh huh (1). Mmhm (1).

Martin: I know.(47.28).

(Observer (turns tape over) (0.03): Is there any thing more you want to add to it?(initiating, instructing, on the next step: 9) You don't want to paint it? (9).

Martin: Mmmhmm. The quickest way should be crayon.

Observer: Pardon (1).

Martin: The quickest way should be crayon.

Observer: The quickest way should be crayon? (clarification: 5).

Martin: Yeah.

Observer: Mmhm (1). Well that's a possibility isn't it (prompt for next step, not initiating this time: 7).

Martin: Mm. Now where would the crayons be?

Observer: Where would they be indeed (1). They live up here (giving information, implicitly requested by child: 8).

Martin: Mm. (...) copy Ken's one.

Observer: Copy? (5).

Martin: Ken's one.

Observer: Copy Ken's one? (5) Who's Ken? (asking for an interpretation, for the relevance of Ken: 10).

Martin: Um he he's at school.

Observer: He's at school (1). Is he your brother? (5)

Martin: Mm. He's the biggest one of the lot.

Observer: He's the biggest one of the lot? (5). (1.57)

Martin: Mm.

Child (Linda?): Look at my hat.

Martin: (...)

Observer: Pardon? (1).

Martin: Craig's 7 and I'm (pause) catching up by five.

Observer: You're catching up with five (1).

Martin: Yeah.

(23/2TTA46.00-47.28; 23/2TTB0.03-4.16; 23/2PTB)

(b) Adult Power Scale applied to monster episode

Observer: What're you making Tom? (10).

Tom: What?

Observer: What're you making? (10)

Tom: A monster.

Observer: A monster?(1) Uh huh (1). Do you need a hand?(6)

Tom: Yes.

Observer: Are you all right?(4). I'll just put my camera away and I'll give you a hand (6). Use the table (6). Use the table for support for the stapler (6).

Tom: This is the this is the tooth for it.

Observer: That's the? (5).

Tom: Tooth.

Observer: The tooth for it (1). Right (4). OK (4).

Tom: It's too big, so I need to.

Observer: It's a bit big, so what do you need to do?(7). No staples left in it? (5).

Tom: No.

Observer: I'll get some shall I? (6) Do you know how to put them in Tom? (12) In the end there (9). Slide it along, whoops (9). Now (1).

Tom: There's its big big big tooth.
Observer: It is a very big tooth isn't it (4).
Tom: It's going to be sticked out.
Observer: It's going to be what? (5)
Tom: Sticked out.
Observer: It is going to be sticked out (1).
Tom: Yeah. OK. Now. This is a special kind of tooth that sticks into these boxes.
Observer: Yes (4).
Tom: OK.
Observer: Right (4). So what do you need to do now? (7)
Tom: Get another one of these and get another roll.
Observer: Right (4).
Tom: Have to (...) teeth for the monster.
Observer: That's a tooth for the monster?(5). I thought these were the teeth (5).
Tom: Yeah but those are these are special teeth to stick into each box.
Observer: Right (4). OK (4). I'll just put my battery in, I'll be with you (2).
Tom: See me putting in the tooth?
Observer: I do (3).
Tom: That's how they talk. Do they have lots of teeth? Or, monsters.
Observer: What do you think? (12)
Tom: I'm running out of space now.
Observer: Running out of space? (5). Yes (4).
Tom: Those are the top teeth. Top teeth have to be up there.
Observer: Up there (1). Top teeth up there do you think? (5).
Tom: Yeah.
Observer: How many top teeth do you think you'll need? (9) (Pause) Same (9).
Tom: Now the middle one. What's that called?
Observer: It's a tape recorder (8).
Tom: It isn't quite as long, this. OK. I need it longer.
Observer: Oh well, cut a longer bit (9) There's a rubbish bin there Tom (8).
Tom: There! There's the teeth.
Observer: There's the teeth (1).
Tom: Now. How're we going to put the big boxes inside there. Oh I know. I have to make that to the head.
Observer: Oh do you (1).
Tom: Now. How'm I gonna stick that box to be its head? Hmm (31.02). (31.58) OK. Do you know how to make monsters?
Observer: Monsters? (5). I've never made a monster (2). Have you ever made one before? (10).
Tom: Hmm. Mmm. I I had to staple that bit on.
Observer: Yes (4). Stapled that bit on (4).
Tom: Probly need to cut a bit off.
Observer: Oh OK (4).
Tom: There! Cut a bit off. I cut a bit off.
Observer: Cut a bit off have you? (4). Right (4).
Tom: That's my big box there. (33.25)[Observer helps Meg with her cutting out for a screen print] . . . (37.44)
Observer: How's the monster going? (10).
Tom: Good, but I can't make um the head go on.
Observer: How would we attach the head? (9). Any ideas? (10).
Tom: The teeth are too far over there. I can't put the head over there.
Observer: Can't you? (5).
Tom: I have to put the head over here.
Observer: OK (4). Put the head on that end (5).
Tom: Yes.
Observer: You want to put the head here? (11)
Tom: N-no. Cos then I I need to cut a bigger bit off.
Observer: Where do you want to put the head? (12).

Tom: I want to put it there.
Observer: You want to put it there? (5) Right (4). Staple (9). Oh, is that the head? (5) Right (4).
Tom: That's the head.
Observer: OK (4). Right (4). Do you need to staple that on now? (7).
Tom: Yes.
Observer: This side too? (7).
Tom: Yes.
Observer: What do you think? (12).
Tom: Good. Well. Mmm. Well That has to be the mouth.
Observer: That has to be the mouth does it? (1)
Tom: This this is the pull-up. (Uh huh uh uh Right (4)) The tummy's under there.
Observer: Right (4). So what needs to be done next do you think (7)?
Tom: Now. Have to put the middle bit on. (The middle bit on (4)). Mm. Cos this is all its bone. (Oh that's its bone?(5)). Yeah but this is its teeth. (Right right (4)). 'K. This is the bone (Yes (4)). It's in its tummy now (Right Yep (4)). Now what else. (What else do we need to do?(4)) Put that middle bit on. (Put the middle bit on? (5)). Yeah (OK (4)). Now. How're we gonna miss the teeth? Cut that bit off.
Observer: How about putting it on top like that? (9). Would that do it do you think? (12). (Yes. It'll need to be cellotaped I think). Do you think? (1). (Ah no, I guess we could staple it). OK (4).
Tom: Oh we can't. Would you think that'll do? For now?
Observer: Wonder if you need another bit of cellotape (9). Down that side (9). Mmhm (4).
Tom: That's enough (42.05). Hm. Now we have to paint it (42.52).
(9/3PTA21.11-42) (21.41 minutes)

APPENDIX 2

HAT-MAKING EPISODES
SUMMARY

No.	Date	Participants (Adults in upper case) People nearby who make a contribution in brackets	Boys	Girls	SOCIAL (see code *)	Speech turns	Adult speech turns	B'day hat	B'day	Being 5	School	Notes	△	◇	#
1	31/1	ALISON Wendy Rachel		2	E	41	7				√	Hat for Ray (brother?) Peer support: 'Can you reach it?' 'Nice one eh?'	√		√
2	3/2	OBSERVER Nell		1	B	80	40	√	√			Hat for father. Nell screens paint onto it			
3	3/2	OBSERVER Penny Catherine		1	E	21	9	√	√			Birthday hat for Sandra (sister) 'I wearing a prettier hat' 'No, I am'	√		
4	3/2	3 girls		3	C	Field notes only			√			Birthday box for making cards and hats. The girls rummage through it: 'has Justin made his birthday hat?'			
5	7/2	OBSERVER Peter	1		D	25	5		√			Peter 'Not my birthday...Robert's coming to my house tomorrow' 'How's my hat Helen?' (to nearby girl) 'Good'	√		
6	8/2	ANDREA Peter and another boy	2		E	9	2		√			Peter: 'It's not my birthday yet' 'Are you going to paint your hat?' 'No-o'	√	√	
7	13/2	OBSERVER Penny		1	D	27	14			√	√	Yellow hat for Sandra (sister)"She's at school...she's five"			
8	13/2	AMY ALISON OBSERVER Linda Meg		2	E	70	22					Meg: hat for Panda (her cat). Linda: hat for her cat			

9	13/2	ALISON OBSERVER Jason Nell	1	1	E	16	5					Nell: 'Why don't you make a hat, for you' Jason: How do you make those hats? Nell: too big for my baby 'Can you pass me um the string'	√	√	
10	13/2	ALISON Jason Nick Trevor	3		E	7	4			√		Nick: My head's bigger than this hat Alison...You must be turning five soon			
11	13/2	Meg Susie Linda		3	C	2	0								
12	13/2	OBSERVER ALISON Nell		1	E	20	10			√		Nell: That's a difficult five. Hat for Sandra	√		
13	13/2	ALISON Jason John	2		E	13	5					Jason: That's Myra (his sister)'s hat..Look at Myra's hat.	√		
14	14/2	OBSERVER Nell Nick (Valerie)	1	1	E	22	5					Nick: This hat doesn't fit me, it's too big isn't it (Valerie laughs). Nell: Make it go over your eyes then Nick abandons the task			
15	14/2	OBSERVER ANN Nell Laura		2	E	33	16					Nell: Can I do a hat for my baby?			
16	15/2	ANN Nell Tania (Lisa)		2	E	16	8			√		Nell: That's for little baby Lisa (not making hat): Do you know what school I'm going to?....		√	
17	15/2	OBSERVER Jason Nell John	2	1	E	24	8					Jason stamps splodges onto a stapled strip then cellotapes strips of paper on, presses down hard. Tells Observer he's making a print Nell (to Jason) I haven't got a real baby. It's only a toy John: That wouldn't fit your head		√	
18	15/2	OBSERVER Nell		1	D	39	16			√		Nell: Dad will...I'm gonna get a big hat for him			
19	16/2	OBSERVER Jason	1		D	3	1	√	√			Photo: hat with strips of paper cellotaped on	√		

20	17/2	ANN Emily Laura (Nell)		3	E	102	22		√			Laura (to Nell, who is nearby) Oh you're doing lovely lovely work Emily: We don't like it really eh Laura: Yeah, we just lying eh Laura: How does my tiara look? Emily: Good	√		√
21	20/2	Nick Samuel	2		B	7	0					Samuel: Can I help you? Nick: No Nick abandons task: I don't think I can make a hat	√		
22	20/2	OBSERVER ALISON Lisa Molly		2	E	153	69	√		√	√	Lisa: I'm making a hat....with a number 5 on it...This is not a kind of nice hat eh? Cos it's kind of funny eh...Doesn't fit me...So. Shall we chuck it in the rubbish bin?			
23	20/2	OBSERVER Nell Jinny		2	E	18	7					Both are making hats for their cats			
24	20/2	Molly		1	A	Field notes only						Molly has made a print from the painting on her hat, and presented it to Alison			
25	21/2	ALISON Deborah		1	D	Video notes only						Alison helps Deborah with her hat			
26	22/2	Meg's MOTHER ALISON Linda		1	D	12	4					Alison: You've got a crown Linda, haven't you			
27	23/2	OBSERVER Myra Molly		2	E	90	32					Molly makes hat for her Dad: with flashing light; Myra makes a crown, also with flashing light Molly: Where did you get that gold? Myra: Here you are, I got you some.	√	√	√
28	23/2	ALISON OBSERVER Meg Linda		2	E	20	3					Interrupted by earthquake drill. Linda: Heaps of lights on mine. So I don't get lost...Mine's beautifullest..			
29	23/2	ALISON Tony	1		D	10	5					Tony: I want to make one of these. A little little...it's too little. Alison: Well, how do you think you could make it bigger?			

30	27/2	Brian (Trevor)	1		A	Video notes only						Brian makes a big hat out of computer paper			
31	28/2	ANN Myra Molly		3	E	33	2					Myra makes another hat with a light; she staples Molly's hat for her. ['Can you staple this?' 'Yep, I will'] Molly has made a hat from reconstructing a COMPLAN food box	√	√	
32	28/2	ANN Rita		1	D	123	49	√	√	√		Birthday hat			
33	28/2	ANN Lisa		1	D	65	29	√		√	√	Lisa talks about going to school			
34	28/2	ANN OBSERVER Linda Meg		2	E	57	22	√	√	√		Ann: Wouldn't a number 4 be better then? Meg: I don't think these will fit us when it's our birthday Ann: I'll leave you girls to help each other to measure and staple, OK? 'Yes'		√	
35	1/3	Sarah		1	A	Field notes only									
36	3/3	Trevor	1		A	Video notes only						Trevor gets a strip of card, staples it, tries it on his head, staples again, puts it on (just the right size, watched by Tania)			
37	8/3	ANGELA Nell Jinny		2	E	13	1					Nell making a hat for her cat; Jinny discusses her Dad's new job with her Jinny:...new job Nell: Does he like it? Nell: You want to do one (hat)? For your cat.	√	√	
38	8/3	AMY Tony (Peter)	1		D	20	5	√	√			Starts hat, then abandons it Tony: Peter, Peter. Want to do a birthday hat? Peter....It's not my birthday today. Tony: It's not mine either.			
39	9/3	Meg		1	A	Video notes mostly. 3	1					Makes hat with blue cellophane visor, video notes 10.22-10.55 am (33 mins). Linda nearby, making a paper chain.			

40	9/3	Martin	1		A	Field and video notes only		√		√		Martin makes hat with a 5 on it Borrows Ann's 'special five'. Wears hat all morning.			
41	9/3	Emily Diana		2	B	Video notes only						Emily and Diana start hats at tidy up time			
42	10/3	Trevor	1		A	31	0					Trevor measuring his hat			
	Summary	Adult present in 32 episodes	21	49		1225	428 (34.9%)	9							

*Coding for social categories. A=one child alone; B=2 chn, no adult; C=>2chn, no adult; D=adult(s) for at least part of the time and one child; E= adult(s) for at least part of the time and >one child

△ = peer support, praise (>one child with transcript)

◇ = peer gives technical assistance or advice (>one child with transcript)

= complex friendship talk (>one child with transcript)

APPENDIX 3

MARBLE-PAINTING EPISODES SUMMARY

No.	Date	Participants (Adults in upper case) People nearby who make a contribution in brackets	Boys	Girls	SOCIAL (see code *)	Speech turns	Adult speech turns	Notes	△	◇	#
1	2/2	ANN Joan		1	D	1	1	Ann: Would you like to go and find your name on the name board?			
2	2/2	OBSERVER Nell		1	D	23	12	Observer: You want to do one ...like Joan? Nell: Like that (gestures)			
3	15/2	OBSERVER Lisa Jason John	2	1	E	22	5	Lisa: Where's the piece of papers? Jason: There...looks like it needs more paint		√	
4	15/2	OBSERVER Jason	1		D	6	3	We can't find the marble box. Jason: What I could is use the other box			
5	15/2	OBSERVER Nell Jason	1	1	E	24	11	Nell: D'you know how you can cut it? Cos I don't. Jason: You need to cut the top off. Don't cut the end off		√	
6	16/2	Jason Nick Nell Jinny (ALISON)	2	2	C	44	4	Nell: You've got to put the marbles on, you've got to make a box. Nick: Do those balls do that?...Is it easy?		√	
7	20/2	Nick Molly	1	1	B	no transcript		After chatting to Molly while she has a turn, Nick finger paints in the marble tray			
8	21/2	Molly Myra (ALISON at end)		2	B	62	5	Myra: You didn't know that I went to day care. Molly: When?... Myra: We are (allowed to say 'eh').	√	√	√

9	21/2	Nell Jinny		2	B	27	0	Nell: Can you please write my name on the back? Jinny: No. You can write it after... Nell: You could make your own box. There's one that you can make it out of. ... (to Lisa) Only friends are allowed to look at other friends	√	√	
10	21/2	Nick Danny	2		B	6	0	Nick's last day; Danny watches him finger painting. "I like you being the monster"	√		
11	22/2	ALISON Danny	1		D	10	6	Alison teaches Danny the process			
12	22/2	ALISON Penny		1	D	1	1	Alison: Whoah, I think you'll just about have the whole bowl of paint in there.			
13	23/2	OBSERVER Chris Tony	2		E	35	14	Tony: I'll show you how to do it		√	
14	27/2	ANN Penny Nell Linda		2	E	34	10	Linda: Oh gross. Did the teacher said you could do that?			
15	27/2	AMY Lisa		1	D	6	4	Lisa: I want to have a turn of this. Can I please have a turn of this?			
16	2/3	Nell watched by Meg Bridget and Jinny		4	C	no transcript		Nell finger paints and squidges her hands together. Meg and Jinny watch. They all laugh			
17	2/3	Linda Meg Sarah (Observer nearby)		3	C	16	1	Linda: I'm not your friend any more... Meg: Then I've got another friend. Diana.			√
		Adult present in 10 episodes				317	77 (24.3%)				

*Coding for social categories. A = one child alone; B = two chn, no adult; C = >2 chn, no adult; D = adult(s) for at least part of the time and one child; E = adult(s) for at least part of the time and >one child

△ = peer support, praise (>one child with transcript)

◇ = peer gives technical assistance or advice (>one child with transcript)

= complex friendship talk (>one child with transcript)

APPENDIX 4
SCREEN-PRINTING EPISODES
SUMMARY

No.	Date	Major players	Boys	Girls	SOCIAL (sec code *)	Speech turns	Adult speech turns	Name	Figure or shape	Notes	△	◇	#
1	31/1	ALISON Linda, Meg Penny (Danny)		3	E	23	15	√	fish	Good example of tutoring, and teacher coping with several children at once			
2	31/1	ALISON Danny	1		D	8	5	√	Danny: face	'Looking good. Good cutting'			
3	31/1	ALISON Bridget		1	D	15	6	√		'Lovely. Nice colours'			
4	1/2	OBSERVER Jinny		1	D	6	3		flower	Nell (nearby) 'I've got to wait for my friend' Jinny: "I'm going to keep going'			
5	1/2	Kiri Kay Emily ANN (at end)		3	E	85	19	√	house	Kiri: Is my Mum going to like mine Kay? Kay: Yeah cos I like yours. It's cool....Can you cut it out (for me)? Kiri: Yeah, sure Kiri: 'Good cutting Kay'	√	√	√
6	1/2	Emily Rachel Meg ANN ANDREA		3	E	33	18	√		Ann tries to persuade Emily			
7	1/2	ANN unidentified child	?	?	D	4	2			Queuing			
8	2/2	ANN Linda		1	D	4	2	√	aeroplane				
9	3/2	OBSERVER Danny	1		D	47	23	√					
10	3/2	OBSERVER Nell		1	D	82	39		Nell screens onto hat (no template)	Friend calls. Nell: 'Just a minute'.			
11	3/2	OBSERVER Samuel	1		D	67	38	√	screens uncut drawing				
12	7/2	ANN Joan		1	D	1	1			Myra: I copied you Molly: No you didn't. Look. You didn't. Yours is a heart. Myra: What did you make? Molly: I made a moon			

13	8/2	Myra Molly		2	B	14	0	√	moon, triangle			
14	8/2	ALISON Meg		1	D	4	3			minimal notes and transcript		
15	8/2	ALISON Jason John	2		E	84	30	√	circle	Jason makes a screen print for John, and writes his name	√	
16	13/2	ALISON Rita		1	D	42	18	√	circle	Rita: 'I can't cut...Wait til I show Mum it'		
17	14/2	AMY Bridget Danny	1	1	E	124	65	Amy writes name on	whale	Amy: 'Want to make something to take home?...Look at this everybody...Are you pleased with it?'		
18	14/2	AMY Tom Meg	1	1	E	42	21	Amy writes name on	whales	Children copying whales from a book, then cutting them out and making screen prints, with Amy helping		
19	14/2	OBSERVER Linda Catherine		2	E	10	5	√	whale. Linda keeps template and throws away print	Linda: 'I'm just going to small it down'		
20	16/2	ALISON Lisa		1	D	60	26	√	several indeterminate shapes '3 bits'			
21	20/2	Penny		1	A	no transcript				video notes. Gives it to Alison to hang up		
22	21/2	ALISON Lisa		1	D	60	32		several indeterminate shapes (Lisa counts them: 7)	Alison: 'Can you count them?'		
23	21/2	ALISON Nathan	1		D	20	10	√	Alison prompts: '..any kind of shape'			
24	22/2	ALISON Lisa		1	D	11	5	√	5 indeterminate shapes			
25	22/2	MEG'S MOTHER Meg		1	D	22	12		tent & fish	Mother: 'You're so good at cutting there'		
26	22/2	MEG'S MOTHER Linda		1	D	31	16	√	'person'	Mother: 'Spider?' Linda: 'No, person'		
27	22/2	OBSERVER Rita		1	D	17	5		screens uncut drawing of face			

28	22/2	OBSERVER Samuel	1		D	6	3		house; saves template, throws away the print	Observer shows Samuel an example of a print, but he throws his print away			
29	22/2	OBSERVER Joan Bridget John Freda	1	2	E	11	6	√	Joan: flower	Queue. Joan shows Freda where to put the rubbish		√	
30	22/2	ALISON Meg Freda Joan Bridget		4	E	34	5			Discussion about friends at the screen printing table. "This is Meg. My g. my other friend...she doesn't know where I live though			√
31	22/2	ALISON John	1		D	6	2	√	indeterminate shape				
32	22/2	ALISON Freda		1	D	9	6	√	lollipop shape				
33	23/2	Nell		1	A	no transcript			uses screen as painter, no template	Nell screens, paints, and punches holes in a piece of card			
34	23/2	AMY Lisa		1	D	23	12	√	small indeterminate shapes	Good video notes. 1.09 hours.			
35	23/2	ALISON Tony	1		D	9	5		rectangle triangle and circle	'I don't know how to do triangles'			
36	27/2	ANN Lisa		1	D	54	19	√	small indeterminate shapes	10 minutes			
37	27/2	ANN Penny Molly		2	E	1	1	√	Penny: horse-shoe shape; Molly: triangle	Ann sends Penny back to recut her shape more accurately. Penny helps Molly to lift the screen and remove the template (so that she can have a turn)			
38	27/2	Tania		1	A	1	1	√	cut-up holed edges of computer paper	Tania appears to have learned by watching the others.			
39	27/2	Chris	1		A	no transcript			indeterminate shape				
40	27/2	OBSERVER Matt	1		D	7	2			Matt screens for a bit, then abandons the task			

41	27/2	Nell		1	A	no transcript			uses screen as painter; in effect, no template	screens thick (glued) cardboard circle over a larger circle: only the top circle is painted			
42	28/2	ANN Lisa		1	D	46	23	√	several 'circles'	Discussion about cats with Ann			
43	28/2	ANN Sarah		1	D	55	31	√	face	Sarah's first day			
44	1/3	Meg		1	A	11	5			Few notes on this			
45	2/3	Lisa		1	A	no transcript				Linda's schoolboy brother helping			
46	2/3	Myra		1	A	no transcript			Circles	Video notes on cutting out, no notes on completion			
47	3/3	Molly		1	A	no transcript			Irregular triangle; pegs up template, abandons print	Video notes			
48	3/3	Lisa		1	A	7	1		5 or 6 circular pieces				
49	8/3	ANGELA Joan Danny	1	1	E	8	0		Figures	Joan: You putted that on the wrong way Danny: 'Going to do the shadow of it'		√	
50	8/3	AMY Bridget Miriam Susie		3	E	32	5		Circle shape with 'bite' out of it, described by Bridget as 'person'	Susie tries to help Bridget. Bridget: No! I spread it. It's my painting....How does that look? (Child replies: Good) Amy suggests magic; Bridget disagrees: 'I know what it is'			
51	8/3	Tania		1	A	10	5	√	Cut out holed edges of computer paper as before, but abandoned	Abandons task when newspaper not readily available for under the screen.			
52	8/3	Nell		1	A	no transcript			uses screen as painter, no template				
53	9/3	AMY Danny	1		D	17	10		rabbit				
54	9/3	AMY Joan		1	D	33	14		face				
55	9/3	OBSERVER Meg		1	D	no transcript			rabbit				

56	9/3	Linda		1	A	no transcript		√	two figures	Amy helps her to remove the template; Meg does too			
57	10/3	AMY MOTHER Rita		1	D	22	12	√	scribble on a circle: template removed and shown to Amy				
58	10/3	AMY Susie		1	D	3	2		figure				
	summary	Adult present in 44 episodes. No adults in 14 episodes, 12 on or after 23/2)	15	59		1321	589 (44.6%)	27					

*Coding for social categories. A=one child alone; B=2 chn, no adult; C=>2chn, no adult; D=adult(s) for at least part of the time and one child; E= adult(s) for at least part of the time and >one child

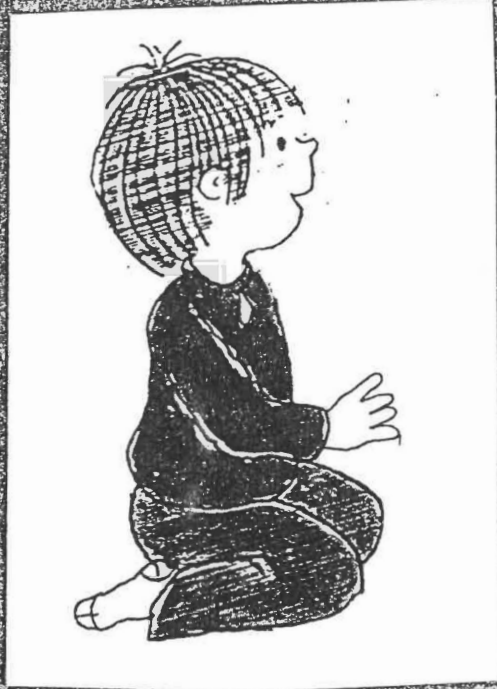
△ = peer support, praise (>one child with transcript)

◇ = peer gives technical assistance or advice (>one child with transcript)

= complex friendship talk (>one child with transcript)

APPENDIX 5
THE STORY BOOK

Jason goes to kindergarten



Linda goes to kindergarten





**This is Jason. He is a four-year-old
and every morning he goes to
kindergarten.**



**This is Linda. She is a four-year-old
and every morning she goes
to kindergarten.**



This story begins one morning when Jason walks to kindergarten with his mother and his baby brother. The sun is shining, and baby brother has his sun hat on.



This story begins one morning when Linda walks to kindergarten with her mother and her baby brother. The sun is shining, and baby brother has his sun hat on.



When Jason arrives at kindergarten the teacher and the children all say hello



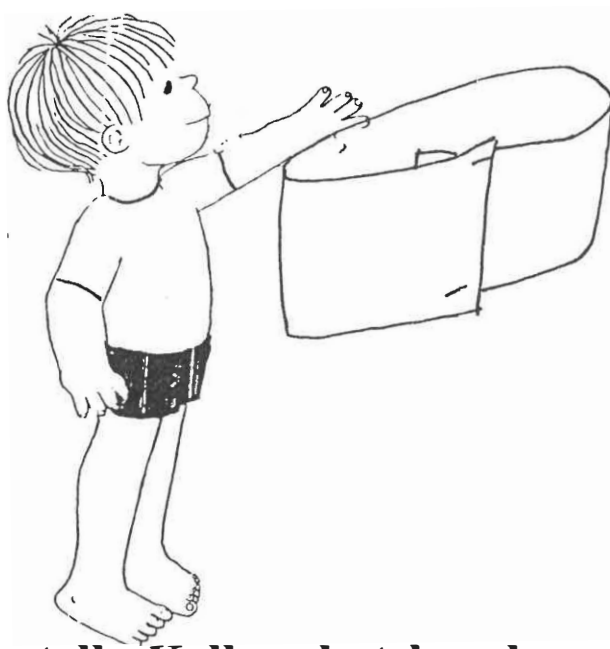
When Linda arrives at kindergarten the teacher and the children all say hello



After mat time Jason is wondering what to do. He decides he would like to make a sun hat, one with a brim at the front and a sun shade at the back. But he has never made a sun hat before, and he doesn't know if he can make one.



After mat time Linda is wondering what to do. She decides she would like to make a sun hat, one with a brim at the front and a sun shade at the back. But she has never made a sun hat before, and she doesn't know if she can make one.



He tells Kelly what he plans to do. Kelly has some advice. "No, don't make a sun hat. Sun hats are too difficult and you might make it wrong. Make a birthday hat: you know how to make a birthday hat, it's easy"

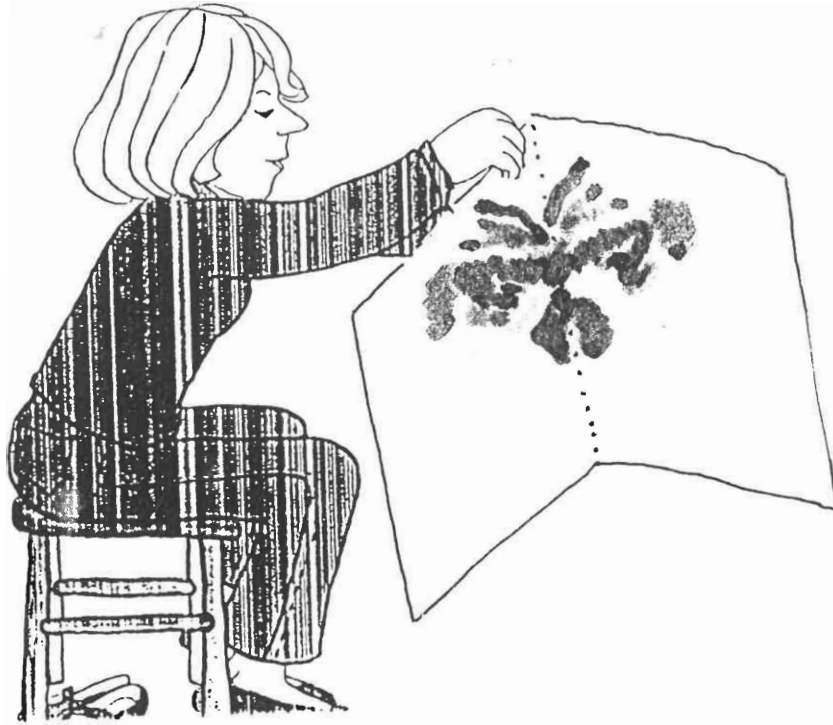


And indeed he does know how to make and decorate a birthday hat because he's often done that....



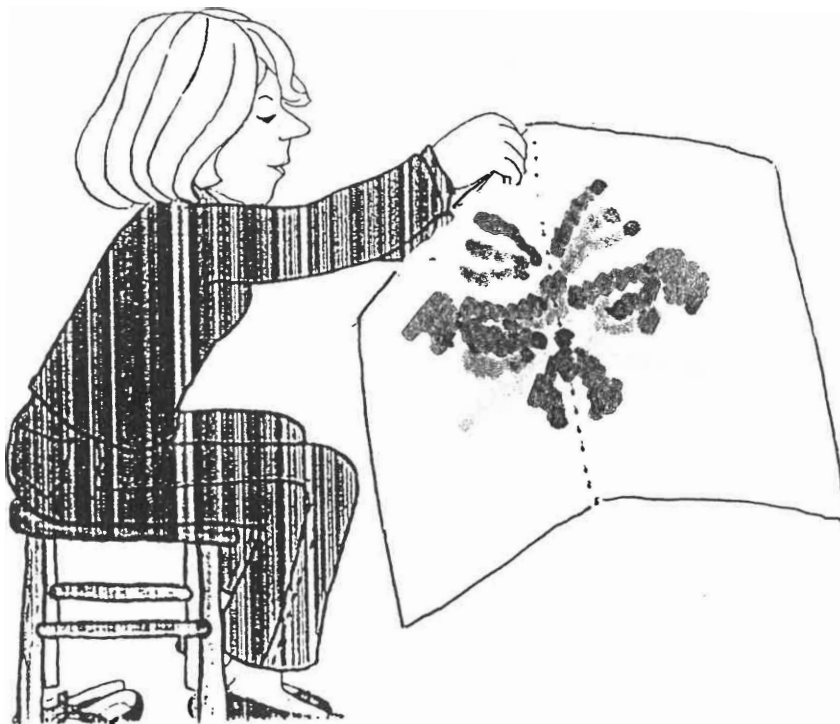
She tells Kelly what she plans to do. Kelly has some advice. "No, don't make a sun hat. Sun hats are too difficult and you might make it wrong. Make a birthday hat: you know how to make a birthday hat, it's easy"

And indeed she does know how to make and decorate a birthday hat because she's often done that....



He tells one of the teachers what he planned to do. The teacher has some advice. "No, don't make a sun hat. Do a butterfly painting. We've put out four colours for butterfly painting on a special table and all the children are going to do one".

And indeed it is enjoyable to do the things that are set out for the day, the things that everyone else is doing...



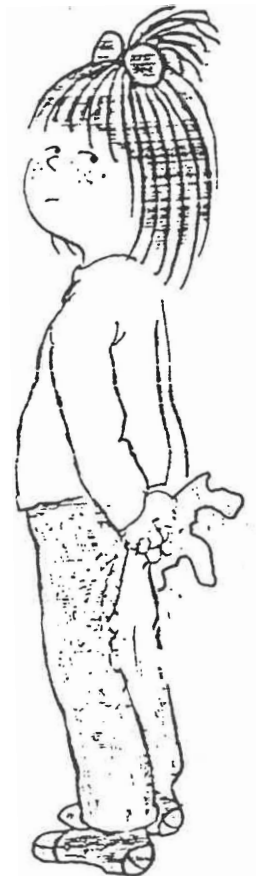
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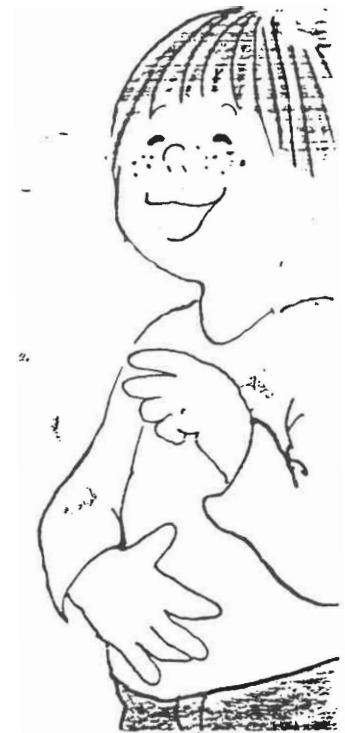
He tells his best friend Kim what he planned to do. Kim has some advice. "No, don't make a sun hat. I'm doing a screen print. Do a screen print with me. If you don't do a screen print with me I won't be your friend."

And it is certainly fun to do things with a best friend.....



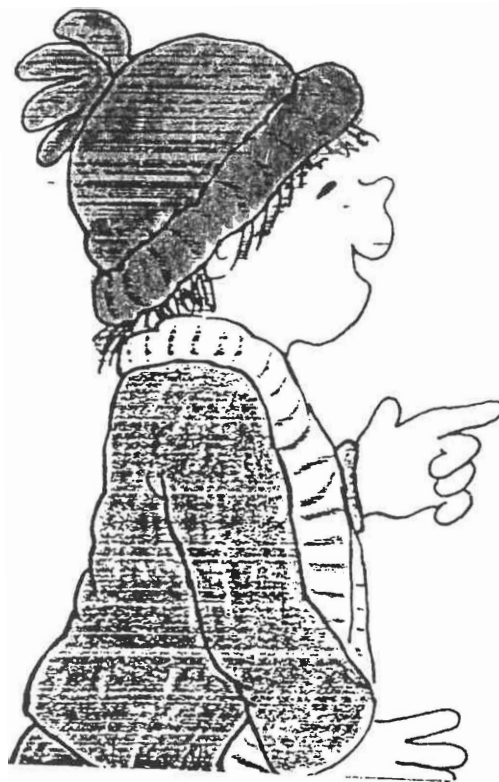
She tells her best friend Kim what she planned to do. Kim has some advice. "No, don't make a sun hat. I'm doing a screen print. Do a screen print with me. If you don't do a screen print with me I won't be your friend."

And it is certainly fun to do things with a best friend.....



He tells one of the other children what he planned to do. He gets some more advice. "No, don't make a sun hat. Just put on one of the dressup hats and pretend that you made one"

And it is certainly would feel good to imagine that you're wearing a sun hat that you've made. It would be like making magic.....

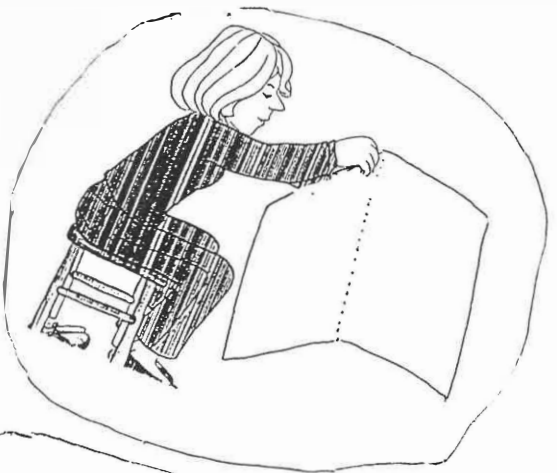
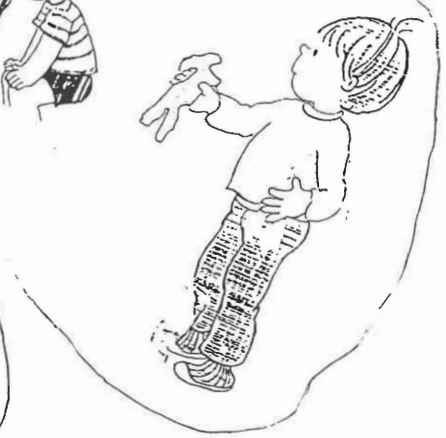
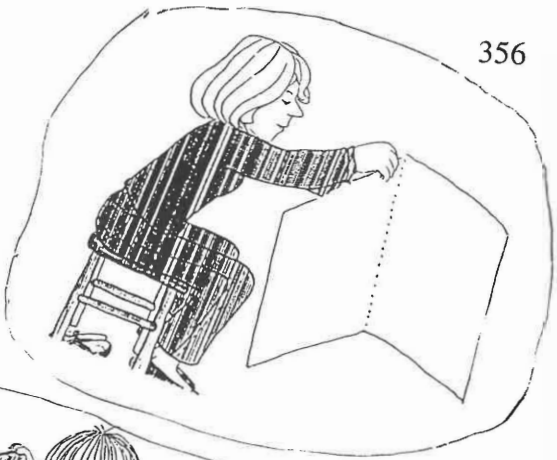


She tells one of the other children what she planned to do. She gets some more advice. "No, don't make a sun hat. Just put on one of the dressup hats and pretend that you made one"

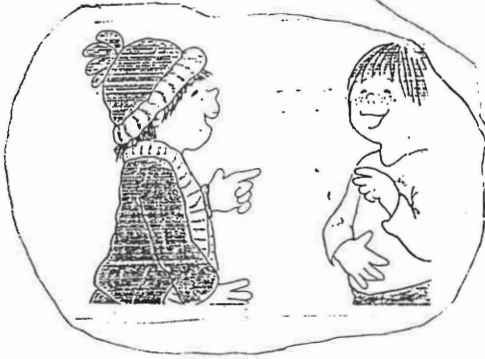
And it is certainly would feel good to imagine that you're wearing a sun hat that you've made. It would be like making magic.....



What should he do?



What should she do?



APPENDIX 6
CHILDREN'S RESPONSES TO THE STORY BOOK INTERVIEW

DATE	POSITION ON AUDIO-TAPE	CHILD'S NAME	CHOICE: (i) sun hat (difficult) (ii) birthday hat (easy) (iii) butterfly painting (teacher request) (iv) screen print (best friend request) (v) pretend (no construction)	ANY REASONS GIVEN either for this choice, or for not choosing another option	VALUED KNOWLEDGE in response to "what can you do now that you couldn't do when you were a baby" "what will you be able to do when you're five?" "what do you get more clever at?" "what is difficult for you?"	OTHER COMMENTS
27/3	A0.00	LAURA	Screen print	She hasn't got the right material	(i) short tennis (ii) telling Emily I don't want to play with her	I do the things I know how to do
27/3	A16.00	MEG	Butterfly painting	Cos she's too little, the teacher would have to help her		
27/3	A29.22	WENDY	Screen print		(i) cartwheels (ii) write	(How did you get to be friends?) We just knew each other's names
27/3	A29.22	RACHEL	Don't know		handstands	
27/3	B0.00	DEBORAH	Birthday hat	She's made them before	sandpits	
27/3	B11.1	NATHAN	Butterfly painting		doing flips on the trampoline	
27/3	B11.1	SIMON	Sun hat		I'm all right at painting (Do you do any painting here?) No	
28/3	A4.10	SAMUEL	Birthday hat		(i) hard puzzles: "I can do 100 pieces" (ii) a forward flip (demonstrates)	If he got it wrong the teacher could help him
28/3	A16.20	RITA	Screen print	You cut it around	when I get bigger I go to school and do vacuum	
28/3	A23.04	LISA	Butterfly painting			(What do you do here?) You're allowed to do painting and make things out of boxes
28/3	A31.39	TANIA	Screen print	Cos her best friend is doing it		
28/3	B0.20	SARAH	Birthday hat	Because it's easy	(i) diving under the water (ii) trampolines (iii) climb up trees	
28/3	B4.58	TREVOR	Screen print			(If he makes a mistake?) He should just leave it
28/3	B4.58	JOHN	Screen print	He doesn't want to make a hat		
28/3	B18.04	NELL	Screen print			

29/3	A0.10	TOM	Sun hat	Get teacher to help		(You made a monster, didn't you) Yeah, and you had to help me a lot (If it was difficult?) Get the teacher to help me
29/3	A0.10	TONY	Screen print	What the friend wanted him to do		
29/3	A6.43	MARTIN	Pretend	Because it's the best of all	(i) running (ii) jumping (iii) (what d'you think you'll be able to do when you're five?) make a big dinosaur	(Do you ever make mistakes?) No I don't
29/3	A18.48	LINDA	Butterfly painting	Because the teacher wants her to	(i) before I couldn't do jumps and now I can (ii) And I can dive (in the water?) yep	I can dress up when I go to school
29/3	B2.28	TODD	Pretend	You can buy them		
29/2	B8.0	EMILY	Butterfly painting			
29/2	B19.04	MYRA	Butterfly painting	Cos it would be the prettiest...th at's easier	put two hands on the branches and swing from one branch to another	
29/2	B25.9	DANNY	Sun hat	Describes procedure	(i) learning how to ride a two wheeler (ii) drawing cars like Len (big brother)	(What do you like doing here?) Digging in the sandpit (What can you do here now that you didn't used to be able to do?) Swing on the swing
30/3	A2.41	PETER	Screen print		go to school	(What do you like doing here?) Playing with a friend. I don't cry.
30/3	A2.41	PATRICK	Pretend			
30/3	A17.03	JINNY	Sun hat			How did you make this book?
30/3	A28.30	MATT	Birthday hat		(i) castles (ii) (when you're five?) I will go up the street to get some eggs (by yourself?) yep	
30/3	A37.58	CHRIS	Birthday hat		build houses - sometimes here and sometimes at home (What's tricky?) putting the roof on - cos my Dad does it	
30/3	B0.19	BRIAN	Pretend		(What can you do now that you couldn't do when you were a baby?) I'm a boy...play with blocks	(What do you do here that's difficult) Swing. Jungle gym. When it's wet.
30/3	B19.30	BRIDGET	Pretend			
30/3	B19.30	ROBERT	Butterfly painting			
30/3	B28.54	VALERIE	Sun hat	Describes design: adapt a birthday hat	(i) drawings of different things (cats are difficult) (ii) writing my name by myself	

31/3	A1.06	JOAN	Screen print			
31/3	A9.32	FREDA	Sun hat		(i) drawing noses properly (ii) and I know how to do an e properly, across and around. I know how to do an 'a' - you do an 's' and then you join it up to the other side (Who taught you that?) Mum	(How do you get to make new friends?) If you start see them...and then they like you...you start to like them and then they come friends
31/3	A28.0	MARK	Sun hat		me nearly five and me know how to whistle (Who taught you that?) My Dad	
31/3	A34.2	CARL	Sun hat		I did a picture of my Dad right here with paint	
31/3	B12.12	SUSIE	Screen print		draw a house, draw a butterfly	I don't do anything that's hard for me...if my big sister does something really hard I won't do it
31/3	B23.29	JOSEPH	Sun hat	Sew...stitch	swinging	

APPENDIX 7

**THE EMERGENCE OF *BEING RIGHT* AS A DISCOURSE:
the example of Emily**

(1) 1/2TTB1.00 Painting (with Nell). She worries that the paint will not come off her dress. Nell reassures her that it will come off. Emily says "So everyone's wrong about it eh?"(TTB8.08). Earlier in the same episode (1/2TTB3.41) they have another 'theory of mind' exchange:

Nell: Margie (*my sister*) thinks (*i.e. believes*) your brother's Bobby.
 Emily: My mine um my brother's Bobby.
 Nell: And my big sister thought it was Bobby.
 Emily: Yeah.
 Nell: Good eh.
 Emily: He (*meaning your sister Margie*) knows his (*my brother Bobby's*) name eh.

(2) 1/2PTA31.07 Observer helping her to write her name.

Emily: Just a little mistake. (pause) That doesn't matter, eh? (sounds anxious).
 Observer: No, that doesn't matter.
 Emily: (a short time later) Oh. Mistake.
 Observer: That's the A. That's good. Yep.

(3) 15/2TTB37.53 Emily and Laura are attaching wings; they ask the observer for help.

(4) 1/3TTA23.19 Emily is painting a circle, and listening to some music. The music stops and Ann asks "What's happened to our music?"

Emily: I think it is. I think you have to turn it over (Ann turns the tape over and the music starts again). Yes, I were right, weren't I?
 Ann: You *were* right. We turned it over and it was there.

(5) 9/3PTB34.10 With Diana, cutting out card to make 'money' as part of a dramatic play sequence. Emily has taken on the role of the daughter, Diana the mother. Emily's comments include: "I'm a really good girl eh. Say I'm a really good girl eh. . . That's why you're letting me go to the circus eh . . . I'm allowed to do that".

(6) 10/3TTA25.59 Emily and Laura are painting with cottonbuds, mixing glue with the paint and making bubbles (Linda: "I'm telling on you").

(7) Dramatic or 'family' corner.

Emily is recorded on three occasions in the family corner, developing complex dramas often with Laura.

7/2TTB24.47 "I just pretend I I just pretend eh? . . . And just pretend I'm the sister eh?"

(8) Dramatic or 'family' corner.

15/2TTB2.05 "Just pretend I am the horsie and I've got the fleas eh? Just pretend that I'm a horsie that's got fleas and I'm going um I'm gonna have to go to the doctor's 'cos you have to cut my heart open and get the fleas out eh?"

. . . "It's too late for you. I'm you I aren't your friend now. (pause) It's so funny that we've got to laugh eh". (15/2TTB12.57)

. . . Sharing morning tea with Laura as part of the same episode: "One each. So it's fair eh?"(15/2TTB16.20)

(9) Dramatic or 'family' corner.

16/2TTA0.36 With Laura "Then play the one the game that that the wizards are in that we played yesterday".

(10) In the carpentry on 14/2 I ask her how to attach the vice to the table, and she gives me instructions, "You put that bit um this bit steeling (?) onto there um and you twirl this little thing down here, open it all the way and then it's all done".She adds: "I think. Try that. But I don't know. I guess it".
(14/2TTB33.00)

(11) Finally (apart from a recording with a group of boys in the Lego area where she complains that "No-one's being good or kind to me"), the field notes record that:

Yesterday (27/2) as we were tidying up Emily and Laura were helping me to do a jigsaw. Laura: "That's wrong Emily". Emily: "No! Don't call me wrong. If you call me wrong I won't let you stroke my mouse". Laura: "All right". Later, Emily: "That's wrong Laura. Now we're both wrong". Laura: "No. I'm not"
(FN28/2)

APPENDIX 8

**CHILDREN WHO WORKED AS A MAJOR PLAYER IN ONLY ONE
TECHNOLOGICAL PRACTICE: summary of the observation data**

- Bridget
see text, section 14.2.5
- Jason
Appendix 10
- Joan
see text, section 14.2.5
- Lisa included in text as Figure 14.2
- Martin
9/2 Martin staples sheets of paper together to make a book and draws in it, asking the observer to write a title under one of the pictures ('school' work; 9/2PTA 11.40-13.26).
9/3VN he makes his 5 hat, another *being nearly five* activity.
27/2 he paints a circle red, an activity for the morning ("That look like a red circle?" he asks).
28/2 he works hard to make a 'shaker' by cellotaping two yoghurt pots together.
16/2 he works with other children to construct and attach 'wings'.
- Myra
8/2TTB29.13 collage and chat with Molly.
17/2TTB12.32 making a birthday card for Hayley who is leaving for school.
21/2TTA0.42 marble painting and chat with Molly
23/2TTA0.10 hat making and chat with Molly.
28/2TTA11.50 hat making and chat with Molly.
3/3VN screen print (keeps the template, throws away the print).
- Nathan
21/2TTA43.40 Alison teaches Nathan to do a screen print and write his name.
27/2FN and 27/2TTA11.30 Nathan and Mark are painting and gluing circles. He giggles with Mark and Peter, pretends to fall off his chair, throws the crayon around. He goes to hang up his painted and glued circle 'then mutters "my name", puts a squiggle with yellow crayon and a brush of red paint' (presumably to represent his name).
28/2 VN 'Nathan bashes a stapler onto a squashed box. Mark is keeping an eye out for Ann's reactions. Observer shows them how to see if the staples have run out, and how to use the stapler efficiently without banging it. Nathan squashes and staples a box, gives it a bang, and looks at the observer for a reaction. Looks around a lot. "I'm making lots of these". He abandons the work and goes outside.

Nick

9/2PTB22.12 Collage with Jinny and Nell. No notes on Nick's work; he makes three conversational turns, two of them are questions to Nell and Jinny.

13/2TTB7.36 Makes what he calls a 'transformer gun' out of a cardboard tube. Then looks at the observer through it in a telescope-like manner.

Observer: Hello Nick! It's turned into a telescope. It has transformed. It was a gun one way, and the other way it's a telescope.

Nick: Round the other way (...)

Observer: Mmm. And a telescope that way.

Nick: And a (...) one this way

Observer: Right. A microphone that way. Excellent. Three different things.

Nick: Here comes a alligator, it's hungry as can be!

Observer: And it's an alligator as well.

(13/2PTB)

He works on his construction and later has a discussion with Alison about cellotape and glue. Alison advises him to hold the cardboard roll and attachments together with cellotape until the glue dries (13/2 41.41): "Will it stick. Will the glue be a bit more sticky when it's dry?". Alison "Yes. The drier it gets the harder it becomes and then it makes things stick together. But that just helps to hold it while you wait for the glue to dry".

14/2FN Makes a hat. "Too big, isn't it". Abandons the task.

20/2TTA11.56 Says he's going to make a hat, then says to Samuel "I don't think I can make a hat". Goes outside to play with Samuel.

21/2 Paints his hands and makes monster noises, admired by Danny.

21/2TTB27.20 His last day; he makes a dough birthday cake and with his mother's help he writes his name in a thankyou card.

Peter

7/2TTA0.26 Makes a hat, tells the observer "Hey my, David's coming to my house tomorrow".

17/2TTB19.21 Drawing. No detail in the notes. "I'm gonna take it home" Ann: "Are you, is it something special? Do you want to pop your name on it?" Peter: "No".

20/2TTB0.08 Drawing a whale, in a group that includes Molly and Carl. Amy is helping them, referring to a book on whales and encouraging them to cut out their pictures and turn them into puppets with a 'hand hold' at the back. She says "Have a look Peter. Stop. Have a look. Spend a bit of time looking at this. Look at his mouth. It doesn't curve up like yours when you're smiling".

23/2 TTB32.14 Construction with Tony, little detail in notes. He says they are 'making fire engines'. Later (23/2TTB34.53) tells Trevor's mother "I'm making a sword".

27/2TTA11.30 Giggling with Nathan and Mark while they paint and glue circles.

9/3VN Makes handcuffs, tearing paper into strips.

Trevor

13/2TTB8.56 Hat making

Alison: Is this to go round your head Trevor?

Trevor: Mhm

Alison: Let's measure . . . might need to press down really hard with that Trevor. I'll just check. Will that fit?

21/2 FN Looks in boxes for inspiration, comes up with plastic container and an egg carton. Has trouble with cellotape roll which has become detached and he can't put it back. Puts dispenser and materials back (doesn't ask for help). Goes away Returns later, folds a piece of paper, staples it and goes off to locker with it.

22/2 VN10.40. Asks Observer for help with stapler: he is stapling green beer advert. sheet of paper. Counts the staples. 1-2-3-4.

23/2 TTA 14.00 Staplers advert. sheets. Goes to get some corrugated card. To Valerie "Look what I done. Rolled this up. Rolled it up. I rolled it up. Valerie: "You could take that home and do patterns on it". Trevor: "No". Observer asks him how many of these he has now ("Four") and what he does with them ("Hangs them on the wall")

23/2TTB34.29 When his mother stays with him and she suggests they make a sword (Peter tells her that he is making a sword). He says "No. No no no swords at kindy Mum" (they make a boat).

27/2 VN Screwing up small pieces of paper. Brian gives him the stapler. he raises his leg in a 'Kung Fu' gesture. Brian smiles. Cellotapes a short cardboard roll to a box, then goes off.

3/3 VN and 3/3TTA 5.45. "These shooters". Pushes cardboard tubes down through a cardboard carton. Brian comes over. He holds two fingers up and says "Two".

3/3 Making a hat. Staples strip, tries it on, walks about: it slips down towards his eyes. Returns and adds more staples.

9/3 FN. Folds another beer advert. sheet over and staples it. Takes it off to locker. Cellotapes lids. Talks to Observer about the number of motors, and a 'one-forty' (140 Horse Power?).

10/3 Hat. FN and 10/3TTA 35.02 Works hard to get hat to fit (the episode where he uses waist to measure for head, Figure 7.5). Tells Linda and Chris: "I'm making a hat" (pronounces it 'hart').

10/3 FN 10.35 a.m. Makes large envelope by folding paper and stapling it. Puts toothpaste box inside and takes it off to locker.

Valerie

Led the retreat in the butterfly episode (chapter 5).

14/2 (FN) Works in an absorbed way folding card so that it stands up and becomes three-dimensional; later other children will copy her.

23/2 (TTA14.00) Talks to Trevor who appears to be wondering what to do with some cardboard tubes: "You could take that home and do patterns on it".

2/3 (TTA32.50) Makes a folded painting and writes her name: "I did my name all by myself".

APPENDIX 9

**CHILDREN WHO WORKED AS MAJOR PLAYERS IN MORE THAN
ONE TECHNOLOGICAL PRACTICE:
summary of the observation data**

Danny

31/2TTA10.24 Screen print (a face) with Alison's help.

3/2PTA0.00 Screen print (two figures). Discusses with Observer.

14/210.00 Discussion at construction table about crickets.

Amy: Just leave him (a found cricket) there carefully, I wouldn't want to shake him 'cos that might break his legs. You might like to let him go soon.

Danny: Those things haven't got any bones.

Amy: Pardon?

Danny: They haven't any bones

Amy: What are you two going to do today?...What about a screen print Bridget?

14/2TTA12.01 Screen print of whale

22/2TTB18.55 and 22/2VN Marble painting. Asks Alison to show him how to do one, and she shepherds him through the process

28/2TTA42.50 Collage. Collaging onto a circle. Copies Diana who has stuck her collaged circle onto blue patterned and stapled paper.

1/3FN and 1/3TTB42.09 Drawing. He makes a drawing, sits in the block corner to draw, singing. Amy: "Danny, that's great, I'll write a story on it later for you. Great eyelashes . . . Good boy Danny . . . You're clever aren't you".

3/3TTA27.14 Construction with Bridget. He tells Bridget how to cellotape it together: "If I help you you'll do it quicker".

8/3VN9.52 and 8/3FN Screen print, with Joan. Angela helps him to cut out his picture. Joan: "You putted that on the wrong way" Danny: "Going to do the shadow of it".

9/3FN Collage with natural materials, with Catherine Nell and Penny. They collage seeds etc and crayon around them. Discussion about swear words, whether you're allowed to say 'shuddup'.

9/3TTA26.14 Screen print of dinosaur, helped by Amy.

Linda

31/1FN and 31/2TTA0.01 Mixing paints. "You're allowed to take any colour you like".

31/1TTA10.24 Screen printing with Alison "I don't need my name any more, I can write myself".

31/1TTA22.05 Painting with Meg. When Meg shows her her painting she says "Don't".

2/2TTA4.20 Writing her name. Andrea: "good girl. Well done. I only showed you yesterday. You're a very quick catcher-on".

2/2TTA7.54 Screen printing. (to Ann) "There's too much of it" Ann: "No. spread it up and down and see if. It's got to go right in the corners and cover the whole screen" Later, Ann: "...fabulous aeroplane".

7/2FN and 7/2TTA1.13 Collage/painting sea mural with Meg.

Linda: I'm going to make a dolphin now.

Meg: A dolphin.

Linda: Are you going to make a dolph a dolphin now?

Meg: If you want to make a whale that's the way . . . That's stingray OK?

Linda: It's got blue funny eyes . . .

Meg: I'm doing by myself (7/2TTA11.31-12.40)

7/2FN and 7/2TTB13.12 Collage (covering box with material) with Meg and Molly. "Hey, I don't know what to do. . . (to Meg) Don't. Don't say 'love' "

8/2FN and 8/2TTA1.30 Drawing, with Meg and Freda

Meg: This is my Mum.

Freda: What?

Meg: This is my Mum.

Freda: Oh. Funny legs.

Linda: Those are her ah arms.

Meg: No, legs.

Linda: Mmm.

Meg: I'm making ah Mum. Freda, Freda! Freda, come and put your name on your. (Meg goes off to get Freda) . . .

Linda: What are you doing?

Meg: Doing my Mum.

Linda: Not five legs. Two legs. I did two legs.

Meg: Those're her arms.

Linda: Funny, that looks like a scarecrow.

Freda: Yeah, does.

Linda: Looks like a girl scarecrow.

Meg: No, it's my Mummy.

Freda: No, but it hasn't got any neck or.

Meg: (...)

Linda: And doesn't look like it has a tummy.

Meg: That's the tummy.

Linda: No, that's the legs see.

Meg: No, those are.

Linda: I done my Mum.

Meg: Those are the legs.

Freda: (starting to write her name) F.

Meg: There's the tummy. See. Don't copy mine. Don't want cha to copy (covers her drawing with her arm. Linda copies the diagonal lines Meg draws across her drawing).

8/2TTA6.52 Roller painting. "I've got this colour. Got a different colour than you. Got purple". Meg: "Ooh, that's mine" Linda: "Nooh I want it. Hey that's mine".

13/2TTA18.52 (to Observer) "I cut a bit off. (pause) 'cos it was a bit long" Making a hat for her cat.

13/2TTA30.24 Dough picture. Alison: "You can make a dough garden, a dough picture". Linda: "Yeah I want to do that". Alison shows her how to write her name with dough.

13/2TTA36.25 Discussion about whether she brought a sunhat to kindergarten "I didn't bring a hat . . . but I got sun stuff on my face".

13/2FN Hat-making. (to Susie) "I'm her (Meg's) friend so don't fight".

13/2FN Construction. Asks Alison to help attach two plastic tubes onto an egg container. Meg copies.

13/2FN Collage, with Rita and Meg

Linda: Can you get me a leaf?

Meg: What sort of leaf?

Linda: Like those (points to fern on Meg's collage. Meg finds one for her)

14/2TTA34.12 Screen print of whale, with Tom. Amy helping. Won't use grey paper because she wants it to be the same as Meg. Screws up the print, keeps coloured positive. To Observer: "I don't know how to put it on there (hang it up)".

16/2TTA12.37 Nell is marble-painting with Nick and Jinny They talk about marble-painting in the box with no paper in it. Linda: "You'll be naughty".

22/2VN9.51 Hat. Meg's mother staples it for her.

22/2TTA13.40 Screen print with Meg's mother. Mother: "Is that a spider?"

Linda: "No, it's a person".

22/2TTA23.50 Collage with Meg's mother (will you look after my pictures please Sue).

23/2TTA45.5VN10.30 Hat-making. "I don't know which measure it". Alison helps her align shapes. She asks Observer to measure her head (Observer holds card together in right place and Linda staples it).

24/2FN and 24/2TTA1.36 Blocks (Warthogs)

Two groups have formed: Linda and Meg are separating wild animals from domestic (at Meg's suggestion) and making enclosures. Molly Tania and Catherine are building nearby. Linda, unsure about the category for a warthog says "What's this for?" Molly calls out "For the warthog". Meg by mistake kicks down part of Catherine and Molly's walled structure. Linda: "I didn't do it. It was Meg" Catherine or Molly: "Oh Meg. Now you have to build them all up again. Doesn't matter. We can do it". Later, when Laura comes over and tells Meg "It's mean having two horses", Linda takes Meg's hand and says "This is my friend".

27/2TTA35.17 Penny fingerpainting in the marble painting box. "Are you allowed to do that?" . . . "Did the teacher said you could do that?"

27/2FN Dough gardens with Meg.

28/2TTB31.03 Hat, birthday hat. Asks Observer for help with measuring. Ann: "Why're you putting a number 5 then? . . . Are you getting ready for your birthday?".

1/3 Butterfly construction, see Chapter 5.

1/3FN Construction, telescopes, with Meg. Looking through yellow cellophane, attached to the end of cardboard rolls (started during the butterfly construction).

1/3TTB21.33 Construction of hessian containers with Amy and a group of children. Linda: "Doesn't bother if we get it on the table".

2/3TTA10.51 Dough pictures with Meg and Linda's mother. Meg: "I'm making a birthday cake to take home" Linda: "I want I do as well".

2/3PTB Folded painting with Observer. To Observer (although she has carefully watched Samuel make a folded painting): "Now what do you have to do?...I can't remember. You show me".

2/3TTB17.07 Marble painting. To Meg: "I'm not going to talk to you any more".

3/3TTA0.15 Discussion with Observer about party at her place tonight.

9/3PTA4.38 Splodge paintings. Asks Observer several times about a painting that she doesn't like any more. "Where should I put it?"

9/3VN10.10 Screen print. Watches Meg and Observer work together on cutting out a rabbit for a screen print. Linda then asks Observer to help *her* cut out a rabbit. Observer says "Just a minute" (she's helping Tom make his monster). Linda cuts it out by herself. Amy helps her remove the template (she asks for help); Meg helps her to glue the template onto a sheet of paper. She keeps the print too.

9/3VN10.36-11.19 (43 minutes) Construction. Works away on a paper chain, without assistance.

10/3TTA19.39 Painting with cottonbuds. Emily mixes glue with dye and makes bubbles. "You're not allowed doing that. I'm telling telling on you soon".

Meg

31/1TTA10.24 Screen print (not a random shape: "Mine's a fishy").

31/1TTA22.05 Painting alongside Linda. "Look Linda. Linda. Linda" (Linda: Don't) "I'll write my name".

3/2PTB1.46 Name-writing. "I've wroten my name" (to Observer).

7/2TTA1.13 Collage and painting a sea mural with Linda.

Linda: I'm going to make a dolphin now

Meg: A dolphin

Linda: Are you going to make a dolph a dolphin now?

Meg: If you want to make a whale that's the way. . . That's stingray OK?

Linda: It's got blue funny eyes . . .

Meg: I'm doing by myself (7/2TTA11.31-12.40)

7/2TTB13.12 Collage (covering boxes of material) with Linda and Molly. "You gotta share". When someone finds a grasshopper: "Show the teacher".

8/2TTA1.30 Drawing with Linda and Freda. Meg Linda and Freda are drawing. Freda wanders off. Meg runs after her and tells her to write her name on her drawing. "This is my Mum". Linda: "Funny. That looks like a scarecrow". . . Meg: "I've finished mine. . .(to Freda) write your name?" Freda: "Yeah. OK." Meg: "Now we can put them in our lockers".

8/2TTA6.54 Roller painting with Linda. "See if those (rollers?) work. Hold the paper. I'll go and get (us) some more".

13/2TTA18.52 Making a hat for her cat.

13/2FN Making hats. Susie to Meg: "I'll measure your head eh? . . .so I'll do the thing (stapling)". Meg: "No, I will". Linda: I'm her friend so don't fight".

13/2FN Construction. Linda asks Alison to help her attach two plastic tubes onto an egg container. Meg copies, asking Observer to help her.

13/2FN Collage with Linda and Rita. Linda: Can you get me a leaf?" Meg: "What sort of leaf?" Linda: "Like those (points to fern on Meg's collage)". Meg finds one for her.

14/2TTA34.12 and 14/2FN Screen print with Amy helping. Stands passively while Amy takes the initiative to cut out the mouth of the whale for her. Later: won't let Linda help her put on cape when they go off to dress up.

14/2TTB2.58 Writing her name. Meg (to Observer): "It's not right" Observer: "Yes it is. Just put an 'e' in the middle. An 'e' in between" FN: Meg is upset because she wrote her name wrong. She pastes over the error.

21/2VN10.11 Meg helps Phoebe to write her name and then hangs up her painting for her.

22/2TTA4.07 Screen print with mother helping. "I'm not s'posed to write my name on (the template?)".

24/2TTA1.36 Blocks (Warthog episode, details in Chapter 11). Takes the initiative: "Those are all the wild ones OK?".

24/2FN Dough. To children throwing dough. "You gotta share".

27.2TTA35.17 Marble painting. Penny is finger painting in the marble box. To the teacher "She's doing it wiv (with) her hands".

27/2FN Making dough gardens with Linda.

1/3 Group butterfly construction (see Chapter 5).

1/3FN Construction, with Linda. Making telescopes by cello taping cellophane across the end of cardboard tubes: looking through coloured cellophane started during the butterfly construction.

1/3TTB20.12 Construction of hessian containers with Amy and a group of children. "Can I do some? . . . Linda's my friend".

2/3FN Screen print. Meg and Bridget chat to Nell and Jinny. Nell squidges her hands together as she finger paints in the marble box. Meg laughs.

2/3TTA10.51 Dough pictures with Linda and Linda's mother Meg: "I'm making a birthday cake to take home" Linda: "I want I do as well".

2/3TTB17.07 Marble painting with Linda and Sarah.

Meg: Got to talk nicely.

Sarah: Yeah.

Linda: You don't know how my name goes. You don't know how my name goes either.

Meg: You don't know how my name goes.

Linda: Yes, I seen.

Meg: But you don't know how my next name goes.

Linda: I know everything. I'm clever . . . Not gonna talk to you any more. I'm not your friend any more (...) another friend.

Meg: Then I've got another friend. Diana.

Linda: Who? I'm gonna. I'll (pause) I'm doing. I'm not telling which one I'm doing.

9/3FN Painting splodge paintings with Linda.

9/3VN10.22-10.55 Hat making (makes hat with blue cellophane as a visor, see details in Chapter 7) Interrupts to help Linda at screen printing. Amy: "What a good friend".

9/3PTA32.46 Screen print (to Observer): "Can you help me make a rabbit? . . . Can you cut it out?" (Danny has screen printed a rabbit). Observer: Oh. I don't think I'm very good at cutting out. I can hold it for you".

9/3VN10.55 Construction. Cellotapes transparent egg carton together, paints it, and opens it again to poke cut out pieces of wool and lace into the compartments.

Molly

7/2TTB13.12 Collage with Meg and Linda. Covering boxes with material. Admires Meg's work: "I like that sponge".

8/2TTB29.13 Collage with Myra. Covering boxes with material. To Myra: "I'll get you some flowers for you".

20/2FN Hat making. Comes to make a hat like Lisa's. Asks for help with the stapling. Makes a print from her painting onto the hat, and presents it to Alison.

20/2VN10.38 Nick helps Molly to do a marble painting. Then he does one. He takes her painting out for her, she chats to him while he paints.

20/2TTB0.08 Drawings and puppet making with Amy.

Molly: Look at mine

Amy: (teacher) Oh you've made it all on your own Molly. He's beautiful. Are you pleased with it?

Molly: Yes. (pause) Here's my person. (pause) That's the Mum. That, this is the Mum. That one's the Dad

21/2TTA0.42 Marble painting with Myra. Myra: Victor Smith's not allowed to say 'eh'. Victor Smith's not allowed to say 'eh'. But we are, OK? OK Molly?" Molly: "Who cares? Who cares?". . . "Hey, the ball's making me do that" Collaborative exchange see Chapter 11.

21/2TTA22.46 Construction. Paints a box. Observer: "What will you use it for?" Molly: "A trailer". Observer helps her to attach wheels.

23/2TTA0.10 Hat making with Myra. Making crowns and a hat with a 'flashing light'. See Chapter 7 for details.

27/2VN Screen printing. Molly has been screening a triangle shape.

28/2VN Hat making with Myra. Holds two strips and Myra staples them for her. Cuts out patterned paper, cutting around some of the flowers in the pattern. Staples them onto the hat.

1/3 Group butterfly construction, see Chapter 5.

8/3TTB9.00 Construction. Camera, no details.

9/3FN Cuts out pictures from a magazine. Tells Observer they are her 'little bits': takes them to her locker.

Nell

1/22TTB3.41 Painting, with Emily. "Margie thinks your brother's Bobby" . . . "And my big sister thought it was Bobby".

1/2PTA29.30 Discusses birthdays with Observer (she has a special dress for birthday parties)

2/2TTA23.43 Marble painting. Tells Observer she wants to do a marble painting like Joan. "Looks like Bananas in Pyjamas" (an egg on a spoon in the video is like the marble on the spoon in marble painting). Writes her name. "I know how my name goes". Later: "I love painting".

Nell (cont'd)

3/2PTA12.12 Screen print. Screens paint onto hat construction.

Nell: 35. That's how old Malcolm is. (pause) I don't know how to do 35. Dad's birthday.

Observer: When's it going to be his birthday?

Nell: It's already been.

Observer: Oh, he's already had it. Uh huh.

Nell: And he was at work when it was his birthday.

Observer: Was he?

Nell: So we had it at night.

9/2PTB22.12 Collage, with Penny and Jinny and Nick. Tells Penny about her grandmother. Jinny comments. Nell: "I know that 'cos I sleep the night at your house". . . "I'll come out and push you in a minute". "Guess why? 'Cos one day I got a bled lip from the cello tape 'cos I bited it".

13/2TTB12.07 Hat. "How old shall I let her be?" Hat for a baby.

13/2TTB29.31 Hat for Sandra, her sister. "I'm always maing things for Sandra always things 'cos she always wants things off me".

14/2TTA0.35 Hat. Making a hat for a baby.

14/2TTB41.33 Hat, for baby. Nell (to Observer) "What can I do?" Observer: "What can you do?" Nell: "Can I do a hat for my baby?"

15/2TTB10.20 Hat, for baby.

Ann: (teacher) How are we going to measure this one? Is it for round your head? Shall we measure it again? . . .

Nell: That's for little baby, and I know how big my baby's head is. (Later, to Jason: "I haven't got a real baby. It's only a toy").

15/2TTB28.50. Hat, for father. "Dad will...I'm gonna get a big hat for him".

Observer: That is a very big hat.

Nell: It's a giant.

Observer: It's for a giant is it?

Nell: It's a giant hat . . . Guess what? My sister's got some magic felts.

15/2TTB34.44 Marble painting, with Jason. "Do you know how this one has, no the marbling works? 'Cos you need to cut out a big box . . . D'you know how you can cut it? 'Cos I don't. (Jason tells her: "Don't cut that end off").

16/2TTA12.37 Marble painting, with Nick and Jinny. Instructs Jinny "'Cos you've got to make a box".

16/2TTB0.01 Threading. Instructs Observer "You can make one.... You just you have to put one of them (points) on before you put one of them (points)". Observer: "Why's that?" Nell: "'Cos then it won't fall off".

17/2TTB4.00 Painting? Laura and Emily pretend to admire her work. She suggests that Laura might be invited to her birthday party. Reciprocal story telling. "Tell me truth". See Figure 7.6.

17/2TTB15.56 Attaching wings. Asks Ann to help.

20/2TTA45.12 Hat-making. Makes a hat for her cat (tells Observer).

21/2TTA37.11 Marble painting. "It's all twirly...you could make your own box...(to Lisa) Don't watch my friend Lisa, it's rude" Jinny consults her about whether to finger paint or not.

Nell (cont'd)

21/2TTB0.40 Collage. Collaging old birthday and christmas cards with Jinny, Nick, and Alison is there too

Nell: Jinny.

Jinny: Yep.

Nell: Want this card? . . . Jinny would you like that lovely one?

Jinny : (tells a story) It was scary in the night . . .

Nell: (prompting) Was it a ghost? Was your Mum and Dad scared?

22/2TTA20.34 Card collage with Jinny.

23/2VN9.50 Screens paint onto a piece of card.

24/2PTB Discussion with Observer: "Guess what Margaret? . . . My cat came home from his holiday".

27/2FN Painting circles red.

27/2TTA28.50 Marble painting.

27/2FN Screens paint onto a small circle over a large circle; doesn't make a print (the card is too thick); she hangs it up anyway.

1/3TTA1.20 Painting.

Nell: (to Jinny) Can you do a heart for me?

Jinny: Yep. And I'll do a square and a heart and a triangle OK?

Nell: I'll do a square and a triangle. And you can do the heart.

Jinny: Shall I do a really big one for you?

Nell: A big what?

Jinny: Triangle

Nell: No, you can't, 'cos I've only got a little piece.

1/3FN Circles, gluing and painting, with Jinny.

2/3VN9.38 Marble painting. Finger paints in the marble painting box. Puts picture on table, gets a brush and adds black strokes. Cuts the edge with scissors.

2/3TTA2.54 Card collage with Jinny.

Jinny: It's for my Daddy but I'll do one of these for you . . .

Nell: Jinny, do you know what. It's the first day of Autumn so all of the leaves should be falling off the tree

2/3TTA21.20 Dough pictures, with Meg and Linda.

3/3VN9.51 Circle painting, painting with black paint on a circle of cardboard.

8/3TTA1.17 and 8/3VN9.9 and 8/3FN Hat, with Jinny. A hat for her cat. Observer asks her if her cat wears hats. Reply: "On sunny days" Cellotapes wool on. Writes 'LUCKY' (the name of the cat): asks teacher (Angela) how to spell it.

8/3VN Screens paint onto shaped black paper.

9/3TTA7.76 Collage, with Catherine Penny and Danny. Discussion about swear words, whether you're allowed to say 'shuddup'.

APPENDIX 10
JASON'S LEARNING NARRATIVE
technology discourse, pursuing difficulty, and collaboration

(1) 8/2TTA8.07 - 26.38. An adult has shown Jason how to make a screen print (cutting a shape, writing his name on the back of the paper for screening, and then making the print). John, younger, arrives at the construction table and asks Jason to do a screen print 'for me'. . . Alison assists Jason to write John's name, he cuts out a circle shape for him, then gives John instructions.

John: Now, what're you going to do?

Jason: Wait and see, John. Ha, ha! Now.

(He takes the named paper and the cut out circle and places them in the frame, lowers the hinged screen and spoons paint on. Gives the scraper to John.)

Jason: You got to squeer it back and forward. You do that. I'm gonna do it after there.

(A girl comes over and asks John if she can do one).

John: Cut little pieces out.

Jason: Yep that's enough John, that's enough. That's enough, that's enough. Nah, don't do it on the newspaper John, don't do it on the newspaper. Now. Going to see what it looks like (He lifts the screen, and removes the circle, puts it into the rubbish). Yeah! Ah, just put it over on one of those racks, I'll be there in a minute.

(2) 15/2FN. Jason decides to do a marble painting, where the 'painting' results from the movement of a painted marble over paper in the base of a cardboard box. He elicits the help of the observer to look for the 'marbling box, which we can't find. Jason: 'I could just get another box!'

He cuts the side and then the end flap off a muesli bar box. Now he has a tray with one side cut off. He tucks some paper into one end, spoons in the painted marble, and rolls it about. The marble rolls onto the table. He controls the marble by pushing it around with the spoon, instead of tilting the box. Then he tilts the box again, catching the marble with his hand. He explains the problem to the observer: "It needs one 'up there'" (another side to the tray), and he curls the paper insert up to form a fourth side and a curved edge for the marble to roll up onto and back down.

Nell comes and wants to make a marble box. She consults Jason, who gives her instructions. She chooses a large box, of thick cardboard, difficult to cut with the scissors. Jason advises her not to cut off the end flap.

(3) 15/2 FN and 15/2TTA12.10 - 23.83. Jason has been experimenting, alternating brush and finger marks, dipping his fingers in the painted blobs, painting his finger, painting his hand, dabbing with the brush. Jason shows Observer his picture, and she explores the possibility that this picture expresses movement.

Observer: How did you do that, Jason?

Jason: I just stapled that and then I done a paintbrush onto it.

Observer: That's your finger marks there, isn't it?

Jason: Yeah.

[Interruption as Lea asks Observer to write her name on her painting; Observer suggests she gets her name card to copy]

Jason: I'm painting my hand.

Observer: Have you ever done that before, making big marks like that?

Jason: Yep.

Observer: Looks a bit like animal tracks, doesn't it. Running around....The green animal has run around to there. The black animal has run up and down there.

Jason: No, that looks like it's.
[Lea: I've finished mine. Observer: Great, Lea: How can you hang it up? Observer gives her instructions on how to hang her painting up by herself]

Observer: (to Jason)So what does it look like?

Jason: Squirrel feet.

Observer: (mishearing) Straw feet?

Jason: No squirrel feet.

Observer: Uh huh. Squirrel feet.

Jason: Uh huh.

Observer: What about this? That doesn't look so much like feet, does it? Bigger blobs. Don't look quite so much like feet, do they?

Jason: Those are the (...)

Observer: Those are the?

Jason; Troughs for the water.

Observer: Troughs for the water, right.
(Jason watches Lea do a marble painting and takes on his tutor role).

Jason: (to Lea) Looks like it needs more paint on that anyway. (to Observer:) That's my name.

Observer: It is, Jason.

Jason: I can do the squiggly Ss now.

Observer: Pardon.

Jason I can do the squiggly Ss.

Observer: The Ss, they're the tricky ones aren't they? If you get them round the wrong way.

Jason: Yes.

(4) 16/2FN and 16/2TTA16.42-18.02. The day after Jason had made his own marbling box, and Nell had copied him, she passes the knowledge on to Jinny. Jason chips in with some expert advice too.

Nell: ..can't do one yet, Jinny. Cos you've got to make a box you've got to get some of these scissors, go and get a box. As big as this probly. Or like that. And then you cut it.

Jason: Ah, only off the top, not these (gestures to the end flaps)

Nell: No, not the sides

(5) 16/2FN and TTA5.32-8.30. Jason helps John to help Martin to make some wings from cardboard, and to tie them around his waist. Jason and John break the task down for Martin, and provide technical assistance and advice.

Martin: I can't do it.

John: You do this bit.

Martin: O.K.

John: Hold on. I'll do it, I'll do it. I'll hold it up for you.

Martin: Someone tie it round me? Wrong way.

Jason: Nah. That's. You need a longer piece of string.

Martin: Oh. That's long. I'll have this long piece.

Jason: I need that.

Martin: Can you pass me some string.

Jason: Na. You can have that bit. (pause) I'm making a kite

(6) 16/2 Jason's interest in materials and what you can make with them is encouraged in the kindergarten by the variety of materials, the permission to combine them in any way, and technical assistance from the adults. During a month of observation at the kindergarten, at the end of which Jason turned five and left to go to school, he was particularly interested in exploring ways to express movement. One of his hats (16/2), recorded in

the hat-making chapter, turned out like a Len Lye sculpture with strips bouncing up and down as he walked.

- (7) 16/2FN. Jason makes a kite, by cutting out a picture of a fire engine from a piece of material, gluing it onto a box, attaching strips off the edges of computer paper with cellotape, and attaching a string by using a hole punch to punch a hole, threading a long piece of wool through, and tying it. He runs about outside, trailing it behind him.
- (8) 16/2FN. Jason finds a straw, puts dabs of paint onto painting paper on the easel, then blows the paint around the paper.

Jason went to school on 28th February so was not interviewed.

Appendix 11

DATA CONTRIBUTING TO PREDICTED CHOICES IN BOOK INTERVIEW (TABLE 14.2)

Bridget and Joan (screen printing):

If the screen printing narrative is reflected in the interview, teacher options would be chosen. However, it was suggested that Joan and Bridget screen print partly because their friend Danny has become interested in it, so they may choose the friend option.

Danny (butterfly making and screen printing):

If the screen printing narrative employed by Danny is privileged, he will opt for the *difficult* option; if the butterfly narrative where he and Tom were key players is privileged, a *friend* option would be predicted.

Linda (butterfly making, hat making, screen printing):

Discussion in the last chapter, on Linda's interest in avoiding those activities that may not be "allowed", would suggest the *teacher* option.

Lisa (screen printing):

Lisa, with her concern for permission and approval, would probably choose the *teacher* option.

Martin (dinosaur making, also made a '5' hat):

Did not refer to social practice at kindergarten for advice, therefore he would not choose friend or teacher. Valued sources of difficulty are outside the kindergarten, implying an opting out *pretend* response.

Meg (butterfly making, screen printing, one of the children who made an interesting and difficult hat):

Meg is too much of a mixture for me to predict: she was the one who raised the *difficult* option in the butterfly incident and makes a difficult hat, but expressed anxiety to the *teacher* when Penny fingerpaints in the marble box. She is very helpful, assisting Phoebe to write her name, interrupting her hat-making to help her *friend*, Linda.

Myra (butterfly making):

Myra joins in with the "who spilt the paint" discussion with alacrity, and spends her time at kindergarten with Molly, practising her friendship discourse; she might choose a *friendship* option

Nathan (butterfly making):

As well as his role in leading the boys in the butterfly episode, in another episode Alison teaches him to do a screen print and helps him to write his name. In another two episodes he is 'horsing around', giggling and 'being a bit naughty': 'boy'

behaviour. *Friend/boy* discourse (except for the screen-print where the *teacher* took the lead).

Nell (hat making and marble painting):

Nell would not choose the difficult option (she carefully avoids it outside of friendship discourse), is happy to risk censure by finger painting, is creative about and interested in friendship, may choose the best *friend* option.

Peter (butterfly making):

At the butterfly construction Peter says to Carl : "Cos it's hard work. It's hard work isn't it Nathan?" He frequently comments to David that he is David's friend, and makes a sword and handcuffs to support social play outside. His interest is centrally in being a *friend*.

Tom (monster making and butterfly making):

If the monster-making narrative is privileged, then the choice would be to try something *difficult*. If the butterfly narrative is privileged, then he would choose a gender option and the nearest to this would be *best friend*.

Trevor (hat making):

Trevor works with an adult helping five times, alongside Brian twice, and on his own four times. On a further recorded occasion he joins in with John and Jason in the blocks, taking a helping role as they build a house with blocks and use the crane to shift blocks from one place to another. He doesn't usually choose difficult tasks, maybe an *easy* hat, or a *friend's* request.

Valerie (butterfly making):

Friendship and gender discourses do not appear again outside the butterfly episode; she often takes the lead (as she did there), making suggestions to others: once she invented a new activity with folded cardboard that other children copied, and she suggests to Trevor that he should decorate his cardboard tubes. Perhaps she would choose *friendship* (the butterfly narrative) or *difficulty* (the folded cardboard and painted tubes, technology discourse).

APPENDIX 12

**TWO DRAMATIC PLAY TRANSCRIPTS:
examples of peer collaboration and negotiation**

(1) The four-year-olds in this study were experts in negotiating arguing and directing the play in the 'family' corner, allowing one person to be the leader for a while, and negotiating shifts in role. The following is a typical allocation of roles amongst the girls: Emily wants to be the mother, but one viewpoint says that Jinny should be the mother since she has the wedding dress. Two solutions are suggested: two Mums, or a mother and a helpful sister. Emily opts for the helpful sister, and the troublesome dissent is solved. It included differences of opinion, forcefully expressed.

:- Hey you can't be the mother!
 Emily: What?
 :- You can't be the mother.
 Emily: I just....
 :- No but you're not you're not the mother. Jinny is.
 :- Yeah.
 :- Jinny is.
 :- Yeah cos she's got the wedding dress on.
 Emily: I just pretend I I just pretend I'm. (...) eh?
 :- Yeah. You're the helpful sister eh? and you look after, 'tend you're looking after . . .
 (lots of children all talking at once).
 :- There can be two Mums.
 :- No there's only one Mum.
 :- Yes.
 Emily: And just pretend I'm the sister eh. (7/2PTB24.30-26.18)

(2) In the following example, although there is also a girl present, Nick combines two viewpoints to achieve a compromise that is satisfactory to all parties. Rachel tells Tony he's not playing the game. When Tony doesn't go away she gets (mildly) cross and reiterates that he's 'not coming to our party'; Nick combines the two viewpoints by suggesting that when they prepare the party food they prepare something for his (Tony's) dinner: Tony can both play the game, and not go to the party.

Nick: . . . some yummy meat balls for the party tonight.
 Tony: And I'm making some.
 Rachel: No, you're not playing this game with us.
 Tony: Uh?
 Nick: 'Cos these are just for us for the party.
 Tony: I'm making something as well for the party.
 Rachel: No, you're not coming to our party.
 Nick: No, he's just making something for us to take eh?
 Tony: And I'm coming as well, eh?
 Nick: No.
 Rachel: No.
 Nick: You're just making something for us to take. And you can. And we can cut a bit in half for you to have for dinner tonight, OK?
 Tony: Because I'm.

Nick: Because you won't have any dinner left, will he Rachel?

Rachel: No.

Nick: So we we're going to cut him a bit.

Tony: I'm cutting.

Nick: 'K. Now go and put that bit in the fridge. That bit. That bit of pizza.
It's a bit of pizza. OK? (TTA15/2 37.54-38.50)

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