Using complexity thinking to explore games of chase in the early childhood curriculum

January 2011

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ACKNOWLEDGEMENTS

Bismillahirahmanirahim

In the name of Allah Most Gracious, Most Merciful

Executive Summary

This research uses complexity thinking to explore games of chase in the early childhood curriculum and is part of a wider PhD research. It investigates using complexity thinking firstly, to occasion emergence (i.e., create a new phenomenon) in children's games of chase at an early childhood centre and secondly, to describe this emergence.

This final report to SPARC presents a local curriculum theory for games of chase at the centre which explains the design (curriculum design) and describes how the games of chase curriculum unfolded (curriculum dynamics). The local curriculum theory, curriculum design and curriculum dynamics are underpinned by the discourse of complexity thinking.

This research involved taking the role of a volunteer teacher-researcher-curriculum designer at an early childhood centre to play games of chase with children. This role was informed by and contributed to the curriculum design that focused on designing the teaching and learning environment to occasion emergence in learning and curriculum.

The games of chase curriculum contributed to children's learning, my own learning and the general rhythm at the centre. The children learnt to distinguish between children who were playing and those who were not. They also learnt to tag in different ways. In addition, the children and I developed a game playing routine before playing each game. This routine involved putting on tag belts, discussing what game we were playing and how we were going to play it. We played three different games of chase, starting with *tag*, followed by *What is the time Mr(s) Wolf?* and finally the emergent game *Big A, Little A*.

The curriculum dynamics or enacted curriculum is described in terms of narratives related to three curriculum-related phenomena, i.e., teaching, activities related to games of chase, and children's learning in, through and about games of chase.

This research suggests that teachers who are interested in exploring games of chase at their own centres can use the local curriculum theory presented here as a starting point for their own explorations. Using the local curriculum theory implies adapting the curriculum design presented here to fit the local teaching situation and drawing relevant insights from the curriculum dynamics that unfolded in this research. In this way, the teacher can be seen as using complexity thinking to expand on teaching, learning and curriculum possibilities in his/her own setting.

Introduction

Playing games of chase in an early childhood setting can be a valuable learning experience for young children. It can contribute to multiple and diverse learning outcomes including social competence, movement skills and concepts such as running, dodging and spatial awareness, as well as an understanding of the nature of games. More elaborate games such as *What is the time Mr. Wolf?*, which includes verbal interactions between the wolf (chaser) and the other players can also promote language development, especially when children who take on the role of the wolf are encouraged to express different ways of describing time, e.g., by responding "It's time to take a nap" in addition to "One o'clock". However, there are also possible issues that can emerge in playing these games, given the number of children, the range of their ages and development, and the diversity of knowledge in, through and about games of chase. Some of these issues include aggression (Chandler, 2008) and safety and injury (Chandler, 2008; Henry, 2001; Lipton, 2003).

This research uses complexity thinking to explore games of chase in the early childhood curriculum and is part of a wider PhD research. It investigates using complexity thinking firstly, to occasion emergence (i.e., create a new phenomenon) in children's games of chase at an early childhood centre and secondly, to describe this emergence.

Methodology

In this report, I present a summary of the research methodology; an in-depth presentation of the methodology is available in the thesis report. To summarise, this research combined emergent, design-based and self-study methodologies. It involved taking on the multi-faceted role of a teacher-researcher-curriculum designer at an early childhood centre (henceforth referred to as the Centre) to play games of chase with mainly three- and four-year old children. I did this four mornings a week for fourteen weeks.

During this teaching phase, I collected multiple types of data related to curriculum, including video and audio data, fieldnotes, photographs and learning stories (Carr, 2001). I created an initial curriculum design to guide my teaching, which was refined during teaching as part of on-going data analysis. Further refinements to the design continued after the teaching and these were based on the analysis of data collected.

Data analysis involved organizing the data into episodes and activities and conducting three analytical investigations: (1) creating a graphic reconstruction of the episodes and activities directly and indirectly related to games of chase, (2) creating stories of emergence in games

of chase and (3) creating stories related to the teaching intentions associated with games of chase. These analyses were supported by a range of philosophical and conceptual tools and gave rise to stories of emergence in teaching, curriculum (activities) and children's learning.

Centre context

I chose to do my research at the early childhood centre where I used to teach in the ten months preceding the start of my PhD studies in April 2008 because I felt that the relationships and knowledge I had already established with the Centre community could benefit both the community and me.

The Centre's curriculum was based on Te Whāriki (Ministry of Education, 1996), the New Zealand early childhood curriculum document, which has been inspired by progressive and sociocultural theories and beliefs (Soler & Miller, 2003) and recognizes complexity in its acknowledgement of the nested structure of children's learning environment (Ministry of Education, 1996). As is the case in most early childhood centres in New Zealand, the Centre's curriculum focused on play and on following children's interests, and children were generally allowed to choose and change the ways they participated in activities.

The Centre operated on a full-day license between 8.15 am and 5.15 pm with a maximum daily roll of 32 children. There were 41 children enrolled at the Centre with each child attending between three to five days a week. The children and their families arrived at varying times. A small number of children would arrive at the opening time of 8.15 am, most just before 9 am and a small number after that. By the end of morning tea at 10.30 am, all the children would have arrived.

At the start of the research, the unit had three full-time qualified teachers. During the fourteen weeks, there were some changes to the teaching team. One qualified teacher, two part-time teachers who were studying for their early childhood qualifications and a new support staff who relieved teachers for their breaks joined the team at different times. One teacher went on maternity and was replaced by another teacher from a different unit. There was also a student-teacher from the university doing her placement at the Centre. The teacher-to-child ratio was 1:8 and the student-teacher and I were not counted as part of the ratio. The Centre employed relievers to maintain the ratio if any of the teachers were away.

Key assumptions and concepts

Complexity thinking

Complexity thinking is a discourse or a way of thinking and acting that is based on the assumption that we live in a complex world (Davis & Sumara, 2006) where inter-connections abound and they affect us in visible and invisible ways. Davis and Sumara assert that complexity thinking is not an explanatory system, but "an umbrella notion that draws on and elaborates the irrepressible human tendency to notice similarities among seemingly disparate phenomena" (p. 7).

The discourse of complexity thinking has emerged from and within studies of complexity. It is a multi-disciplinary, inter-disciplinary and trans-disciplinary field that is characterized by diversity. Studies of complexity both contribute to and draw upon other fields of knowledge (see Davis & Sumara, 2006; Alhadeff-Jones, 2008) and some of the language associated with complexity has included chaos, chaos theory, complexity theory, self-organisation, emergence, complex adaptive systems, living systems, learning systems, complexity science and complexity thinking.

Given the diversity in the field of complexity, this symposium deals with a type of complexity referred to as complicity. This term was coined by Cohen and Stewart (1994) to refer to a class of phenomena where "totally different rules converge to produce similar features, and so exhibit the same large-scale structural patterns" (p. 414). Complicity is associated with highly complex systems that continually interact and influence each other directly and indirectly and implicates the observer as part of the interactions. It carries the connotation of entanglement and systems that are complicit co-emerge with each other, i.e., they change together but not necessarily at the same pace. Thus, systems whose relationships are characterized by complicity are described as coupled systems and are simultaneously distinct and inseparable from each other.

For the purposes of this report, I frame the notion of complexity thinking as a way of thinking and acting that has two important features. The first feature is a consciousness of couplings which exist in teaching and research, where couplings are connections between entities that involve the entities mutually influencing each other. Consciousness can be tacit and/or explicit while couplings can be visible and/or invisible as well as potential and/or actual. The second feature of complexity thinking is a focus on expanding possibilities in curriculum, teaching and learning in ways that are ethical and meaningful for individuals and collectives.

Emergence and complex systems

Emergence refers to the creation of higher-level patterns (at system level) that arises from the complex interactions of agents that make up the system (interactions at sub-system level).

Emergence suggests

- an outcome of higher-level complexity than the lower-level entities/agents/sub-systems that give rise to it, and
- one or more processes which involve the interactions of these lower-level entities in complex ways.

Outcomes of emergence can include a new system, new properties of a system or even a new phenomenon.

In this research, I focus on emergence related to complex systems. These complex systems are composed of agents or parts that interact on an on-going basis towards a common purpose or interest as shown in Figure 1. Unlike complicated systems, which are also composed of interacting parts that do not change as in a clock or a car, the nature of the interactions among the agents in complex systems are neither fixed nor clearly defined (Davis & Sumara, 2006) and therefore more fluid. As the system and/or its parts change, so too does the nature of the interactions. For example, in an early childhood centre, individual children and teachers are agents and a group of people playing an episode of games of chase is a complex system that emerges during play. Individuals and groups are also levels in a nested system of knowers; this system, together with the systems of knowledge and activities, is elaborated on in the conceptual framework.

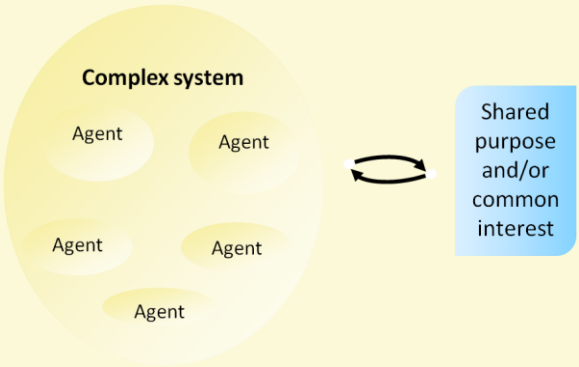

Figure 1: A complex system emerges when agents interact on an on-going basis towards a shared purpose and/or common interest

In a nested system, the agents and the system display self-similarity, i.e., they share some characteristics that are similar regardless of which levels of the system we refer to. Interactions of agents at any one level generate patterns that can be discerned at the higher level. For example, patterns within collective social bodies (e.g., group) emerge through the

actions of individual agents or persons. Thus, a complex system exists in a nested and complicit (interdependent) relationship with its agents.

Local curriculum theory

A local curriculum theory is an explanation and description of curriculum that is specific to a particular curriculum domain, teaching and learning setting and duration, and involves 'seeing' curriculum from the perspective of complexity thinking. It is a complex theory which embodies both theory and practice, and arises from the coupling of two elements as shown in Figure 1. The first element is the curriculum design which articulates a teacher's conceptual understanding of how to occasion emergence in a particular facet of curriculum domain or content. The second element is the curriculum dynamics which is a description and explanation of the emergence that unfold in the curriculum enacted by the teacher(s) and children.

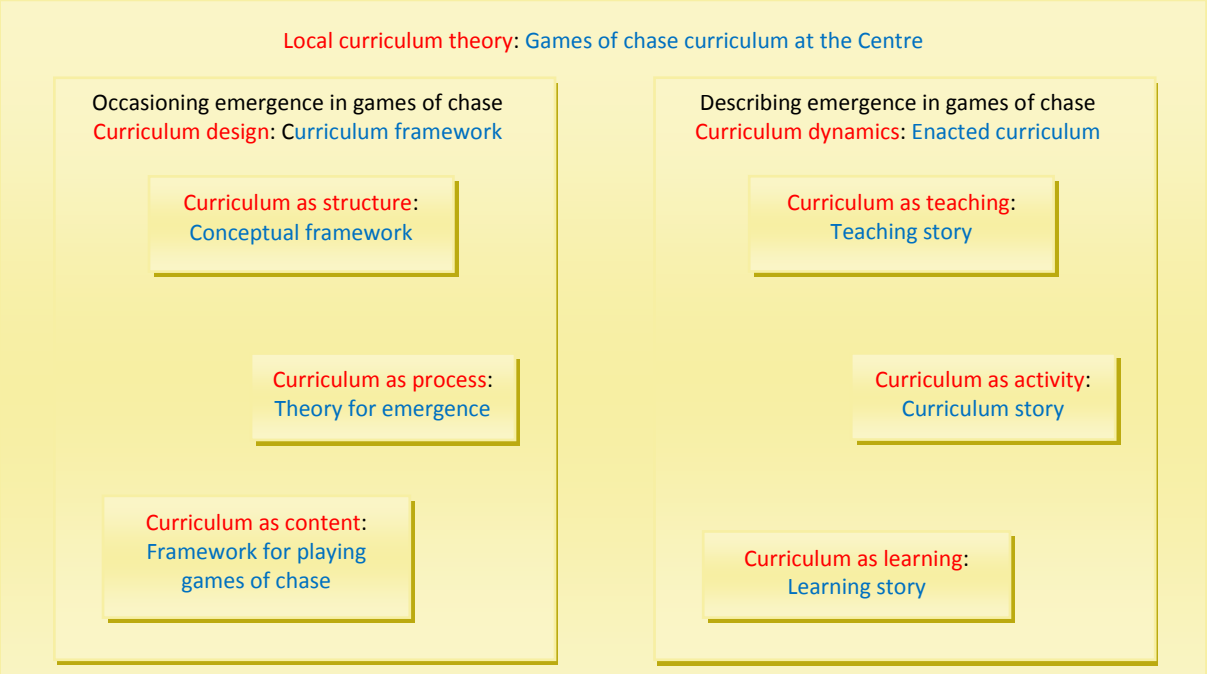

Figure 2: Nested relationship between curriculum dynamics and its elements

The coupled nature of the two elements means that over time, both curriculum design and curriculum dynamics unfold from and enfold in each other; they are complicit in each other's emergence at the same time that their complex interactions give rise to the local curriculum theory. This understanding of a local curriculum theory resonates with Doll's (1993) assertion that theory should be grounded in and developed from practice and in terms of local "states of affairs" (p. 162) or local context.

The local curriculum theory for games of chase at the Centre is an emergent phenomenon which describes and explains the games of chase curriculum that unfolded at the Centre between January and April 2009. This phenomenon first emerged after I left the Centre when I noticed and recognised a relationship between two other emergent phenomena, i.e., the curriculum design and the curriculum dynamics.

The local curriculum theory for games of chase is presented in this report in terms of its two elements, curriculum design and curriculum dynamics. The curriculum design counts as the designed aspects of the local curriculum and explains a design for occasioning emergence in the games of chase curriculum. The curriculum dynamics counts as the enacted aspects of the games of chase curriculum and describes how the curriculum unfolded at the Centre.

Curriculum design

I adopt Terzidis' (2007) notion of design as a conceptual activity that involves clarifying an idea to be acted upon or articulated in a visible form. Terzidis elaborates on the meaning of design and identifies its relationship with planning:

> "Design is about conceptualization, imagination and interpretation. In contrast, planning is about realisation, organization, and execution. Rather than indicating a course of action that is specific for the accomplishment of a task, design is a vague, ambiguous, and indefinite process of genesis, emergence, or formation of something to be executed, but whose starting point, origin or process often are uncertain. Design provides the spark of an idea and the formation of a mental image. It is about the primordial stage of capturing, conceiving, and outlining the main features of a plan, and, as such, it always precedes the planning stage." (p. 69)

Based on the above understanding of design, there are three elements in the curriculum design, i.e., the conceptual framework, the theory for emergence and the framework for playing games of chase with children. From a complexivist perspective, these three elements are viewed as elements that address different but inseparable facets of curriculum: the structural, process and content elements of curriculum respectively. The elements are coupled in the sense that each element serves a different purpose and makes a different contribution to the overall purpose of the curriculum design. This also means that while each element has its own coherence, it also plays a role in supporting the other elements. The interactions of these three elements give rise to the curriculum design, as shown in Figure 1.

Conceptual framework: Curriculum structure

The conceptual framework draws upon Te Whariki's (Ministry of Education, 1996) conceptualization of curriculum as "the sum total of the experiences, activities, and events, whether direct or indirect, which occur within an environment designed to foster children's

learning and development" (p. 10). It extends on this understanding of curriculum to conceptualise curriculum as a nested and complex system of activities which is distinct but inseparable from the nested systems of knowers and knowledge at an early childhood centre. Davis and Sumara (2006) further distinguish between a knower and knowledge:

> "a knower is a physical system that might be described as a stable pattern in a stream of matter; a body of knowledge is an ideational system and might be understood in terms of stabilized but mutable patterns of acting that are manifest by a knower." (p. 155)

Figure 3 shows these relationships and identifies the levels of each system in ECE. Each level is viewed as a complex system that emerges from the on-going interactions of the agents below it. For example, the activity level curriculum emerges from the on-going interactions of the episodes of the activity.

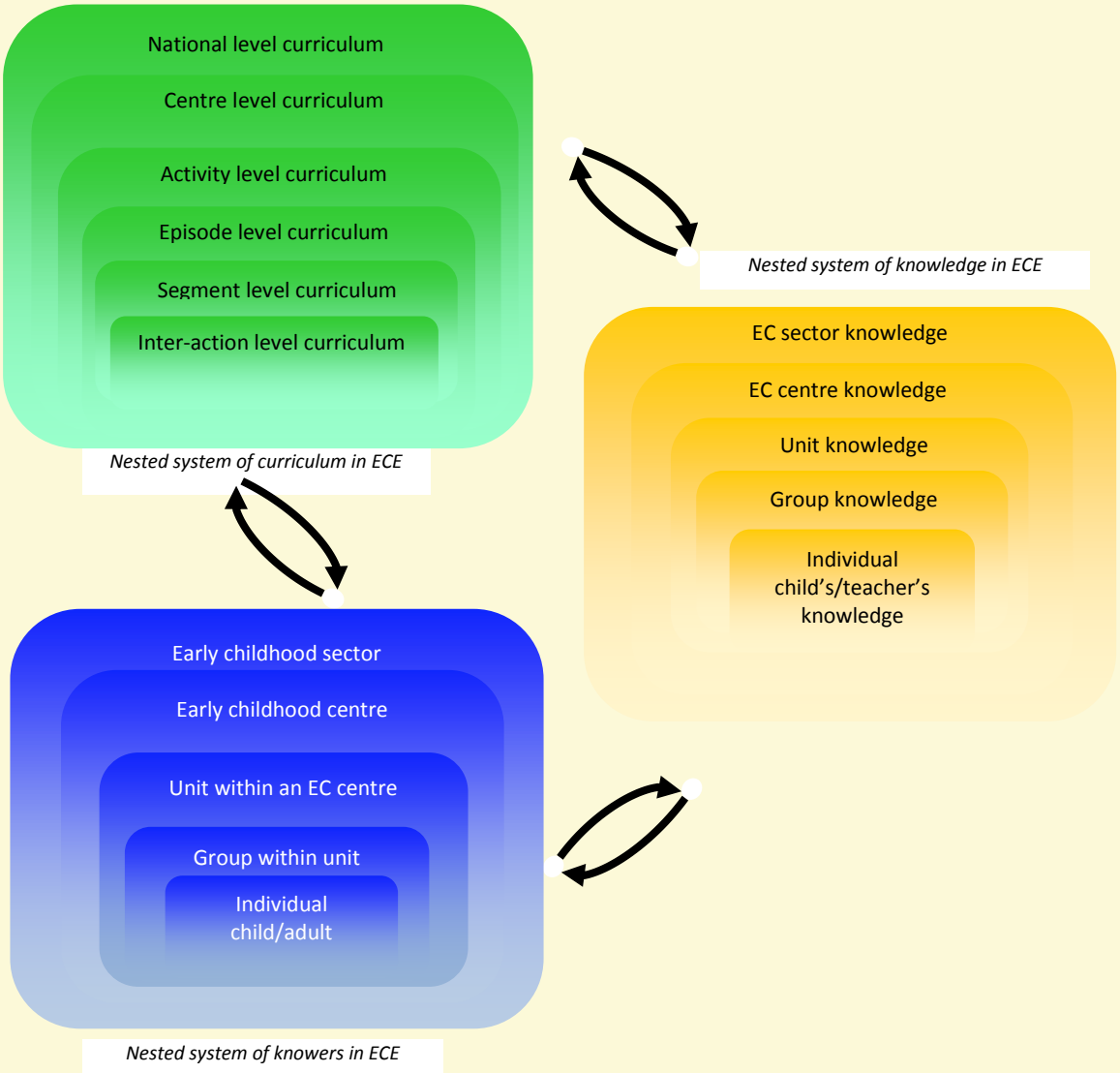

Figure 3: Nested and complex systems of knowers, knowledge and curriculum in ECE

It is important to note the following considerations when researching emergence. Firstly, researching emergence means identifying the level(s) of emergence we are studying and the level below it/them (Lemke & Sabelli, 2008; Davis & Simmt, 2003; Davis & Sumara, 2006). Secondly, different levels of a complex system operate at different timescales which means that the time it takes for a level in a system to emerge varies. For example, an episode level curriculum may take minutes or hours to emerge whereas an activity level curriculum may take days of week and a centre level curriculum weeks, months or years.

Based on the above considerations, I focused on the following levels of emergence in this research:

- Emergence of individual and group knowledge in the system of knowledge
- Emergence at the level of group knower in the system of knowers
- Emergence at the levels of activity and episode in the system of curriculum.

Theory for emergence: Curriculum process

The theory for emergence identifies occasioning emergence as the focus on curriculum. It provides a theoretical explanation of the processes and conditions for occasioning emergence, i.e., generating new possibilities in teaching, learning and activities. The theory for emergence presents an understanding of emergence that has a number of features.

Firstly, emergence embodies the idea that a system and its agents are simultaneously distinct from and responsive to each other. This idea is consistent with the structure of curriculum.

Secondly, emergence can be unintended and occasioned, i.e., it can happen unintentionally and intentionally. In unintended emergence, emergence happens without any intention by any knower to create emergence whereas in occasioned emergence, a knower intends for it to occur. In both cases, emergence is brought forth in the on-going interactions of agents so that emergence cannot be scripted or forced into existence (Davis & Sumara, 2006). This means that we cannot fully anticipate what the outcomes of emergence will be.

Thirdly, although emergence is a naturally occurring phenomenon that can exist beyond an observer's knowledge, the observer who recognizes emergence becomes a part of the phenomenon in the way he/she recognizes the pattern that emerges. This idea is consistent with the notion of curriculum-knower-knowledge couplings in the curriculum structure.

Fourthly, emergence involves gradual and spontaneous changes in a system over time through the processes of structural drift and self-organization respectively. Structural drift gradually changes the system to a state where there is both stability and instability in the

system. In this state, self-organization can spontaneously take place giving rise to dramatic changes in the system. It is important to note that these processes look different in different systems.

Finally, emergence can be occasioned by creating an enabling constraint. An enabling constraint refers to a set of conditions in a system which can (1) enable the agents in the system to act creatively within the boundaries of the system, and (2) enable the system to creatively respond to randomness from within and outside the system. Thus, an enabling constraint refers to a structure that is both constrained and flexible and benefits both the system and its agents. It is characterized by sufficient coherence and randomness in the system. In the context of ECE, this is the balance between constraints (the boundaries of what is acceptable and/or unacceptable) and freedom (to act in ways that are creative). The notion of 'sufficient coherence and randomness' carries the connotation of enough of each and a balance of both. But it is a notion that is dependent on the teacher's judgment as it can be sensed and cannot be measured. Furthermore, what counts as an enabling constraint is likely to be different in different teaching situations.

Framework for playing games of chase: Curriculum content

The framework for playing games of chase is a flexible framework that identifies key assumptions and outcomes in games of chase that can enable the games to be enacted in ways that are meaningful to individuals and collectives at the Centre. It can be seen as an enabling constraint because it is a structure that is both constrained and flexible enough to enable teachers and children to enact the games of chase curriculum in many possible ways as long as it does not involve breaking the proscriptive rule embedded in the framework. Figure 4 summarizes the framework in a diagrammatic form.

The framework is a knowledge or ideational system that consists of two knowledge threads which allude to what counts as valued knowledge in games of chase. Knowledge thread 1 focuses on the social aspect of games of chase by implying the value of playing games of chase in socially acceptable ways. Knowledge thread 2 focuses on developing an understanding of games of chase that resonates with the experiences of preschool children by valuing both the structure and flexibility in games. Each knowledge thread consists of two facets with an underlying idea, ideas children should know and related teaching intentions that teachers can focus on in their teaching.

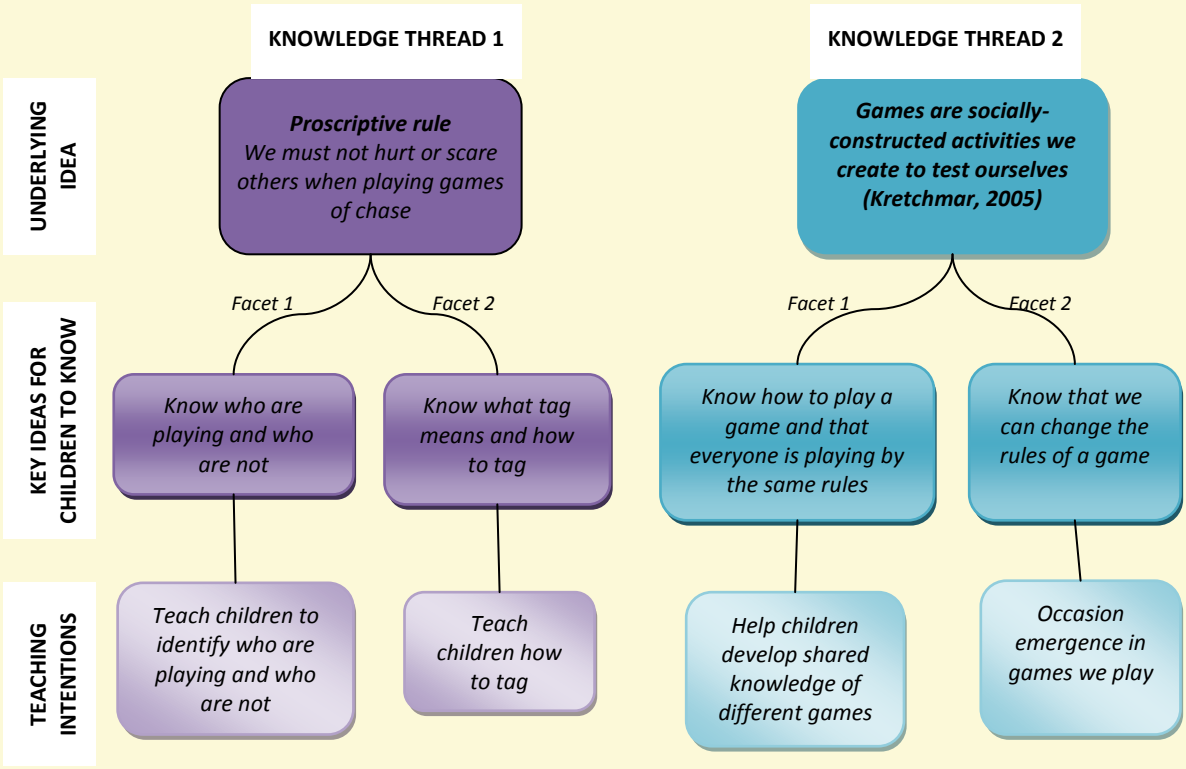

Figure 4: Framework for playing games of chase

Knowledge thread 1

Knowledge thread 1 focuses on developing shared knowledge that can prompt games of chase to unfold in ways that are socially acceptable. It does this by identifying what counts as unacceptable outcomes in games of chase, and by addressing what children and teachers need to know in order to minimize the unintentional emergence of these outcomes.

This framework identifies scaring and/or hurting others while playing as the unacceptable outcome in games of chase. It is an outcome I have observed among children in early childhood settings and is related to two key issues in games of chase at school, i.e., aggression (Chandler, 2008) and safety and injury (Chandler, 2008; Henry, 2001; Lipton, 2003).

The proscriptive rule that we should not scare or hurt others when playing clarifies what counts as the non-negotiable bottom-line in games of chase. It also implies that other outcomes are potentially acceptable. However, as I have observed from experience, it is possible for pre-school children to unintentionally hurt or scare others and it is important to make a distinction between intentional and unintentional acts. This distinction is important because teachers can address them differently although there may be some difficulty

identifying children's intention in relation to young children who may have limited verbal communication skills.

There are two common scenarios in which children can unintentionally hurt or scare others while playing tag at an early childhood centre. The first involves a child chasing another child who is not playing. This can happen in an early childhood setting where groups of children often engage in different activities in the same shared outside space. In such a setting, a chaser may not be able to clearly identify who are and are not playing. Learning to identify who are and are not playing is important knowledge for a child if he/she is to play without unintentionally hurting or scaring others; hence the use of tag belts as a means of helping children to learn this at the Centre.

The second scenario involves a child hitting someone, thinking that he/she is tagging that person. This is a situation that can easily arise if a child does not know the difference between tagging and hitting someone. It suggests that it is important for children to learn what tag means and how to tag in a game. At the Centre, this involved learning different ways to tag, e.g., by touching, by pulling off the flags on the tag belts and by putting a hoop over a person, and negotiating the ways to tag before and during play.

Therefore, in this knowledge thread, the key ideas for children to know serve as important knowledge that children should know to avoid situations where they unintentionally hurt or scare others. To support children's learning of these ideas, teachers need to design the games curriculum to incorporate the associated teaching intentions and proscriptive rule.

Knowledge thread 2

Knowledge thread 2 focuses on helping children learn the nature of games from their game experiences. It does this by introducing children to the tension that games have rules which players agree to abide by, and that players can also agree to change the rules of games. This knowledge thread also implies that teachers can work with the tension to help children learn these features of games.

According to Kretchmar (2005), games are activities we create to test ourselves and are not natural problems we solve in the course of our daily lives. As socially-constructed activities, they require rules that (1) define the game, (2) specify the start and end of a game, (3) specify what happens when a rule is violated or an unexpected event happens, and (4) specify how we test ourselves and/or compete with others in the game.

The first facet of this knowledge thread addresses an understanding of games relevant to preschool children. Here, it is important to make a distinction between sport, games and play. In sports, the rules and procedures are more standardised and strictly adhered to (Graham, Holt/Hale, & Parker, 1998), while those in games can be varied and flexible, as evidenced by the variety of ways in which we can play tag. However, for preschool children, playing a game can sometimes count more as play than a game if it is characterised by "an encounter with possibilities" (Esposito, 1995, p. 116) or constant negotiation of the rules over the course of play.

The ambiguous nature of games in relation to preschool children suggests that for a group of children to successfully play a game and enjoy it, players need to know how to play a particular game and also know that everyone is playing by the same rules. In other words, there needs to be some shared knowledge of a game and its rules among players. A teacher can help children to develop shared knowledge of various games by allowing children to experience different games and at the same time develop shared understandings of these games.

The need for shared knowledge of a game does not necessarily preclude the possibility of negotiating changes to the rules as the game unfolds. The second facet of this knowledge thread addresses this possibility by suggesting a relationship between children knowing that they can change the rules of a game and teachers focusing on occasioning emergence in games, where occasioning emergence here refers to the co-creation of a new game from existing ones. This idea of occasioning the emergence of a new game resembles the idea of "game metamorphosis" where a "game is completely transformed to a completely different one" (Morris & Stiehl, 1999, p. 47).

Curriculum dynamics

The term *curriculum dynamics* draws from dynamical systems theory which views the dynamics of a system as the patterns of behavior of the system under a certain set of conditions. Dynamical systems theory studies the dynamics of a system under different conditions and can be viewed as a qualitative analysis of a system's patterns of behaviours (Mosekilde, 1996). I use curriculum dynamics to refer to descriptions of the enacted curriculum, where descriptions of the enacted curriculum are descriptive and narrative patterns. These descriptions emerge from the qualitative analysis of the coupled systems of knowers, knowledge and curriculum that unfolded during the teaching phase.

Enacted curriculum refers to the lived experiences of the children as they participated in the games of chase curriculum during the teaching phase. It has the same meaning as Kelly's (2009) notion of received curriculum which is the actual curriculum or the reality of the children's experiences. It includes both the overt and the hidden curriculum. The former refers to aspects of curriculum that are intended for children to learn while the latter refers to aspects of curriculum that are unintended or even deliberately hidden from children (Kelly, 2009) and include the values, norms and structures of the educational setting. The hidden curriculum is also referred to as the implicit curriculum (Eisner, 1992) or collateral learning (Dewey, 1938).

Although curriculum dynamics describes the enacted curriculum at the Centre, it is important to note that the enacted curriculum cannot be fully described because it involves the structural coupling of systems of knowers, knowledge and activities at multiple levels. This structural coupling means that over time, the enacted curriculum becomes indescribably complex and any attempts to describe the enacted curriculum can only be partial. This research presents the curriculum dynamics as three partial views from different perspectives of curriculum-related phenomena, i.e., curriculum as teaching, as activity and as learning. The relationship between curriculum dynamics and its elements is similar to that of curriculum design and its elements, and is shown in Figure 1.

Curriculum as teaching

In this research, the teacher's role is one of collective consciousness (Davis, 2004). In this role, the teacher pays attention to existing and potential couplings and orients the children's attention to possibilities that can emerge from these couplings. Here, coupling can exist within and across (1) children's, teachers', community and societal interests and values, (2) available resources, (3) ideas and/or (4) events and activities. Davis write about this role from a complexivist perspective:

> "Such is the role of the teacher in an eco-minded classroom: attending to and selecting from among those possibilities that present themselves to her or his awareness. In this sense, teaching is about *minding* – being mindful in, being conscious of, being the consciousness of – the collective." (p. 178, author's italics)

The description of teaching presented here describes and explains teacher thinking and actions in the enacted curriculum, and how these co-emerged with activities and children's interests, ideas and actions.

Teaching strategies

There were four strategies used to achieve the purposes of the teaching intentions in the framework for playing games of chase and therefore contributed to the creation of an enabling constraint. These strategies were (1) using tag belts, (2) developing a routine before playing an episode, (3) teaching children game structure and design, and (4) sharing the games of chase we played within the community.

Using tag belts

The tag belts were used as tools to help children recognize players from non-players in an environment where (1) players and non-players could share the same play area, (2) children could join and leave an activity at any time, and (3) players were constantly moving about. In such an environment, it was not effective to simply tell children that they should know who were playing; they needed a visual tool to help them do this.

Although there were other options such as coloured bibs or coloured bands, I decided to use rip tag belts (see Figure 5) as the visual tools for two reasons. Firstly, they were suitable as visual tools. Secondly, the tag belts could also be used to help children learn different ways to tag; pulling off the flag from the belt could count as one of the ways to tag someone.

Figure 5: Putting on tag belt

The use of tag belts was also linked to an element in game structure and design, i.e., the element of players (Table 1). By purchasing ten tag belts, I had set the maximum number of players in any one episode at ten. Although I wanted to give as many children as possible the opportunity to experience the game at any one time, I also wanted the game experience to be manageable for me and enjoyable for the players, and I felt that a maximum of ten players in a game episode would make for both a manageable and enjoyable game experience for all.

Developing a routine before playing

This routine consisted of two segments that featured regularly within a game episode. The first segment was putting on tag belts and the second was discussing as a group how to play the particular episode (see Figure 6). The discussion involved making decisions on the four elements in games of chase, including how to tag (Table 1).

Figure 6: Discussing how to play a game

I decided to include a segment for putting on tag belts before playing as part of this routine because I could not assume that children initially would know the purpose of putting on tag belts or how to put them on. On the contrary, it seemed unlikely that the children would have seen or used a tag belt as it was not an item normally associated with early childhood education in New Zealand.

Given children's initial unfamiliarity with tag belts, expecting children to put them on before playing could help to create a coherent and shared understanding of the role of the tag belts in a particular episode.

Similarly, I decided to set aside a segment for discussing how to play our game episode before we started playing because it was an opportunity for us to create some coherence and shared understanding around the design for that particular episode. In a newsletter to teachers and parents, I explained my purpose in relation to teaching game structure:

> I have included a short discussion around how we would play the game before we started playing. Hopefully, this can eventually raise children's awareness of the need to sometimes negotiate the rules and boundaries of a game before we start playing, bearing in mind that playing a game whose rules and boundaries emerge during play can also be appropriate in some situations.

By embedding this routine as regular segments of a game episode, the routine itself would become a visible feature of the games curriculum. At the same time, the knowledge of tag belts, ways to tag and rules could 'spread' among the children who watched and/or played in the various episodes. Over time, this 'spreading' of knowledge across different children could give rise to a redundancy in the routine and knowledge in the sense that although no

one individual would know everything about these, most children would eventually know enough to be able to play an episode.

Teaching game structure and design

Game structure refers to the elements in a game and the ways in which these elements are related or organized. Some writers refer to these elements as components, game factors or variables and identify them differently (see Gallahue & Donnelly, 2003; Kirchner & Fishburne, 1997; Morris & Stiehl, 1999; Graham *et al*., 1998; Gump & Sutton-Smith, 1971). For example, Gallahue and Donnelly (2003) identify the following as components of a game: players, rules, boundaries, strategies and motor skills and movement concepts used or required. Morris and Stiehl (1999), on the other hand, identify the following as elements: purposes, players, movement, objects, organization and limits. In all cases, however, a game's structure gives coherence to a game and forms the basis of a shared experience among players and spectators.

Game design refers to the decisions made about a game's structure. Gallahue and Donnelly (2003), Graham *et al.* (1998), Morris and Stiehl (1999), Kirschner and Fishburne (1997) make calls for teachers to consider the design of games we teach or play with children because game design strongly influences children's experiences of the game (Morris & Stiehl, 1999). When children have enjoyable game experiences, they are more likely to be "excited about participating in game-playing activities on their own" (Graham *et al.*, 1998. p. 618).

In early childhood where a game can appear more like play, these design decisions can be pre-determined or emergent, explicit or tacit, negotiated by players or made by the teacher. When these decisions give rise to a game structure that has enough boundaries and flexibility, i.e., it is an enabling constraint, children with diverse game experiences will have the capacity to enjoy the episodes they play. The boundaries give coherence and create redundancy in game-related knowledge while the flexibility helps individual children to adapt the game to suit their game experience and knowledge. At the same time, this enabling constraint can give the group of players the capability to change the game structure within each episode.

In this research, I identified four elements of game structure that formed the basic elements in any game of chase. These elements, as shown in Table 1, afforded us the structure and flexibility to play and change the games at episode and activity levels. We discussed these

elements before playing an episode and I framed the elements as questions so that children could easily understand them.

Element	Element framed as question(s)	Research notes
Name of the game	What is the game called? OR What are we playing?	The three main games of chase we played were *tag*, *What is the time Mr Wolf?* and *Big A, Little A.* Examples of non-chasing games we played were *Running Races*, *Bird and Bees* and *Creep up on Granny*.
Space	Where are we playing?	There were three main areas for playing, i.e., the concrete area, the rubber mat area and the bark area [Figure 7]. The boundaries for each area were visually defined by the edges that made up the area. We tended to stay within the defined boundaries when we played on the concrete area but not when we played in the other two areas.
Players	Who are playing?	This element was very unpredictable and dynamic because children could enter and leave a game at any time during an episode. Episodes played with tag belts limited the number of players to ten and helped us to identify who the players were at any one time. Episodes played without tag belts tended to have four or fewer players and were less dynamic.
Rules	How are we playing?	In the early episodes when the games were relatively simple, we talked about what roles were in the game and how to tag someone. Later, as the games became more complex, our discussions included whether there was a safe place and where this was, how we would decide on who would be the next wolf or bird (i.e., the chaser) and/or what we would do with the flags we pulled off other people's belts.

Table 1: Elements in game structure for games of chase at an early childhood setting

Sharing games of chase within the community

In this research, sharing means making the games we played visible to the Centre community. There were three main reasons for sharing the games: (1) to generate interest and encourage participation, (2) to enable ideas to interact within and across episodes, and (3) as a strategy for collaboration.

There were three ways in which sharing took place. The first was by playing the games in a visible place so that children, teachers and parents were able to notice and make sense of these games. The second was by incorporating facets of the games in other activities, e.g., by incorporating the game *What is the time, Mr(s) Wolf?* in a storytelling activity, by reading books about games. The third was by showing videos, movies and Powerpoints of games to teachers, children and parents and talking about these.

Teaching patterns and variations in game episode

There were several ways in which a game episode could be initiated, e.g., as a request from children, as a suggestion from me and/or as an activity that unfolded from another activity. When an episode was initiated, there were a number of decisions that needed to be made, i.e., where we would play, whether to use the tag belts and how we would play the games. Initially, I made many of these decisions myself and modeled them to the children, but later when the children became more familiar with the games, we negotiated these decisions.

On many occasions, we played on the concrete area although we did also play on the rubber mat area and the bark area (Figure 7). The choice of where to play was coupled to other factors such as which spaces were available, the maximum number of players in the episode, how visible I wanted the episode to be to the children and whether we would be using tag belts to play.

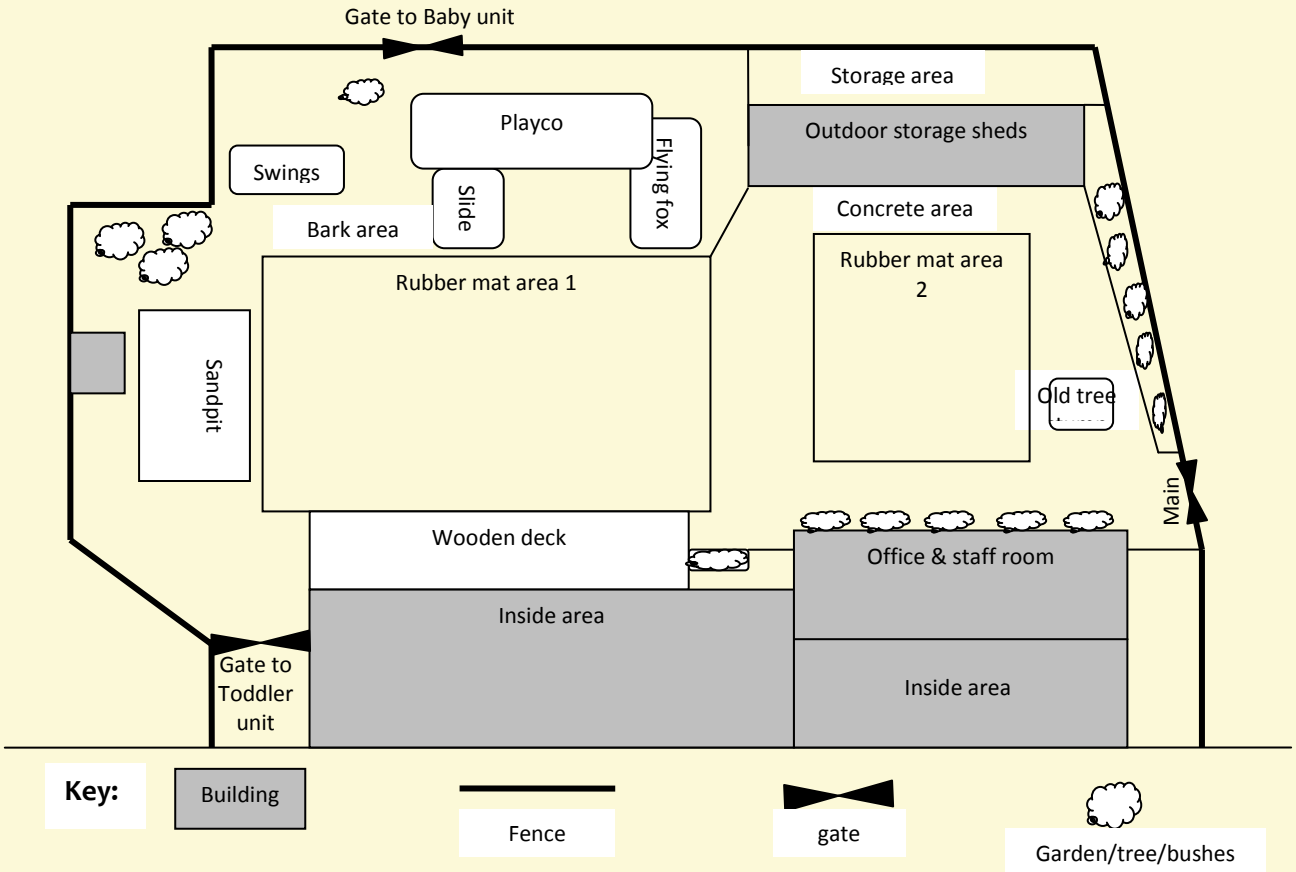

Figure 7: Spatial representation of outdoor environment

If a decision was made to use tag belts, I would bring the box of belts out and place it in a visible place. I would then spend the next few minutes helping children to put on the tag belts because they were too long for the children to put on by themselves. On numerous

occasions, other teachers helped as well and later, when I decided to shorten some of the belts, a number of the older children were able to put the belts on themselves. During this segment of putting on tag belts, it was not unusual for other children to gravitate towards us and either watch what we were doing or ask to play.

When it seemed as if whoever wanted to play were ready, we sat together and talked about how to play this episode. Our discussion generally revolved around the following questions although there were variations as to which questions we discussed and in which order:

- What were we playing?
- What roles would we have in this episode? What would we do in these roles? Who would take on which roles at the start?
- How would we tag someone?
- Did we want a resting place and if so, where would this place be?
- How would we change roles?

When these questions were more or less clarified, we would play until there was an interruption to the episode. Sources of such interruptions could be internal or external. Internal interruptions included stopping the game to help children put on or take off tag belts, re-negotiating rules of the game, negotiating roles and attending to children who had fallen down. External interruptions arose from calls by other teachers to put on sun screen lotion, have a drink on very hot days or stop for morning tea or mat time.

However, there were also some changes that occurred within an episode that did not stop our play, for example, the float teacher taking children to the toilet, and children leaving and joining the episode without requiring my help to remove or put on tag belts.

There was no set duration for an episode. In most cases, the episode ended when one of the following situations arose: (1) it was time for morning tea or mat time, (2) no one wanted to continue playing or (3) the children and I decided to play something different.

Curriculum as activity

The children and I played running games, three main games of chase and *Creep up on Granny*. For the games of chase, we started with *tag*, followed by *What is the time Mr(s) Wolf?* and finally Big *A, Little A*. For each game, we started by playing a simple version and over time varied the ways we played it. When a new game was introduced, we continued to play the game(s) that preceded it. Table 2 summarises details of the games we played.

Table 2: Summary details of the games we played between January and April 2008

Game & type	Summary of episodes played	Rules for simple version of game	Some variations
Running games	We played a total of 11 episodes over 8 weeks between Weeks 1 and 8. The games we played included running races, *Birds and Bees* and *Stop and Go*. In the later weeks, we played running games as an introductory activity before playing a chasing game.	*Birds and Bees* There are two roles: the caller(s) and the runner(s). All runners crouch, with heads down, and listen to the caller. When the caller calls out "birds", the runners remain crouching. When the caller calls out "bees", the runners get up and run around a pre-negotiated course. *Stop and Go* There are two roles: the caller and the movers. When the caller calls out "go", the movers will run around on the concrete area. When the caller calls out "stop", the movers freeze.	• When the caller in *Birds and Bees* called out "Stop", the runners had to go back to the start. Otherwise they would continue running. • In *Stop and Go*, the caller could vary the movement on "go" to include movements such as skipping, running backwards and flying like a butterfly.
Tag	We played a total of 15 episodes over 13 weeks, starting from Week 2.	There are two roles: the chaser and the runners. The chaser runs and tags the runners by touching them.	• Incorporating the role of a caller who called out 'Stop' and 'Go' to which the chaser and runners had to respond by stopping and running respectively. • Tagging by hugging and tickling, pulling off flag from the runners' tag belts (rip tag) and putting hoops over someone (hoop tag). • Incorporating into the rule how to choose the next chaser, for example, whoever gets tagged becomes the next chaser and allowing a chaser to choose who gets to be the next chaser. • Designating a safe place where a chaser cannot tag runners who are in this place. • Having multiple chasers or taggers in an episode or everyone pulling off each other's flags.

What is the time Mr(s) Wolf?	We played 12 episodes over 8 weeks between Weeks 6 and 13.	The wolf sits in the tyre while the pigs call out "What is the time Mr(s) Wolf?" from their house. If the wolf calls out a time like one o'clock, the pigs call out again. If the wolf calls out "Dinner time" or "Lunch time", the pigs run out of their house and the wolf chases them. Pigs can go back to their house to be safe. The wolf chooses the next wolf.	• Instead of calling out the time as "one o'clock", the wolf called out "Kay time" or "time to have a shower". • We played with families of wolves and families of pigs. • We embedded a rule for deciding who would be the next wolf, for example, the current wolf chooses the next wolf or whoever gets eaten by the wolf gets to be the next wolf
Big A, Little A	We played 7 episodes over 5 weeks between Weeks 10 and 14.	We play on the concrete area using two opposite ends of the rubber mat area as 'lines' to mark our positions. The bird stands at one end of the rubber mat while the bugs (all other children) stand at the other end. The bird faces away from the bugs. The bugs creep up towards the bird, repeatedly chanting "Big A, Little A, bouncing B, (Child's name) bird's asleep and he/she can't catch me" When the bird turns around to look at the bugs but doesn't say anything, all the bugs have to freeze both their movement and singing. When the bird looks away, the bugs start moving and chanting. When the bird turns around to look at the bugs and says, "I'm awake", he/she starts chasing the bugs. The person who is tagged becomes the next bird.	• The bugs chose which bug to be and moved like the bug or animals. • We incorporated the role of adult and baby birds and bugs. • We played in different playing areas, i.e., the rubber mat area, the bark area and the concrete area. • Sometimes we played with one bird and at other times we played with two or more birds. • Although we played mainly with the rule that whoever was tagged became the next bird, in one of the episodes, the players decided who the next bird was.
Creep up on Granny	We played 3 episodes in Weeks 6, 8 and 10.	Grandma faces away from others who start from a line. Grandma can walk forward and others follow behind her. When Grandma turns around slowly, everyone freezes. Whoever does not freeze goes back to the start.	See Kay's learning story.

Figure 8 shows the elements in the different games and some of the influences that gave rise to the games. It also illustrates an increase in complexity of the game structure from the running games to *Big A, Little A*. These are elaborated on next.

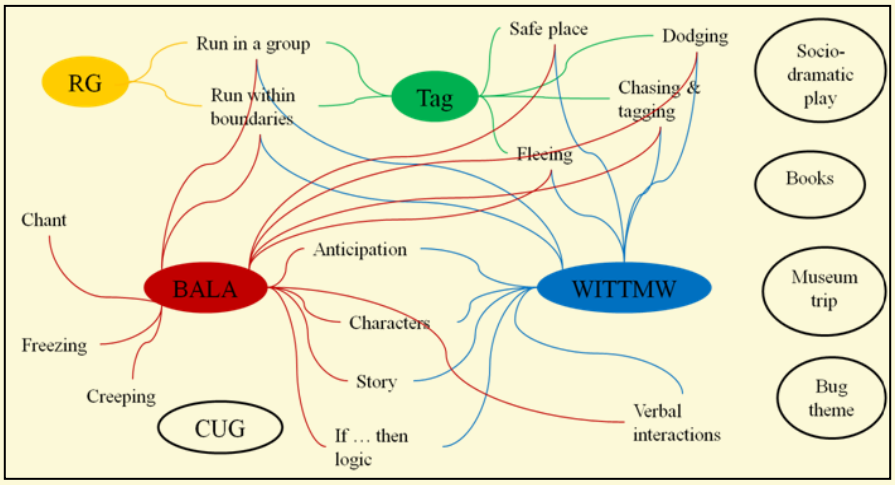

Figure 8: Game elements in the various games we played

Playing running games

I began by first playing running games with children when I realised that it would be useful for them to have experiences running together in a big group and within prescribed boundaries (see Figure 8). These experiences could help children to develop the spatial awareness necessary for playing games of chase and in the process minimize accidents during play. Furthermore, playing simple running games could help me focus on developing the routine before playing. As the children became more familiar with the routine, it would fade into the background and I could focus more attention on teaching game structure.

Playing tag

Although we started playing tag in Week 2, we began to play earnestly only in Week 5 when I felt that the children had had enough experience of running in a big group. We played the simplest version which introduced the children to the tag belts, dodging, fleeing, chasing and tagging. Later, some of the children introduced the concept of a safe place for the runners.

Emergence of *What is the time Mr(s) Wolf?*

By the end of Week 5, I had a sense that many children had a strong interest in stories and socio-dramatic play. This sense was based on my observations that

- many children enjoyed reading stories with teachers throughout the morning and at mat time,
- some groups of children regularly engaged in socio-dramatic play which revolved around characters and/or stories, e.g., playing Barbie and playing jaguars,
- some children appeared to enjoy the role of the caller in the running game, *Birds and Bees*.

I began thinking about incorporating characters and a story into our games of chase since a story could be used as a means of sharing the rules of the game with children. I decided to introduce children to *What is the time Mr. Wolf?* because the game could be linked to the story *The Three Little Pigs and the Big, Bad Wolf* and I knew that some of the children already knew the game and/or the story.

We played our first game of *What is the time, Mr. Wolf?* in Week 6. I made a decision to couple the game with the story *The Three Little Pigs and the Big, Hungry Wolf*, which was an adaptation of the story some of the children knew. This adaptation deliberately avoided creating an impression that the wolf was necessarily bad. The first few episodes of the game were coupled with storytelling and craft episodes of the story. For example, the first episode embedded the story while the second episode was preceded by storytelling and a craft episode during which we made magnet board pieces for the story.

The simple version of the game incorporated elements of tagging, tag belts, a safe house and running from the game of tag. However, there were other elements that were new, i.e., new characters, a related story and verbal interactions between the characters. It also incorporated the logic of *if ... then* in the interactions and the element of anticipation which were present in the game *Birds and Bees* but not in tag.

Emergence of *Big A, Little A*

At around the time we started playing *What is the time, Mr(s) Wolf?*, two events unfolded which influenced the nature of the games of chase curriculum. The first was a new game that two girls, Kay and Rachel, introduced to the Centre. They had learnt this game at a birthday party and agreed to teach me to play it. The second event was a conversation with the teachers. They mentioned that they were organizing a trip to the museum to attend a lesson on bugs because they had noticed many of the children showing an interest in the bugs that were in the Centre's outdoor area. In preparation for the trip and as part of this interest, they were incorporating the theme of bugs and insects into activities at the Centre. I said that I would incorporate this theme into my games after I introduced children to the game *What is the time, Mr(s) Wolf?*, but at that time, I had no idea how I was going to this.

Three weeks later, I was inspired to combine some elements of *What is the time Mr(s) Wolf?* with some elements of the bug world and the game *Creep Up on Granny*. It was from the process of combining these various elements that the game, *Big A, Little A* emerged.

The game included a chant which some children initially found difficult to remember. I showed the children videos of the game and incorporated the chant during mat time to help them remember it. Apart from the chanting, the game also had other elements that were different from *What is the time, Mr(s) Wolf?* These included the chaser (bird) facing away from the runners (bugs) and the creeping and freezing movements. The element of anticipation as the bugs waited for the bird's response was also different from that in *Birds and Bees* in the sense that it resembles a game of peek-a-boo that many young children enjoy.

Curriculum as learning

In this research, learning is viewed as on-going transformation of knowers, knowledge and activities. This view extends on Davis and Sumara's (2006) notion of learning as on-going transformation of knowers and knowledge. Changes in activity also constitute learning because the nature and dynamics of activities we engage in as knowers also change as our knowledge changes; this understanding is consistent with the idea embodied in the conceptual framework that knowers, knowledge and activities are co-emergent systems. In addition, learning as transformative change embodies both gradual and dramatic changes associated with structural drift and self-organization respectively since both are processes in co-emergence.

This research focuses descriptions of children's learning in terms of children's explicit and/or embodied knowledge in and across episodes and activities. It identifies learning as explicit as well as embodied and/or embedded in children's experiences and actions and as changes in knower-knowledge-activity couplings.

There are two forms of learning described. The first describes learning at the level of children as a collective which represents emergence of children's collective creation and negotiation of knowledge and learning distributed across children. The second form describes learning at the level of an individual child in terms of her relationships with people, places, ideas, activities and things over fourteen weeks and how these triggered changes in her knowledge in, through and about games of chase and *Creep up on Granny*. These changes represent emergence in an individual child's knowledge. It counts as one possible example of individual learning, bearing in mind that (1) we can describe other possible learning pathways for this child and (2) other individual children's learning pathways were different.

Learning at the level of collective knower: Learning distributed across children

Children learnt about tag belts and its use. Their learning was embodied in the following actions:

- Sharing with others what they knew about tag belts, including its use as a means of identifying who were playing,
- Helping others to put on tag belts,
- Looking for tag belts before joining in a game that had already started,
- Asking for tag belts before starting a game,
- Participating in decision-making about whether to put on tag belts to play a game,

Children learnt to tag in a variety of ways. Some children also learnt that the way we tag can emerge from our decisions about rules of the game and/or the tools we use. Their learning was embodied in the following actions and experiences:

- Experiencing different ways to tag in an episode, including tagging by touching, pulling off flag from the tag belts, tickling, hugging, putting a hoop over someone,
- Experiencing the same ways of tagging across different episodes,
- Making suggestions on how to tag in an episode,
- Talking about the way(s) to tag

Children experienced and talked about game structure. Their learning was embodied in the following experiences and actions:

- Playing a variety of games with different rules and levels of complexity, i.e., running games, tag, *What is the time Mr(s) Wolf?*, *Big A, Little A*, *Creep up on Granny*, and *Follow the leader*,
- Participating in and contributing to group discussions on how to play a particular episode before playing,
- Suggesting changes to elements of the game while playing.

Learning at level of individual knower: Kay's learning

Kay was three years old at the time of this research in 2009. She attended the Centre four full days a week and generally arrived at the Centre with Mum, Jacqueline, before 9 am each morning. I knew Kay prior to this research; she joined the Big Side from the Toddler Unit around the time I started working at the Centre between 2007 and 2008.

Kay was an active participant in many of the activities from the beginning. She participated in running games, tag and storytelling activities. I also noticed that Kay appeared to enjoy spending the flying fox, which was located adjacent to the concrete area where we played

most of our games of chase. This location was a good vantage point for observing the games. There were at least two occasions when she joined us after spending some time at the flying fox.

When Kay and Jacqueline arrived on the morning of 16 February 2009, they told me that Kay and Rachel had learnt to play a new game, *Creep Up on Granny*, at a birthday party. I was not familiar with this game and suggested to Kay to teach it to me later.

After morning tea, I went outside to play wrestling with some children and noticed Kay and Rachel playing *Creep Up on Granny*. I asked the girls if they could teach me how to play and they agreed. However, each had a different version of the game. Kay's version seemed to emphasize the actions of grandma turning around and those behind her stopping or freezing when she did this.

About two weeks later, on 5 March 2009, Kay asked to play *Creep up on Granny* while she, Ray, Renea and I were chatting after morning tea. Kay wanted me to be Granny and I agreed, and not long after we started, I began to include a tagging element into the games by turning around to tag the children as they got closer to me. Then, Kay asked to play tag and we did this without tag belts since there were only four of us. But our game of tag did not last very long either. We started playing *What is the time, Mr(s) Wolf?* on Kay's suggestion.

Kay did not initiate another episode of *Creep up on Granny* for the next two weeks but continued to play *What is the time, Mr(s) Wolf?*. By then, I had had some conversations with her and another parent about the game and decided to incorporate some its elements into another game, *Big A, Little A*. Kay was not present at the storytelling session when I introduced the rules of this new game and she joined in one episode of *Big A, Little A* a few days later.

On 19 March 2009, a group of children wanted to play a game of chase and we agreed to play after morning tea. Kay approached me after morning tea to initiate playing and when I asked her to invite two other children to join us, she invited Rachel and Edith. However, the girls could not agree what to play; Kay wanted to play *Creep up on Granny* while the other two girls wanted to play *Follow the leader*. In the end, we agreed that Kay would watch the three of us play *Follow the leader*, after which we would play her game.

After playing *Follow the leader*, Rachel and Edith decided to play with Enya and left us. Renea asked to join us but changed her mind as I was putting on her tag belt, leaving Kay and I as the only two players in *Creep up on Granny*. When I asked Kay how we would play the

game, she explained it to me. Her explanation included the elements of chasing and tagging which were not present in earlier versions of the game.

Kay's explanation of *Creep up on Granny* in the third episode of the game

Kay: You have to tag someone and then you pull someone off like that (Kay showed me tagging by touching and pulling off the flag).
Hanin: Oh, ok. So Granny, Granny's going to walk or stand still?
Kay: She's going to stand still.
Hanin: She's going to stand still.
Kay: And she's going to tag someone and she's going to pull the belt off. (Kay tugged at her front belt to show how it was done.)
Hanin: So, when do people know that she's going to tag them?
Kay: [Yeah, and then
Hanin: She's going to turn] around and say … something?
Kay: And then they go.
Hanin: They go. Ok, let's try then.

As we walked towards the tree where Granny was going to stand, we continued to talk about the game.

Hanin: So you're going to be Granny.
Kay: No, you're going to be Granny first.
Hanin: Ok, I'll be Granny and if I turn around you have to freeze.
Kay: Yes, and if you say I'm awake, you you [(unclear)
Hanin: I'll chase you.]
Kay: (unclear)
Hanin: I'll pull the belt off.
Kay: Yeah. That's it.

Note: Text in [ ] means we were talking at the same time.

Kay and I played until we were joined by John. Later, when I needed to go inside to get ready for the morning's mat time, I asked Kay and John if they wanted to ask another teacher to join them. They chose Josie who played with them until the end. Josie later wrote a story of the game for Kay's learning journal.

Four weeks later, on my last day at the Centre, Kay asked me to play *Big A, Little A* with her and Edith. I agreed but did not want to draw attention to our game because I had already wrapped up the tag belts to give to the Centre as a present. So I asked the girls to suggest a different place to place our game and Kay brought us back to the tree where she, John and I had played *Creep up on Granny* four weeks ago.

Conclusion

This research presents the games of chase curriculum in terms of a local curriculum theory, i.e., an explanation and description of curriculum that is specific to a particular curriculum domain, a teaching and learning setting and duration. This local curriculum theory is underpinned by the discourse of complexity thinking and emerges when the teacher focuses on making sense of the curriculum in terms of both its design and dynamics. Curriculum design articulates the teacher's conceptual understanding of how to occasion emergence in games of chase while curriculum dynamics describes and explains the emergent phenomena that unfold in the curriculum enacted by the teacher(s) and children.

This research presents the games of chase curriculum design in terms of three coupled elements of curriculum, i.e., its structure, process and content. Each addresses a different facet of curriculum but contributes to the overall purpose of occasioning emergence in the games of chase curriculum. It also presents the curriculum dynamics as three stories, i.e., teaching story, curriculum story and learning story. Each story focuses on describing a particular curriculum-related phenomenon associated with the role of the teacher, i.e., teaching, activities associated with games of chase and children's learning in, through and about games of chase.

The emergence of the local curriculum theory for games of chase gave rise to a curriculum that was rich and 'thick'. This richness and thickness is manifested in the following features of the local curriculum theory: (1) it valued both children's and teachers' interests, (2) it enabled teachers and children to broadly and deeply explore facets of games of chase together over a long period of time, and (3) it focused not only on following children's interests, but also generating children's interest in a new activity or curriculum domain.

From a complexivist perspective, the local curriculum theory is consistent with Doll's (1993) notion of a self-organising curriculum which is characterized by diversity, multiple perspectives and explorations. Diversity was visible in the different games we explored, the variations that unfolded in the games and the different ways to tag. Multiple perspectives were visible in the ways the local curriculum theory embodied both the teaching intentions and children's interests. Explorations manifested itself in the emergent nature of the curriculum, where ideas and actions during play brought forth new ideas, actions and activities.

For teachers interested in exploring games of chase in their own settings, I offer the local curriculum theory as a curriculum vision for using complexity thinking to explore games of chase in the early childhood curriculum. Gough (2002) describes a curriculum vision as a curriculum invention that embodies the author and can be experienced by others. As a curriculum vision that is an enabling constraint, the local curriculum theory for games of chase envisions curriculum as "a space for running" and "the paths of running in that space"; Doll (1993) refers to the latter as currere. This image carries the connotation of boundaries and structure as well as freedom and flexibility. This vision brings together and extends on two traditionally opposing views of curriculum, i.e., curriculum as a set course to be run and curriculum as currere (Doll, 1993).

This curriculum vision enables teachers to reflect on the theory and use it as a starting point to create their own local curriculum theories. This means that teachers can use the curriculum design as an initial design for exploring games of chase at their own centres and modify it as their exploration unfolds. Teachers can also consider the curriculum dynamics as a case study of teaching and learning in, through and about games of chase; as a case study "what becomes useful understanding is a full and thorough knowledge of the particular, recognizing it also in new and foreign contexts" (Stake, 2000, p. 2).

The above discussion does not imply that anything goes in the games of chase curriculum since the design, though flexible, has structure and boundaries. Instead, it implies the need for teachers to be reflective and critical to determine ways in which the theory is useful in the context of his/her teaching situation. For example, he/she will need to consider the following questions:

- What are existing conditions at my centre that can contribute towards an enabling constraint? What other conditions do I have to create?
- To what extent are the teaching strategies explained in this report useful in my situation? Do I need or want to modify aspects of the strategies, e.g., the use of tag belts? If there are modifications, what are these and why?

By considering these questions and acting on them, the teacher is using complexity thinking to explore games of chase in his/her setting since he/she is bringing into consciousness the couplings that exist between this local curriculum theory and curriculum in his/her setting. At the same time, he/she is expanding on possibilities in teaching, learning and curriculum in his/her own setting.

References

Alhadeff-Jones, M. (2008). Three generations of complexity theories: Nuances and ambiguities. *Educational Philosophy & Theory, 40*(1), 66-82.

Carr, M. (2001). *Assessment in early childhood settings: Learning stories*. London: Sage.

Chandler, M.A. (2008, April 4, 2008). 'Pyramiding' puts tag in the bad books. *The Press*.

Cohen, J., & Stewart, I. (1994). *The collapse of chaos: Discovering simplicity in a complex world*. London: Penguin Books.

Davis, B. (2004). *Inventions of teaching: A genealogy*. Mahwah, N.J.: Lawrence Erlbaum Associates Inc.

Davis, B., & Sumara, D. J. (2006). *Complexity and education : Inquiries into learning, teaching, and research*. Mahwah, N.J.: Lawrence Erlbaum Associates.

Dewey, J. (1963). *Experience and education*. New York: Collier.

Doll, W. E. (1993). *A post-modern perspective on curriculum*. New York: Teachers College Press.

Eisner, E. (1992, August). *The role of education in the cultural and artistic development of the Individual.* Paper presented at the 43rd UNESCO International Conference on Education, Geneva, Switzerland.

Esposito, J. L. (1995). Play and possibilities. In W. J. Morgan & K. V. Meier (Eds.), *Philosophic inquiries in sport* (2nd ed., pp. 114-119). Champagne, IL: Human Kinetics.

Gallahue, D. L., & Donnelly, F. C. (2003). *Developmental physical education for all children*. Champaign, IL: Human Kinetics.

Gough, N. (2002). Voicing curriculum visions. In W. E. Doll Jr & N. Gough (Eds.), *Curriculum visions* (pp. 1-22). New York: Peter Lang.

Graham, G., Holt/Hale, S., & Parker, M. (1998). *Children moving. A reflective approach to teaching physical education*. Mountain View, CA: Mayfield Publishing Co.

Gump, P. V., & Sutton-Smith, B. (1971). The "it" role in children's games. In E. M. Avedon & B. Sutton-Smith (Eds.), *The study of games* (pp. 390-397). New York: John Wiley & Sons Inc.

Henry, J. (2001). British bulldogs hold their ground. *Times Educational Supplement*, 5.

Kelly, A. V. (2009). *The curriculum: Theory and practice* (6th ed.). London: SAGE.

Kirchner, G., & Fishburne, G. J. (1998). *Physical education for elementary school children* (10th ed.). Boston, Mass: WCB/McGraw Hill.

Kretchmar, R. S. (2005). *Practical philosophy of sport and physical activity.* Champaign, IL: Human Kinetics.

Lipton, L. (2003). Big fight on the playground. *Wall Street Journal - Eastern Edition, 242*, W1-W4.

Ministry of Education. (1996). *Te Whāriki : He whāriki matauranga mo nga mokopuna o Aotearoa : early childhood curriculum*. Wellington, N.Z.: Learning Media.

Morris, G. S. D., & Stiehl, J. (1999). *Changing kids' games* (2nd ed.). Champaign, IL: Human Kinetics.

Mosekilde, E. (1996). *Topics in nonlinear dynamics: Applications to physical, biology and economic systems*. Singapore: World Scientific.

Soler, J., & Miller, L. (2003). The struggle for early childhood curricula: A comparison of the English Foundation Stage Curriculum, *Te Whāriki* and Reggio Emilia. *International Journal of Early Years Education, 11*(1), 57-67.

Stake, R. E. (2000). The case study method in social inquiry. In R. Gomm, M. Hammersley & P. Foster (Eds.), *Case study method* (pp. 19-26). London: SAGE Publications Ltd.

Terzidis, K. (2007). The etymology of design: Pre-Socratic perspective. *Design Issues, 23*(4), 69-78.