PART E PROJECT DESCRIPTION

E1 Project Title
Pedagogy, play and conceptual development: Early childhood teachers’ and children’s perceptions of the environmental scientific concepts embedded in play-based experiences.

E2 Aims and Background

Four children assembled around a wading pool at a preschool are intently engaged in play. Samples collected during a recent excursion to their local beach are the focus of attention. Seaweeds and sponges have been combined with plastic sea animals and placed in the wading pool with a small amount of water to help the children learn aspects of biodiversity and conservation. The children introduce well known characters from a Nickelodeon cartoon, and one of the sponges becomes SpongeBob SquarePants whilst a plastic sea star morphs into his sidekick Patrick. Seaweed is heaped upon both SpongeBob and Patrick by two of the children. The remaining children swirl the water vigorously with sticks gathered from a nearby tree, creating whirlpools that lift the seaweed from SpongeBob and Patrick. The teacher observed the children at play, noting the appropriateness of their social interactions and the sophisticated articulation of the cartoon genre to their SpongeBob SquarePants dramatisation.

Twentieth century approaches to early childhood education were informed by progressive notions of childhood, education, teaching and learning. Historically important figures, including Froebel, Owen, Pestalozzi, Montessori, Dewey and Hall described pedagogical perspectives that emphasized the need for children to participate in play-based and child-centred activities to support learning and development (Soler & Miller, 2003). Combined, these perspectives produced a theoretical and philosophical commitment within early childhood education to an experiential-based pedagogy where play became the primary approach for teaching and learning, and scenarios such as the one described above were common practice (Spodek & Saracho, 2003). This view was reinforced in later years by research emerging from the constructivist-developmental literature, particularly that drawn from Piaget’s investigations into the origins of knowledge. During this period, ‘appropriate’ early education was defined by the provision of experiences aimed at enabling individual children to construct content knowledge through play (Bredenkamp, 1987; Charlesworth, 1998). More recently, arguments drawn from the post-modern and post-developmental literature have argued the need to go beyond focusing on individual children, emphasising instead the socially and culturally situated nature of knowledge (Prout, 2005; Ritchie, 2002; Robbins, 2005). Nevertheless, play remains the dominant pedagogy of choice in early childhood education and is positioned in many Australian and overseas early childhood curricular frameworks as an appropriate medium for supporting young children’s acquisition of conceptual knowledge.

International research critiquing the pedagogy of play suggests children may not gain conceptual knowledge via participation in open-ended play based experiences as previously assumed (Kendall, 2003; Kesseler & Hasuer, 2000). Rather, emphasising play-based learning risks placing conceptual knowledge in a secondary position to pedagogical activity, suggesting young children may not develop conceptual understandings through participation in child-directed and open-ended play (Brooker, 2002; Hedges, 2003; Kallery & Peillos, 2001). More recent research supports this contention, indicating that children can benefit from opportunities to interact with adults to support the development of conceptual understandings through play (Jordan, 2004; Wood, 2004). In Australia, research informed by Vygotskian theory suggests pedagogy is poorly informed by assumptions regarding the role of play as the main vehicle supporting conceptual development (Flear & Raban 2006). This work defines children’s conceptual development in terms of three main ideas, including everyday concepts, scientific concepts and mature concepts. Everyday concepts are children’s localised, experientially orientated, understandings of how the world works (Karpov,
Higher level understandings, described as 'scientific' or 'academic' concepts represent theoretical explanations for world phenomena across a range of knowledge domains including the mathematical, linguistic, scientific (for example, environmental), musical and artistic domains (Karpov, 2003). Mature concepts develop from children's transformation of everyday concepts through understandings derived from the acquisition of scientific concepts (Vygotsky, 1987). In the scenario described earlier, this would involve the children's everyday knowledge about SpongeBob SquarePants and Patrick being transformed by scientific (environmental) knowledge regarding biodiversity so that their concepts of sponges and sea stars would be informed by understandings about the different plants and animals that exist within the marine environment rather than continued reference to the cartoon characters.

The challenge associated with play-based pedagogy is the extent to which it centralises children's engagement in everyday concepts (such as SpongeBob SquarePants), without necessarily providing access to (and support for accessing) scientific concepts (such as biodiversity), therefore limiting children's opportunities to build mature concepts (such as relationships between organisms and ecosystems) from the early childhood curriculum (Fleer & Raban, 2006). This particular argument is further informed by research suggesting early childhood educators' commitment to play-based pedagogies can overshadow the role of scientific concepts in children's learning, thus placing increased emphasis on the development of children's everyday concepts over the development of mature concepts (Cullen, 1999; Hedges & Cullen, 2005). There is an urgent need to examine the relationship between conceptual development and play-based pedagogy in early childhood education, including teachers' perceptions of the conceptual knowledge embedded in play experiences and the strategies they employ, and/or believe, children should use to access scientific concepts through play. Additional concerns relate to children's perceptions of the conceptual knowledge they believe teachers intend them to obtain from their play, the conceptual knowledge children actually obtain and the strategies they believe they have utilised to access and understand scientific concepts when engaged in play.

Given the dominance of play-based pedagogy in early childhood education an important concern arising from these issues relates to the possible discrepancy between teachers' perceptions of the scientific concepts embedded in play, and how children actually perceive themselves to have acquired these concepts. In other words, to what extent are children acquiring conceptual knowledge from play-based pedagogies? And, how does such acquisition relate to teachers' and children's perceptions of the conceptual-pedagogy relationship and the strategies necessary for articulating conceptual knowledge from active participation in play? Given these questions, the project aims to:

1. Identify teachers' perceptions about scientific concept knowledge embedded in specific play experiences
2. Identify the strategies teachers employ and/or expect children to use in the acquisition of scientific knowledge via specific play experiences
3. Determine children's perceptions of the concepts they believe teachers intend them to learn through play, compared to what they actually do learn through play
4. Identify the strategies children believe they have used to acquire conceptual knowledge from specific play experiences
5. Ascertain the nature and degree of any discrepancy between the pedagogy of play in early childhood education and young children's acquisition of conceptual knowledge.

### E3 Significance and Innovation

Drawing on Foucauldian theory, Allwood (2003) argues that play governs early childhood education in two ways, including as a rationalisation for pedagogy, and as a means of defining children's learning through observation. This argument helps explain how the emphasis on play-
based pedagogy in early childhood education has persisted despite new theorisation emerging from the sociocultural, and other post-modern perspectives in early childhood education (see for example, Ball & Pence, 2000; Brooker, 2005; Kilderry, 2004; MacNaughton, 1997; Rhedding-Jones, 2005). The pedagogies of play and observation operate as filters through which the implications arising from newer theoretical perspectives may be considered. Filtering allows theories of development to be re-theorised, whilst simultaneously reducing the risk associated with ideas moving beyond traditionally valued approaches. This results in the situation where developmental constructs (such as those associated with developmental-constructivism) and their role in early childhood can be re-theorised whilst allowing play to maintain its position as the vehicle through which new ideas are realised (Edwards, 2005). Play therefore becomes problematic because new theoretical ideas may be inadvertently misconstrued reducing the opportunity for Australian children to make the most of their early childhood education opportunities.

There is a need to develop a sufficient research base from which to analyse the effectiveness (or otherwise) of play-based pedagogies in supporting children's conceptual thinking, therefore highlighting the significance of the proposed study (which is to ascertain the nature and degree of discrepancies between the pedagogy of play in early childhood education and young children's acquisition of conceptual knowledge). Should the study identify such discrepancies the role of play as the primary educative means in early childhood education would be challenged. Conversely, if the study confirms a relationship between the pedagogy of play and children's acquisition of conceptual understandings the role of play as a vehicle for learning in early childhood education would be affirmed. Either way, findings from the project will offer benefits to the early childhood community in two ways, firstly, through the provision of a research base allowing examination of the efficacy of play in early childhood education, and secondly by contributing new understandings about how about play can be effectively used in practice. These benefits will be readily articulated to early education on a social and political level given recent bi-partisan commitment to play-based programs in early childhood education by the Liberal Party of Australia and the Australian Labor Party (Australian Government Taskforce on Child Development, Health and Wellbeing, 2003; Rudd & Macklin, 2007). Both parties have identified future directions for early education that offer support for traditional play-based programs. Whilst important, these initiatives should be informed by contemporary understandings regarding the conceptual-pedagogy relationship to ensure young children have access to learning experiences that enhance the development of their scientific knowledge in the important prior to school years. The findings are therefore significant on three levels, including, 1) through the development and contribution of new knowledge to the existing research base regarding the relationship of play to conceptual development in early education, 2) through the identification of strategies children and teachers can use to access conceptual knowledge from play to inform current teaching practices, and 3) through the application of the research to current bi-partisan policy directions about the role of play-based programs in early childhood education.

The innovative aspect of the project is located in its attempt to move beyond an emphasis on the pedagogy of play to discover knowledge regarding its operation as a driver of conceptual development in early childhood. This aspect is utilised in the methodology which intersects teachers' and children's perceptions of the conceptual-play relationship through an examination of a common play experience, serving to highlight whether or not the pedagogy of play provides young children with access to foundational conceptual knowledge in the early years. Given recent research emphasising the importance of early years education for young children's later school success and developmental outcomes (for example, Schewehart & Weltart, 1999), this represents an important development in early childhood research and positions the project strongly in relation to national and international research problematising the role of play in early childhood curriculum (Brooker, 2002; Fléc & Raban, 2006; Hedges, 2003; Jordan, 2004; Kallery & Psillos, 2001; Wood, 2004). Methodologically, the project offers a fine-grained approach to examining how play relates
to children's conceptual development, seeking to understand children's perspectives in relation to those of the teachers. The use and analysis of video footage to obtain these perspectives is central to developing this understanding, and represents an appropriately novel use of existing technologies to the problem.

The research outcomes from this project relate to Priority Goal One 'A healthy start to life' under Research Priority Two: Promoting and Maintaining Good Health (Australian Research Council, 2005). This goal supports the Government's National Agenda for Early Childhood initiative, specifically, Priority Area 1.2 Early Learning and Care, with a focus on the need to develop a 'skilled and knowledgeable early childhood learning and care workforce able to provide best practice in early learning and care programs' (Australian Government Taskforce on Child Development, Health and Wellbeing, 2003, p.16). Developing a research base regarding the efficacy of play in early childhood education is central to supporting this agenda.

## E4 Approach and Methodology

The project will use environmental education as the content area for examining teachers' and children's perceptions of the environmental scientific concepts embedded in play experiences. Environmental education represents an appropriate conceptual area for investigation as it is grounded in children's and teacher's lived experiences and is therefore easily adapted to play-based pedagogies. Furthermore, environmental education is a conceptually rich area of investigation from an environmental scientific perspective, including concepts such as biodiversity and conservation. These areas represent appropriate constructs for determining teachers' and children's perceptions of conceptual knowledge, and include those represented in the play scenario described earlier such as the properties and functions of different organisms.

### Data Collection

A mixed methodology will be used. Qualitative techniques including open ended interview schedules, video recording, teacher notes and children's drawings will be employed to generate data for categorisation and analysis using quantitative methods to test the significance of the relationship between the pedagogy of play and children's conceptual knowledge. The project will be conducted across five pre-school sites from a local Victorian municipality. Each site will involve participation by a qualified teacher and four to six children (n = 5 teachers; n = 30 children). Data collection for the project is based on the implementation of a specific play experience designed by the teachers. There are five steps to the data collection for each group of children.

**Step 1:** Prior to implementation, teachers will be asked to record, in provided research notebooks, the conceptual knowledge associated with the experience and the strategies they hope children could use to access the knowledge. All play experiences will be implemented and recorded during morning sessions.

**Step 2:** Children will be invited to participate in the experiences whilst teachers engage in their usual pedagogical activity. The children's and teacher's actions will be video recorded. The length of each recording will be determined by the amount of time children spend engaged in the experiences. A pilot investigation currently underway is being used to inform the use of the digital technologies and to address issues associated with the children's interest and/or teachers' concerns about the presence of the video cameras.

**Step 3:** Teachers will be invited to view the video footage during the afternoon. During the viewing teachers will be asked to describe what conceptual knowledge they believe the children acquired through play. Teachers' pre-implementation notes regarding the conceptual knowledge embedded in the play will then be examined and teachers will be asked to consider the extent to which this knowledge was evidenced in the children's videoed play. Teachers will then re-view the footage,
this time commenting on the strategies they believe the children either needed to use, or were shown to use to access conceptual knowledge. Semi-structured interview schedules, including questions such as 'what is the main concept the children are playing with there?' And, 'how do you think those children learnt that concept?' will be used to guide the footage-based interviews. The teachers' viewing of and responses to the footage and interview questions will be video-recorded and transferred to Snapper software (Websoft Technologies) for video analysis. Pre-identified categories developed during the pilot investigation for understanding and evidencing conceptual knowledge in play (for example, low, nominal, functional and accomplished) will be used to code the teachers' responses (Cutter-Mackenzie & Smith, 2003). Categories will also be used for coding the identified learning strategies (for example, testing, questioning, and seeking clarification). Frequencies will be attached to individual teacher's references to both conceptual knowledge and learning strategies for each category. This data will then be transferred to SPSS Version 14.1 (Statistics Package for the Social Science) where the data will be entered and analysed using a range of univariate, bivariate and multivariate techniques; in turn presenting an overall preliminary analysis of the teacher data.

Step 4: Children will also be invited to view the video footage of their play immediately following an afternoon rest period. Children can elect to view the footage individually or in groups. During the viewing children will be asked to describe what they think the teacher wanted them to learn when they were playing. Children will then be asked to identify what they believed they learned from the experience and how they accessed this knowledge. Semi-structured interview schedules including questions such as 'do you remember what you were doing when you were playing?' 'what do you think your teacher wanted you to learn when you were playing?' 'Can you tell us what you learned when you played with this?' And, 'Can you tell us how you found that out?' will be used to guide the video-based interviews. Children will be offered opportunities to control the video footage, fast forwarding, rewinding and pausing on selected aspects of the play experiences. Children will be provided with a variety of media including, textual and graphic to support their descriptions. The children's viewing of and responses to the footage and interview questions will be video-recorded and transferred to Snapper software for video analysis. Children's responses will be coded according to the conceptual and strategic categories utilised for the teacher data and frequencies attached to individual references to both conceptual knowledge and learning strategies. Children's responses regarding what they believe the teachers wanted them to learn will be coded and counted separately according to pre-identified categories developed during the pilot investigation (for example, not sure, nothing, about animals [sic]) and refined following data collection. These data will be analysed in corresponding categories to those used for examination of the teacher data.

Step 5: Teachers will be invited to view the footage of the children responding to the play footage. Teachers' responses will be audio-recorded. Semi-structured interview schedules, including questions such as 'what are the children saying about their learning that interests you?' 'Do you think the children understand what you intended for them to learn?' And, how would you change, respond and/or adapt this play experience given what the children have said about their conceptual understandings?' Teachers' responses will be categorised as a) continuing to promote an emphasis on the pedagogy of play; b) focusing on the conceptual knowledge embedded on play; and/or c) identifying strategies within the play for supporting the children to acquire conceptual understandings. These categories will be cross referenced with the data collected during steps one and two, therefore contributing to the triangulation of teacher data. [The research timeline is presented in Table 1 and the research activity for each nominated year detailed in relation to the study aims].

Data Analysis
Data analysis will be framed theoretically in relation to arguments associated with the
governmentality of play in early childhood education (Allwood, 2003; Edwards, 2005). Figure 1
details the layers of intricate data analysis to be conducted within this perspective. The primary
analysis will be based upon the categorisation of the footage associated with the teacher’s and
children’s responses to the initial play video footage. Both the existing teacher and child data sets
will be reduced and recoded to develop one primary SPSS data set. Using multivariate regression
analysis, the data will be analysed to determine the degree of discrepancy and relationships between
the pedagogy of play (i.e. what the teachers believed the children were acquiring through play) and
young children’s acquisition of conceptual knowledge (i.e. what the children thought the teacher
wanted them to learn and what they actually learned). A second layer of data analysis will be
undertaken using NVIVO. The teacher interview data, notebooks, children interview data, text and
graphics will be analysed using NVIVO. NVIVO will allow the researchers to identify the emerging
themes and patterns in the data. The data will be analysed in two different ways: ‘up’ from the data,
as meanings of the data are noted and stored, and ‘down’ from the data through the pilot study, prior
ideas, existing literature and theories (Richards, 2000).

Figure 1: Research Methodology