

A Formative Study of Rhythm and Pattern:  
Semiotic Potential of Multimodal Experiences for  
Early Years Readers

by  
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## **Abstract**

Literacy education defined as the reading and writing of print text is undergoing a paradigmatic shift towards a pedagogy of multiliteracies (Cole & Pullen, 2010). At the same time, demands for rapid, efficient, and accurate reading skills escalate (Katzir et al., 2006) in a global society with increasingly instant and complex literacy requirements. Musical rhythm plays a role in multiliteracy and print literacy learning. Rhythm is essential for music making and reading, and may facilitate print literacy for all children, including those who struggle with traditional print-based teaching and learning.

The purpose of this research was to investigate the potential for the semiotic resource of rhythm to engage early years children in print and non-print literacy learning. A twelve week mixed methods quasi-experimental study was conducted to examine the effects of a multimodal Orff-based learning design on elements of reading and rhythm for grades one to three children in four schools. Students (n = 169) from nine classrooms were non-randomly assigned to one of two groups. The researcher instructed both groups two to three times a week totaling twenty-five sessions in each homeroom classroom. The experimental groups participated in Orff-based learning experiences that focused on elements of rhythm and prosodic oral reading fluency. The control group listened to and sang song-storybooks.

Beat performance and oral reading rate assessments were administered as pre- and post-tests to each group. Struggling readers in the experimental group significantly improved on measures of oral reading rate compared to struggling readers in the control group using matched pairs t-procedures and analyses of variance. Associations between beat performance and oral reading rate were explored using bivariate and multivariate

regression and correlation analysis. A strong positive correlation was found between measures of beat competency and measures of oral reading rate.

Qualitative methods using grounded theory, semiotic data analysis, multimodal analysis, action research, and design research methods placed within a bricolage framework (Kincheloe & Berry, 2004) and examined through the lens of complexity thinking (Davis & Sumara, 2006) added multiperspectival meaning-making of data. Findings pointed to the value of multimodal music and rhythm experiences for engaged, deep, meaningful print and non-print learning for diverse individual and classroom collective learners in both control and experimental classrooms.

Beat competency was important to both print and music literacy learning in experimental classrooms. Beat experiences were compelling, equitable, and appeared to organize music, oral language, and print literacy into meaningful and accessible patterns and structures. Similar findings may be occasioned through an ontology of multimodal richness, a complex epistemology, embodied ways of knowing and communicating, and systemic shared beliefs and values.

## Acknowledgements

My childhood home is nestled among the forests and rock of the Canadian Shield. The clear, cold waters of the Shield border the town and are a favourite walking destination for many of the town residents. Along that walk is a special place I go to, where the waters and I find stillness. In a small protected bay, the undisturbed water closely reflects the stretching pines and rocky shore. When a stone from the shore is thrown into the quiet, the water's smoothness is interrupted as gently articulating circles silently form and spread across the bay. When the ripples meet the shore, the irregularities encountered refract the water's geometries and send the circles back transformed. The angles and images of the shore are echoed and re-shaped by the ripples as they intersect and rebound. When the waters and images find stillness again, the quiet music of the bay is changed forever.

The story of the bay is the story of the people who have shaped, transformed, and supported the thinking and practice of this extended study. Countless stones were thrown into the waters of my research to generate interactions of ideas, new perspectives, illuminating moments, and perplexing images for analysis. Children and teachers threw those stones, as did family, my advisory committee, critical and personal friends, colleagues, and provocateurs from the literature.

I will remain forever grateful to my thesis committee: Kelvin Seifert, advisor, Charlotte Enns, Francine Morin, and Sheila Scott, who created the necessary ripples and then allowed the essential space for them to unfold, reshape, and transform. My precious family was ripple and rock: inspiration; refuge; strength; and support. I wish to

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## **Dedication**

I gratefully dedicate this lifelong project to my collaborators:

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### **The Starting Note**

That arpeggio lifts, like warmth, from the fifth of B minor,  
offers its hand—*let me/ tell you a story...*

(Zwicky, 2001, p. 556)

The picture book flew across the room and slammed against the wall. “I hate this stupid stuff,” cried Tyler. “I’m not doin’ this stuff no more!” “But Tyler,” I assured him, “you can read that book—it’s just the same words we were using in your Arctic chant.” Tyler answered, “But we were just playing then. That was just for fun.”

Tyler was a ten year old student participating in the pilot study that informed this research. The goal of the pilot study was to investigate the nonmusical effects of rhythm for elementary students with reading disabilities. The study was enacted in a Learning Assistance Centre designated as a Special Education Behavior Support Program for a large city school division. The mixed methods single group design pointed to rhythm as a promising potential for meaning-making and communicating meaning in both print and non-print literacies.

Music seemed an important pathway into reading for Tyler and other students in the pilot study. The element of rhythm in particular, appeared to create sensitivity to the sounds of language that facilitated understandings about print literacy. Playful rhythm experiences engaged students in seemingly transformative music and print literacy learning. As long as we were chanting, singing, moving, and playing the words from the picture book about the Arctic, Tyler was able and willing to read the picture book’s print text.

Jesse, another participant in the study, also engaged deeply with the music and rhythm experiences. Beat and rhythm became a key means of communication for Jesse. His grandmother came to the school one day to find out why it was that Jesse was suddenly papering his bedroom with music compositions that he worked on for hours at a time in his room. Each day, as soon as Jesse returned home from school, he headed straight for his bedroom to create new rhythmic pieces using the patterns that we explored in the pilot study.

Rhythm exerted some kind of irresistible attraction for the six students in the pilot study. I understand that attraction in part, because I experience rhythm in synesthetic ways. Feelings and perception are expressed as rhythms in my mind; I hear emotion. Synesthesia (Cytowic & Eagleman, 2009) is an unusual way of perceiving one semiotic system through another. The related notion of transmediation (Suhor, 1984) is a natural way of sense-making that refers to the process of creating meaning by taking what is known in one sign system and moving it into other sign systems.

This thesis is primarily a research story of transmediation. It is a story about transmediation that is understood and communicated through transmediation. As part of the poststructural methods of bricolage (Kincheloe & Berry, 2004), art, music, and poetry have been used to perturb, illuminate, and transmediate understandings about research data and theory in order to make sense of the research and represent it through the words of these pages.

Throughout this thesis, I share some of the transmediators used to make meaning of the research. Jazz has been a powerful transmediating phenomenon since the first course of my PhD program when one of the advisors on my thesis committee handed out

an article entitled, “Qualitative Research as Jazz” (Oldfather & West, 1994). The metaphor of qualitative research as jazz was a serendipitous offering to a music educator and beginning researcher. The metaphor and sounds of jazz mediated epistemological understandings about qualitative and quantitative inquiry that I extended in a self-study of jazz using the text *Jazz* (Giddins & DeVeaux, 2009a) and *The Norton Jazz Recordings* (Giddins & DeVeaux, 2009b). Thinking in jazz (Berliner, 1994) inspired new musical and research structures to further investigate the themes of rhythm and reading tentatively explored in the pilot study. Elements of jazz are used as chapter headings to capture the interpretive essence of each chapter. Significant jazz repertoire used to interpret, transmediate, and synthesize understandings expressed in the chapter is included at each chapter’s end.

Poetry was also used as a sense-maker for this study. Each chapter opens with a quote from a poetry source used to generate deeper meanings and new insights about the research. The poetry source introduces a focusing concept for each chapter. In particular, the wisdom and metaphor (Zwicky, 2003) and lyric philosophy (Zwicky, 1992) of Canadian poet Jan Zwicky, created resonant spaces for integrative modes of thought (Zwicky, 2003). Lyric thought is characterized by an eros of clarity not exclusive of passion and emotion (Zwicky, 1992). It is “clear thought enabling us to hear” (p. 116).

The score is now complete but like jazz, the music is never finished. The composition joins the “artist’s general storehouse of knowledge, where, in relatively fixed form, it awaits further use and transformation during the performance or at some later opportunity” (Berliner, 1994, p. 495). I invite you to listen to my composition.

## Chapter One: The Head

Resonance here is a root metaphor. To sound an utterance in a resonant thought-structure is, among other things, to produce sympathetic vibrations of varying intensities throughout—to cause other utterances to sound, some less faintly, some more.

(Zwicky, 1992, p. 62)

### Overview

The utterance sounded in this thought-structure is rhythm. The geographies of rhythm are found in nature, place, and body, and “shape human experience in timespace” (Edensor, 2010, p. 1). In this study, the utterances resonating in response to the sounding of rhythm are explored through a learning design that integrates rhythm and language experiences in early years classrooms. The goal of the research is to examine the resulting sympathetic vibrations to determine the potential, if any, for elements of rhythm to engage early years children in meaning-making in print and non-print literacies.

Specific characteristics of rhythm define the idiom of jazz. The injection of highly developed, complex African rhythms and counter-rhythms into European forms influenced the origins of the jazz idiom (Perry, 1996). Characteristic use of rhythm, harmonic progressions, form, and melody has formed the basis of jazz improvisation throughout the history of jazz (Berliner, 1994). In jazz, the melody or theme is often referred to as the head. Conventionally, the head is performed at the beginning and end of the composition’s performance with chorus and improvised solos in between (Berliner, 1994). The composition is organized around the head, which is often composed and sets out the time signature, key signature, and the harmonic progressions used as a source and basis for improvisation. The reading and rhythm head for this research is generated from

a variety of sources. A social constructivist stance underpins the head with connecting threads to multiliteracies and multimodal learning. The guiding theoretical framework is drawn from a “chorus of *agents provocateurs*” (Zwicky, 1992, p. ix) including literature and research from the domains of reading, music, the arts, music education, semiotics, multiliteracies, multimodal semiotics, creativity and flow studies, play, embodied learning, neuroscience, and complexity thinking.

I place myself within the theoretical paradigm of bricoleur (Denzin & Lincoln, 2000; Kincheloe & Berry, 2004). The worldview of postmodern constructivism assumes a relativist ontology of multiple realities and a subjectivist, transactional epistemology. As bricoleur-theorist, I work “between and within competing and overlapping perspectives and paradigms” (Denzin & Lincoln, 2000, p. 6) from post-positivism, constructivist, pragmatist, and advocacy/participatory world views.

The chapter begins by stating the head, then explores and develops related workings of the themes, and finally returns to the head to conclude the summary purpose and research questions. The related workings of the theme include the issues and debates that exist in the literature, theory or practice (Roberts, 2004) for reading and rhythm that lead to a need for the study. The chapter includes what the study is about, why the study is important and timely, what contributions it may make to theory and practice, and how the study fits into the existing state of reading and rhythm. A background for the purpose statement, variables, and concepts related to the study is presented (Roberts, 2004). The chapter concludes with the definitions of key terms used in the thesis.

**Background: The Necessary and the Insufficient**

The head chosen for this thesis contains two high profile themes in current research and practice: reading and rhythm. The role of rhythm and timing at every level of learning is targeted in recent study (Jenkins, 2011). The temporal patterns of rhythm may mediate and enhance cognition (Thaut, Peterson, Sena, & McIntosh, 2008). Thaut (2005) explores the importance of rhythm for learning and identifies rhythm as one of the brain's central processors for learning and perception across widespread neural networks. Rhythm is a significant element influencing the brain's "perceptual processes related to cognition, affect, and motor function" (Thaut, 2005, p. 17).

Rhythm is a current focus of study in neuroscientific efforts to understand the workings of the brain, the effects of musical rhythm on the brain, and the innateness of human rhythmic perception and production (Berger & Turow, 2011; Levitin, 2007; Patel, 2008; Thaut, 2005). While evidence is not conclusive regarding the possibility of shared neural systems for rhythm and language (Rogalsky, Rong, Saberi, & Hickok, 2011), "both speech and music are characterized by systematic temporal, accentual, and phrasal patterning" (Patel, 2008, p. 96). Patel (2008) suggests that if there is overlap between neural mechanisms for music and speech, then learning in one domain could enhance learning in the other. Conversely, impaired neural "perception and expression of rhythmic timing could affect both language and music" (Corriveau & Goswami, 2009, p. 128).

The theme of rhythm, essential for music-making and language, is placed within the umbrella of the arts and music. The arts have assumed growing importance in recent educational discourses related to the need for a pedagogy of creativity and arts-based learning in schools of the twenty-first century (Hope, 2010; Sheridan-Rabideau, 2010).

The second theme of reading has been a focus of study for decades. There seems to be a common belief “around the world that learning to read is foundational to becoming a contributing, participating member of global society” (Gunderson, D’Silva, & Chen, 2011, p. 13). Reading skills appear to give better access to expanding technologies, economies, and knowledge (Gunderson, D’Silva, & Chen, 2011). Demands for rapid, accurate, and efficient reading skills escalate (Katzir et al., 2006) in a global society with increasingly instant and complex literacy requirements.

Statistics Canada’s 2010 report on Canadian results from *The Programme for International Student Assessment (PISA)* in tests of reading, mathematics, and science, opens by claiming that shifts to knowledge-based economies have created a rising demand for strong foundation skills (Knighton, Brochu, & Gluszynski, 2010). The report goes on to outline the large portions of government budgets around the world that have been directed towards providing and assessing foundational skills and knowledge. The skills and knowledge of reading, mathematics, and science are recognized as key educational outcomes and prerequisites to full participation in society.

Reading is the gold standard of current educational currency. Reading is considered such an important foundation for education that interest in reading research has reached unprecedented levels of global attention (Paris, 2011). As a result, school reading programs and children who experience reading difficulties are coming under increasing scrutiny and regulation (McGill-Franzen, 2011). Schools are being held accountable for student reading achievement as defined by discrepancies in standard deviation from the mean on norm-referenced standardized reading achievement tests administered locally, nationally and internationally.

For example, recent *PISA* results (OECD, 2010) made local and national news in Canada and around the world. Although administered only to fifteen year olds, the *PISA* tests are intended to represent and reflect cumulative learning and skill development throughout the school years. Korea and Finland were found to be the highest performing of the participating member countries of the Organization for Economic Cooperation and Development (OECD) for reading literacy. Girls outperformed boys in reading skills in every OECD participating country. While results varied widely from country to country, countries of similar prosperity produced very different results (OECD, 2010).

*Macleans*, the popular Canadian national newsmagazine, boasted Canada's fifth place global finish in reading scores with the headline, "Good news about Canada's education system" (Macleans.ca, 2010), but a national paper, *The Globe and Mail*, thought otherwise. In an article called, "How Canada is becoming outclassed in school," Canada was accused of being left in the chalk dust and Prince Edward Island and Manitoba were singled out for their poor performance (Hammer, 2010).

In Manitoba the criticism was even harsher. "Manitoba students barely reached the OECD average" trumpeted the headline (Martin, 2010, para. 1). However, the comments left under the online article uncovered another way of looking at the issues of reading. CountryLiving1, a teacher, posted a challenge to the *Winnipeg Free Press* article. After noting that the typical fifteen year old is the one using laptop, TV, and iPod usually all at the same time, CountryLiving1 commented:

ELA [English Language Arts] no longer involves spelling and grammar, yet we test kids using proper grammar, syntax, context, expanded vocabulary and

spelling. Perhaps we should give in to their lexicon? I meen reele they comunic8, dont they? R U shur it znt us woo cnt reed? (CountryLiving1, 2010)

By asking, “Are you sure it isn’t us who can’t read?” CountryLiving1 transfers the discourse to the domain of multiliteracy and multimodal thinking. “The world is changing... [and] the ways we make meaning are changing” (Kalantzis & Cope, 2001, p. 9). The rapid rise of new technologies that inspired The New London Group (1996) to write their seminal paper introducing a pedagogy of multiliteracies, continues to influence and broaden definitions of what it means to be literate in today’s society (Morin, 2006).

The importance of literacy is a common discourse, but definitions for what constitutes literacy appear to be polarized. A politically driven agenda for statistical improvement of reading skills in English and French defines literacy as the “active, purposeful and functional application of reading in a range of situations and for various purposes” (Knighton, Brochu, & Gluszynski, 2010, p. 13). An alternate view of literacy recognizes that although the fundamentals of reading may not have changed, literacy processes have moved from cognitive processing of print text to parallel processing of multimodal texts (Luke, 2003). The goal of one agenda is to reduce variation from the mean; the goal of the other is to embrace and encourage variation and diversity.

Kincheloe (2008) believes that a definition of literacy limited only to reading and writing print, “is no doubt a blatant form of myopia. Such skills are necessary but insufficient in our larger effort to develop new critical ways of being” (p. 201). I seize upon the words “necessary” and “insufficient;” my research lies at the intersection of these notions. As a researcher, educator, and policy maker, I exist in a state of tension

between acknowledging the necessary and embracing the possibilities that may address the insufficient.

Manitoba provincial tests for Grade Three assessment of reading in English indicate that 39.1 percent of students entering Grade Three in 2006, and 41.6 percent of students entering Grade Three in 2009 needed help to meet expectations of understanding print text (Manitoba Education, 2010a). Publication of test results creates local pressure to improve foundational reading skills. At the same time, advocates for the de-privileging of a singular literacy and a broadening of the definition of what it means to be literate are supported by the research and theories on multiliteracy and multimodal approaches to teaching and learning (Anstey & Bull, 2006; Burke & Hammett, 2009; Cole & Pullen, 2010b; Cope & Kalantzis, 2000; Jewitt, 2006; Jewitt & Kress, 2003; Kress et al., 2005; Unsworth, 2001, 2008).

These conversations raise questions: Whose literacy is considered important? What literacy is considered important, by whom, why, and in what context? McGill-Franzen (2011) suggests that an enormous volume of research on reading difficulties from cultural and critical perspectives has been excluded from educational policy-making conversations. An examination of the issues that exist in the domains of reading, multiliteracies and multimodal learning must include a profile of the students that learn in those domains and the cultural and critical perspectives that influence their learning. In Canada and Manitoba, these students represent diverse cultures and multiple perspectives.

### **Literacy and Diverse Learners**

A portrait of the multicultural society in Canada (Statistics Canada, 2003) indicates that Canada is one of the most ethnically diverse nations in the world. Only one

half of the population reports British, French, or Canadian ancestries, yet our primary linguistic modes are mainly limited to learning and assessment in English and French. Students enter schools in Canada with multiple ways of knowing and each year over 200,000 new permanent residents from all over the world make Canada their adopted home (Citizenship and Immigration Canada, 2010).

In Manitoba, the 13,520 newcomers to the province in 2009 represented a 20.5 percent increase over 2008 and was the highest number of immigrants to Manitoba since 1946 (Manitoba Labour and Immigration, Immigration Division, 2010a). The province of Manitoba plans to increase this number to 20,000 within the next decade (Manitoba Labour and Immigration, Immigration Division, 2010b). These new residents add to the diversity and vibrancy of Canada's multicultural society and will increasingly enrich our classrooms over the next decade.

Ethnic and cultural diversity raises questions for any literacy research. How can students who struggle with reading English or French print text achieve educational currency and identity as equal learners in their learning communities? How can educators create learning environments with meaningful and appropriately challenging collective experiences to meet the needs of all learners that make up the richness of any twenty-first century classroom in Canada? How can teaching reading practices view diversity as a resource? How can all diverse learners be understood to have unique ways of knowing rather than be considered learners with deficits? Research connecting theory to practice is needed to explore possible answers to these questions.

In addition, the deficit view of learning and reading is being increasingly challenged (McIntyre, 2011). Research suggests that children from poor and minority

groups are often underestimated, constrained, and misevaluated by classroom practices and educators. Non-standard forms of dialogue are not necessarily evidence for poor literacy skills and knowledge, but may be alternate forms of well-developed, rule-based language (McIntyre, 2011). Arguments are made instead for “alternate ways of viewing what counts as knowing” (McIntyre, 2011, p. 46).

### **Multiliteracies/Multimodal Learning**

A multiliteracy, multimodal approach to learning answers the need for alternate ways of viewing what counts as knowing. Educators must recognize the “social realities of pluralism and develop strategies for inclusion that are without prejudice to that diversity” (Cope & Kalantzis, 2010, p. 98). Teaching strategies and practices that feature transmediation (Suhor, 1984) or mode shifting (Cope & Kalantzis, 2010) build on social diversity and the inter-connected and naturally multimodal ways of meaning-making in children’s everyday experiences (Cope & Kalantzis, 2010).

A multimodal, multiliteracy approach opens doors to a range and variety of symbol systems including the semiotic systems of dance, drama, visual arts, and music (Wright, 2003). In multiliteracy, multimodal teaching and learning, sign systems are central to all learning and opportunities are created for students to learn simultaneously in multiple sign systems (Whitmore, Martens, Goodman, & Owocki, 2005) so that what is known in one system can be recast through another (Berghoff, Egawa, Harste, & Hoonan, 2000).

The related terms multimodal and multiliteracy, often used interchangeably throughout the literature (Cole & Pullen, 2010a), spring from different roots. Expanded approaches to new literacies can be examined from three perspectives (Jewitt, 2008):

New Literacies Studies (Coiro, Knobel, Lankshear, & Leu, 2008b; Gee, 2002; Kist, 2005; Lankshear & Knobel, 2006, 2011; Street, 1998), multiliteracies (Cole & Pullen, 2010; Cope & Kalantzis, 2000; New London Group, 1996), and multimodality (Jewitt & Kress, 2003; Kress, 2010; Kress, Jewitt, Ogborn, & Tsatsarelis, 2001; Kress & van Leeuwen, 2001; Unsworth, 2008).

New Literacy Studies (NLS) focus on the literacy events, practices, and texts found in everyday lives. From this perspective, literacy is no longer viewed as the acquisition of autonomous, neutral skills acquired in school but as multiple, universal, local, and situated literacies that cross physical and virtual spaces (Jewitt, 2008). New literacy practices include the ability to continuously adapt to new literacies as required by changing technologies, and the ability to know how and when which technologies and literacies are appropriate for the specific context or situation (Coiro, Knobel, Lankshear, & Leu, 2008a). New Literacy Studies focus on how literacy is used for different purposes in daily life, anchored by a “belief that literacy functions in all contexts in different ways guided by different discursive practices” (Pahl & Rowsell, 2006, p. 3-4).

The pedagogy of multiliteracies proposed by an international group of multidisciplinary academics known as the New London Group (1996) acted as a catalyst around the world for changing “literacy research, policy, curriculum and pedagogy” (Mills, 2006, p. 62). The New London Group (1996) created a framework for a pedagogy of multiliteracies in response to major social and technological changes, globalization of multiple media and communication, and emerging issues of global connectedness and local diversity. Their framework was based on an available design of structured sets of

conventions associated with the grammars of any semiotic system or combination of different semiotic systems within a given social space (New London Group, 1996).

The concept of multiliteracies has been widely applied to various domains and disciplines and must be defined according to the context in which it is being used. A plethora of literacies are now common: media literacy, digital literacy, visual literacy, scientific literacy, emotional literacy, family literacy, and so on. The widespread and differing applications of the term multiliteracies has resulted in controversy and confusion (Kist, 2005). However, “multiple doesn’t mean infinite, nor does it mean a vague number more than one. Multiple means a definite number of factors that converge on one point of literate behavior” (Cole & Pullen, 2010a, p. 1-2).

The use of multiliteracy approaches has been criticized for watering down and marginalizing traditional and historical forms of print literacy (Mills, 2009). Many advocates of multiliteracy approaches view the critique of traditional and historical forms of literacy as necessary and healthy. Multiliteracy pedagogy is characterized by critical engagement with values, identity, power, and design through a wide range of literacy practices and texts. Student interest, experience, and existing discourse resources are starting points in an agenda to redesign social futures across boundaries of difference (Jewitt, 2008). Bull and Anstey (2010) conceptualize multiliteracies as socio-culturally derived and co-dependent on both literacy and pedagogy. They view multiliteracies as integral to all disciplines because all disciplines have unique forms of literacy.

Despite varying multiliteracy practices, Jewitt (2008) claims that multiliteracy approaches continue to be focused on the “cognitive and analytic processes of written and spoken language” (p. 246). Conceptions of multimodality extend such processes and

broaden definitions of literacy to include any semiotic mode that can be used to represent and communicate meaning (Kress & van Leeuwen, 2001). Multimodal practice is rooted in the functional linguistic theories of Halliday (1985) and a social semiotic theory of communication (Halliday, 1978, 1985; Hodge & Kress, 1988; Vygotsky, 1978).

Viewed from a social semiotic perspective, one sign system can never fully represent all teaching, learning, or research; all modes are partial and all modes contribute to meaning in different ways. The “partiality of all modes is a significant aspect of multimodal approaches” (Jewitt & Kress, 2003, p. 3). This understanding has important implications for research methods. From a multimodal stance, any investigation of literacy must include the “full multimodal ensemble used in any communicative event” (Jewitt, 2008, p. 247).

Different modalities allow for alternate pathways and choices for meaning-making and communicating meaning and encourage varying destination points for learners. A preferred mode might be a starting point for learning that can then be extended by shifting to less comfortable modes (Cope & Kalantzis, 2010). As Cope and Kalantzis (2010) explain, “If the words don’t make sense, the diagram might, and then the words start to make sense” (p. 102). Cope and Kalantzis suggest that mode shifting has potential for powerful learning; the words may also make sense “because the picture conveys meaning that words could never (quite or in a completely satisfactory way) do” (p. 102).

Current multiliteracy and multimodal theory and practice include notions of both multiliteracy and multimodal perspectives (Cope & Kalantzis, 2010). The research design for this study is framed within a pedagogy of multiliteracies common to a general classroom context, using available modes including reading and music, for transmediating

and communicating meaning. In multimodal practice, learning in reading and music is not compartmentalized into isolated subject-specific experiences. The multimodal, multiliteracy research design explores interrelationships between multiple modes to facilitate shifting between modes (Cope & Kalantzis, 2010) that “may open new meaning potentials” (Mills, 2011, p. 54) for the early years students in this study.

An earlier question, “How can diversity be viewed as a resource rather than as a deficit?” is answered through the affordances of diverse and multiple modes within a pedagogy of multiliteracies. When the literacies and languages for making and communicating meaning are broadened beyond print literacies to include cross-cultural modes, diversity is fostered “as a resource for learning” (Smolin & Lawless, 2010, p. 173). In this study, music, oral, and print literacies are experienced through the diverse modes and media of speech, song, aural listening experiences, body percussion, nonpitched instruments, spatial and gestural movement, improvisation, oral and print language and music compositions, and visual systems of music notation and print text.

A pedagogy grounded in the diversity and available affordances of multimodal and multiliteracy approaches views meaning-making as a “creative application of existing resources for meaning” (Fairclough, 2000, p. 162). An approach to learning and language that centers on “difference, change, and creativity” (Fairclough, 2000, p. 162) is welcome at this point in time. Along with political agendas and expectations for increased test scores, learning and sociocultural needs for broadened views of literacy and a greater range of modal affordance, there is also an increasing economically driven need for students to develop flexibility, adaptability, and innovative, divergent, and creative thinking skills.

## **The Creative Economy**

The recent report on Canadian results of the *OECD PISA* study opens by referencing a shift to knowledge-based economies (Knighton, Brochu, & Gluszynski, 2010). Current literature, however, describes further global shifts from knowledge-based economies to idea-based, creative economies, ecologies, education, and research (Araya & Peters, 2010; Beghetto & Kaufman, 2010; Craft, Gardner, & Claxton, 2008; Florida, 2002, 2008; Howkins, 2010; Isenberg & Jalongo, 2009; Kelly & Leggo, 2008; Pink, 2005; Robinson, 2011; Sefton-Green, Thomson, Jones, & Bresler, 2011; Sheridan-Rabideau, 2010; Starko, 2010; Thomson & Sefton-Green, 2011; United Nations Conference on Trade and Development & United Nations Development Program, 2008).

Sheridan-Rabideau (2010) believes that “creativity is the cultural capital of the twenty-first century” (p. 54). From this perspective, creativity is repositioned at the centre of education and the arts are given the role of leading a new wave of educational reform (Sheridan-Rabideau, 2010). Educators are handed yet another responsibility in an educational mandate that includes raising test scores and incorporating authentic and relevant multiliteracy/multimodal approaches to teaching and learning. Educators are also being asked to focus teaching and learning on creative and divergent thinking processes. And, they are being asked to do so in ways that will motivate and engage all learners (Baker, Dreher, & Guthrie, 2000; Riggs & Gholar, 2009; Stipek, 2002; VanDeWeghe, 2009; Verhoeven & Snow, 2001).

Teachers are being urged to consider creativity as an essential aspect of everyday life but are cautioned to underpin pedagogies of creativity with ethical, moral, social, and ecological responsibilities and considerations (Claxton, Craft, & Gardner, 2008).

Creativity is as much a collective process as an individual one but because creativity is not culturally universal or neutral, it requires awareness and sensitivity to nurture (Claxton, Craft, & Gardner, 2008). Ethical and moral considerations must be a part of educational practice that includes creative processes. Quality creative practices and processes are also encouraged; creative initiatives are debased and wasted on bursts of light relief, superficial engagement, and easy, entertaining approaches to learning (Claxton, Craft, & Gardner, 2008).

How can education and educators provide learning ecologies that support reading and music in creative, ethical, authentic, meaningful, relevant, empowering, democratic, multimodal, and engaging ways for all learners and still provide key outcomes and foundation skills as defined by the Council of Ministers of Education in Canada (Knighton, Brochu, & Gluszynski, 2010)? Some of the answers to these challenging questions and issues may be found in creative approaches associated with the multiple literacies and modes of the Arts Education teaching and learning domain.

### **Arts Education**

Cornett (2011) portrays the arts as “remarkable meaning makers” (p. 1). A wealth of literature supports and celebrates experiences in the arts as essential and even central to education. The importance of the arts to human life has been explored from diverse perspectives throughout history. Aristotle perceived art as an imitation of life. In his opening to *Poetics* (Aristotle, trans. 1996), Aristotle identified three elements that define and distinguish the arts. Two of these elements, rhythm and language, are the focus of this research. Aristotle pointed to their artful role and connectedness: “...in the case of the arts I have mentioned: in all of them medium of imitation is rhythm, language and melody,

but these may be employed either separately or in combination” (Aristotle, trans. 1996, p. 3-4).

In more recent times, Dewey (1934/2005) viewed the arts as an essential element of human context and daily life. Art, Dewey said, is part of being fully alive and is found in every process of living. Art deepens and intensifies the experiences of life and “celebrates with peculiar intensity the moments in which the past reënforces the present and in which the future is a quickening of what now is” (Dewey, 1934/2005, p. 17). Through experience as art, we are able to move beyond mere recognition of things and make meaning through the unique ways we perceive through art (Dewey, 1934/2005).

Dewey’s belief in the importance of the arts to all life and life’s experiences is reflected in a recent surge of literature advocating the centrality of arts in education, for example, Sinclair, Jeanneret, and O’Toole (2009). O’Toole (2009) believes the arts are so important “they should be at the centre of the primary school curriculum” (p. xxiii). O’Toole (2009) and colleagues advocate arts as central to education because “they naturally address one of the most pressing demands of the twenty-first century: creativity—the ability to foresee needs and problems, and respond imaginatively, innovatively, and flexibly to them” (p. xxiii). Recent literature champions the potential for the perspectives and creative, complex energies of the arts to understand the world and imagine and innovate ways to deal with the world’s pressing problems (Sheridan-Rabideau, 2010).

Other writers celebrate the potential of the arts to create meaning through feelings and emotions that cannot be expressed by language alone (Langer, 1988). Langer argues that the symbol systems of art are essential ways of thinking, knowing, and feeling the

world. Our understanding of the world is incomplete without the intuition of the arts to capture and convey the complexities of feeling that mediate our understandings.

However, the importance of the emotional and intuitive artistic experience as ways of knowing the world has been largely ignored (Langer, 1988).

Eisner assumes a similar position in advocating for the importance of aesthetic modes of knowing (1994, 1998, 2002, 2005). Eisner extends notions of literacy to include ways of knowing through the arts and proposes educational reform that positions arts education as a central pedagogy (1998). Although education in the arts may contribute to academic achievement in a variety of disciplines, Eisner believes the arts are important to education for their content and form within a cultural context and for their potential to refine awareness of aesthetic qualities in art and life.

The arts are essential for the opportunities they afford to transform ideas, images, and feelings into art. The arts are vital for the potential to imagine possibilities, explore ambiguity, and perceive and communicate multiple perspectives (Eisner, 1998). The arts “help us learn to notice the world” (Eisner, 2002, p. 10). The arts teach flexibility, improvisation, and attention to relationships, and provide media and tools for unique ways of understanding (Eisner, 2002). Eisner (2002) claims that anyone interested in enhancing education has much to learn from the arts. “Put simply, the arts can serve as a model for teaching the subjects we usually think of as academic” (Eisner, 2002, p. 196).

Greene (1995) likewise argues “strenuously for the presence of the arts in classrooms” (p. 41). Greene describes the importance of the arts for releasing imagination and for understanding the world. Greene asserts a need to create contexts through arts experiences that nurture agency and a sense of worthiness for all learners in ways that

affirm values of plurality and difference. Whatever the art form, experiences in the arts have the potential to dislodge fixed thinking, resist one-dimensionality, and create space for multiple personal voices and perspectives (Greene, 1995).

Influential, authoritative, and popular voices such as Berghoff, Borgmann, and Parr (2005), Davis (2008), Eisner (1998, 2002), Fineberg (2004), Fowler (1996), Gardner (1990), Greene (1995), Isenberg & Jalongo (2009), Jensen (2001), Pitman (1998), Robinson (2011), and Wright (2003) permeate educational thinking about the importance and centrality of the arts; their voices make a compelling case for the arts in education. Davis (2008) identifies ten unique and invaluable benefits to arts education. Arts' processes and products have the potential to generate imagination, agency, expression, empathy, interpretive possibilities, respect, inquiry and reflection, and a sense of connection through engagement and responsibility.

The power and potential of the arts to engage learners and provide new multimodal pathways and systems for print literacies is well documented (Albers, 2007; Berghoff, Egawa, Harste, & Hoonan, 2000; Bloomfield, 2000; Cornett, 2011; Goodwin, 2004, 2011; Kelly & Leggo, 2008; Leland & Harste, 1994; McDonald & Fisher, 2002, 2006; Narey, 2009; Sinclair, Jeanneret, & O'Toole, 2009; Wright, 2003). Fowler (1996) suggests that what the arts do best is open the doors to learning through our eyes, ears, feelings, and mind.

Education in the arts gives children a realm of rich, imaginative tools and resources for perceiving, for meaning-making, and for communicating understandings about the world. Arts education provides unique and powerful affordances for learning and sharing in all disciplines through creative, critical, divergent and affective ways.

Pitman (1998) argues, “If the arts’ essential capacity to reach out to every discipline were understood, it would provide a strong argument for recognizing the role the arts could play in the curriculum” (p. 61).

Pitman (1998) concludes the argument with a cautionary note. The arts have unique values and intrinsic worth but their integrity, Pitman warns, can be exploited. There are inherent dangers that accompany the enthusiasm for positioning arts-based learning as central to current pedagogy. Without in-depth knowledge of the artistic tools and language, artistic ways of knowing may be misunderstood, inappropriately applied, or trivialized. A wealth of meaningful connections exist between the arts and other disciplinary areas (Cornett, 2011); however, interest in the potential of the arts should not force “an unholy alliance between art and an academic objective” (Fineberg, 2004, p. 63). In addition, care must be taken to ensure that the arts are not reduced or marginalized as handmaidens (Eisner, 1998) that exist to serve the curricular goals of other subject areas.

### **Music Education**

Music has been considered foundational to education and culture since the time of Socrates and Plato (Jorgensen, 2003). Music has been identified in all cultures beginning with the discovery of earliest human musical artifacts; the history of the world is recorded and reflected through music. The instinct for music is inherent in humans; music appears to be something we cannot do without (Ball, 2010). Music is a vital communication and learning vehicle that expresses cultural and personal identity and is deeply integrated into the daily lives of all people around the globe (Cornett, 2011).

Experiences in music have the potential to act as rich and complex modal affordances for meaning-making in the domains of both reading and music (Cornett,

2011; Jensen, 2001; Wright, 2003). Montgomery (2002) declares that “music is a fundamental human resource which presumably is borne out of the need for humans to express themselves beyond the simple use of words” (p. 2). Music experiences in elementary school play a critical role in education as schools often provide the sole opportunity for children’s music-making (Montgomery, 2002).

Jensen (2000) believes that the “musical arts are central to learning” (p. 3). The grammars of the semiotic system of music are important designs available to all children as part of visual, spatial, aural, and bodily-kinesthetic modes of knowing (Wright, 2003). Jensen (2001) makes a compelling case for the importance of music and music education and concludes that “the message with music education is, start early, make it mandatory, provide instruction, add choices, and support it throughout a student’s education” (p. 48). However, Regelski (2009) challenges such thinking and asks if music education always and automatically benefits culture and students. His answer is “clearly not!” (p. 189).

While Regelski (2009) acknowledges the enormous and important role that music plays in the daily lives of students outside school, Regelski suggests that music education is not always equally relevant or engaging in the traditional and sometimes limited ways that it is often presented in schools. Regelski proposes that music be viewed as praxial, as a “doing” or musicking (Small, 1998) to expand music’s potential value for all learners and to meaningfully connect music to life and society. This view underlies the philosophy of the Manitoba music curriculum framework (Manitoba Education, Citizenship and Youth, 2008b). At the time of this study, the new curriculum was not available. However, music experiences were explored in this study that connected outcomes from all four essential learning areas of the current Music curriculum framework: music

language and performance skills, creative expression in music, understanding music in context, and valuing musical experience.

An approach to music-making that uses music language and performance skills in meaningful and creative ways extends the manner in which music is sometimes used in general classrooms. The potential value of music making goes beyond useful mnemonic applications or the ways in which music is used to entertain or make superficial thematic connections to engage learners. Although songs and rhythmic chants may aid memorization of facts, vocabulary, and math tables, the potential for music is not limited to such applications. The powerful patterns of music coupled with emotion may create memorable learning; however, music experiences also provide pathways for thinking deeply about complex and difficult subject matter (Cornett, 2011).

Music pathways for meaningful learning are specific to the context and situation of each classroom. Goble (2010) views diverse social and cultural music traditions through the philosophical pragmatism and semiotics of Charles Sanders Peirce (see Chapter Four). From the pragmatist viewpoint, musical practices are context-specific and context-particular; they are unlikely to be understood without knowing the ways in which the sign systems are conceptualized in the culture or society (Goble, 2010).

Pragmatist philosophy and semiotics are part of the supporting foundation of this research. Music is used in context-specific and context-particular ways in this study. Those ways are only understood by determining the semiotic interpretant or habits of mind (Goble, 2010) of each classroom community, and by examining the meanings they carry in the particular multimodal use and context of each classroom.

Experiences in music offer the potential for creating unique and multiple pathways into print and non-print learning. Music may also create new neurological connections and pathways. Neurobiologist Patel (2008) suggests that music has the power to rewire neural connections: “Music...resembles the ability to make and control fire; it is something we have invented that transforms human life...not only is it a product of our brain’s mental capacities, it also has the power to change the brain” (p. 412). This study is significant then, for its contribution to authentic and meaningful music education outcomes that have the potential to enhance all learning.

### **Rhythm**

In a groundbreaking treatise on rhythm analysis, Lefebvre (1992/2004) claims, “Everywhere where there is interaction between a place, a time and an expenditure of energy, there is rhythm” (p.15). Rhythm is found in every day life, space and time, as part of corporeal rhythms, rhythms of nature, of cities, and of course, music (Lefebvre, 1992/2004). Building on the work of Lefebvre, Edensor (2010) believes that rhythm shapes all human experience. Rhythm can be used as an analytic tool to recognize repetition, consistency, and reproduction, as well as chaos, dissonance, and breakdown (Edensor, 2010).

In this study, rhythm is both a tool used for analysis and an object of analysis. As discussed earlier, the element of rhythm is used as a tool in current neuroscientific efforts to understand the workings of the human brain. Rhythm is analyzed for its role as a central neural processor and for its effect on all learning (Berger & Turow, 2011; Patel, 2008; Thaut, 2005). The supporting neuroscientific research contributes to a working definition for rhythm used in this study. Patel (2008) defines rhythm as “the systematic

patterning of sound in terms of timing, accent, and grouping” (p. 96). Rhythm is considered part of the temporal dimension in music that includes rhythm, beat, and meter (Owen, 2000). According to the online *Oxford Dictionary of Music*, rhythm is defined in its fullest sense as everything pertaining to the aspect of time in music including the effects and grouping of beats. Beat is further defined as a unit of measurement of the rhythmic pulse of music (Kennedy & Bourne, 2010).

A rhythmic pulse is important for both music and language. Text “written in a steady predictable rhythm is easier to remember than a more random arrangement of syllables” (Powell & Halperin, 2004, p. 39) and the more regular the rhythm the more easily the text is remembered. Metrical regularity provides “sticking power” whether used in advertising jingles or children’s chants or nursery rhymes. A regular and recurring accent found in dance, song, or text, is elemental, pleasing to the ear and creates expectation for which the listener then comes to depend (Powell & Halperin, 2004).

The universal, pleasurable human response to verse may have other advantages. Rhythm functions as a pathway into language and increases interaction; adults and children share some kind of rhyme in all societies (Cook, 2000). The appeal of rhythm may be rooted in the common human experience of music, dance, and language. Certain childhood rhythms are surprisingly common across cultures suggesting a generalized disposition among children and adults to perceive and enjoy rhyme and rhythm (Cook, 2000).

The qualities of pleasure and appeal intrinsic to rhyme and rhythmic language play are important for learning engagement. Enjoyment of rhymes makes them easier to learn for all children (McCracken & McCracken, 1987). While students “are having fun,

they are learning the patterns and rhythms of language and the way it is put together” (Wolfe & Nevills, 2004, p. 47). Gregory and Kuzmich (2005) highlight young children’s enjoyment and engagement in language play. They describe rhyming and rhythm with words to be students’ “phonological awareness in practice” (p. 68). Egan (2005) likewise illuminates the power of rhythm and rhyme to engage learners. Egan believes that rhythm is an essential cognitive tool and includes rhythm as part of a tool kit for teaching and learning. Egan (2005) explains:

Rhyme, rhythm, and pattern are potent tools for giving meaningful, memorable, and attractive shape to any content. Their roles in learning are numerous, and their power to engage the imagination in learning the rhythms and patterns of language—and the underlying emotions that they reflect—is enormous. They are important in learning all symbol systems, like mathematics and music, and all forms of knowledge and experience. (p. 3)

### **English Language Arts**

Research and practice suggest that “no single method or single combination of methods can successfully teach all children to read” (Morrow & Dougherty, 2011, p.43). Literacy instruction is dependent upon student background, needs, interests, the learning context, and the professional background and philosophy of the teacher. English Language Arts are complex and multidimensional (Strickland & Townsend, 2011). Several dimensions have been identified in current reading research and literature that are considered crucial for reading success in Kindergarten through grade three. These dimensions include phonemic awareness, vocabulary, comprehension, fluency (Morrow & Dougherty, 2011), and oral language development (Strickland & Townsend, 2011).

The music and reading experiences in this study contribute in some way to all areas that are crucial for literacy development, although explicit efforts are made to increase phonological and phonemic awareness, vocabulary, oral reading fluency, and oral language development.

Many goals and outcomes from the Manitoba English Language Arts curriculum were met through the multimodal and integrated experiences in music and language arts designed for this study. The Manitoba English Language Arts (ELA) curriculum guided planning for this research. The goal of the ELA curriculum at all grades is to focus on “acquiring language and literacy skills through listening, speaking, viewing, and representing, as well as reading and writing. In keeping with the literacy demands placed on them, students now learn to read and produce a wide range of texts” (Manitoba Education, 2010b, para. 1). In this study, all six language arts are integrated as part of music experiences to produce a range of texts including reading and rhythm.

### **Music, Language, and Culture**

Lidov (2005) analyzes both differences and commonalities between music and language and suggests that the bi-directional metaphor “language of music/music of language” indicates a “genuine interpenetration” (p. 1) of the metaphor’s two domains. Deep parallels between music and language have been noted throughout history (Jackendoff & Lerdahl, 1980). “Speech and music are universal among human cultures” (Patel & Daniele, 2003, p. B35) and are equally important communicators and meaning-makers in cultures around the world. For example, in the African culture, drums are used both as musical instruments and as speech surrogates to reproduce the intonation and rhythms of the spoken words (Aiello, 1994).

A culture's distinct musical grammar is based on the organization of rhythm and pitch (Levitin & Tirovolas, 2009). Research from neuroscience suggests that humans have an innate capacity to perceive certain rhythmic and tonal elements of music and internalize the rules of their musical culture (Levitin & Tirovolas, 2009). Newborns and infants use rhythmic information to classify utterances into broad language classes according to rhythmic properties of their cultural languages (Nazzi, Bertoncini, & Mehler, 1998; Nazzi & Ramus, 2003; Ramus, Nespor, & Mehler, 1999). Infants appear to become sensitive to features of the musical grammar of their culture during the first year of life (Levitin & Tirovolas, 2009; Trehub, Schellenberg, & Kamenetsky, 1999). The babble of infants has been shown to echo the musical "prosodic properties of their native language" (Corriveau & Goswami, 2009, p. 129).

Despite language and music variations across cultures, music and language share similar cognitive, perceptual, and auditory characteristics and mechanisms (Sloboda, 1985). Language and music are both made up of discrete sounds that are organized in time (Lerdahl, 2001, 2003) with specific rhythms, segmental and prosodic qualities (Besson & Schön, 2003). The division of a spoken language stream into smaller and separable segments of sound is known as segmental phonology (Holliman, Wood, & Sheehy, 2010a). The overarching prosodic qualities of speech are known as suprasegmental phonology and include elements of tempo, rhythm, stress, intonation or pitch, phrasing, and duration (Holliman, Wood, & Sheehy, 2010a; Rasinski, 2011; Schreiber, 1991; Whalley & Hansen, 2006).

A large body of research over several decades has linked successful segmental phonology to successful reading development (Holliman, Wood, & Sheehy, 2011) but the

potential role of prosody or suprasegmental phonology in reading development is less well known and has only recently been explored in the literature (Whalley & Hansen, 2006). The available empirical research suggests a relationship between prosody and reading skill development (Holliman, Wood, & Sheehy, 2011; Kuhn, Schwanenflugel, & Meisinger, 2010) and reading comprehension (Kuhn, Schwanenflugel, & Meisinger, 2010). Prosody appears to be predictive of reading skill and comprehension (Holliman, Wood, & Sheehy, 2011; Kuhn, Schwanenflugel, & Meisinger, 2010).

Prosody is also an essential component of successful oral language and oral reading fluency development and may be a marker for good oral reading fluency (Kuhn, Schwanenflugel, & Meisinger, 2010). Oral language, oral reading fluency, phonological awareness, and prosody are variously defined in the literature, but a consensus has been synthesized from the authoritative literature and is presented here.

### **Oral Language**

Research documents the role and importance of oral language to emerging literacy; aspects of oral language are strongly and positively linked to the acquisition of literacy skills (Vasilyeva & Waterfall, 2011). “The interdependence of oral language and literacy development is evident from the earliest years and continues through the grades” (Strickland & Townsend, 2011, p. 47). Oral language word learning begins with hearing the sounds of the words, where and how they fall in speech, and the meaning of the words (Harris, Golinkoff, & Hirsh-Pasek, 2011).

Research indicates that oral vocabulary development for early years children is dependent upon learning words for things and events that interest students, interactive and responsive contexts, meaningful contexts, an awareness that children learn the words that

they hear the most, and playful learning (Harris, Golinkoff, & Hirsh-Pasek, 2011). These conditions for the development of oral language are easily and naturally realized through Orff approaches to music education as featured in this study. Oral language is an important element in the Orff approach. Research that explores oral language with Orff-based experiences in music and rhythm might contribute to ways of enhancing and enriching oral language for early years children.

### **Oral Reading Fluency**

Oral reading fluency is an essential component in successful reading acquisition and comprehension (Chall, Jacobs, & Baldwin, 1990; Lyon, 1997; Miller & Schwanenflugel, 2008; Rasinski, 2011). Theoretical and research support for the importance of oral reading fluency in any effective reading program is provided in Chapter Two. Oral reading fluency may function as an overall indicator of reading competence (Fuchs, Fuchs, Hosp, & Jenkins, 2001); however, effective strategies for oral reading fluency are still under study and debated in the literature (Rasinski, 2011).

Although oral reading fluency has recently become a prevalent topic in reading research (Rasinski, 2011), oral reading fluency is currently not well understood (Allington, 2009). Its historical development has been described as schizophrenic and tumultuous (Rasinski, 2011). Miller and Schwanenflugel (2008) highlight the near universal agreement on the importance of fluent reading for educational outcomes, but note that the construct of fluency lacks clear theoretical and definitional consensus.

Oral reading fluency is commonly defined as “the oral translation of text with speed and accuracy” (Fuchs, Fuchs, Hosp, & Jenkins, 2001, p. 239). The dimension of reading rate is strongly associated with reading competence (Fuchs, Fuchs, Hosp, &

Jenkins, 2001) and is the dimension measured quantitatively in this study due to the quantitative challenges of reliably and efficiently measuring prosodic dimensions of oral reading fluency (Fuchs, Fuchs, Hosp, & Jenkins, 2001). However, Rasinski (2011) believes that the current association of oral reading fluency with definitions and practice focused on reading rate is a corruption of reading fluency.

Rasinski defines oral reading fluency as “the component of the reading process that allows readers to decode the words in a text with sufficient accuracy and automaticity (efficiency) to allow for understanding of the text and that reflect the prosodic features embedded in the text” (p. 239). Oral reading fluency then, is multidimensional. All dimensions of rate, prosody, phrasing, and expression work together to produce fluent reading; all dimensions are considered in planning this study’s learning experiences and are examined through qualitative methods.

Rasinski (2011) advocates synergistic reading fluency instruction that integrates various established methods for oral reading fluency. Recommended strategies for oral reading fluency related to prosody, oral assisted reading, and explicit organization of text into meaningful phrases (Rasinski, 2011) are naturally connected to music tools and processes. Research integrating various approaches for oral reading fluency could be useful for both reading and music education practices. Dimensions of oral reading fluency so crucial for comprehension and meaningful interpretation of text are also important for music education.

### **Phonological and Phonemic Awareness**

Phonological awareness is known as the conscious ability to process and manipulate the rhythms of spoken text (Muter, 2003). Phonemic awareness is the ability

to segment and blend together the individual sounds that make up words (Morrow & Dougherty, 2011). The role of phonological awareness (Metsala, 2011) and phonemic awareness (Strickland & Townsend, 2011) in learning to read has been well-documented for the last several decades. Phonological awareness is the most extensively studied predictor of early reading skills, and research indicates causal links between children's sensitivity to speech sounds and the acquisition of beginning reading skills (Muter, 2003). A large body of research highlighted in Chapter Two demonstrates that phonological awareness is essential for successful reading acquisition and comprehension for children.

Phonological skills include the subset of rhyme awareness (Holliman, Wood, & Sheehy, 2011; Muter, Hulme, Snowling, & Taylor, 1998). Early experiences in rhyme, singing, and chanting are important for developing phonological awareness (Almasi, 2003). Rhyme awareness is strongly associated with reading development (Bryant, Maclean, Bradley, & Crossland, 1990; Goswami & Bryant, 1990; Ziegler & Goswami, 2005) and has been found to predict successful reading development (Bryant, 1998). The body of evidence that connects rhyme awareness to early reading skills indicates that an appropriate route to print text literacy for early years children might be along a musical avenue. Children's natural capacity for developing rhyme and segmentation awareness through music and speech experiences suggests that multimodal experiences in music to facilitate print text and non-print learning for early years children would constitute a worthwhile investigation.

### **Prosody**

The suprasental prosodic elements of speech previously identified are known as the musical signals in language and reading (Gilbert, 2008). Although prosody is

sometimes used to mean just speech rhythm, these musical signals include both tonal and rhythmic elements (Gilbert, 2008; Kuhn & Schwanenflugel, 2008) that signal meaning and intention to the listener through emphasis and relationship of sounds (Gilbert, 2008). Elements of prosody are common to all languages and this universality has important implications for learning in diverse classrooms. Meaning is conveyed through the sound of the words as much as through the words themselves. This can affect comprehension for all learners including language learners when prosodic first language structures are different to additional prosodic language structures (Gilbert, 2008). Prosodic sensitivity might be particularly important for learning strong/weak stress-timed languages such as English (Goodman, Libenson, & Wade-Woolley, 2010).

The rhythmic and tonal prosody of speech overlays phonological segments of speech sound (Raskinski, 2011; Schreiber, 1991). Language production and meaning-making is facilitated in part by differing emphasis placed on individual syllables of words (stress), by the rise and fall of the voice pitch (intonation), by the length of time to pronounce a word or word segment (duration), and by the boundaries created by groups of rhythms organized in words, sentences, or phrases (Rasinski, 2011). Whalley and Hansen (2006) capture the role of prosody in language comprehension:

Prosody is a universal linguistic subsystem that performs many functions in all languages. Prosody interacts with, and adds value to, other language subsystems such as syntax and semantics, facilitating understanding and providing scaffolding to children when acquiring language. For example, prosodic cues help segment the speech stream into phrases, words, and syllables, inform syntactic structure and emphasize salient information to facilitate understanding. (p. 289)

Prosody plays a key role in both oral reading fluency (Rasinski 2011) and phonological awareness (Whalley & Hansen, 2006). “Prosodic sensitivity is important for processing oral language and oral language proficiency is related to the development of

phonological awareness and reading” (Goodman, Libenson, & Wade-Woolley, 2010, p. 115). The importance of prosodic sensitivity including sensitivity to speech rhythm as an explanation of differences in phonological awareness and related to successful reading independent of phonological awareness, is of growing interest to educators and researchers (Goodman, Libenson, & Wade-Woolley, 2010; Holliman, Wood, & Sheehy, 2010a).

The element of prosody known as speech rhythm is related to non-speech, general, or musical rhythm (Holliman, Wood, & Sheehy, 2010b; Wolff, 2002). Although there are differences between speech and non-speech rhythm, these structures share fundamental properties (Wolff, 2002). Successful performance of music and speech both depend on the ability to anticipate timing of individual units of speech or sound, and the ability to organize and order units of speech or sound rhythms (Wolff, 2002). Difficulties in these areas would be expected to affect both speech and non-speech rhythms (Wolff, 2002).

### **Music and Reading**

Many of the strategies suggested for effective phonological and phonemic development and acquisition of oral language and oral reading fluency include practices that are common to developing music literacies in elementary music education. Rasinski (2011) suggests that a focus on assisting readers to phrase texts meaningfully has substantial potential for improving oral reading fluency. From earliest music education experiences, students are encouraged to hear, feel, and respond to the concept, sense, and sound of phrases as “complete musical sentences that are delineated by a pause or a breath” (Montgomery, 2002, p. 284).

Rhythm and rhyme are also used in both music and reading experiences to create awareness for the underlying beat of print or music text, the sound of the words or music, and prosodic elements of speech, reading, and music. Expressive elements such as timbre, tempo, dynamics, and articulation are important to both music and oral reading fluency. These elements may be used to achieve reading and musical outcomes and to strengthen the connections between rhythm, music and reading for early years children.

The coding for music is related to that of reading English in several ways. Both music and the English language are read from left to right and structured on a horizontal plane. Both are highly organized code systems and both codes are composed of small units of “language” that are used together to make patterns for construction of meaning. Phonological, syntactic, and semantic structures can be described in both music and language (Sloboda, 2005).

The symbol system of music is less complex than the codes used for reading. A common music education approach uses the sound of tah for a quarter note and a ti-ti for two eighth notes. In the context of the time signatures used in this study, the quarter note (one sound per beat) is always a “ta;” two eighth notes (two sounds per beat) are always a “ti-ti.” In one page of print text, however, one sound or syllable may be “dog,” “sit,” or “down,” and two sounds or two syllables may be expressed as “open,” “running,” or “tiger.” Music coding can function as efficient and effective scaffolding for more complex print text codes; even if the print text is challenging to students, they may be able to fluently read the series of “tas” or “ti-ti’s” that represent the sound of those words.

In teaching practice, the processes for reading music and print text ideally progress from sound to symbol. When children begin to experiment with reading they

need to focus first on the sounds that make up the words (Morrow & Dougherty, 2011). The sound of the musical text is appropriately and naturally perceived, understood and performed through aural, kinesthetic, and oral experiences before labeling and reading through symbolic representation (Montgomery, 2002). Sound before symbol approaches to music (Montgomery, 2002) and print literacies are part of the pedagogical design of this study.

### **Orff Approaches to Music Education**

The Orff approach to music education “is a dynamic approach to music and movement education that began as an experiment over 75 years ago” (Goodkin, 2004, p. vii). Carl Orff, a German composer and educator, collaborated with Dorothee Gunther, Gunild Keetman and colleagues to develop an approach to music education grounded in speech play, singing, movement, playing instruments, improvising, composing, and listening (Frazee, 1987; Goodkin, 2004). The Orff approach forms the basis of the music experiences in this study and is founded on the principle that all children are musical. Simple or elemental ideas and tools are used to generate successful and meaningful music-making experiences for all students (Goodkin, 2006). The Orff approach is significant and appropriate for this study because it is used worldwide in school music education programs including schools in every province in Canada.

Speech play is an important and indispensable part of the Orff approach (Frazee, 1987; Goodkin, 2004). Speech-play offers unlimited possibilities for creating sensitivity to the units of language and for exploring and integrating elements crucial to phonological awareness, oral language development, oral reading fluency, and music. A focus on speech sensitivity is created through music activities in which children perform

the beat or rhythm of the words with body percussion or nonpitched percussion instruments, experiment with new words to fit the existing rhythm or beat patterns, use rhythm or beat to accompany text, and create chants with familiar words from children's experience or print text. Such experiences naturally explore the sounds of language, aspects of phonological awareness such as segmenting, blending, and manipulating of language, and prosodic elements of oral reading fluency.

Repeated experiences with text, important for oral reading fluency, are inherent in the Orff approach. Speech-pieces and song are often repeated with dynamic, tempo, expressive, and rhythmic or melodic variations. Speech pieces or songs may be repeated through form, as for example, a verse with repeating refrain or a rondo in which a recurring familiar section is sandwiched in between layers of other contrasting sections. Repeated patterns are known in the Orff vocabulary as *ostinati*, a characteristic feature of the Orff approach to music education (Frazee, 1987). Elements of a speech-piece, chant, or poem can be repeated over and over for an *ostinato* effect as described in results sections of this thesis.

Montgomery (2002) cautions that the abstract notion of beat is not always easily discernible by early years children. Text often creates aural focus for the rhythm of the words and the music, rather than for the silent, underlying pulse (Montgomery, 2002). Orff-based approaches to music education begin with experiences in beat awareness and competency (Frazee, 1987). When beat awareness and competency is secure, rhythm is introduced in ways that distinguish rhythm from beat. Simple text rhythms are performed first as speech-pieces, and then transferred to sound color using body percussion, nonpitched instruments, and movement. Text rhythms then can be combined or reworked

to improvise and create simple speech patterns or ostinati, body percussion, or nonpitched and pitched instrumental compositions.

### **Contributing Theories**

As stated at the outset to this chapter, the paradigm of bricoleur draws from different disciplinary perspectives. A variety of theories contributed to the bricolage, both informing the study from its outset and emerging, true to the spirit of grounded theory, through data analysis and construction of theory. Semiotic theory, embodied knowing, imaginative approaches to teaching and learning, play theories, flow theory, creativity theories, and complexity thinking all contributed important understandings described throughout the thesis.

Semiotics, or the study of signs and symbols to convey and share meaning, is as important to education today as it was to Plato circa 360 BCE. As Veivo (2007) observes, “If we concede that all thought, values, and emotions have to pass through signs, texts and sign systems in order to be communicated (shared, reflected), then semiosis is crucial for the...culture and the society” (p. 7). The particular pragmatic philosophies and semiotics of Charles Peirce inform this research and are presented in Chapter Four.

Theories about embodied ways of knowing supported the inclusion of movement as an important mode of knowing for this study; kinesthetic meaning-making and communicating acquired particular significance for the study as described in results. Theoretical understandings about embodied knowing that are important for this study include: seminal theorizing on body as a primary means of knowing (Merleau-Ponty, 1945/1962); tacit knowing (Polanyi, 1966); embodied mind, image schemas, philosophy and language (Johnson, 1987); embodied mind, cognitive science, and experience

(Varela, Thompson, & Rosch, 1991); cognitive linguistics, embodiment, and experiential realism (Lakoff & Johnson, 1999); situated and embodied cognition (Ziemke, 2002); embodied theories of teaching and learning (Bresler, 2004); and embodied theories of music cognition (Bowman, 2000, 2004; Walker, 2000).

Without entering into the debate on varying perspectives and notions regarding embodied cognition (Wilson, 2002), I assumed the broad-based understanding and stance that “cognitive processes are deeply rooted in the body’s interactions with the world” (Wilson, 2002, p. 625). In particular, Bowman’s (2000, 2004) embodied, enactive account of cognition was important for this research. Bowman maintains that mind and body are inseparable and are the material basis of all cognition. Bodily constituted ways of knowing are indispensable and not different from “intellectual kinds of knowing” (Bowman, 2004, p. 31). Bodily and intellectual knowing “are continuous, deeply involved in each other’s construction, and each in turn ecologically situated in the social world” (Bowman, 2004, p. 31). Music is a prime example of this kind of embodied knowing (Bowman, 2004).

The text, *An Imaginative Approach to Teaching* (Egan, 2005) was influential from the early design stages of the pilot project. Egan’s emphasis on imaginative approaches to teaching and learning so intrigued me that I submitted paper and presentation proposals to the Imaginative Education Research Group’s International Conferences. At the 2006 and 2007 International Conferences on Imagination and Education I shared the natural and purposeful connections to imaginative teaching and learning that were part of the design of this study as influenced by Egan (2005).

In teaching approaches proposed by the Imaginative Education Research Group and Egan (2005), imagination is not peripheral or relegated to the domain of the arts, but is “at the center of education” (p. xii) and viewed as crucial to any and every subject area as part of everyday classroom experiences (Egan, 2005). Gallas (2003) likewise advocates “moving imagination to the center” (p. 1) of teaching and learning although Gallas acknowledges the incongruous fit between imaginative learning and standardized educational benchmarks as used in this study.

Play theories are part of the foundational literature that grounds this research and supports the choice of an Orff-based approach to teaching music and rhythm that Frazee (2006) stresses is “rooted in the idea of children’s play and fantasy” (p. 21). A definition for play is particularly elusive; “there is no common agreement about what play really is...its meaning is both ambiguous and paradoxical” (Brown & Cheesman, 2003, p. 3). Despite the challenges in characterizing play, the importance of play to learning has been described in the literature since the ancient Greeks (Brown & Cheesman, 2003).

Csikszentmihalyi (1996) relates playfulness to flow and creativity and began his investigation of intrinsic motivation by examining the literature on play. Play has been linked to creativity and learning throughout this century (Bruner, Jolly, & Sylva, 1976; Cohen, 2006; Egan, 2005; Elkind, 2007; Garvey, 1977; Goodwin, 2004; Herron & Sutton-Smith, 1971; Huizinga, 1938/1955; Montessori, 1949/1995; Piaget, 1951; Rogers & Sawyer, 1988; Roskos & Christie, 2007; Sutton-Smith, 1979; Vygotsky, 1933/1967). Connections between play and early years children’s literacy development have been investigated for several decades (Roskos & Christie, 2001, 2007, 2011) and play is an important element in many approaches to early years and elementary music education

(Frazee, 2006; Goodkin, 2004; Katz & Thomas, 1992, 2004; Smith & Montgomery, 2007; Upitis, 1990; Wright, 2003).

A definition of play for the context and purposes of this study was developed as part of emerging grounded theory. I began with a synthesis and adaptation of historical criteria presented by Saracho and Spodek (1998) including Rubin, Fein, and Vandenberg (1983):

- Play is intrinsically and personally motivated by satisfaction inherent in the activity.
- The activity is more important than the goal.
- Play includes spontaneous activity; play activities naturally unfold.
- Children bring their own meanings to and construct their own meanings through play activities.
- Play may be nonliteral.
- Rules are flexible.
- Play creates positive emotional effects.
- Play involves imagination.
- Play actively engages all players and is sociable (Henricks (2003).
- Play is freely chosen by children (Brown & Cheesman, 2003).

To conclude play theories, Biesty's stance on play (2003) was particularly apt for this research and the unique context and setting of each experimental classroom:

- Each participant is essential to the play activity.
- "Play exists in relation to the ordinary activities that surround it and from which play absorbs its content and derives its meaning" (Biesty, 2003, p. 50).

Complexity thinking emerged during the final data analysis as described in Chapters Ten and Eleven. Perspectives from complexity thinking helped transform understandings about data and occasioned new insights, perspectives, questions, and considerations. Complexity thinking (Davis & Sumara, 2006) originated in the sciences and has been widely applied to many interdisciplinary areas, including education. However, Davis and Sumara (2006) are careful to point out that “complexity thinking is not a hybrid. It is a new attitude toward studying particular sorts of phenomena that is able to acknowledge the insights of other traditions without trapping itself in absolutes or universals” (p. 4).

Cilliers (1998) draws on seminal theorists Nicolis and Prigogine (1989) to analyze complex systems from a postmodern, post-structural perspective. Cilliers (1998) describes characteristics of complex systems (p. 3-5):

- Complex systems are made up of a large number of elements.
- Elements in a complex system interact in dynamic ways and change with time.  
The interactions may be thought of as transference of information and do not have to be physical interactions.
- System elements influence and are influenced by each other, resulting in rich interactions.
- Interactions are nonlinear; a precondition of complexity is that small causes can have large results and vice versa.
- Interactions are usually short-ranging and primarily from immediate neighbors, although wide-ranging influences are possible.
- Interactions have both negative and positive feedback loops.

- Complex systems are open in that they interact with their environments. The border of a complex system may be difficult to define.
- Complex systems rely on a constant flow of energy to prevent death from conditions of equilibrium.
- Complex systems are affected by their histories. All complex systems have a history and time is an important dimension in system analysis.
- Complexity emerges as a result of the patterns of interactions between elements. The system responds to local information and system elements are unaware of the behaviour of the system as a whole.

Smith and Jenks (2006) and Byrne (1998) challenge certain points developed by Cilliers (1998). Nonetheless, Cilliers' thinking is largely congruent with interpretations of complexity thinking found in the educational literature and serves as a useful starting point for this thesis. Notions of complexity thinking are further developed in Chapter Ten as they emerge through data analysis.

I began this research firmly grounded in understandings about constructivism as a psychological theory of learning (Fosnot & Perry, 2005). A variety of learning theories fall under the constructivist umbrella that can be traced back to Piaget and Vygotsky. Social constructivists (Lave & Wenger, 1991; Vygotsky, 1978) emphasize collaborative learning within a socially and culturally situated community of practice (Leonard, 2002). A cognitive view of constructivism (von Glasersfeld, 1984) focuses on the individual's active and mental meaning-making processes.

I assume Cobb's (2005) pragmatic approach to theorizing constructivism. Cobb proposes a coordination of sociocultural and cognitive constructivist perspectives justified

by pragmatic principles. Cobb advises the researcher to acknowledge her own interpretive position based on particular reasons. In this research, the classroom community is the unit of analysis and the design research is constructed with the classroom unit in mind. Learning is collaborative within social and culturally situated whole group activities. This constructivist view positions learning as an “interpretive, recursive, nonlinear building process by active learners interacting with their... physical and social world” (Fosnot & Perry, 2005, p. 34).

Greene (2005) advocates a constructivist perspective for teaching and learning in the arts. Representations in the arts are always provisional. No artistic representation or interpretation is the same for everyone; there are multiple realities affected by cognition, imaginative processes, unique perception, “and an opening to the possibilities in the world” (p. 129). Constructivist thought in the arts is not concerned with harmony and coherence, but with untapped perspectives (Greene, 2005).

Complexity thinking emerged to trouble understandings of constructivist learning theories during analysis of this research. Fosnot and Perry (2005) believe that constructivism is based on complexity thinking; however, Davis and Sumara (2006) challenge that assumption. From a complexivist perspective learning is not either individual construction of knowledge or socially constructed knowledge, nor does complexity thinking attempt to reconcile such paradigms. Rather, from a complexity thinking perspective, personal cognition is nested within collective activity (Davis & Sumara, 2006).

Kincheloe (2008) puts it this way: “...any rigorous knowledge work involves studying the construction of the selfhood of the knower and the impact it has on what any

group of people claim to know” (p. 227). The implications of this thinking are that both the individual and the classroom collective are important to learning processes. The individual learns within the collective and the collective responds, evolves, and adapts and is viewed as another learner in the process.

Throughout data analysis, I also engaged with ideas from critical constructivism as informed by complexity theories (Kincheloe, 2005). From a critical constructivist perspective, students analyze, interpret, and construct “a wide variety of knowledges emerging from diverse locations” (Kincheloe, 2005, p. 3). Issues of power, privilege, democracy, evocative knowledge, enactivism, and marginalization are central to this theoretical approach. My exploration of critical constructivism and complexity thinking raises questions I cannot yet answer about constructivism. I do not question the philosophical underpinnings of social constructivist theories of learning; I do question whether they are entirely sufficient. At this point in the research, I am still exploring this issue.

### **Need for the Study**

A variety of related issues exist in the literature, theory, and practice that lead to a need for this study to investigate the potential for rhythm to engage early years children in print and non-print literacies. A pre-existing, extensive body of reading research informs current practice. However, the literature mainly focuses on either functional applications of literacy defined as reading or multiliteracy/multimodal approaches to literacy. Current educational practice is challenged to address the need for successful reading outcomes within expanding multimodal and multiliterate learning ecologies. This research is intended to bridge the gap between these competing paradigms.

Teaching practice has historically focused on the paradigm of literacy defined as reading, and classrooms are still largely structured around monomodal learning (Cummins, 2006). Some early years teachers increasingly resort to scripted lesson plans for literacy learning and incorporate developmentally inappropriate memorization techniques and isolated, disconnected practice for language and literacy development in efforts to meet mandated narrow focuses on reading outcomes (Harris, Golinkoff, & Hirsh-Pasek, 2011). In Manitoba, teachers face pressure, criticism, and scorn from those who view constructivism as problematic and instead advocate rote learning, testing of reproducible learning, and a narrow view of literacy restricted to reading and writing (Zwaagstra, Clifton, & Long, 2010).

Further research is needed to examine ways to address current, complex questions and issues in literacy education. Innovative approaches to teaching and learning are needed to appropriately and ethically meet the needs and value the resources of all diverse learners in twenty-first century Canada. Diverse learners, struggling readers, and English language learners may need alternate pathways to literacy learning, varying individual learning destination points within collective learning goals, and a wide range of multiple learning opportunities through a variety of modes.

Innovative approaches are also essential for engaging learning and generating the creative, divergent thinking skills essential to learning and living now and for the future. Arts-based learning, including music, is identified as an important source of creative, innovative thinking that is important to the holistic education of all students, addresses their diverse needs and addresses pressing educational concerns. Research is necessary to explore innovations that can meet the complexities of twenty-first century learning

demands so that teaching and learning reading and music can be successful, motivating, and enjoyable for all learners and teachers.

Successful music-making depends on awareness and facility with beat and rhythm which music educators argue is the most fundamental and important of all music elements (Dalby, 2005; Hannon & Trainor, 2007; Reifinger, 2006; Rozmajzl & Boyer, 2006). Since music acquisition begins with multisensory timing connections (Hannon & Trainor, 2007), experiences in beat and rhythm are important as part of early elementary education. Beat competency may improve naturally with age; however, at a certain point in early childhood, rhythmic skills stabilize and further growth is not evident without formal music education (Drake, 1993; Gruhn, 2005; Reifinger, 2006; Smith, Cuddy, & Uptis, 1994). To be effective, music education must include rhythmic experiences as part of meaningful music events rather than limited to intellectual or motor exercises (Reifinger, 2006). This study meets a need to provide meaningful music experiences that develop beat and rhythmic awareness and competency in the formative early years.

The phenomenon of rhythm is foundational and essential to both music and reading. According to Corriveau and Goswami (2009), “the production of structured rhythm and temporal language patterns is a crucial part of language acquisition” (p. 129). Other authorities also agree that rhythm, the most rudimentary structure of a child’s natural language (Corriveau & Goswami, 2009), likely plays a pivotal role in language acquisition (Curtin, Mintz, & Christiansen, 2005; Geiser, Zaehle, Jancke, & Meyer, 2008).

Recent research (Corriveau, Goswami, & Thomson, 2010; Huss, Verney, Fosker, Mead, & Goswami, 2011) appears to confirm links between rhythmic timing issues and

reading difficulties. The authors of this latest research recommend rhythmic experiences for children who experience speech and language difficulties. Corriveau and Goswami (2009) suggest that “motor and language play focused on rhythm seems likely to be beneficial for the development of speech and language” (p. 129). Support from this body of research indicates that a study of the potential benefits of rhythmic experiences for the development of speech and language is timely and warranted.

A need for this study is also indicated in the literature investigating speech and non-speech rhythm. Holliman, Wood, and Sheehy’s (2010b) findings suggest that while speech and non-speech rhythm are related, they “also make contributions to reading attainment that are independent of each other” (p. 247). Holliman, Wood, and Sheehy (2010b) counsel that further research is needed to examine the relationship between speech and non-speech rhythm and reading development, and the independent contributions of speech and non-speech rhythm to reading development. “Despite a handful of published papers identifying speech rhythm as a potential source of variance in reading development (e.g. Wood & Terrell, 1998), there are few relevant empirical studies to date” (Wade-Woolley & Wood, 2006, p. 253).

In addition, Holliman, Wood, and Sheehy (2010a) suggest that ways to improve speech rhythm sensitivity are open for debate. They state that “at present there is no speech rhythm intervention study in the literature, although a project of this kind would be timely” (p. 364). I do not label this study “intervention research” in an effort to avoid framing the study around a deficit approach to learning that suggests there is something about students or classrooms that needs to be fixed. This research is focused on investigating ways that musical and speech rhythm may be facilitated for all early years

learners and addresses the need identified by Holliman, Wood, and Sheehy (2010a) to explore ways of improving speech rhythm sensitivity.

Experimental research into the connection between rhyme awareness and reading has been criticized for “studies which base their results on scores which include the measurement of rhyme and something else as well” (MacMillan, 2002, p. 22). The “rhyme only” criterion is identified by MacMillan as possibly the most important criteria threatening validity in this area of research. This study attempts to address that concern. The quantitative tests chosen for this research are limited to the evaluation of rhythmic competency specifically focusing on the element of beat. Qualitative multimodal data analysis is used to determine the modal load and density of each learning event in order to assess whether rhythm, or “something else as well” is contributing to findings.

A focus on the ways that the specific construct of rhythm may enhance reading and language addresses a gap in current research that investigates and reports the positive benefits of arts and music education for learning, but not on the processes for doing so. This study is important to determine ways to engage all learners in foundational reading and music skills within a democratic, multiliteracy/multimodal context and through ethical, creative and imaginative processes meaningfully integrating reading and rhythm.

**Purpose of the Study**

The purpose of this study was to discover the potential for rhythm to be an engaging, functional, accessible, integrated and democratic semiotic resource for diverse early years children's meaning-making and communicating in non-print and print literacies as part of an Orff-based approach to music education within a multimodal pedagogical framework and classroom collective. It also investigated the relationship between oral reading rate and beat competency measures.

The pedagogical goals of this research were to engage students in print and non-print literacies connected to classroom cross-curricular learning, to facilitate literacy learning through multimodal pathways, and to support both print literacy and music learning curricular outcomes for early years children in inclusive educational settings.

**Research Questions**

This research was guided by the following broad questions:

1. What is the potential for the semiotic resource of rhythm and pattern for early years children's engagement and meaning-making from print and non-print literacies?
2. What factors facilitate or inhibit the effectiveness of the semiotic resource of rhythm and pattern for supporting early years children's engagement and meaning-making from print and non-print literacies?
3. Is there a relationship between measures of early years reading competencies and rhythmic competencies?

### **Definitions of Terms**

1. Beat: Steady pulse underlying music and speech (Montgomery, 2002).
2. Mode: A semiotic resource that can be used to represent and communicate meaning (Kress & van Leeuwen, 2001).
3. Multiliteracy: All modes including thought, emotion, and action as ways of knowing (Wright, 2003).
4. Multimodality: “The use of several semiotic modes in the design of a semiotic product or event, together with the particular way in which these modes are combined” (Kress & van Leeuwen, 2001, p. 20).
5. Orff-based music education: An approach to music learning that includes performing, improvising, creating, listening, analyzing, and reflecting through speech, song, body percussion, non-pitched percussion instruments, barred instruments, movement, and listening (Frazee, 1987).
6. Oral reading fluency: Accuracy, automaticity, and prosody in print text reading that allows for understanding of text (Rasinski, 2011).
7. Phonemic awareness: “Awareness of the individual sounds that make up a word” (Kuhn & Schwanenflugel, 2008, p. 175).
8. Phonological awareness: “Metacognitive knowledge about and sensitivity to the sound system of language” (Kuhn & Schwanenflugel, 2008, p. 175).
9. Prosody: “Tonal and rhythmic aspects of reading” (Kuhn & Schwanenflugel, 2008, p. 175).
10. Rhythm: Everything pertaining to the aspect of time in music including the effects and grouping of beats (Kennedy & Bourne, 2010).

11. Semiotics: The study of signs and sign systems for making and communicating meaning.
12. Transmediation: “The process of taking understandings from one sign system and moving them into another in order to make meaning” (Semali, 2002, p. 1).

### **Organization of the Thesis**

The study is organized into eleven chapters, a reference list, and appendices. Chapter Two presents a review of literature related to the research questions, goals and variables of the research. Chapter Three outlines the mixed methods research, the study participants, site and setting, the qualitative and quantitative instruments used to gather data and the processes and procedures for gathering data. Chapter Four presents the qualitative methods: grounded theory, the design-based/action research, semiotic analysis, and multimodal analysis. Chapter Five presents the design-based/action research results, Chapter Six presents the grounded theory results, Chapter Seven presents the semiotic data results, Chapter Eight presents the multimodal results, and Chapter Nine presents the quantitative data results. Chapter Ten synthesizes results from all methods through a complexity thinking lens using a bricolage map, and Chapter Eleven contains the conclusions and recommendations. The study concludes with the reference list and appendices.

\* \* \*

## **Changes**

“Changes” by Walter Donaldson (1927/2009) and performed by the Paul Whiteman band was used in part to transmediate understandings about the problem statement, purpose statement, research questions and significance of this study. The title refers to a variety of changes associated with the music, the context, and the cultural changes of the 1920s in the United States (Giddons & DeVeaux, 2009a). Changes included the growing influence of jazz, changes in style, orchestration, and changes in improvisation techniques (Giddons & DeVeaux, 2009a).

The lyrics outline the harmonic changes as the vocals sing, “Beautiful changes in different keys, beautiful changes and harmonies.” Listening and thinking the variety of musical changes clarified thinking about the changes in understandings about literacy driven by technological and economic transformation in the twenty-first century, demographic changes in Canada and Manitoba, and competing and changing attitudes towards the arts.

Changes in thinking regarding issues of critical constructivism were heard through the diversity of music styles. As Giddins and DeVeaux (2009a) point out, the music never sticks to any one sound. Sounds of the new jazz are contrasted with sounds of older musical styles as heard in the Charleston beat and the ballroom symphonic dance sound. Contrast is heard between the two distinct vocal groups and through contrasting rhythmic styles that spoke to me of the tension between narrow and broad interpretations of literacy, the arts, and associated practices. “Changes” ends with the sound of a bell that seems to resonate with the possibility of promising practices to follow.

## **Chapter Two: The Cats in the Band**

The ‘experience’ of truth is always the experience of resonance, that is, of the attunement of various distinct components of a whole.

This is not to say that everything that is true is also resonant.

(Zwicky, 2003, Left 37)

### **Introduction to the Literature Review**

A diverse body of literature was examined in order to seek out the experience of truth and resonance to support this study. The resonant supporting literature is presented in this chapter and examined for aspects of relationship and attunement. The literature review is the whole; the various distinct components are the interdisciplinary sources that informed this research and acted as discourse partners and co-creators of this research. The literature review draws from the fields of education, reading, the arts, music, neuroscience, linguistics, and the literature on engagement and motivation. A resonance and attunement are created between the various and distinct components through their relationship to learning, music, language, and the contributions to how children make and communicate meaning.

In the world of jazz, Duke Ellington was a consummate resonance generator who frequently invited his musicians to collaborate in the writing (Giddins & DeVaux, 2009a). Ellington created ensembles with a wide variety of instrumentation in nearly every genre of Western music except grand opera (Giddins & DeVaux, 2009a). He referred to his band members as “‘dramatis fedilae’—the ‘cats’ in the band” (Giddins & DeVaux, 2009a, p. 225). This literature review introduces my cats in the band, the various co-creators that shared their work with me and shaped the design and goals of this

research. The band is introduced by category beginning with a broad-based perspective of motivation and engagement and learning in the arts and music, and concluding with the specific research focus of reading and rhythm. Literature related to pertinent reading processes is examined, as is evidence from the field of neuroscience that indicates a neurological link between music, rhythm, and language.

### **Motivation and Engagement**

A convincing body of research presented later in this chapter indicates a positive relationship between arts education including music, and student motivation and engagement in learning. A Canada-wide study examining learning through the arts that included over 6000 students “provided strong indications that involvement in the arts went hand-in-hand with engagement in learning at school” (Smithrim & Upitis, 2005, p. 120). The research connecting engagement in arts experiences to engagement in learning, underpins and supports this study’s goal to investigate children’s engagement and learning in print and non-print literacies through experiences in rhythm.

Motivation is a topic of interest in recent reading research, particularly related to struggling readers (Van Ryzin, 2011). A large body of research confirms that students who are intrinsically motivated to read, do so more often and read more widely than students who are not motivated to read (Guthrie & Davis, 2003). On the other hand, students who experience difficulties reading may come to see themselves as non-readers. This view affects beliefs and values that in turn negatively affect motivation. Efforts to change negative beliefs and alter “student perceptions of the learning environment can play an important role in overcoming reading difficulties” (Van Ryzin, 2011, p. 242).

Numerous theoretical frameworks are proposed for motivation in learning (Stipek, 2002) but there is disagreement about the nature of motivation and its associated processes (Schunk, Pintrich, & Meece, 2008). However, research points to high effort, persistence, and achievement as common indicators related to motivation (Schunk, Pintrich, & Meece, 2008). Various dimensions of motivation have been developed from theoretical frameworks (Baker & Wigfield, 1999). The dimension of intrinsic motivation (Lepper & Henderlong, 2000; Wigfield & Guthrie, 1997) is investigated in this study. Intrinsic motivation pertains to students who are motivated to learn for an internally driven sense of satisfaction (Ryan & Deci, 2000). Intrinsic motivation is linked to self-perceived competence, self-determination, preference for challenge, enhanced conceptual learning, creativity, pleasure, and active involvement (Stipek, 2002). Students who are intrinsically motivated demonstrate persistence, involvement, and curiosity (Ryan & Deci, 2000).

Motivation is also historically linked with affect (Linnenbrink & Pintrich, 2002b). Affect is described differently in the research (Schunk, Pintrich, & Meece, 2008) but can be broadly defined to include positive and negative feelings, emotions, and moods. Strong emotion can both impede and facilitate learning (Sprenger, 2005). Positive emotional engagement and emotional learning are essential for successful academic learning (Goleman, 2006; Zins, Weissberg, Wang, & Walberg, 2004).

VanDeWeghe (2009) extends affect to include the notion of engaged hearts or spirit. VanDeWeghe develops a construct of engaged hearts or spirit through foundational themes of mindfulness, unity, and compassion. Mindfulness involves attunement to self and others; unity includes deep connections to self, others, and large meaning sources

(such as nature); and compassion refers to the attunement and understanding of how others think and feel (VanDeWeghe, 2009).

Motivation, learning, and performance interact with and influence affective processes (Linnenbrink & Pintrich, 2000a, 2002b). Although affect and emotion are described in the research, many current social cognitive models of motivation downplay the role of affect (Linnenbrink & Pintrich, 2002b). More research is needed to examine the role of affect in motivational theories to develop more nuanced and accurate models of motivation (Linnenbrink & Pintrich, 2002b) and to determine ways of effectively integrating affective processes within learning communities (Schunk, Pintrich, & Meece, 2008). In particular, positive affective processes may be important for struggling learners (Linnenbrink & Pintrich, 2002b).

Intrinsic motivation indicators common to the literature include flow (Csikszentmihalyi, 1997), self-efficacy (Bandura, 1997; Schunk, 1991), persistence (Zimmerman & Ringle, 1981), and effort (Pintrich, 2003) particularly for challenging activities. Students who are motivated to learn willingly spend greater amounts of time involved in the learning processes and persist in efforts even when obstacles are encountered. However, the usefulness of effort and persistence as motivation indicators is limited since students require less effort and persistence as their skills improve (Schunk, Pintrich, & Meece, 2008).

Self-efficacy is a student's belief and judgment that they have the ability or capability to meet a goal or achieve a set task successfully (Bandura, 1997). High self-efficacy is related to high self-esteem. Students with high self-efficacy are more likely to seek out challenges, persist in the face of challenges, and find effective strategies to meet

learning challenges than students with lower self-efficacy (Bandura, 1997; Eccles, Wigfield, & Schiefele, 1998). Collective efficacy (Bandura, 1997) refers to the self-efficacy of the classroom collective. Collective self-efficacy affects the group's mission and purpose, the strength of commitment to common goals, effectiveness of collaboration, and group resiliency in the face of challenges or difficulties (Bandura, 1997). Schunk, Pintrich, and Meece (2008) point out that educational research is needed in the area of classroom collective efficacy.

Intrinsic motivation is related to flow theory (Csikszentmihalyi, 1990a, 1997; Csikszentmihalyi & Csikszentmihalyi, 1988). Flow is characterized by complete absorption in whatever one is doing. A state of flow encourages persistence, commitment and achievement of positive outcomes (Nakamura & Csikszentmihalyi, 2002). "The flow experience acts as a magnet for learning—that is, for developing new levels of challenges and skills" (Csikszentmihalyi, 1997, p. 33). Csikszentmihalyi (1990b) outlines phenomenological conditions necessary for a state of flow (p. 127-131):

- Action and awareness merge so that the participant feels that she or he is an inseparable part of the activity.
- The challenges in the activity are in balance with the participant's skills and ability to respond. Challenges are not greater than the skills (resulting in frustration, worry, and anxiety) and skills are not greater than the challenge (resulting in boredom).
- Flow experiences have clear goals that become increasingly complex as the student's skills develop. Goals may begin for extrinsic purposes but with time and engagement, become intrinsic to the activity itself.

- Immediate and meaningful feedback is provided to maintain student involvement.

When these conditions are met, attention is concentrated on the activity to the extent that the individual loses self-consciousness and is no longer aware of possible sensations of worry, anxiety, or fear of failure. An individual may become so engrossed in the activity that she or he loses all track of time. Csikszentmihalyi (1990b) depicts these characteristics as universal ones associated with enjoyment. “When these dimensions of experience are present, the activity becomes *autotelic*, or rewarding in itself” (p. 131).

The phenomenon of flow is an important dimension of current literature on student motivation, engaged learning (Easton, 2008; VanDeWeghe, 2009) and motivation for literacy in schools (Csikszentmihalyi, 1990b). Csikszentmihalyi (1990b) claims that the major obstacles to learning in general and literacy in particular, are motivational and not cognitive. Csikszentmihalyi (1990b) argues that we exhaust our energies with efforts to improve the teaching of literacy “when the real problem is to stimulate the desire for learning” (p. 119). The solution to the problem of increasing student motivation is to apply the flow model, a “theoretical model that describes intrinsically rewarding experiences” (p. 127).

Flow emerged from this research data as an important dimension of group motivation and engagement in the study learning experiences. Shared flow experiences are less studied as the individual is typically treated as the unit of analysis in flow theory (Nakamura & Csikszentmihalyi, 2002). Sawyer (2003) relates the notion of group flow to Csikszentmihalyi’s flow theory and suggests that conditions for group flow are created when the group is united in the attainment of an extrinsic collective goal matched by pre-

existing structures shared by the group. Sawyer (2003) distinguishes between Csikszentmihalyi's notions of flow and group flow theory in group music and theatre performance: "Csikszentmihalyi intended flow to represent a state of consciousness within the individual performer, whereas group flow is a property of the entire group as a collective unit" (p. 44).

Riggs and Gholar (2009) relate flow to the notion of conation, a construct associated with intrinsic motivation and interconnected with the affective and cognitive domains. They believe conation is essential to learning and define this construct with the attributes of: belief, courage, energy, commitment, conviction, and change. Belief, courage, and energy are necessary to sustain commitment to learning goals. Together, these qualities strengthen convictions that enable change (Riggs & Gholar, 2009).

Engagement in learning is an important outcome of flow experiences. Learning engagement is well-studied in reading research (Verhoeven & Snow, 2001). Engagement is defined within the context of reading to mean readers who are motivated, knowledge-driven, socially interactive, and able to use a variety of strategies for reading (Baker, Dreher, & Guthrie, 2000; Guthrie & Anderson, 1999; Guthrie, Wigfield, & Perencevich, 2004). Motivation and engagement constructs for education and reading are appropriately applied to music learning. Research demonstrates broad generality of motivation and engagement constructs across school, music, and sport (Martin, 2008). Constructs such as self-efficacy are relevant in any learning and performing situation. Motivation and engagement factors are realized differently across and within domains, but constructs may be commonly applied (Martin, 2008).

Research has identified a number of factors that improve intrinsic motivation. Intrinsic motivation may be enhanced through activities that students perceive as interesting (Renninger, 2000). Intrinsic motivation is positively affected by challenging but achievable activities and goals and by activities that stimulate curiosity through surprising, incongruous, or discrepant ideas or information. Intrinsic motivation is also fostered by activities that provide students with voice, choice, and a sense of control, and through activities that involve learners in fantasy and make-believe (Schunk, Pintrich, & Meece, 2008). Reading motivation can be promoted through conceptual themes, real-world interactions, support for self-direction, interesting texts, scaffolding and instruction in reading strategies, social collaboration, and support for student self-expression (Guthrie & Knowles, 2001).

The learning experiences in this study were purposefully designed around factors known to improve student motivation and learning engagement. A learning engagement and motivation protocol was synthesized from the authoritative literature on motivation and learning engagement for use as a data collection tool. The tool was adapted from the work of Baker, Dreher, and Guthrie (2000); Guthrie and Anderson (1999); Guthrie, Wigfield, and Perencivich (2004); Stipek (2002); and Wigfield and Guthrie (1997) and is outlined in the following chapter.

### **Arts Education**

Well-designed experiences in arts education contribute to student motivation, engaged learning, and positive social and academic effects (Boyes & Reid, 2005; Bresler, 2007; Burton, Horowitz, & Abeles, 2000; Deasy, 2002; Eisner & Day, 2004; Gullat,

2007; Morin, 2004; Rabkin & Redmond, 2004, 2006; Russell & Zembylas, 2007; Uipitis & Smithrim, 2003). Gangi (2004) claims:

The past several decades have been tremendously exciting in the fields of cognitive psychology, human development, special education, second language learning, brain-based learning, and reading. A common area of research from these domains is the arts and their contributions to human learning. (p. 13)

Edwards (2009) believes that research and theory “provide a comprehensive view of why the arts are an integral component of education for all learners, especially children” (p. viii). However, the research and literature on the benefits of arts education is challenging to navigate. The quality and claims of arts research in the last few decades vary widely (Eisner, 2002) and have resulted in eccentric applications of the research. A research report by Rauscher, Shaw, and Ky (1993, 1995) on the temporary effects of listening to Mozart for several minutes, notoriously spawned an entire industry of “Mozart effect” related books, CDs, and instructional classes for infants and children.

The Rauscher, Shaw, and Ky study claimed that listening to Mozart increased college students’ IQ scores for a limited period of time. A hypothesis was presented that music processing activated neurons used in spatial tasks. Media dubbed this the “Mozart effect” and the findings were quickly disseminated in popular literature. Results were inappropriately applied to infants and children and Hetland (2000) tells of well-meaning politicians, including the governor of Georgia, distributing classical CDs to all new-born infants in that state in an effort to make that state’s children smarter. Controversy and a mistrust of arts-based research were an unfortunate consequence when the Mozart effect could not be replicated in subsequent research.

The lesson in this telling is that the arts-based research informing and supporting this study is approached with caution. “Correlation isn’t causation” (Winner & Hetland, 2008, p. 29) although correlation does indicate a relationship that requires explanation. Distant cognitive transfer as for example, between music and spatial processing, is yet to be proven (Winner & Hetland, 2008). Hetland and Winner (2004) consider the possibility that transfer effects are more likely to aspects of critical and creative thinking, and the ability to cope with ambiguity and uncertainty, than to concrete skill sets such as spelling. Eisner (2002) points out that a careful review of the literature indicates that good studies of transfer effects from the arts are scarce and do not provide convincing evidence that transfer occurs.

Catterall (1998, 2002) disagrees and suggests that transfer effects from arts experiences to other disciplines are indicated. Catterall is supported by voices such as Hallam (2010) who believes that transfer effects from music experiences to a variety of areas including academic achievement are possible. Catterall (1998, 2002) suggests that more research is needed to explore possible transfer relationships. Aprill (2001) likewise advocates for new research to investigate the potential positive impact of arts education on academic achievement and suggests that the arts are valuable entry points and pathways for students who struggle with learning.

Burton, Horowitz, and Abeles (2000) tackled the question of learning transfer in and through the arts. They examined the artistic experiences of 2,406 children in grades four to eight using combined qualitative and quantitative methods to evaluate transfer of cognitive effects, attitudes, dispositions, and creative thinking in the arts. They concluded that experiences in the arts did not indicate clear evidence of transfer to any subject area,

but that a positive relationship existed between learning in the arts and other disciplines in the areas of creative flexible thinking, imagination, problem solving, expressive abilities, and risk taking.

Learning in the arts and in other subject areas appear to mutually contribute to each other in complex and distinctive ways to generate multiple perspectives, create relationships, and to activate learning. Burton, Horowitz, and Abeles (2000) concluded that a one-way transfer of learning model is likely too simplistic and not appropriate for the complex, dynamic, and interactive ways that children learn in the arts and all subject areas. In addition, such a model does not take into account the many contextual variables that affect learning in the arts.

Hetland and Winner (2004) and Winner and Hetland (2000) reported findings from a set of ten meta-analytic reviews of effects of arts education on non-arts cognition. Of the research linking non-arts outcomes with experiences in the arts, two areas of research indicated equivocal support: music and mathematics, and dance and spatial reasoning. Three areas of research indicated a causal relationship: music and spatial reasoning, music listening and spatial reasoning, and classroom drama and verbal achievement. Five analyses including music and reading, did not allow causal conclusions (Hetland & Winner, 2004).

Hetland and Winner (2004) conclude that arts education has great value but that arts education research is in need of more rigorous research designs, evaluation measures, and clearer reporting of empirical research. They stress the need for research that examines social and motivational effects of arts education and the effects of “*explicit* teaching for transfer in the arts” (p. 156). Arts education research should be used to

explore reasonable bridges between arts education and other subject areas, and the ways that teaching deeply in the arts can inform teaching in other areas (Hetland & Winner, 2004).

Morin (2004) corroborates Winner & Hetland's (2000) findings. Morin examined the Winner & Hetland (2000) meta-analyses along with two other prominent reviews of research claiming academic effects from experiences in the arts (Deasy, 2002; Fiske, 1999). Morin concluded that this research "produced interesting results though with varied quality. The evidence indicates that well-crafted, arts-rich learning experiences are linked to positive academic effects across a range of areas" (Morin, 2004, p. 2).

Boyes and Reid (2005) reviewed the literature claiming benefits for students participating in arts activities and conclude that there are two distinct, although interrelated bodies of arts participation research. One body of research examines the effect of the arts on personal and social skills and a second body of research examines the development of transferable cognitive skills. Like the previous reviewers, Boyes and Reid conclude that the arts participation research is of varied quality with mixed results. They particularly highlight a rigorous ten year longitudinal study (Heath & Roach, 1999) on the affects of an after-school arts program for youth. This study found positive effects for increased motivation for learning, development of personal and social skills, increases in academic achievement, and an increase in confidence and self-esteem.

Recent research suggests a potential for the arts to deeply and critically engage learners in thinking across all subject areas and cultures. In particular, arts integration seems especially powerful for disadvantaged learners and transformative for their schools (Rabkin & Redmond, 2004, 2006). Russell and Zembylas (2007) reviewed research of

arts integration across the curriculum and conclude that integrated arts curricula “have the potential to create transformative zones, thereby encouraging open-endedness, spaces for exploration, connection, discovery, and collaboration by bringing together various areas of knowledge, experiences, and beliefs” (p. 298).

The Russell and Zembylas (2007) review includes a large-scale Canadian study (Upitis & Smithrim, 2003) referenced at the outset of this chapter. This study is a seminal project for arts education in Canada. It is the first Canadian national arts education research project and the largest study of its kind to date in Canada with a sample size of over 6000 students. The three-year study examined effects on student achievement and attitude for an arts education program called *Learning Through the Arts™ (LTTA™)*.

Results indicated a connection between arts education and engagement in learning and a statistically significant but modest positive effect for tests of computation and estimation (Upitis & Smithrim, 2003). A noteworthy 90% of parents reported that the arts motivated their children to learn. By the end of the three-year study, significantly more teachers involved in the study as compared to teachers not participating in the study, believed that arts-based education was an effective teaching and learning approach across curricula (Upitis & Smithrim, 2003).

Causal evidence for transfer of learning effects from arts experiences to other domains may be scarce, but “there is agreement that the arts engage multiple skills and abilities rather than a set of discrete skills” (Gadsden, 2008, p. 47). Experiences in the arts may provide numerous benefits including engagement with abstract and concrete thinking, imaginative thinking, new ways of seeing the world, persistence, resilience, and learning engagement (Gadsden, 2008).

## **Music and Neuroscience**

Music is well-represented in the body of research reporting a positive association between arts experiences and academic achievement. A relationship between the study of music, academic success including reading, student engagement and improved self-esteem has been described in doctoral research presented later in this chapter, and in reviews of music research (Boyes & Reid, 2005; Butzlaff, 2000; Deasy, 2002; Fiske, 1999; Gullat, 2007; Hallam, 2010; Hetland, 2000; Hetland & Winner, 2004; Lessard & Bolduc, 2011; Morin, 2004; Rabkin & Redmond, 2004, 2006; Schellenberg, 2001; Scripp, 2002; Standley, 1996; Vaughn, 2000; Winner & Hetland, 2000).

A range of academic, social and emotional benefits resulting from the study of music has been published in the literature for several decades. Levitin and Tirovolas (2009) state that “the study of music perception and cognition is one of the oldest topics in experimental psychology” (p. 211). Beginning in the 1990s, interest escalated in possible and various academic advantages of music study (Cutietta, 1995, 1996a, 1996b, 1996c) fueled in part by neuroscientific interest in music and new tools and methods for studying music processing in the brain. Thaut (2005) observed that the neuroscientific research focus in music was unprecedented. “Music received an almost exclusive and privileged position in brain research compared to other artistic fields. No other art form has received anything close to this level of attention” (Thaut, 2005, p. vii).

Neuroscientific research spurred interest in music potentials for both science and education. Music involves “a variety of complex motor, auditory, and multimodal skills” ( Schlaug, Norton, Overy & Winner, 2005, p. 219) using widespread cortical and subcortical neural networks for music perception and recognition, memory, emotion

(Peretz & Zatorre, 2005), motor, attention, and sensory functions. Music processing can be used to study the general processes and organization of the human brain including functional and structural brain plasticity (Patel, 2008; Schlaug, Norton, Overy & Winner, 2005; Thaut, 2005) and “the study of brain organization provides a unique tool to reveal the inner working of music processing” (Peretz & Zatorre, 2005, p. 90).

A branch of science known as the cognitive neuroscience of music emerged with the goal of studying the neuroscience involved in music processing. Interest in this new field was reflected in special issues of the *Annals of the New York Academy of Sciences* and *Nature Neuroscience* devoted to the cognitive neuroscience of music: *The Biological Foundations of Music* (Zatorre & Peretz, 2001), *The Neurosciences and Music* (Avanzini, Faienza, Minciacchi, Lopez, & Majno, 2003), *The Neurosciences and Music II* (Avanzini, Lopez, Koelsch, & Majno, 2006), *The Neurosciences and Music III* (Dalla Bella et al., 2009), and *Music and the Brain* (Spiro, 2003). Laboratories, centers, and university programs studying the cognitive neuroscience of music are now found around the world.

The explosion of interest in music and the brain has made its way into popular writing and national best sellers, for example, *Music with the Brain in Mind* (Jensen, 2000), *This is Your Brain on Music* (Levitin, 2007), *The World in Six Songs* (Levitin, 2008), and *Musicophilia: Tales of Music and the Brain* (Sacks, 2008). The popular literature is joined by a body of academic writing and research on music and the brain, for example: *Neurosciences in Music Pedagogy* (Gruhn & Rauscher, 2007), *Brain and Music* (Koelsch, in press), *Music, Language, and the Brain* (Patel, 2008), *The Cognitive Neuroscience of Music* (Peretz & Zatorre, 2003), and *Rhythm, Music, and the Brain* (Thaut, 2005).

Despite the growing body of research and writing exploring the cognitive neuroscience of music, the specific neural structures, networks, and processes used for music processing are under debate (Alossa & Castelli, 2009; Peretz & Zatorre, 2005). However, there is convincing recent work in the field of neuroscience that points to strong similarities between language and music processing in the brain. Music and speech may share cortical areas and mechanisms (Levitin & Tirovolas, 2009; Patel, 2008; Patel & Peretz, 1997; Koelsch, Gunter, et al., 2002; Wallin, Merker, & Brown, 2000) and may be “closely related in early development” (Anvari, Trainor, Woodside, & Levy, 2002, p. 112). Evidence from neuroscience suggests that children process syntax in music before they process syntax in language and that “musical elements pave the way to linguistic capacities earlier than phonetic elements (Papoušek, 1996)” (Koelsch et al., 2003, p. 689).

Schön, Magne, and Besson (2004) state that language and music processes elicit similar positive variations in brain electrical activity in experiments reproduced over time. Areas in the brain known to be involved in the processing of language have shown activation for music processes in functional neuroimaging studies (Koelsch et al., 2002). Research indicates common areas for processing music and language in both cortical and subcortical areas of the brain (Musacchia, Sams, Skoe, & Kraus, 2007; Wong, Skoe, Russo, Dees, & Kraus, 2007).

Although music and language appear to share a common set of neural networks, music also has distinct neural circuits (Patel, 2008). A theoretical neuroanatomical model of the brain suggests an interactive system of music processing with independent centers for pitch and rhythm processing. Pitch and rhythm appear to be first processed separately in the brain and then synthesized across networks for music perception and production

(Levetin & Tirovolas, 2009). Music processing is believed to be widely distributed across neural networks in all lobes of the brain and in cortical and subcortical structures (Levetin & Tirovolas, 2009).

Different components of rhythm perception and production are invoked in different regions of the brain. Specific areas of the brain are associated with an “internal, intuitive, ‘beat-based’ timer in both musicians and nonmusicians” (Levetin & Tirovolas, 2009, p. 215). Neural distribution and specialization for music and rhythm processing mechanisms in the brain are well-studied and detailed in the neuroscientific literature (Levetin & Tirovolas, 2009; Patel, 2008; Thaut, 2005).

Studies and evidence from neuroscience indicate that music training can shape structural brain development (Hyde et al., 2009; Wan & Schlaug, 2010) beginning in early childhood. Music study has been shown to modify both cortical and subcortical organization and structures (Musacchia, Sams, Skoe, & Kraus, 2007; Wong, Skoe, Russo, Dees, & Kraus, 2007). Such findings suggest that music experiences may be beneficial in some way for music learning and learning in general. Thaut (2003) describes the potential of music and rhythm for neural mechanisms, learning, and this research:

Clinical studies have shown striking evidence that auditory rhythm and music can be effectively harnessed for specific therapeutic purposes... [Parkinson’s disease, Huntington’s disease, stroke, brain injury]. Such findings underscore further the complex ways in which music engages the human brain and in which the brain that engages in music...can be changed by engaging in music. (p. 371)

It is important to note that the cognitive neuroscience of music is a very new field and at this point in time it is uncertain how neuroscientific understandings about music and the

brain may be directly applied to education or educational policies. However, evidence from the cognitive neuroscience of music supports the research indicating that experiences in music may be beneficial in a variety of ways for students when well-designed, sustained, appropriate, and meaningful to the context of the learning and learners. Widespread cortical and subcortical music processing suggests possible links to a variety of non-music areas important to learning and emotion.

### **Music, Math, and Spatial-Temporal Reasoning**

The research literature examining connections between music experiences and non-music outcomes is varied and extensive, and includes positive effects for socio-emotional well-being, health, creativity, language, reading, memory, visual-motor skills, mathematics, and spatial-temporal reasoning associated with IQ tests. Hetland and Winner (2004) and Winner and Hetland (2000) found the most reliable, equivocal, and causal transfer of music learning (Tunks, 1992) in studies of music, mathematics, and spatial-temporal reasoning. Highlights of the research investigating music, math, and spatial-temporal reasoning are presented chronologically in Table 1.

Despite claims for music transfer in the literature, this research does not indicate automatic transfer of skills from music, if transfer occurs at all. There appear to be a number of variables that potentially interact and affect claims of transfer for example, unaccounted and previous music knowledge and experience, quality of music instruction, effects from other variables, few longitudinal studies, lack of triangulation, the particular context for integration and instruction, and sensitivity or not of measures used to assess music and academic achievement for local context. In addition, the focus of this body of

research is generally on the end results of the music learning for spatial-temporal tasks, IQ, and math achievement rather than on the learning processes.

Table 1. *Music, Math, and Spatial-Temporal Reasoning*

Author	Research Focus
Rauscher, Shaw, & Ky, 1995	Listening to Mozart improves short-term spatial-temporal reasoning in college students
Rauscher, Shaw, Levine, Wright, Dennis, & Newcomb, 1997	Piano lessons result in improved spatial-temporal reasoning for preschool children, N=78
Gromko & Poorman, 1998	Music learning results in improved spatial-temporal tasks for three year olds, N=30
Catterall, Chapleau, & Iwanaga, 1999	High math proficiency related to 5 year instrumental music involvement for Grade 12 students, based on 10 year longitudinal panel study of 25,000 students
Costa-Giomi, 1999, 2004	Piano lessons have small positive effect on general and spatial cognitive development for Grade 4 students after 1 and 2 years of piano instruction. After three years, no significant academic effects but positive effects for self-esteem, N=117
Graziano, Peterson, & Shaw, 1999	Piano lessons improve math for grade two students, N=237
Orsmond & Miller, 1999	Music learning linked to improved nonverbal/spatial abilities for pre-school children, N=58
Bilhartz, Bruhn, & Olson, 2000	Significant, positive relationship between music learning and spatial-temporal reasoning abilities for 4-6 years olds, N=71
Rauscher & Zupan, 2000	Keyboard instruction improves kindergarten children's spatial-temporal performance, N=62
Schellenberg, 2004	Voice and keyboard lessons result in small IQ increase in six year olds, N=144
Schellenberg, 2006	Positive correlation between duration of music lessons, IQ, and academic ability for 6-11 year olds, N= 147

Studies examining links between music learning, math, and spatial-temporal reasoning were a particular focus of music research in the 1990s. Hetland's (2000) review of some of the key research claiming enhanced spatial temporal reasoning as a result of music listening experiences led Hetland to conclude that music processing has a moderate and robust effect on specific types of spatial-reasoning tasks. The nature and cause of the effect was not clear but possible links to rhythmic elements were suggested. Hetland's (2000) recommendation for future research to examine the promising rhythm hypothesis for spatial performance was extended in later research investigating links between music, language, and reading.

### **Music, Language, and Reading**

The connections between music and language have been studied for centuries and there is increasing scientific and educational interest in the link between music, language, and reading. This is due in part to the recognition that “music and language both represent complex, higher-order cognitive processes that invoke a large number of subsystems” (Levetin & Tirovolas, 2009, p. 221).

A body of accumulated research suggests that music experiences may facilitate language and reading development for children (Butzlaff, 2000; Hallam, 2010; Lessard & Bolduc, 2011; Standley, 2008). However, in a review of sixty years of literature examining the relationship between music experiences, language, and reading, Chang (2000) concluded that where music experiences appear to support reading, the processes for doing so and the extent and nature of the relationship are uncertain. A decade later, Lessard and Bolduc (2011) reached the same conclusion in their review of studies investigating the connection between music learning and reading for early years students.

Lessard and Bolduc (2011) reviewed three correlational and fourteen quasi-experimental studies that indicated “an undeniable link between music learning and reading” (p. 109). However, findings from these studies demonstrated varying results. The nature of the connection between music learning and reading is not clear and no causal relationship can be established. The reading and music skills under study differed widely between studies and results claimed significant effects for different elements of music and on various aspects of reading development. Lessard and Bolduc conclude that while results do not specify which music element or process is most effective for supporting reading development, indications of the possible benefits of music learning for early years readers are promising and warrant further rigorous research.

Hallam (2010) examined research findings indicating positive associations with music learning and numeracy, intellectual development, general academic achievement and engagement, creativity, social and personal development, physical development, health and well-being, perceptual and language skills, and literacy. According to Hallam, the research indicates that music learning facilitates growth in language and reading skills. The element of rhythm is singled out as “an important factor in reading development” (Hallam, 2010, p. 273). Hallam suggests that music learning may support reading development through a variety of pathways including improvements for verbal memory, language skills, general perception, timing, and engagement. Hallam maintains that the research evidence provides a strong claim for the benefits of music learning in many areas including literacy, motivation, self-esteem, and self-efficacy.

In a meta-analysis of thirty experimental studies, Standley (2008) examined a variety of music interventions designed to improve reading skills. Standley concluded an

overall positive and significant effect size (0.32). When music activities are used to reinforce reading development and include specific, focused reading skills matched to the needs of the study participants, benefits are considerable. Reading instruction is enhanced by music activities that include alphabet recognition, phonetic patterns, word segmentation and sound blending skills, and activities that promote oral reading fluency.

Benefits were greater when music and reading activities were integrated with existing curriculum instead of being used to replace the program of study. Interventions were successful regardless of the time period of implementation. Music and reading interventions were equally successful when implemented on a daily short-term basis, or implemented weekly throughout the entire school year.

In a meta-analysis of twenty-four correlation and experimental studies, Butzlaff (2000) examined the hypothesis that music can be used to teach reading. Butzlaff's hypothesis is based on four assumptions: 1) music and print text have common coding practices; 2) music and reading require sensitivity to phonological distinctions; 3) repetitive and predictable song lyrics may facilitate reading; 4) music experiences can be motivating and engaging.

Butzlaff (2000) found a strong and reliable association between music study and performance on standardized reading and verbal tests in correlation studies. However, these studies do not explain the associations or confirm which underlying assumptions are factors in reading performance. Butzlaff found a somewhat significant relationship between variables in the experimental studies but the relationship was not large, robust, or reliable. In addition, differences can be explained by a variety of factors other than the

music effects of the studies. Butzlaff recommended more stringent research methodology in future research.

The authors of the above reviews all characterized music learning as potentially important for learning in other areas including language and literacy. However, these authors also emphasized the diverse methods, approaches, and variables associated with findings. A range of music and reading dimensions can be found in a single study, challenging interpretation of results. For example, an early, seminal and small music intervention study (Standley & Hughes, 1997) examined the effects of two months of music learning for both pre-reading and writing skills in pre-kindergarten classes. The positive effects for pre-reading print concepts and pre-writing skills are difficult to attribute to any particular element of the music learning in this study, if indeed the music learning was responsible for the positive results.

Register (2001) found similar positive effects for both pre-reading print concepts and pre-writing using a larger sample size (N=50) in a study modeled on Standley and Hughes's (1997) research. Register's research was extended in a study (Register, Darrow, Standley, & Swedberg, 2007) examining the potential of music learning for second grade students, including those with reading disabilities. An intensive, short-term music program was developed specifically for remediating and improving reading comprehension and vocabulary skills. Although both control and experimental groups improved significantly on measures of word decoding and word knowledge, the experimental classes improved significantly more for tests of word knowledge. Only students identified with reading disabilities improved significantly for reading comprehension.

The music program used in the Register, Darrow, Standley, and Swedberg study (2007) was further investigated in a group of five studies (Darrow et al., 2009) at different school sites with a total sample size of 458 grade two children. Each study was organized around a short-term music intervention for experimental and control groups with varying control conditions, schedules, and teacher experience. The music intervention involved eighteen lessons one to three times a week over six to nine weeks.

The dependent variables were measures of word decoding, reading comprehension and vocabulary skills. Results indicated slightly higher but not significant gains on reading measures for students receiving the music and reading curriculum than for the control groups in four out of five studies. There was no change in test scores for the site that had music and reading instruction just once a week. These findings suggest that in those sites where music and reading instruction replaced regular reading instruction, students experienced greater engagement and enjoyment of learning while not at the expense of reading instruction. An integrated music curriculum appears to be a useful, engaging, and motivating alternative to traditional approaches for teaching reading.

### **Music, Phonological Awareness, and Oral Reading Fluency**

Hallam (2010) claims that the research evidence indicates that music experiences may play a major role in developing perceptual processing systems related to encoding and identifying speech sounds and patterns. Hallam declares, “transfer of these skills is automatic and contributes not only to language development but also to literacy” (p. 272). Direct music transfer is questioned as previously noted; however, evidence from neuroscience and experimental psychology converge to indicate that musical elements of speech appear to play a crucial role in creating sensitivity and awareness for the sounds of

language and in the acquisition of language (Jusczyk & Krumhansl, 1993; Koelsch et al., 2003; Trehub, 2000; Trehub, Schellenberg, & Hill, 1997). Peretz (2003) notes that sound pattern recognition is a basic auditory task performed “constantly and without effort, in both music and language domains” (p. 194).

Rhythmic aspects of speech are essential for many areas of language processing and subsequent reading development (Wade-Woolley & Wood, 2006). Music and language are connected through both the domains of phonological awareness and oral reading fluency. Literature and research that supports the importance of oral reading fluency for the complex processes of reading development includes: Allington (1983, 2001, 2009, 2011); Chard, Vaughn, and Taylor (2002); Fountas and Pinnell (2006); Kuhn and Schwanenflugel (2008); Kuhn, Schwanenflugel, and Meisinger (2010); Kuhn and Stahl (2000, 2003); McGuinness (2004); Rasinski (2000, 2003, 2011); and Ruddell and Unrau (2004).

An extensive body of literature provides evidence that phonological processing is important to the development of reading processes beginning with the seminal work of Bradley and Bryant (1978, 1983). Other authoritative evidentiary sources for the importance of phonological awareness to reading acquisition and comprehension include: Christensen (1997); Goswami (2000); Hatcher and Snowling (2002); Jordan and Goldsmith-Phillips (1994); Metsala (2011); Snowling (2000); Stanovich, Cunningham, and Cramer (1984); Torgesen, Morgan, and Davis (1992); and Torgesen, Wagner, and Rashotte (1994). Importantly, phonological skills are teachable (Smith, Simmons, & Kameenui, 1998). Castles and Coltheart (2004) offer a rare dissenting voice arguing against a causal link from phonological awareness to successful reading development.

A relationship between phonemic and phonological awareness and musical abilities has been investigated for over twenty years. Lamb and Gregory (1993) determined a relationship between phonological awareness and pitch discrimination in children aged four and five years. Anvari, Trainor, Woodside, and Levy (2002) found a relationship between phonological awareness and musical aptitude and concluded a positive correlation between phonological awareness and musical aptitude in a larger sample of four and five year old children. Gromko (2005) reported significant improvement for measures of phonemic awareness in kindergarten children participating in a music program as compared to kindergarten children who did not participate in music education.

The benefits of music learning appear to extend to second language learning. Slevc and Miyake (2006) found that music abilities related to phonetic perception and production in second language learning. Similarly, Lowe's (1995, 1997, 2000) research indicates that integrating music into French immersion classrooms reinforces French second language learning. Bolduc (2009) examined the effects of two different music programmes on Franco-Canadian kindergarten children's phonological awareness skills and determined that a music program integrating Orff elements with music therapy strategies focusing on reading and writing significantly increased scores for phonological awareness. Degé and Schwarzer (2011) likewise found that music education can improve measures of phonological awareness for kindergarten children.

Recent research proposes that phonological awareness difficulties may be secondary to sensitivity issues with dimensions of oral reading fluency. The dimension of prosody is receiving particular interest, often in reference to underlying elements of

speech rhythm (Holliman, Wood, and Sheehy, 2010b). Speech rhythm sensitivity has been found to predict reading ability over time and “may play an important role in children’s reading development” (Holliman, Wood, & Sheehy, 2010a). Rhythm is considered a central element of speech and crucially involved in segmentation processes essential to language acquisition and comprehension (Geiser, Zaehle, Jancke, & Meyer, 2008).

Speech rhythm, or prosodic rhythm, and non-speech rhythm have been linked to different elements of successful reading development in a number of well-crafted studies. However, definitions of prosody and speech rhythm vary. Research demonstrating a connection between prosodic dimensions of reading related to both phonological awareness and oral reading fluency uses a range of prosodic dimensions as the variables under study. A wide range of prosodic dimensions makes it difficult to determine exactly what measure of prosodic reading actually affects each different aspect of phonological awareness, oral reading fluency and subsequent reading comprehension. Measures of prosodic reading include intonation, pausing, stress sensitivity, beat detection, and phrasing.

Although prosodic reading is widely considered a hallmark of oral reading fluency (Miller & Schwanenflugel, 2008) and is gaining recent attention for its role in phonology (Whalley & Hansen, 2006), the nature of the link between reading prosody and other reading processes is poorly understood (Miller & Schwanenflugel, 2008) and it is not certain what contributes to this relationship. The connection between reading and speech prosody has been examined in humans from the first year of life (Levitin & Tirovolas,

2009). Infants and young children are found to be sensitive to prosodic elements of speech (Dowhower, 1991; Schreiber, 1987, 1991).

It is suggested that sensitivity to the rhythmic properties of speech may help infants and children by providing aural cues and by segmenting speech sounds into meaningful units to facilitate understanding of oral language (Holliman, Wood, & Sheehy, 2010b; Whalley & Hansen, 2006). The alternating stress patterns of strong and weak syllables may help to separate the constant stream of utterances into meaningful speech (Whalley & Hansen, 2006). Awareness of the rhythmic sounds and structures of speech and text would then hypothetically provide oral cues to facilitate understanding. Whalley and Hansen (2006) suggest that segmenting speech sounds into meaningful units also reduces memory load, allowing students to focus on listening comprehension.

Wood and Terrell (1998) hypothesize that rhythmic properties of speech are potential cues for infants to indicate where word boundaries are likely to occur. They suggest that these skills could affect later reading development. Wood & Terrell investigated their hypothesis using tests of rhythmic awareness, rhyme detection, phoneme deletion, and speech perception with thirty primary school children. They determined that struggling readers experienced difficulties on tests of rhythmic awareness although there were no significant differences on measures of speech perception when controlled for vocabulary. The study results were limited by the small sample size.

Schwanenflugel, Hamilton, Kuhn, Wisenbaker, and Stahl (2004) examined the dimensions of pausing and intonation in reading prosody as related to reading rate and comprehension in a sample of 123 grades two and three children. They found evidence of a relationship between prosodic features and reading rate as well as between reading rate

and comprehension but only minimal evidence that elements of prosody are related to reading comprehension.

Miller and Schwanenflugel (2006) examined the degree to which prosodic elements of pausing and intonation vary as a function of reading rate and accuracy, and explored the role of reading prosody in reading comprehension for 80 grade three children. Prosodic reading skills were found to be related to reading rate and comprehension; however, pitch changes rather than pause structures accounted for variance in reading comprehension.

Whalley and Hansen (2006) also examined the role of prosodic sensitivity in children's reading development and extended the findings of previous studies. Measures of word-level and phrase-level prosodic skills were used to examine intonation, stress, pause, and phrasing. Measures of word identification, word attack, reading comprehension and oddity tasks for phonological awareness were used to assess reading ability. When controlling for phonological awareness and general rhythmic sensitivity, prosodic skills were found to predict variation in word accuracy and reading comprehension for grade four children.

Wood (2006a, 2006b) found similar strong and positive relationships between sensitivity to speech rhythm using measures of metrical stress and measures of reading. Measures of speech rhythm sensitivity (metrical stress) accounted for variance in spelling ability (Wood, 2006a). Speech rhythm sensitivity was found to be related to phonological measures of rhyme detection skill and predictive of phonemic awareness (Wood, 2006b). Wood, Wade-Woolley, and Holliman (2009) reviewed research examining the relationship between prosodic sensitivity and aspects of reading and concluded that the

acquisition of phonemic awareness may be enhanced by sensitivity to speech rhythm. Sensitivity to speech rhythm may help make sense of phonemic relationships (Wood, Wade-Woolley, & Holliman, 2009).

Holliman, Wood, and Sheehy (2008) extend the body of research on prosody and reading with their findings that speech rhythm sensitivity predicts significant and concurrent variance in reading measures for five and six year old English speaking children after controlling for age, vocabulary, and measures of phonological awareness. Findings indicated that the dimension of stress manipulation predicts a significant amount of variance in phonological measures. The authors suggest that prosodic elements of stress sensitivity are important, but neglected aspects of reading development which need to be considered in theories and models of reading development.

The body of research presented above is limited by duration of study. Only two longitudinal studies were found to demonstrate a connection between speech rhythm and dimensions of reading development over time. A longitudinal study of prosodic sensitivity and elements of reading (Miller & Schwanenflugel, 2008) examined suprasegmental features of oral reading including pausing and intonation for 92 children from grades one to two. It explored the impact and relationship of prosodic text reading, reading fluency and comprehension when students reached grade three.

Findings indicate the number of pausal intrusions in grades one and two are related to word reading skills. Fewer pausal intrusions in oral reading for grade one children are related to subsequent development of later adult-like intonation contour in grade two. Intonation contours were found to be a significant predictor of later reading fluency. The aspects of pausing and intonation were both found to be relevant to word

reading skills and later reading comprehension for grade three students. The authors concluded that prosodic oral reading is an important element of oral reading fluency leading to subsequent reading comprehension, but the study is limited to prosodic measures of pausing and intonation.

In another longitudinal study, Holliman, Wood, and Sheehy (2010a) found that sensitivity to speech rhythm using dimensions of stress sensitivity predicted variance in word reading and phrasing in reading fluency one year later for English speaking five to eight year olds. However, sensitivity to speech rhythm did not predict variance in reading comprehension controlling for age, vocabulary, and phonological awareness. Stress sensitivity was significantly related to vocabulary and phonological awareness measures of rhyme and phoneme. The authors theorized that sensitivity to stress helped children identify rhyme and word boundaries, facilitating word recognition and vocabulary development.

Music learning has also been found to have benefits for tonal dimensions of oral reading fluency and prosody. Barwick, Valentine, West, and Wilding (1989) found that reading skill is linked to processing the tonal element of speech and that tonal memory is related to age. Moreno and Besson (2006) and Magne, Schön, and Besson (2006) demonstrated that music experiences facilitate pitch processing in language. Findings that music learning improves auditory discrimination abilities and vocabulary along with nonverbal reasoning skills (Forgeard, Winner, Norton, & Schlaug, 2008), verbal memory (Ho, Cheung, & Chan, 2003), and verbal sequencing and vocabulary (Piro & Ortiz, 2009) for children, may be connected to the ways that music creates sensitivity to the tonal and rhythmic elements of speech.

Speech prosody is also implicated in the ability to perceive emotions. In three experiments with adult participants, Thompson, Schellenberg, and Husain (2004) found that “music lessons promote sensitivity to emotions conveyed by speech prosody” (p. 46). The work of Sloboda (2005) and Juslin and Sloboda (2010) certainly supports the strong connection between music and emotion for all ages that has been described in the literature for centuries and is important to this research.

### **Speech Rhythm in Non-English Languages**

Research examining the relationship between sensitivity to speech rhythm and word reading has been carried out in languages other than English. Because syllables can either be strong or weak in the English language, it is termed a stress-timed language (Muneaux, Ziegler, Truc, Thomson, & Goswami, 2004). Research in languages other than English indicate that even in syllable-timed languages such as French and Spanish, where every syllable is approximately the same length of time, links between speech rhythm sensitivity, beat perception, and reading difficulties persist.

Herrera, Lorenzo, Defior, Fernandez-Smith, and Costa-Giomi (2011) examined the effectiveness of a music education program on phonological awareness in Spanish pre-school children and children who spoke a Berber dialect called Tamazight. The authors concluded that music experiences enhanced specific phonological abilities and that the effects “were significant regardless of the native language of the children” (p. 68).

Peynircioğlu, Durgunoğlu, & Öney-Küsefoğlu (2002) examined the relationships between pre-reading phonological awareness and musical aptitude for thirty-two Turkish and forty American children three to six years of age. Using auditory phoneme and

musical aptitude tasks (primarily for pitch and rhythm) in the children's own language, findings were consistent across both languages.

Findings indicate a positive and significant link between verbal phonological awareness tasks and musical aptitude in Turkish and English. Children with high musical aptitude had higher scores for verbal phonological awareness than children with low musical aptitude, indicating cognitive universals (Peynircioğlu, Durgunoğlu, & Öney-Küsefoğlu, 2002). Musical aptitude appears to enhance sound manipulation and the ability to manipulate linguistic sounds. The study did not report findings by specific musical dimension. The umbrella term "musical aptitude" does not indicate what role may have been played by pitch and/or rhythm.

Gutiérrez-Palma and Palma Reyes (2007) investigated the relationship between ability to detect prosodic changes of stress sensitivity and reading performance for seven and eight year old Spanish children. Knowledge of stress rules was found to predict both word and non-word reading. The authors suggest that awareness of prosodic elements of stress sensitivity may help Spanish speaking children learn stress rules that facilitate reading. This suggestion echoes that of Holliman, Wood, and Sheehy (2010a) who proposed that speech rhythm sensitivity should be a purposeful part of English-speaking children's reading development.

Muneaux, Ziegler, Truc, Thomson, and Goswami (2004) investigated whether beat perception deficits were specific to the stress-timed language of English, or whether they would generalize to languages with different properties such as French. Deficits in beat perception related to dyslexia for eighteen grade 5 French-speaking children were investigated (Muneaux, Ziegler, Truc, Thomson, & Goswami, 2004). Using phonological

processing tasks and a beat perception task developed by Goswami et al. (2002), findings demonstrate that deficits in beat perception in speech rhythm may be universal for elementary children with dyslexia (Muneaux, Ziegler, Truc, Thomson, & Goswami, 2004).

### **Non-Speech Rhythm**

Research links successful reading development with non-speech or musical rhythm (Holliman, Wood, & Sheehy, 2010b). However, one of the difficulties in interpreting this varied body of literature is that in some studies neither the reading processes nor the music processes being examined are specifically defined or described fully. Nevertheless, these studies suggest a potential for music processes including rhythm to facilitate learning in both reading and music for early years students.

Musical rhythm is important in language play and reading involving rhyme. Rhyme experiences and rhyming ability have been strongly linked to successful phonological processing in young children for over two decades (Blachman, 2000; Bradley & Bryant, 1985; Bryant, 1998; Bryant, Bradley, MacLean, & Crossland, 1989; Bryant, MacLean, Bradley, & Crossland, 1990; Hatcher & Snowling, 2002; MacLean, Bryant, and Bradley, 1987; Pullen & Justice, 2003). This literature indicates that the element of musical rhythm found in rhyme and rhyme experiences may play some role in language and reading development.

One of the early studies demonstrating a connection between music and language reported that Kodaly-based music instruction for primary aged children enhanced spatial abilities and reading achievement for grade one students (Hurwitz, Wolff, Bortnick, & Kokas, 1975). Twenty grade one children who received Kodaly-based music instruction

with a rhythmic emphasis were found to score significantly higher on measures of reading ability than grade one children who had not received any music education.

Although questions of rigour have been voiced regarding the above study, it made a seminal contribution to awareness of the importance of music education for non-musical as well as musical outcomes. This research focus was extended in a comparison of musical abilities of seven to nine year old children with and without reading disabilities (Atterbury, 1985). Those who struggled with reading also had difficulties with measures of rhythm production, although not with measures of rhythm perception (Atterbury, 1985).

However, in a comparison of music and reading in children aged seven to ten years, Barwick, Valentine, West, and Wilding (1989) found that the musical elements of tonal memory and harmony, and not rhythm, correlated with reading age. Likewise, Lamb and Gregory (1993) found a positive correlation for pitch discrimination and phonemic awareness in four and five year old children. However, in a study of 78 grade four children, Douglas and Willatts (1994) confirmed earlier findings that measures of rhythm, and not pitch, correlate most strongly with measures of reading ability. "Rhythm showed highly significant correlations with both reading and spelling" (Douglas & Willatts, 1994, p. 103).

Another Kodaly-based two-year intervention study (Gardiner, Fox, Knowles, & Jeffrey, 1996) combined visual arts instruction and music for grades one and two students. After seven months of music and art instruction, reading scores improved for the test group of grade one students (N= 96) compared to their previous kindergarten scores; however, experimental and control groups in both year one and two were equal on

reading measures. In an extensive analysis of the relationship between musical skills and reading development, Anvari, Trainor, Woodside, and Levy (2002) examined the link between phonemic awareness, early reading skills, and rhythmic, melodic, and harmonic processing skills for 100 four and five year olds to determine how these factors might relate to reading development. Music skills included identifying same and different rhythms, melodies, and chords. Reading measures included tests of phonemic awareness, letter and word recognition, and vocabulary.

Music perception was found to be reliably related to phonological awareness and reading development, and predictive of reading skill. Inconsistent results were found for rhythmic tasks. Rhythm production and rhythm discrimination tasks correlated with reading skills of four year old children but not with reading skills of five year olds. Correlations between reading and rhythm existed even when controlling for phonemic awareness, suggesting that in this instance, phonemic awareness and rhythmic ability have unique features associated with reading development. Anvari, Trainor, Woodside, and Levy (2002) suggest these relationships are important to examine in future research. They conclude that if music and speech depend on the same auditory processes, early music experiences might enhance reading acquisition “to the extent that reading depends on the same basic auditory analysis skills” (p. 113).

Longitudinal research also indicates a relationship between musical timing skills and reading. David, Wade-Woolley, Kirby, and Smithrim (2007) found that beat competency tasks for 53 grade one children predicted reading in five subsequent grades. Beat competency measures accounted for 9% of the variance in word reading for grade five students, controlling for phonological awareness. Beat competency appeared to be

more important for students as reading demands increased through the grades. Results of beat competency tasks were possibly confounded by motor skills as one section of the tests involved walking a beat.

### **Rhythmic Processing in Children with Developmental Dyslexia**

A body of research examining the relationship between reading and rhythm for children with dyslexia is informed by the hypothesis that phonological processing difficulties are part of a larger problem involving temporal processing deficits (rhythm, duration, and sound sequencing) with non-speech rhythms (Tallal, 1984; Tallal, Miller, & Fitch, 1993; Wolff, 2002; Wolff, Michel, Ovrut, & Drake, 1990). Dyslexia is a term that originated in the United States and was developed by ophthalmologists, physicians, and neurologists to refer to a learning disability that is neurological in origin and characterized by phonological and oral reading fluency difficulties (Gunderson, D'Silva, & Chen, 2011). The more generally preferred term used by educators is reading disability (Gunderson, D'Silva, & Chen, 2011). However; the term dyslexia is used here wherever it is used within the context of the literature under review.

Wolff (2002) examined timing difficulties in children identified with dyslexia in a body of research spanning over twenty years. In a study investigating timing precision and rhythm in students with developmental dyslexia (Wolff, 2002), twelve students aged ten to sixteen participated in exercises designed to evaluate rhythm and timing competencies. Rhythm tapping exercises included synchronizing to the beat and reproducing rhythm patterns by tapping. The findings indicated that students with dyslexia experienced significant group differences compared to the control group for measures of isochronic pacing and reproducing simple rhythm patterns by finger tapping

and speech rhythm. The study is limited by sample size, but similar links have been identified between musical timing skills and dyslexia (Overy, 2000, 2003; Overy, Nicholson, Fawcett, & Clarke, 2003).

Overy (2000) investigated the potential for music learning focused on timing skills to improve language and literacy skills for early years children with dyslexia. Music skills and reading development for six children identified as at strong risk for dyslexia were compared to music and reading development for sixteen children considered not at risk for dyslexia. Music and reading measures were tested before and after a year long program of music instruction by a generalist classroom teacher in a primary classroom.

Overy (2000) found that the “at risk of dyslexia group” had significantly lower scores for tempo, rhythm perception, and rhythm production than the children who were not considered at risk for dyslexia. Rhythm tests were based on identifying simple same or different rhythms (perception) and imitating rhythm patterns (production). Scores were lowest for tests of rhythm production. There were no significant differences for melody perception. After one year of music education, all children in the classroom improved on tests for phonological and spelling skills with the at risk students showing the greatest improvements.

Overy (2000) concluded that the evidence pointed to timing as a key factor in understanding reading difficulties encountered by children with dyslexia. Overy suggested that timing skills could prove to be an effective remediation tool for children struggling with language and literacy skills. The study was limited by sample size and instruction; the classroom teacher was participating in a project to integrate music into

classroom teaching and was not a music specialist. Study recommendations included future program design by a specialist music teacher to possibly produce a stronger pattern of results.

Subsequent studies by Overy and colleagues were undertaken to further investigate the connection between temporal processing and reading difficulties for students with dyslexia. Overy (2003) designed a fifteen week intervention study and found that music learning had significant positive effect on rhythm copying, phonological ability, and spelling for nine boys (mean age 8.8 years) identified with dyslexia. The study results were limited by small sample size. Overy, Nicolson, Fawcett, and Clarke (2003) examined the musical timing skills of fifteen boys identified with dyslexia and eleven boys in a control group ages seven to eleven. The children with dyslexia scored significantly higher on three tests of pitch, possibly attributed to greater musical experience. The same children with dyslexia scored significantly lower than the control group in all three rhythm skills that were assessed. The rhythm tests included identifying same or different rhythms, imitating and tapping back a short, simple rhythm heard over headphones, and tapping the beat of the song Happy Birthday while singing the words.

The tapping of the rhythm of the song was significantly correlated with spelling ability, suggesting a link between non-musical and musical skills of syllable segmentation. The correlation relationship was strongest for the control group, suggesting that “children who are able to extract the rhythm of a song may have a phonological advantage when approaching spelling” (Overy, Nicolson, Fawcett, & Clarke, 2003, p. 34). Overy, Nicolson, Fawcett, and Clarke (2003) concluded by claiming that children with dyslexia experience difficulties with musical timing skills and that “musical

activities, based on songs and rhythm games, may provide a valuable medium in which to develop dyslexic children's timing skills and language skills" (p. 34). The study is limited to students identified with dyslexia; however, it is possible that other struggling readers might benefit similarly from experiences in rhythm.

Goswami and colleagues figure prominently in research investigating connections between sensitivity to non-speech rhythm and phonological awareness, and subsequent reading development. Goswami et al. (2002) developed an auditory beat detection test that "factors the speech signal mathematically into the product of a slowly varying envelope (also called amplitude modulation)" (Corriveau, Goswami, & Thomson, 2010, p. 371). The rate of change, or rise time, of the amplitude envelope onset of a vowel is a crucial cue for timing speech output (Thomson, Fryer, Maltby, & Goswami, 2006).

"Rhythm in speech is a property of the slow amplitude modulation (AM) of the waveform" (Goswami et al., 2002, p. 10911). The amplitude modulation can be varied to create the effect of the sound of beats in the auditory stream. A very slow rise time creates the effect of a continuous sound that varies only in its loudness. A faster rise time creates the effect of a rhythmically sounding loud beat occurring within the continuous sound (Goswami et al., 2002).

Goswami et al. (2002) used amplitude envelope onsets to explore the hypothesis that rhythmic timing was a factor in reading difficulties for children with dyslexia. Amplitude modulation and phonological processing tasks were examined in a group of 101 eleven year old children including twenty-four children identified with dyslexia. A strong and significant positive correlation was noted between literacy skills and beat detection skills over all groups of children.

The ability to detect beat was significantly less in the group of children with dyslexia and significantly better for readers described as precocious readers. Children with dyslexia had low beat detection ability and exceptional child readers had high beat detection ability. After controlling for age, IQ, and vocabulary, 25% of the variance in reading and spelling acquisition was attributed to the beat detection task. After controlling for phonological awareness, speech rhythm further predicted another 9% of the variance in word reading.

In an experimental study examining the low-level auditory processes underpinning phonological awareness for children with dyslexia aged seven to ten, Richardson, Thomson, Scott, and Goswami (2004) confirmed earlier findings. The children with dyslexia were significantly impaired at the beat detection task as compared to the other children in the study. Across all groups, the ability to detect the beat was strongly and positively correlated with reading ability.

Rhythmic timing identified through amplitude envelope rise time and duration was investigated in sixty-three children between seven and eleven years of age, including twenty-one children with speech and language impairments (Corriveau, Pasquini, & Goswami, 2007). The children with speech and language impairments were significantly less sensitive than other children to rhythmic timing cues. The study was extended to investigate rhythmic motor entrainment for sixty-three seven to eleven year old children with speech and language impairments (Corriveau & Goswami, 2009). Children with speech and language impairments experienced difficulties tapping in synchrony to a metronome beat. Children with speech and language impairments had significantly lower scores for beat synchrony compared to age and language-matched control children.

In a study to explore the connection between auditory rhythmic and motor timing skills for forty-eight ten year old children, Thomson and Goswami (2008) found that children with developmental dyslexia scored lower on beat detection tasks than children who did not have dyslexia. Rhythmic finger tapping to a metronome explained variance in reading and spelling and children who experienced the greatest difficulties synchronizing to the beat demonstrated the poorest literacy and phonological development. The authors concluded that rhythmic timing was important for both motor skills and for language development and that rhythmic interventions for children with speech and language difficulties would be worthwhile. They suggested that simple activities such as singing to music or playing a drum in time with stressed syllables “may have previously unsuspected benefits for the development of language, phonology and literacy” (Thomson & Goswami, 2008, p. 129).

Empirical evidence suggests that pre-school and kindergarten children would benefit from beat and rhythm experiences to support phonological awareness and reading development. In a rigorous study of auditory processing and early literacy skills for 88 three to six year old children, Corriveau, Goswami, and Thomson (2010) found that beat detection skills as evidenced by speech envelope tasks were strongly correlated to reading precursor skills. Beat detection was strongly correlated with rhyme awareness and initial phoneme detection and identification. These relationships were confirmed through a longitudinal design with a subset of children from the original study.

Corriveau, Goswami, and Thomson (2010) concluded that “auditory processing influences reading acquisition through its effects on a child’s ability to extract phonological information from the speech stream” (p. 380). Corriveau, Goswami, and

Thomson highlighted the significance of auditory processing and rhythmic skills for later reading ability and suggested that an intervention targeting rhythm and rhyme would be important to reinforce pre-reading skills before a child is exposed to reading instruction and potential failure and discouragement.

Despite evidence from the body of research just presented, there are challenges in the literature to claims of causal relationship between auditory temporal processing deficits and reading difficulties in adults (Chiappe, Stringer, Siegel, & Stanovich, 2002) and children (Boets, van Wieringen, & Ghesquière, 2006). Thomson (2009) cautions that the link between non-speech auditory perceptual deficits and speech equivalents has not yet been convincingly demonstrated.

### **Speech and Non-Speech Rhythm**

In a seminal study examining the interrelationship between speech rhythm, non-speech rhythm, and literacy skills, Holliman, Wood, and Sheehy (2010b) examined both speech rhythm and non-speech rhythm in reading development for 102 English speaking children aged five to seven. The non-speech rhythm tasks involved reproducing a previously sounded rhythm and discriminating between two similar sounds by identifying same or different rhythms.

The rhythm matching tests identifying same or different sounds and the non-speech rhythm tasks were significantly correlated with reading attainment measures (word reading, vocabulary, phonological rhyme detection, phoneme deletion, mispronunciation task), controlling for age, vocabulary, phonological awareness, and short-term memory. The relationship between the non-speech rhythm tasks and reading attainment was not as high as between the speech rhythm tasks and reading attainment.

The body of research linking speech and non-speech rhythm to reading is important for this study as the findings indicate that sensitivity to non-speech rhythm and speech rhythm both play a significant role in reading development and while related, are independent of each other (Holliman, Wood, & Sheehy, 2010b). Holliman, Wood, and Sheehy (2010b) suggest that such findings may have practical implications for early childhood education:

The strong links found between receptive speech and non-speech rhythm, phonological awareness and reading in the current study may be consistent with the idea that developing children's sensitivity to speech and non-speech rhythm through rhythm games and poetry, for example, could have important implications for later reading acquisition. (p. 262)

In addition, research demonstrates that beat detection difficulties related to reading difficulties also continue into adulthood (Thomson, Fryer, Maltby, & Goswami, 2006). This supports an argument for the importance of developing beat awareness and competency to help struggling readers in the early years. Although a relationship is demonstrated between non-speech rhythm and elements of reading acquisition and between speech rhythm and reading, the research does not explain the relationships at this point in time. A variety of pathways by which non-speech rhythm and speech rhythm may positively influence reading development are proposed in the literature (Holliman, Wood, & Sheehy, 2010a, 2010b).

### **Summary of Related Doctoral Research**

Highlights from an exciting body of doctoral research indicate a strong though not causal link between music, rhythm, language, and reading development for early years

children. The related doctoral research summarized chronologically in Table 2 provides a range of results from no effect to strong and reliable positive effects as a consequence of music and rhythm learning. However, the processes that lead to positive effects for music, and the exact nature and extent of the relationship between music and measures of reading development are inconclusive.

Factors that affect results include the amount of instruction time, the quality of instruction, the kinds of music and movement approaches, the intensity and duration of focused music and movement instruction, the local context, experience, background and knowledge of learners, the learning environment, and the size of the population sample. Importantly, no research was found that suggests music and movement experiences produce negative effects for early years children.

Studies investigating the effects of music learning for early years students examined various dimensions of reading development. Kelly (1981) used a random assignment, mixed methods study to explore the effects of an Orff-based music program on reading readiness and basic reading skills for grade one children. Students in the experimental group received Orff-based music experiences for thirty minutes three times weekly over a six month period. Results indicated positive effects for attention, cooperation, self-concept, and the standardized reading measures. Kelly (1981) concluded that music had a demonstrated potential for improving reading on several measures of basic reading skills for grade one students.

Lu (1986) also investigated the effects of Orff and Kodaly-based music instruction for grade one students' reading skills using an experimental design. Lu's results were less conclusive compared to Kelly's (1981) findings. After three months of music

instruction, ninety minutes a week, both the experimental and control groups significantly improved on various measures of reading comprehension, vocabulary, and letter recognition. With no significant differences between groups, the gain in post-test scores was not able to be attributed to the music effects of the Orff and Kodaly-based program.

Another Kodaly-based music and reading study focused specifically on oral reading fluency for grade one students (N = 109). Using a quantitative, quasi-experimental design, Leguizamon (2010) concluded that after one year of Kodaly-based instruction, measures of oral reading fluency improved significantly for the experimental group. Oral reading fluency was also the focus of study for 105 African American grade two students. Januszka (2008) examined the effects of rap music in a grade two classroom using some of the same measures for oral reading fluency as used in the study presented in this thesis. The duration of Januszka's (2008) study was limited; students were given rap-based music experiences for only eight half-hour sessions and this short music experience did not significantly improve tests for Oral Reading Fluency and Nonsense Word Fluency portions of the Dynamic Indicators of Basic Literacy Skills Test. Tendall (2009) also reported no significant differences between experimental and control groups for tests of oral reading fluency and phonemic awareness following singing and movement experiences. The singing and movement learning occurred twice a week for seven weeks in kindergarten and grade one classrooms.

Moritz (2007) investigated the effects of rhythm for phonological awareness in kindergarten students using a longitudinal experimental design. One group of kindergarten students received daily music instruction while the other group received weekly music instruction. After one year, the group receiving daily music instruction had

significantly greater improvement than the group receiving weekly music in tests of phonemic and phonological segmentation tasks and tests of rhyming skills and rhythm production. Phonemic and phonological segmentation skills and rhyming were found to be significantly related to rhythm pattern production.

A positive association between rhythm and reading measures was also found for grade three and five students. Chamberlain (2003) analyzed measures of beat competency and reading and found a significant but moderate correlation between beat competency and reading measures. Horne (2002) similarly reported a significant, positive correlation between rhythm aptitude and reading comprehension scores for students in grades one, three, and four, following twenty-four weeks of thirty-minute weekly music learning experiences.

Bowles (2003) investigated the effects of a music program consisting of aural skills, music demonstrations, composing and notating activities, and performance for kindergarten to grade three students. The experimental group received music learning experiences twice-weekly for twelve weeks. After twelve weeks, there was no significant improvement for measures of reading achievement, although there was improvement for spatial temporal tasks and phonemic awareness measures.

Montgomery (1997) found no significant improvement in tests of picture-word recognition for kindergarten students (N = 145) following six weeks of movement and action songs designed to investigate the effect of locomotor movement activities and action songs for kindergarten children's melodic pitch discrimination and picture-word recognition. No correlation was discovered between melodic pitch discrimination and

picture-word recognition; however, the six week intervention did produce positive results for music listening skills.

Cardarelli (2003) found that the effects of instrumental music learning twice-weekly for five months had positive effects on tests for reading and mathematics as well as on attendance for grade three students in the experimental group. Lyons (2002) also reported positive effects for six reading achievement measures and for positive engagement measures in an experimental group of grade two students who received music lessons, pre-recorded on DVD, for half a semester.

Cochran (2008) found positive results for grade one students participating in classroom singing and chanting experiences as part of their regular classroom routine during one school year. Positive effects were noted for engagement, self-efficacy, finger-point reading, phonics, measures of reading achievement, and reading attitude. Music learning benefits appear to extend to second language learners. Lowe (1995) investigated the effects of music experiences in a French immersion grade two classroom for five fifteen minute periods a week. The music learning was designed to purposefully support and reinforce music and French language for English-speaking students. After eight weeks of lessons, Grade 2 second language learners in the experimental classroom experienced significant and positive results for all measures of music, French comprehension and French oral grammar tests.

Niamatali (1990) found rhythm strongly correlated with reading, vocabulary, visual memory, auditory discrimination, and quantitative and nonverbal intelligence for grade two students (N=34). Although rhythm was still correlated with reading and vocabulary in grade three (N=28), Niamatali (1990) suggested that the association

between rhythm and learning may decrease with age. Rubinson's (2010) study supports the claim that music experiences have the greatest impact the earlier the exposure (Hallam, 2010). Rubinson (2010) found moderate to strong correlations between tonal and rhythmic aptitude and early literacy skills for kindergarten students, as measured by the same tests for oral reading fluency used in the study presented in this thesis.

Although this wide range of music learning and teaching approaches produced varying results using several different dimensions of music and reading for early years students, some kind of a link between music and reading does seem to be indicated by this body of doctoral research. The nature of the connection between music, rhythm, and reading requires further study; however, these findings are promising for research that seeks to explore how early years learners, particularly those who may struggle with traditional approaches to print-based literacy, may benefit from integrated music and rhythm learning experiences.

Table 2. *Summary of Related Doctoral Research*

Author	Research Focus
Kelly, 1981	Orff-based music instruction, reading, and language arts (grade 1)
Lu, 1986	Orff and Kodaly-based music instruction and reading (grade 1)
Niamatali, 1990	Relationship between multiple variables including rhythm and reading (grades 2/3)
Lowe, 1995	Music and French language learning (grade 2)
Montgomery, 1997	Movement, action songs, melodic pitch discrimination, and picture-word recognition (kindergarten)
Horne, 2002	Rhythm pattern, rhythm aptitude and reading (grades 1-5)
Chamberlain, 2003	Beat competency and reading (grades 3, 5)
Bowles, 2003	Music and reading (K-grade 3)
Cardarelli, 2003	Instrumental music, reading, math, and attendance (grade 3)
Moritz, 2007	Rhythm and phonological awareness (kindergarten)
Cochran, 2008	Singing, chanting, and reading (grade 1)
Januszka, 2008	Rap and oral reading fluency (grade 2)
Lyons, 2008	Music and reading (grade 2)
Tendall, 2009	Singing, movement, and reading (K-grade 1)
Leguizamon, 2010	Kodaly-based music and reading fluency (grade 1)
Rubinson, 2010	Music and phonemic awareness (K)

\* \* \*

### **Harlem Air Shaft**

“Harlem Air Shaft” by Duke Ellington (1940/2009) served to mix and transmediate the sounds and feel of the literature review. Ellington’s use of the diverse complexities of human relations as the source of his musical material for “Harlem Air Shaft” inspired the synthesizing of the rich body of literature that was sifted and analyzed for this review. “Harlem Air Shaft” “captures the cacophonous interweaving of the collective sounds of an apartment building’s tenants” (Berliner, 1994, p. 487) as amplified and heard through the apartment building’s air shaft. Through the air shaft, Ellington hears the sounds of a radio, the janitor’s dogs, people praying, fighting, snoring, gossiping, and making love (Berliner, 1994).

Ellington takes the dissonances and harmonies of life and weaves them together into one work that is both sense-making and surprising in its musical twists. The many voices of the literature review have sounded to me throughout several years; they are finally brought together in a way that hopefully creates resonance between the diverse domains, captures interest, presents surprises, and meaningfully synthesizes the potential of the variables and disciplines under review.

### **Chapter Three: The Chart**

Methodology: as in a certain style of sketching, one draws a line again and again, layering over previous attempts. No one of the lines alone is either sufficient or accurate.

If one is lucky the shape will emerge from the accumulation of flawed attempts.

(Although it may not be the shape one had thought it would be, had hoped for.)

(Zwicky, 1992, p. 530)

#### **Introduction to the Methods**

Although jazz is known for its spontaneous improvisation, bands often use written arrangements or charts. The chart guides the sections of the band in their performance (Giddins & DeVaux, 2009a). The chart often consists of the key signature, time signature, melody, and chord symbols or block chords. The ensemble members use the chart as the basis for sketching and re-sketching their parts. Although the chart provides essential harmonic and rhythmic information to create the music, it is never possible to predict the final shape of the composition from the chart. The lines of this study have been sketched and re-drawn throughout this project. It is not the shape originally envisioned. Multimodal methods and a complexity inspired bricolage framework emerged from first attempts as described later in this thesis.

The guiding chart includes the information that was necessary to create the music of this study. The chart consists of the mixed methods rationale and design, the researcher's role, the participants, the context and setting, the qualitative data collection procedures, data analysis and evaluation, the quantitative data collection procedures, instrumentation, data analysis, validity, reliability, limitations, and the ethical concerns

and considerations. The sections of the band are presented in Chapter Four. The inspiration for the chart is found in the initial research questions.

The purpose of this research is to engage early years students in print and non-print literacies and to facilitate literacy learning through pathways other than traditional print text to provide meaningful, equitable, and inclusive learning opportunities for all students, including those who struggle with print symbol systems. The research is guided by these broad questions:

1. What is the potential for the semiotic resource of rhythm and pattern for early years children's engagement and meaning-making in print and non-print literacies?
2. What factors facilitate or inhibit the effectiveness of the semiotic resource of rhythm and pattern for supporting early years children's engagement and meaning-making from print and non-print literacies?
3. Is there a relationship between measures of early years reading competencies and rhythmic competencies?

### **Mixed Methods Rationale**

The purpose of the research and the nature of the questions require answering through mixed methods research. The complexities of a multiliteracies/multimodal approach to teaching and learning in nine classrooms requires multi-perspectival research, or what Kincheloe and Berry (2004) refer to as bricolage. The notion of using what is at hand was introduced as bricolage by Lévi-Strauss (1966) and developed by Denzin and Lincoln (2000) to describe the multiple methodological and pragmatic practices of qualitative research. The concept has been further developed as a means of providing new insight into complex phenomena (Kincheloe & Berry, 2004) and as a means of sense-

making (Duymedjian & Ruling, 2010). It is in this spirit that bricolage is used in this study as presented in Chapter Ten.

Denzin & Lincoln (2000) offer the concepts of montage, pentimento, and jazz to illustrate the notion of qualitative researcher as bricoleur: “Montage and pentimento, like jazz, which is improvisation, create the sense that images, sounds, and understandings are blending together, overlapping, forming a composite, a new creation. The images seem to shape and define one another...” (p. 4). The shaping and reshaping of data images, sounds, and understandings moved my research from notions of triangulation to those of crystallization (Richardson, 2000; Richardson & St. Pierre, 2005). The concept of crystallization is appropriate for research that seeks a variety, rather than a triangularity of angles and perspectives of the data sources. Crystallization extends triangulation to become a “simultaneous display of multiple, refracted realities” and tell “the same tale from different points of view” (Denzin & Lincoln, 2005, p. 6).

In mixed methods approaches, divergent views are valued for the opportunities to explore in depth the multiple perspectives, voices, and complexities of the research (Tashakkori & Teddlie, 2003a). Through mixed methods, I am able to engage in multiperspectival research that Kincheloe (2004) describes as a “double ontology of complexity” (p. 74). I can study the “complexity of objects of inquiry and their being-in-the-world” as well as the “nature of the social construction of human subjectivity, the production of human ‘being’” (p. 74).

A multiple method, multi-method, and mixed model design was chosen because the purposes of the study can be located along a wide-ranging continuum of research typology and divergent points of view that include basic and applied research, formative

and summative evaluation, and action-based research (Patton, 2002). Mixed methods are used to contribute to knowledge and theory of learning related to music, reading, and multimodal learning. I hoped to illuminate a concern for children excluded from learning in traditional classroom settings. I wished to address a specific problem of finding ways to help children who struggle with print and/or rhythm literacies within the context of an inclusive and democratic classroom of learners. I attempted to determine effectiveness of an innovation using rhythm and reading for both print and non-print literacies and I sought ways to improve the innovation based on its use in different classroom contexts.

If the method follows the questions and purpose as Patton declares (2002), then a singular methodological approach would only provide partial answers to the questions and address only fragments of my research purposes. A range of research methods and approaches is needed to fully answer the research questions. Kincheloe and Berry (2004) maintain that bricolage can deploy both traditional and postmodern research approaches. I take up the challenge of this “epistemological paradox” (Berry, 2004, p. 107) to engage in research bricolage to answer my research questions and address research goals and purposes with the greatest possible depth, breadth, and rigour.

Fierce battles have been fought over the issues of linking quantitative and qualitative data (Miles & Huberman, 1994). For some, the issue is not whether quantitative and qualitative methods can be linked, but whether it is appropriate to do so, and how and why it will be done (Miles & Huberman, 1994). Mixed methods can be used to confirm and corroborate each methodological approach and provide new insights and possibilities for discovering the unexpected (Miles & Huberman, 1994). Different

research traditions are combined in unique ways to simultaneously answer confirmatory and exploratory questions and both verify and generate theory.

I began with mixed quantitative and qualitative methods used to triangulate and validate my findings and journeyed to a place of bricolage as research, examining data from multiple angles of external and internal refraction. Through traversing the co-mingled paths of data analysis, reading, writing, interpretation, self-reflection and re-visioning, I moved through quantitative methods, action research/design research, grounded theory, semiotic and multimodal data analysis and finally into the domain of complexity (Cilliers, 1998, 2010; Davis & Sumara, 2006; Page, 2011; Saari, 2011) and autoethnography (Ellis, 1999). Chapters Three and Four present all these methods with the exception of the autoethnographic thesis which will be shared in another form.

I take the stance of bricoleur (Brady & Loonam, 2010; Denzin and Lincoln, 2000; Kincheloe, 2005; Kincheloe & Berry, 2004) in designing methodological strategies for this study. From its mixed methods beginnings, this research has changed and taken on new forms “as different tools, methods, and techniques of representation and interpretation” (Denzin & Lincoln, 2000, p. 4) have been added to deepen and enrich understanding, interpretation and analysis of the research phenomenon. This journey was rooted in and begins with traditional understandings of research methodology.

### **Mixed Methods Design**

The term mixed methods was popularized by Tashakkori and Teddlie (1998) and is now commonly understood to be “a research design that uses both quantitative and qualitative data to answer a particular question or set of questions” (Hesse-Biber, 2010, p. 3). Mixed methods are described as a third methodological movement with a unique

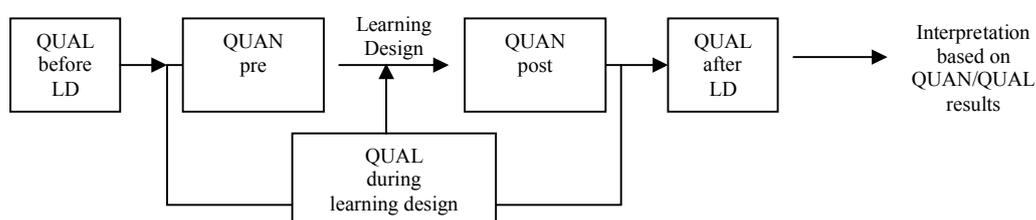
methodological orientation and distinctive vocabulary and techniques (Tashakkori & Teddlie, 2003a). Mixed methods research involves collecting and analyzing closed-ended quantitative data and open-ended qualitative information (Creswell & Plano Clark, 2007).

This research can also be described as a multiple method, multi-method, and mixed model design (Tashakkori & Teddlie, 2003). It is a multiple method design because it uses “more than one method or more than one world-view” (Teddlie & Tashakkori, 2003, p. 11). It is multi-method because the mixing of methods results from “combining two or more qualitative methods in a single research study (such as in-depth interviewing and participant observation) [and] or by using two or more quantitative methods (such as a survey and experiment) in a single research study” (Hesse-Biber, 2010, p. 3). It can be described as a mixed model design because different research questions are rooted in different paradigms mixed throughout the research in various stages of the study (Tashakkori & Teddlie, 2003).

The choice of mixed methods design is complicated by the numerous and varied typologies for mixed methods (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003a). Choice of typology is often based on the timing (concurrent or sequential) and weighting (equal or unequal) of the qualitative and quantitative data and how and when the data are mixed within the research design (Creswell & Plano Clark, 2007). I adapt two design choices as appropriate to this research: the concurrent Triangulation Design-multilevel model, and the concurrent Embedded experimental model design (Creswell & Plano Clark, 2007).

When different research questions require different types of data as in my study, an embedded mixed methods design is appropriate (Creswell & Plano Clark, 2007). In an

embedded design, the data sets and their results can be reported separately and the mixing then occurs at the discussion level. It is a useful design for experimental or correlational research that examines processes of an intervention or innovation (Creswell & Plano Clark, 2007). An embedded experimental model is adapted from Creswell and Plano Clark (2007) and shown in Figure 1 (Qual= qualitative; QUAN= quantitative; LD= learning design):



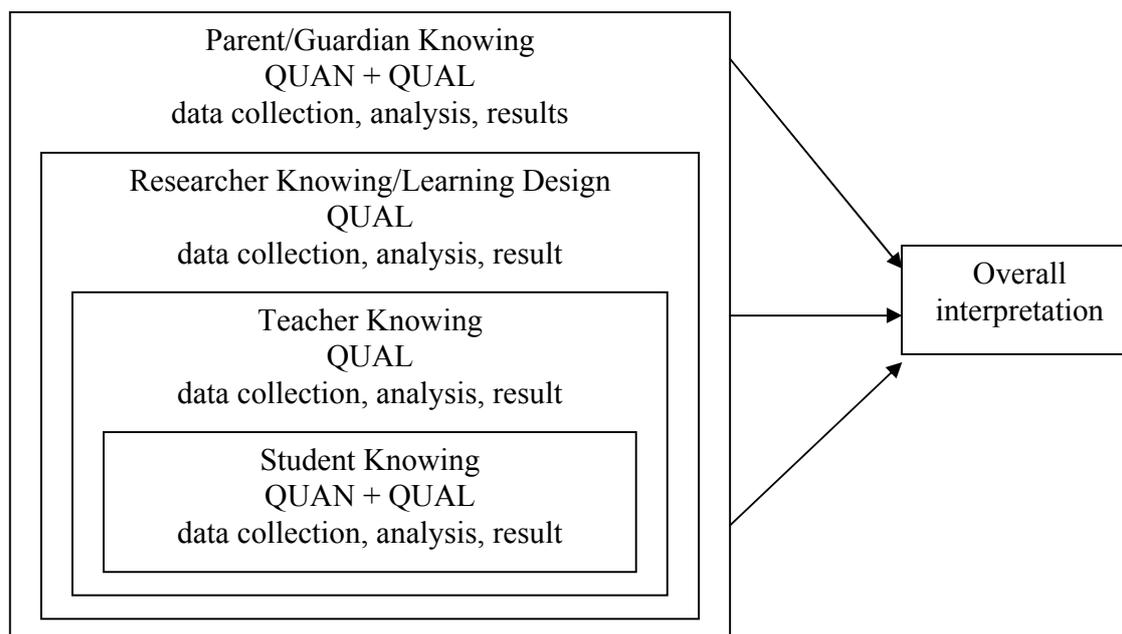
*Figure 1.* Adapted embedded mixed methods design (Creswell & Plano Clark, 2007).

Creswell and Plano Clark (2007) state that the key means of distinguishing the embedded design from other mixed method designs is “whether the secondary data type is playing a supplemental role within a design based on the other data type” (p. 69). In this study, weighting of data is not a defining feature. One data set does not play a supporting role within the design. Both data sets are equally important in their role of answering different research questions. The embedded design model conveys the linear direction of the study and the timing of the methods used in this study but it does not convey the non-linear inter-relationships between the different data sources. These relationships can be illustrated using a nested model adapted from a variant of triangulation design (Creswell & Plano Clark, 2007).

Triangulation Design is one of the most common approaches to mixed methods and used to investigate the same phenomenon with different but complementary data to

corroborate findings and offset biases inherent in both methods (Creswell & Plano Clark, 2007; Greene, Caracelli, & Graham, 1989; Morse, 1991). Qualitative and quantitative methods are weighted equally and collected concurrently but separately, within the same phase or timeframe of research (Creswell & Plano Clark, 2007). There are four variants of triangulation design: convergence model, transformation model, validating quantitative data model, and multilevel model (Creswell & Plano Clark, 2007).

The triangulation multilevel model as adapted best characterizes this research (Figure 2). This is the choice of design if “different types of data are collected to represent different levels of analysis within a system, with the intent of forming an overall interpretation of the system” (Creswell & Plano Clark, 2007, p. 84). In this research, quantitative data are collected at the student and parent level, and qualitative data are collected at the student, teacher, researcher, learning design, and parent/guardian level. The triangulation multilevel design is intended to converge two different data sets in order to investigate the same phenomenon or research question (Creswell & Plano Clark, 2007). My intent was to converge qualitative and quantitative data sets where appropriate (research questions 1 and 2) and to keep the data sets separate where appropriate (research question 3).



*Figure 2.* Adapted multilevel triangulation design (Creswell & Plano Clark, 2007).

I extend the multilevel model to not only indicate different levels of analysis within the research system; but to also illuminate the dynamics and inter-relationships between data sources. For example, quantitative and qualitative data from students generated by their subjective understanding are affected by relationships within the entire system, including interactions and relationships with teachers, the learning design, the researcher, and parents. Situating data sources and ways of knowing within the nested model emphasizes the complexities of individuals and collectives and how their structures and behaviours can be affected (Davis & Sumara, 2006).

The interactions and relationships of the components in the mixed methods model of this research suggest “a network or web rather than a linear or cyclic sequence” (Maxwell & Loomis, 2003, p. 243). Maxwell and Loomis (2003) characterize mixed methods research as an interactive systems approach when it is used to integrate multiple

perspectives. They support mixing the research paradigms in creative ways as long as there is not a mismatch between the conceptual framework and the methods. Rather than constructing a framework based on weighting or timing of methods, the key issue is whether the nature of the theories that makes up the conceptual framework, matches and appropriately informs the various methods chosen. The conceptual framework presented in Chapter One supports the use of mixed methods presented here.

Hall and Howard (2008) extend the fusion of typological and systemic perspectives with notions of synergy. They adopt the concept of synergy as a core principle of their research and define synergy as two or more options interacting “so that their combined effect is greater than the sum of their individual effects” (p. 250-251). “Greater” is interpreted as “more than” rather than “superior to” in their research (Hall & Howard, 2008). A synergistic view provides diverse and multiple ways of looking at the whole (Corning, 2003).

I take a similar stance when viewing the qualitative and quantitative approaches in this research design. The mixed methods framework is not defined by typological issues of qualitative or quantitative weight, priority, or timing. The mixed methods approach is regarded from the perspective of a multiperspectival, interactive network of methods used in different ways and for different purposes as deemed pragmatic. Qualitative and quantitative methods are used as appropriate for each research question and phase of the research. They overlap and inform each other and interact in ways that generate resonance and synergy.

The mixed methods are used to begin construction of a bricolage research framework that is given structural and conceptual direction by concurrent triangulation

multilevel mixed methods and embedded design models (Creswell & Plano Clark, 2007). The research is mapped conceptually using an interactive, systems approach. The options of the mixed methods research create the potential for synergy and resonance during data analysis so that the interacting of the data and diverse and multiple ways of looking at the whole may produce understandings not predicted or possible by one or even two methods on their own. The final mixed methods model is represented in Figure 3.

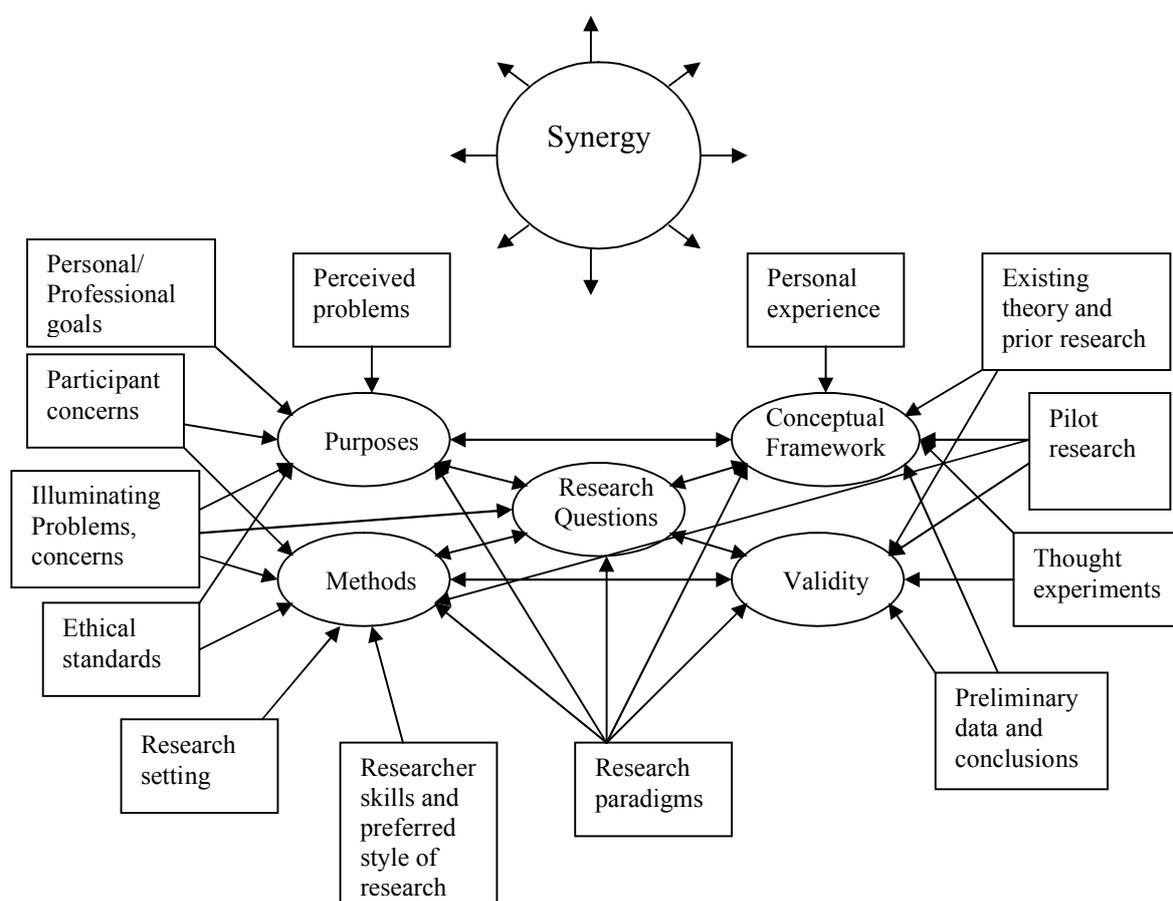


Figure 3. Mixed methods final model for research design.

### **Researcher Role**

In my research, I assumed the role of teacher-researcher from the stance of an outsider to the schools. I established the design research/action research agenda, assumed responsibility for decision-making, designed and taught the music and rhythm innovation, and implemented problem-solving for the cycles of research activities. Collaborating teachers were invited to participate through teacher reflections, observations, and participation in intervention activities. Feedback from collaborating teachers, students, and other adults in the classrooms shaped the iterations of the research design; however, teachers were not engaged jointly in the planning or analysis.

I have been teaching in public schools, college, and university settings for over twenty-five years, primarily in the field of music and the arts. I am an early years Orff specialist but I incorporate a variety of approaches to music education in my teaching. I have taught as an early years classroom teacher and in all grades as a music specialist. I bring a strong belief in the importance of embodied music and arts experiences for all learners as an essential way of being in and making meaning of the world. I advocate interdisciplinary meaning-making through the arts and have explored ways that arts and music experiences can illuminate, extend, and transform learning for students throughout my career.

I have prepared and taught undergraduate courses that examine the provincial Music and English Language Arts curriculum frameworks. I created the research learning design with those outcomes and disciplinary tools and language in mind. My role as instructor at a University Faculty of Education brought me into constant contact with the current literature on education research and practice. Readings from course texts used

in undergraduate and graduate coursework informed development of the research design as did beliefs and understandings of constructivist learning theories. Observation and assessment guides and testing used in this study were informed by current literature and by observation, assessment, and evaluation strategies developed over my teaching career. Experiences in scoring divisional standards tests for English Language Arts supported the task of scoring the tests for oral reading rate used in this research.

### **Participants**

The participants in this study were 169 early years students ranging from grades one to three, their parents or guardians, and nine classroom teachers in nine classrooms across four English schools and two neighboring school divisions in a large urban city. I was a participant in the role of teacher-researcher as described above. There were three grade one classrooms, two grade two classrooms, one grade three classroom, one grade one/two multiage classroom, and two grades one to three multiage classrooms. Each school had a control and experimental classroom assigned by collaborating teachers; one school had one control and two experimental classrooms.

When permission to carry out the study was granted by the Education and Nursing Research and Ethics Board of the local university on January 23, 2007 (Appendix Q), applications to undertake research were made to several school divisions within and immediately outside the city in which the proposed research was taking place. When school divisions granted permissions, letters of information and letters requesting consent were sent to superintendents. Superintendents identified interested schools, and letters of information and invitation to participate in the study were sent out to those school

principals. In several cases, school principals had already heard that I was planning research and contacted me directly requesting to participate.

The response was more positive than anticipated and an amendment was made to the original ethics application requesting an increase in the number of classrooms involved in the study from the three to six classrooms originally proposed. The amendment was granted and the first nine classrooms that responded to the invitation to participate in the study were accepted.

### **Teachers**

All collaborating teachers were volunteers who requested to be a part of the study and signed forms of consent. There were two male teachers and seven female teachers. All teachers shared beliefs in constructivist theories about learning and in inclusive teaching and learning to support all learners. All classroom teachers voiced an appreciation and valuing of multiliteracy approaches to teaching and learning including the arts and music. One teacher (experimental classroom) began her career as a music and Orff specialist before moving into early years classrooms and one teacher (control classroom) was teaching halftime in a general classroom and halftime in the music classroom in her school. Beliefs and values of collaborating teachers are further elaborated in the grounded theory results of Chapter Six. Collaborating teachers' years of experience are listed in Table 3. All names are pseudonyms.

Table 3. *Collaborating Teachers' Years of Experience and Classroom Assignment*

Collaborating Teacher (Pseudonym assigned)	Classroom Assignment	Years of Teaching Experience
Karen	Grade 3: Control Classroom A	4 years classroom and music specialist
Kristen	Grade 2: Experimental Classroom B	First year of teaching
Kendra	Grade 1: Experimental Classroom C	12 years of teaching including one year as a music specialist
Frances	Grade 1: Control Classroom D	8 years early years classroom teacher
Leslie	Grades 1-3 multiage: Control Classroom E	8 years
Rosemary	Grade 1: Experimental Classroom F	First year of teaching
Tony	Grade 1-3 multiage: Experimental Classroom G	2 years
Ezra	Grade 2: Control Classroom H	3 years
Tracy	Grade 1-2 multiage: Experimental Classroom I	2 years

### **Students and Parent/Guardians**

Students were ethnically and culturally diverse and all classrooms, with one exception, included learners for whom English was an additional language. Learners in all classrooms were diverse and teachers identified students with learning and reading difficulties in each classroom. There were 78 females, 91 males, 39 six year olds, 68 seven year olds, 44 eight year olds, and 18 nine year olds. Letters of information and requesting consent were sent to student homes by each classroom teacher before the study began. Parent/guardians were requested to participate by filling out pre- and post-study surveys designed to provide additional dimensions for understanding and answering research questions one and two.

Once parent/guardians granted permission to participate in the study, classroom teachers read and gave letters of information and consent to students for signing. Participation rate for parent/guardians and classroom students was over 90%. Although the return rate for consent forms was high, there were students whose families did not give permission for their data to be used in the study. These students were allowed to participate in study experiences but were not allowed to participate in pre- and post-tests, focus groups, or be video or audio-taped.

### **Context and Setting**

The study took place in four different schools in two ethnically and economically diverse city school divisions. One school was located in Division 1, a small school division and three schools were located in Division 2, a large school division. All schools included students from nursery to grade six with the exception of Emily Murphy, which was a K-8 school. Enrollment figures by class are listed as part of quantitative descriptive statistics in Chapter Nine. Operating fund costs per pupil were \$8,345.00 for Division 1 and \$9,379.00 for Division 2 (Manitoba Education, Citizenship and Youth, 2008a). Populations for divisions and schools are presented in Table 4. The number of schools in each division is shown in Table 5. All school names are pseudonyms.

Table 4. *Division and School Enrollment Figures 2006-2007*

School and Division (Pseudonyms assigned)	Enrollment Figures: Number of Students 2006-2007
Division 1 (Includes Emily Murphy School)	2, 983
Division 2 (Includes John Dewey, Jean Vanier, and Portia White)	31,708
Emily Murphy	402
John Dewey	177
Jean Vanier	276
Portia White	275

Table 5. *Total Number of Schools within Each Division*

School Division	Total Number of Schools	Total Number of Elementary Schools	Total Number of Secondary Schools
Division 1	20	17	3
Division 2	82	75	27

Local neighborhood demographic statistics for each school were compiled from the Canada Census 2006 Community profiles (Statistics Canada, 2010). The Profiles Coordinator for the city where the research was undertaken collaborated in an analysis of the Canada Census 2006 statistics for the local neighborhoods as defined by official neighborhood boundaries used by the city. This demographic neighbourhood information is included in Table 6. Languages other than English include the three most frequently spoken languages other than English. Education includes statistics for numbers of people with and without certificate, diploma, degree, or certificate (D = diploma, degree, or certificate; No = no diploma, degree, or certificate). Demographic information for each school neighbourhood indicates diverse communities with a range of income and education levels across communities.

Table 6. *School Neighborhood Demographic Statistics 2006*

School	Neighbourhood Population: Numbers of Residents	% Visible Minorities	Languages other than English	Aboriginal Identity	Education	Average Income in dollars
Emily Murphy	13,335	40.3	Tagalog, Punjabi, Portuguese	10.1	D: 71.3 No: 28.7	60, 599
John Dewey	2, 705	6.8	German, Polish, Other	2.6	D: 88.1 No:11.7	110, 009
Jean Vanier	2, 565	5.1	German, Ukrainian, Polish	20.0	D: 73.0 No: 26.0	54, 041
Portia White	6, 220	22.2	Tagalog, Ukranian, Cree	44.5	D: 53.4 No: 46.4	32, 883

School divisions provided statistics of newcomer families and students for whom English was an additional language for the 2006-07 school year. Each division reports funded numbers of students for whom English is an additional language; however, that figure does not represent all the newcomer families to the schools; it represents only those who qualify for funding to receive English as an additional programming. For example, Division 1 reported a total of 95 students funded for English as an additional language programming; however, other division statistics indicated there were 74 newcomers in attendance at Emily Murphy School. Divisional statistics indicated that two students for whom English was an additional language were in each of the control and experimental classrooms. Division 2 only reported the number of students funded for English as an additional language programming (EAL) and those statistics are represented in Table 7.

Table 7. *English Speaking and Students Funded for EAL in Division 2*

School	English speaking students	Students funded for EAL
John Dewey	87.7	5.8
Jean Vanier	80.0	2.9
Portia White	70.9	5.8

### **School and Classroom Setting**

The study was carried out in the homeroom classrooms of each participating school. No effort was made to match classrooms and schools or to select classrooms and schools on any criteria other than the first nine classrooms to accept the invitation to participate. Nonetheless, schools and classrooms were very similar in philosophy, values, and pedagogy as indicated in Chapter Six interview data with principals, teachers, and by observations and data analysis.

School websites, newsletters, handbooks, posters, mission statements, mottos, codes of conduct, statistics, and other school artifacts and documentation were analyzed for commonalities and differences. No strong differences between schools and classrooms were found, although Portia White School emphasized arts-based learning and technology to a greater extent on their website and in newsletters as compared to other schools. Arts-based programming was observed in all schools and supported by all participating administrative and teaching staff. Strong common beliefs and values were found between the four schools and nine classrooms. Terminology used in documentation, artifacts and websites that was common to all schools included the following:

Safe	Nurturing	Engaging
Collaborative	Diverse	Inclusive
Community	Variety	Cooperative
Caring	Potential	Families
Self-esteem	Friendly	Positive
Believe	Fun	Learning

All schools had music programs taught by a music specialist who incorporated elements of the Orff approach to music education. Music rooms in all schools were observed to have barred instruments, nonpitched percussion instruments, and space for movement. All schools received music education for a minimum of thirty minutes two to three times a week. All schools featured a wide variety of programming and extra-curricular activities and all schools had active parent councils and were community oriented. All schools housed daycare programs within the schools and all schools were well-established in their communities.

A distinct area in each classroom was consistently used for both control and experimental learning experiences. In all classrooms I sat in a chair in front of or near to a white board and the students sat in a large group, rows, or in a circle on the floor in front of me, depending on the usual practices of the particular classroom. All teachers participated in the learning experiences although in different ways. Some joined the circle or group of students and some sat behind the students. Some teachers participated in every aspect of the learning experience, others selected aspects of the learning experience to participate in. For example, some teachers participated in the nonlocomotor activities and not in the locomotor activities, and others focused more on supervising than playing the games or using instruments or body percussion.

Classroom setting and context were analyzed using texts in current use at that time for Faculty of Education undergraduate courses at a local University. For example, the text *The Essentials of Teaching Children to Read* (Reutzel & Cooter, 2005) was the course text for an English Language Arts curriculum and instruction course in 2006-2007. Materials and approaches suggested in this text were analyzed and classrooms were

observed for ways that these suggested practices and pedagogy were or were not realized. All classrooms without exception utilized best practices teaching approaches and pedagogies suggested by this text and by the provincial language arts curriculum framework of outcomes. All classrooms were observed to have rich sources of literacy using a variety of texts and media. All classrooms had special reading areas such as reading tents and reading corners.

Practices such as storytelling, guided reading, book buddies, discussion webs, word maps, word walls, poetry, songs, themed units, and a rich variety of texts (Reutzel & Cooter, 2005) were in evidence in all classrooms. All schools used elements of inquiry-based approaches to teaching and learning, although a greater focus on inquiry-based approaches was observed in John Dewey, Portia White, and Jean Vanier schools.

All school and classroom curricular programming clearly integrated the five general learning outcomes found in the Kindergarten to Grade Four English Language Arts provincial curriculum framework of outcomes. Evidence that students were listening, speaking, reading, writing, viewing, and representing to: explore thoughts, ideas, feelings, experiences; comprehend and respond personally and critically to oral, literary, and media texts; manage ideas and information; enhance the clarity and artistry of communication; and to celebrate and build community (Manitoba Education and Training, 1996) was found on classroom walls, in artifacts and documentation, heard in conversations and interviews, and observed in student work.

### **Data Collection Overview**

Data collection began in March 2007 for Emily Murphy School and in April 2007 for the other three schools. Because division 1 granted research permissions before

Division 2, the Education and Nursing Research and Ethics Board of the local University was consulted and gave permission to begin the study in Emily Murphy School ahead of the other three schools. Data collection was completed in all schools by June 29, 2007.

Data sources consisted of teacher pre-and post-interviews, student pre-and post-tests, the learning design implementation, student focus groups and parent/guardian pre-and post-surveys. The pre-and post-tests and learning design were conducted over a period of twelve weeks. The learning design consisted of twenty-five visits to each control and experimental classroom over a ten to eleven week period in each school.

When superintendent consents were obtained, I visited the schools with letters of information and letters requesting consent from principals, collaborating teachers, parent/guardians, and students. All letters of consent are found in Appendices A-D. Once principals and teachers had signed letters of consent, I began the pre-study visits and interviews with collaborating teachers. I met with school administration and teachers to create a schedule aimed at visiting each school every second day for twenty minutes each visit. Schools were on six day cycles so learning experiences occurred two to three times a week depending on the cycle and the special events happening in the school. Where classes were interrupted for fire drills, assemblies, field trips etc., the missed time was made up on another occasion.

Teachers had a variety of strategies for ensuring a high rate of return and consent (over 90% of students and families). In one school the letters were handed out at parent-teacher interviews. In another school, school staff went to the families' homes to hand-deliver the letters. Other schools had similar focused strategies for ensuring parent/guardians and students received the letters of information and consent. When the

letters of consent from parent/guardians and students were signed and received from participating students and families, I began pre-testing. With the exception of Emily Murphy School, pre-testing was carried out during the week of April 16-20. Because of absences and time constraints, some testing was also carried out at the beginning of the following week. I began the learning design experiences as soon as a classroom finished their pre-testing.

The rhythm and reading learning design experiences for the five experimental classrooms were implemented in an iterative cycle of data collection and analysis over the next ten to eleven weeks as described in the following chapter. The rhythm and reading experiences used an Orff-based approach that incorporated speech, movement, small nonpitched percussion instruments, song, listening, improvisation, and composition. Focused rhythmic teaching approaches were adapted from Montgomery (2002), the course text used for music education at a local university Faculty of Education. Focused oral reading approaches were adapted in part from Reutezel and Cooter (2005) a course text used for English language arts at the same faculty and university. Oral reading approaches were also adapted from Rasinski (2003). Teaching approaches included direct teaching of rhythm and language tools and processes and interactive learning experiences where students created integrated speech and rhythm activities using the tools of rhythm and language.

Members of the control group participated in listening to and singing song storybooks (Appendix E) connected to classroom curricular materials and supported by the literature (Barclay & Walwer, 1992). Control groups received the same amount of instructional time as the experimental groups. I visited each control group twenty-five

times for twenty minutes each visit, two to three times a week. I sat on a chair in front of the class who sat on the floor in front of me. I held the book so the entire class could follow the illustrations and text and invited them to sing along with me. I used song storybooks with well-known children's songs and I composed or improvised melodies to storybooks that seemed appropriate to realize through song and that were simple enough for students to join in.

Post-testing, student focus groups, and collaborating teacher interviews occurred in the final week of the study and were completed on June 29, 2007. Post-study parent/guardian surveys continued to be delivered or mailed to the university for me throughout the next two months. One was received six months later. Students in experimental classrooms were given a thank you gift in the form of a booklet of the pieces that were used in the study and common to all classrooms (Appendix F). Students from all classrooms were given a letter of thanks and a certificate of appreciation for participating in the study (See Appendix G). Parent/guardians were thanked in the letter that accompanied the post-study survey. Principals were given letters and cards of thanks and collaborating teachers were given thank you cards and gifts as approved in the Ethics application.

Email correspondence continued over the next year with teachers in order to confirm interview analysis and to determine any lasting effects of the research learning design for teachers and students in the year following the study. Qualitative and quantitative data analysis continued throughout the year following the research design by researcher, second readers, critical friends, and by university statistical advisory services.

Preliminary findings were reported at my annual PhD advisory committee meeting and shared at conferences in May and June 2008. The subsequent year, qualitative and quantitative data were re-analyzed by additional second readers and new members of the university statistical advisory service using additional data analysis methods and perspectives as described in later chapters, and publicly shared at symposiums and local and national conferences. Synthesizing of new data and writing took one more year to complete.

### **Qualitative Data Collection**

**Phenomenological data.** A range of qualitative techniques and tools were used to gather and analyze data in this study. Operational definitions for qualitative tools such as interviews and field notes were taken from Bogdan and Biklen (2003). Lankshear and Knobel (2004) describe a qualitative data collection plan to assist in relating data sources to the variables and research questions of the study. Their plan has been adapted for this study and is found in Appendix H.

The study was set in motion with phenomenological data gathering to understand the shared, lived experiences of students and teachers learning and teaching together in the schools and classrooms (Creswell, 2007). Phenomenological data were also important to understand how the collaborating teachers viewed the phenomenon of reading and music through their past experiences and in present practices.

Mishra and Girod (2006) suggest that preliminary data gathering includes a physical description of the setting, location, demographics, facilities, programming, school and classroom philosophies, teaching approaches, attitudes, administrative supports, and parental supports. Phenomenological observations, artifacts, and statistics

contributed to thick descriptions to elaborate the study context and setting as described above. The initial data collection helped me shape the first stages of the learning design. At the same time I was able to fully inform teachers and principals of the parameters of the study and to discuss with administration and teachers how best to begin implementation of experiences in rhythm and pattern.

I continued phenomenological data gathering throughout the study. Observations were made during the learning design and in reflection after each learning experience. I carried a lesson plan and field notes binder with me to every class that included various observation tools presented below. I observed the classes as carefully as I was able during my teaching of the learning design and was supported in this by many years of simultaneous teaching, assessing, and recording. As a music educator, it was my common practice to record data while I taught, so I naturally assumed those practices for this study.

I recorded student and collaborating teacher conversations, comments and observations, emails, questions, concerns, successes, challenges, and responses to activities. I included participant interactions and engagement with the learning experiences. I documented content and procedural descriptions of the activities for each class. I asked teachers to provide feedback on ways in which the learning design goals were facilitated or hindered and I recorded responses in order to guide and revise instructional strategies. Midway through the study I presented each teacher with a journal and invited them to record their reflections, questions, and concerns regarding the study experiences for sharing with me. In addition, student artifacts were regularly collected in the form of written work, music compositions, drawings, and stories.

Carrying out research in nine classrooms and four schools made for a tight schedule, so there were many times I recorded while walking from one classroom to another or while I was driving from one school to the next. I carried a tape recorder with me that I used for such occasions, as well as for occasionally taping the learning experiences in the classroom. I had ethics permission and parent/guardian consent to audio and videotape although videotape presented challenges for both teaching and taping. Classroom teachers offered to tape classes but the use of the video camera seemed to result in a less relaxed and natural classroom environment so videotaping procedures were used mainly in the final two weeks of the study. Field note data were used for grounded theory analysis, semiotic and multimodal data analysis, and informed the research design journal planning and analysis.

In addition to the field notes binder, I kept two additional journals. The research design journal was used to record my reflections on the day's learning experiences after reading through field notes and listening to the tapes. This journal included the questions and concerns I posed regarding the day's experiences, and where I worked out possible solutions and documented revisions and edits to the learning design. Each night, after reading the field notes, I recorded my questions and thoughts for the day and then inevitably, reached for one of the many literature sources I had gathered.

Further reading would usually generate either clarity or additional questions, again recorded in the learning design journal or in a separate journal I kept for recording ideas and thoughts generated from discourse or readings. In the first phase of the study I carefully drew up plans each night for the next day's teaching informed by the reading and reflection of field notes and the learning design journal and placed the next day's plan

in the field notes binder. During phase two and more frequently in phase three, the plans became less detailed and took the form of outlines that were filled in during the learning experiences based on the emergent direction taken by the students in the classroom for that day. Excerpts from the field notes binder and the learning design journal are included in the results chapters.

**Observation tools.** Waxman and Padrón (2004) suggest triangulation procedures and multiple perspectives when observing classrooms in order to capture and understand the complex processes and nuances of classrooms. A variety of observation tools were created in order to examine multiple perspectives and to focus observations on motivation and engagement, student learning, teaching effectiveness, the research variables, and the classroom learning activities as a unit of analysis. Strategies for focused observations of children for the purposes of assessment and planning were drawn from Gronlund and James (2005). Observation tools were kept in the field notes and lesson plan binder. They were used where appropriate, depending on the focus that was decided for the particular learning experience. Guiding questions for observation helped create focus, purpose and meaning for observations and are shown in Table 8. Guiding questions were adapted from Borich (1999) and Gronlund and James (2005) unless otherwise indicated.

Table 8. *Guiding Questions for Classroom Observations*

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 Criteria
 

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1. What are the classroom characteristics? Physical, social, etc.
  2. What are the goals for observation: who, what, why?
  3. What are the variables for observation? (Croll, 1986)
  4. When the activity is the unit of analysis what evidence of shifts or changes in participation and why? What is the activity's purpose? What evidence it is achieved? What are the features of the activity? (Rivera & Tharp, 2004).
  3. What is the learning climate: relaxed/tense, competitive/cooperative, dependent/independent, nurturing/unsupportive, positive/negative, encouraging/critical, teacher centered/student centered?
  3. What is the physical organization? Does it promote or prevent student interaction and cohesion?
  4. What elements affect classroom management? Are procedures and expectations clearly communicated? Are procedures meaningful or arbitrary? Consistent or inconsistent approaches? Are procedures and materials well-organized and smoothly transitioned?
  5. What kinds of instructional variety and approaches seem effective for student learning in print and non-print literacies?
  6. What are the signs of student success for learning in print and non-print literacies?
  8. Do strategies produce surface learning or deep learning? What evidence? (Montgomery, 2002).
  9. What is the body language saying? (Posture, gesture, facial expression, eye contact, body movement) (Wragg, 1994).
  10. What comments are heard from students and teachers?
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Engagement, motivation, oral reading fluency, and rhythm performance

observation tools (Tables 9-12) were developed from the literature to investigate the variables identified in the research questions, conceptual framework, and pilot study. The protocol tools were checked off either during or after learning events. Frequency counts were not tallied as they were used to evaluate the variables for the purposes of revising the learning design; they were only approximate and general representations of criteria for the particular circumstances and context. It wasn't possible to ensure that every student

was observed on each criteria and very often the checklist would be filled out by memory after the class. It was often more expedient to check off only those behaviours and criteria that were not observed by the classroom unit rather than behavior or criteria that were observed. The learning engagement and motivation observation tool is adapted from Baker, Dreher, and Guthrie (2000); Guthrie et al. (2006); Stipek (2002, p. 252), and Wigfield and Guthrie (1997), authorities on student engagement and motivation.

Table 9. *Engagement and Motivation Assessment Tool*

Criteria
1. Attentive and focused on learning activity until completion.
3. Actively and willingly participates.
4. Begins learning activity immediately.
5. Follows directions for activity.
6. Persists and does not give up when learning experiences become challenging.
7. Volunteers answers in class.
8. Asks for help when it is needed.
9. Is not upset by initial errors or difficulties.
10. Enjoys challenging activities.
12. Asks questions to expand knowledge beyond immediate learning experience.
13. Is reluctant to stop working on tasks when highly engaged.
14. Engages in learning activities after work is completed.
15. Appears happy, proud, enthusiastic, and eager.
16. Strives to improve skills, even when performing well relative to classmates.
17. Initiates challenging learning activities on own.
18. Intrinsically motivated by involvement, interest, curiosity, and challenge (Wigfield & Guthrie, 1997)
19. Is absorbed and engrossed in activities (Baker, Dreher, & Guthrie, 2000).
20. Is confident in abilities to read (Wigfield & Guthrie, 1997).

The oral reading fluency observation tools (Table 10-11) were adapted from authoritative pedagogical models and strategies for teaching oral reading fluency and from oral reading fluency assessment criteria suggested by Allington (2001), Rasinski (2003), Reutzel and Cooter (2005), Farstrup and Samuels (2002), and Samuels and Farstrup (2006). The oral reading fluency activity assessment tool (Table 10) and oral reading fluency tool (Table 11) were used to assess learning events and revise and plan for subsequent learning events.

Table 10. *ORF Activity Assessment Tool*

Assessment Criteria	Activity
1. Good expressive, oral reading is modeled for students.	
2. Appropriate scaffolding and oral reading support.	
3. Numerous practice opportunities.	
4. Guided oral repeated readings.	
5. Sensory reinforcement focusing on prosodic qualities essential to phrasing.	
6. Interesting, engaging texts.	
7. Difficulty of texts meets needs of readers.	
8. Students are not stopped or interrupted during reading.	
9. Opportunities for think alouds and responding to read-alouds.	
10. Opportunities for visual response.	
11. Opportunities for physical response.	
12. Texts are appropriate: short texts with good rhythm, distinct parts.	
13. Opportunities for authentic purpose and student choice of text.	
14. A variety of strategies including choral reading, echo reading, poetry reading, oral recitation reading, phrased text reading, but not round robin reading.	
15. Targets high-frequency words and phrases in meaningful context.	
16. Performance reading opportunities.	
17. Balance of genre and text following fluency pyramid (Reutzel & Cooter, 2005).	
18. Text type matches objective e.g. automaticity or rate by genre.	
19. New vocabulary appears multiple times.	
20. Focus on high success reading experiences.	

Table 11. *ORF Assessment Tool*

Oral Reading Fluency Assessment Criteria
1. Reading attempt or refusal.
2. Appropriate rate.
3. Flow and smoothness.
4. Accurate reading.
5. Automaticity/effortlessness.
6. Expressive, meaningful, prosodic reading.
7. Word recognition.
8. Stopped or interrupted reading.
9. Response to read-alouds.
10. Degree of success or difficulty reading text.

The rhythm performance/beat competency tool (Table 12) is adapted from rhythm performance and beat competency criteria suggested by Carlton and Weikart (1994), Weikart and Carlton (1995), Weikart (1998, 2000), Frazee (1987, 2006), and Montgomery (2002), all authorities in the field of music education. Weikart is also an authority in the area of movement education and rhythm. These authors were used as course texts for music education courses at a local Faculty of Education at the time of this study and are texts commonly used to inform music education in Manitoba elementary schools. The rhythm performance/beat observation tool was used to assess the learning event and as part of revisions and planning for subsequent learning events. The beat competency assessment tool is shown in Table 12 (Montgomery, 2002, p. 192-203).

Table 12. *Beat Competency Assessment Tool*

Criteria
1. Identifies beat when modeled by researcher.
2. Moves in nonlocomotor ways to own internal beat.
3. Moves in locomotor ways to own internal beat.
4. Simultaneously matches beat modeled by researcher in nonlocomotor ways.
5. Simultaneously matches beat modeled by researcher in locomotor ways.
6. Imitates beat modeled by researcher in nonlocomotor ways (remembered and overlapping).
7. Imitates beat modeled by researcher in locomotor ways (remembered and overlapping).
8. Chants speech-piece and performs beat patting hands simultaneously with endpoint.
9. Chants speech-piece and performs beat patting hands in alternating motion with endpoint.
10. Chants speech-piece and performs beat patting hands simultaneously without endpoint.
11. Chants speech-piece and performs beat patting hands in alternating motion without endpoint.
12. Chants speech-piece and performs beat in a variety of nonlocomotor ways (clapping, patting head, shoulders, knees, floor etc.).
13. Chants speech-piece in own space while performing beat using nonpitched percussion.
14. Chants speech-piece in own space while moving arms to beat with partner.
15. Performs beat in a variety of nonlocomotor ways with and without endpoint to recorded music.
16. Chants speech-piece in own space while passing an object to another person on the beat.
17. Chants speech-piece while stepping beat in own space.
18. Chants speech-piece while walking beat.
19. Performs nonlocomotor beat to speech-piece, continuing when speech-piece is audiated (inner hearing).
20. Steps beat in own space to speech-piece, continuing when speech-piece is audiated (inner hearing).
21. Performs locomotor beat to speech-piece, continuing when speech-piece is audiated (inner hearing).
22. Points to beat while reading beat diagrams.
23. Performs beat in a variety of ways while reading beat diagrams.
24. Chants speech-piece and performs beat while reading beat diagrams.
25. Chants speech-piece and draws beat.

**Interviews.** Pre-study interviews were an essential data collection instrument. A learning design outline was researched, prepared, and defended, but as the study experiences were intended to be developed in conjunction with each teacher's classroom curricular planning and resources and coherent to the practices and pedagogy of each classroom, the interviews were a critical means of data gathering to inform construction of the study learning design. The teachers' experiences, beliefs, and backgrounds contributed to a greater understanding of the research phenomenon of multiliteracy teaching practice using rhythm and language. A guiding set of questions for each teacher pre-and post-study interview is included in Appendix I. Pre-study interviews were held during noon hours or after school and lasted between forty-five minutes and an hour and a half for pre-study interviews.

Pre-study interviews were carried out before the learning design began with two exceptions. Scheduling challenges resulted in two teacher interviews being held in the same week that the learning design began. All teachers read the letter of information and had opportunities for questioning and dialogue before signing letters of consent and voluntarily participating in interviews.

Post-study interviews were just as vital to the study as the pre-study interviews. They were an important source for evaluating the impact of the study and to provide data for answering the research questions with greater depth and understanding. Post-study interviews occurred in the final week of the study during lunch or after school hours. All pre- and post-study interviews were tape recorded, transcribed verbatim, and emailed to collaborating teachers for confirmation that their responses were properly recorded and

their meanings and intents captured appropriately. Data results from pre- and post-study interviews are presented in the grounded theory results chapter.

**Focus group interviews.** Student focus groups were conducted using guidelines suggested by Morgan, Gibbs, Maxwell, and Britten (2002). Focus group interviews were held in the final week of the study. Focus group interviews were also an essential data tool. The data analysis could not have been considered credible without the perspectives of those students for whom the learning design was intended. In addition, due to the tight schedule and short time period of each learning event, I did not often have a chance for any in-depth discussions with students during the course of the learning design. The focus group interviews were an important opportunity for students to share their feedback, questions, concerns and suggestions. Data results from the focus group interviews are presented in the grounded theory results chapter.

The set of guiding questions for each focus group interview is included in Appendix J. Each focus group consisted of five to seven students. Student focus groups were selected on a basis of convenience. Focus groups were made up of students available during the scheduled focus group time; focus groups were conducted in various quiet spots of the schools. Most focus groups were audio recorded and transcribed verbatim although the transcriptions were not confirmed with the focus group participants.

### **Qualitative Data Analysis**

A variety of qualitative data analysis procedures were used to explore different dimensions and perspectives of the first two research questions. Qualitative methods used in the research were: grounded theory, semiotic data analysis, multimodal data analysis,

and analysis of the iterative research design/action research. The procedures used for these methods are detailed in the following chapter.

### **Qualitative Research Evaluation**

The choice of evaluative criteria and validity procedures is governed by the lens that researchers use to validate their research and the researcher's paradigm assumptions (Creswell & Miller, 2000). In this study, the choice of validity criteria is affected by paradigm assumptions based on constructivist, interpretivist, and pragmatic positions. Validity criteria and criteria for establishing rigour and quality in research are selected from criteria proposed by authorities working in the constructivist, interpretivist and pragmatic paradigms. The terms and criteria for evaluating qualitative research used in this study are drawn from: Charmaz, 2005; Creswell and Plano Clark, (2007); Denzin & Lincoln, 2005; Guba & Lincoln, 1989; Holly, Arhar, and Kasten (2005); Lincoln & Guba, (1985); and Stringer (2004).

There are many challenges and controversies around establishing evidence of rigour and validity criteria for evaluating qualitative research. An array of terms for qualitative evaluation is found throughout the literature (Creswell & Miller, 2000; Guba & Lincoln, 2005). Criteria suggested by Lincoln and Guba (1985) are widely adopted and adapted by qualitative researchers (Lichtman, 2006). Their criteria include evidence for establishing trustworthiness: credibility, transferability, dependability, and confirmability.

Credibility refers to the study's plausibility and integrity (Stringer, 2004) and is established through: (1) prolonged, recorded engagement in the research setting; (2) conscious, persistent, and engaged observation and data collection; (3) triangulation of multiple and varied sources; (4) participant debriefing to review and debrief research

procedures for both researcher and study participants; (5) diverse case analysis to make visible and include diverse interpretations and all participant perspectives affecting the study; (6) referential adequacy so that the study's terminology, language, reported experiences, and conceptual understandings are those used by study participants; and (7) member checks of all participants to verify data accuracy, analysis, and reporting through frequent participant review processes.

Credibility is established in this study through prolonged engagement in the research setting and with the variables under study. The subject areas of music and language arts have been a focus of my teaching for more than two decades. The constructs of rhythm and reading were studied as part of a seven month pilot study presented in Chapter Five of this thesis. Engagement was prolonged through an intensive immersion in the research sites over a four month period that established relationships of trust and gave access to insider knowledge (Stringer, 2004). Recording was detailed in multiple ways throughout the process and presented in this thesis. Intensive engagement in the research continued throughout the period of analysis and re-analysis.

Credibility was ensured through conscious, persistent, and engaged observation and data collection (Stringer, 2004). Observations were directed and focused by means of observation tools described in the instruments section. Observations on every learning experience were made and recorded daily, and excerpted in this thesis. Credibility was also established by the use of multiple and various "sources, methods, and perspectives to corroborate, elaborate, or illuminate the research problem and its outcomes" (Stringer, 2004, p. 57). Meanings were deeply explored and clarified through diverse ways of perceiving the phenomenon (Stringer, 2004).

Participant debriefing took place throughout the research and analysis period. Teachers were invited to review the appropriateness of the research procedures and to clarify their descriptions and interpretations through formal interviews, informal discussions, journaling, and emails. Students were invited to review research procedures and processes through informal discussions and formal focus group interviews.

Diverse case analysis contributed to credibility and was inherent in the construction of the research design. Diverse perspectives were explored through interviews and field note data collection from the nine different teachers and nine classroom experiences. The perceptions, perspectives, and language (Stringer, 2004) of the nine teachers and classrooms were reinterpreted through the lens of other research and theories as presented in Chapter Ten, thus enhancing credibility by referential adequacy. Collaborating teachers had the opportunity to question and review the information gathered during final interviews and to review and revise preliminary outcomes and interpretations of interviews through email. Teachers and administrators were given opportunities to review analyzed data and reports at public and local symposiums and conferences.

Transferability is established through thickly detailed descriptions (Stringer, 2004) of the methods, data, and data analysis. These descriptions will hopefully create sufficient understandings of the context, setting, participants, processes, and constructs to allow other audiences to determine if results are transferable to other contexts. The inquiry audit (Stringer, 2004) contained in this chapter outlines the details of the research process, data collection, and data analysis to allow readers to determine if the research procedures were

sufficient and appropriate for the purposes of this study (Stringer, 2004) and thus enhance dependability.

Confirmability is addressed through an audit trail that is represented in this thesis and includes raw data from field notes, photographs, diary entries, documents, copies of letters, music sources, planning outlines, materials used in the research, and data reduction plans and processes.

Issues of validity and participation were limited to the ways described above that collaborating teacher and students participated in data collection and analysis. Data analysis was primarily undertaken by the researcher in consultation with second readers, critical friends and statistical advisors, rather than in consultation with the research participants.

Validity and utility refer to the practical outcomes of the research study (Stringer, 2004). All teacher participants were contacted one year after completion of the study to determine the usefulness and practicality of the research outcomes for their students and teaching. Teachers articulated ways they were either able to or planned to take action as a result of study experiences. In addition, the study results were shared at public symposiums and conferences and audience members were invited to provide critical feedback and to articulate ways they perceived that action could or could not be taken on the basis of the study findings.

The transformative teaching practices that resulted from this study address issues of authenticity criteria suggested by Guba and Lincoln (1989). Authenticity criteria include “fairness, ontological authenticity, educative authenticity, catalytic authenticity, and tactical authenticity” (Guba & Lincoln, 2005, p. 207). Catalytic authenticity focuses

on ways in which the research outcomes prompt and stimulate action as evidenced in this study by the transformative teaching practices and by responses from families presented in data results. Fairness refers to qualities of balance and representation of all stakeholders' perspectives and voices. Fairness was a focus of this research; attempts are made to represent all voices through grounded theory analysis presented in Chapter Six.

Ontological and educative authenticity is aimed at raising levels of awareness by research participants and by those working around and with research participants. Teacher participants raised levels of awareness through sharing learnings from the study with their classrooms in the following year. I have attempted to raise awareness of issues and possibilities of multiliteracy/multimodal teaching and learning suggested by this study with teacher participants and their administrators and as part of numerous professional development forums. Tactical authenticity empowers participants through professional development offered by the researcher if desired by participants in social and political action based on research results. This criterion was not a feature of this research.

Holly, Arhar, and Kasten (2005) offer additional strategies used in this study to build trustworthiness, credibility, and respectfulness that include:

- Make your standpoint clear.
- Use multiple perspectives of people, theories, and methods such as triangulation, crystallization, revisiting data, and member checking.
- Apply indicators to data.
- Include raw data.
- Be systematic.
- Be self-reflective.

Because constructivist grounded theory approaches proposed by Charmaz (2005) are used in this research, it is necessary to consider the criteria for evaluating the grounded theory methods associated with this approach. Charmaz discusses issues of credibility, originality, resonance, and usefulness as important criteria for grounded theory studies. Credibility concerns include sufficient familiarity with the setting or topic, sufficient data to merit claims, systematic comparisons between observations and categories, a wide range of empirical observations, strong links between data, argument and analysis, and sufficient evidence to lead to an independent assessment and agreement with researcher claims. Attempts to address these concerns are made in this study as described above. Systemic comparisons between observations and categories are evidenced in Chapter Six. Strong links between data are made in Chapter Ten and it is hoped that researcher claims in Chapter Eleven are backed with sufficient evidence.

Issues of originality include fresh categories with new insights, new conceptual applications of findings, social and theoretical significance, and current theory and practice refined, extended or challenged. Charmaz (2005) describes usefulness as analysis that can be used in everyday worlds, is generically applicable and examined for “hidden social justice implications” (Charmaz, 2005, p. 528), stimulates further research, and contributes to a better society. These issues are examined in the final two chapters of this thesis.

Resonance refers to the extent to which liminal (hidden, “in-between,” barely perceptible) and taken-for-granted meanings are revealed, links are drawn between the large community and individuals, analytic interpretations make meaning and sense to participants, and categories “portray the fullness of the studied experience” (Charmaz,

2005, p. 528). Resonance as evidence of quality was an important criteria for this research. Notions of resonance were extended to include the structural and metaphorical resonance of the thesis framework and conceptual understandings. This resonance was explored through the poetry of Zwicky (1992, 2001, 2003) as presented at the opening of each chapter and through transmediation using a variety of musical means and genres during data analysis exemplified at the ends of each chapter.

Finally, quality of research must be examined from the mixed methods paradigm. Creswell and Plano Clark (2007) suggest defining validity within mixed methods research as “the ability of the researcher to draw meaningful and accurate conclusions from all of the data in the study” (p. 146). Evidence of meaningful and accurate conclusions is provided in Chapters Ten and Eleven of this study. Creswell and Plano Clark recommend that validity be reported and discussed within the context of both qualitative and quantitative research, using strategies appropriate for each kind of approach and data set, as has been done here. Pragmatist paradigm beliefs are reflected in recommendations of consequential validity (Creswell, 2004) in which the validity of data are supported by the pragmatist paradigm view that evidence from different and diverse data sets provides more complete and comprehensive results than either qualitative or quantitative data alone (Creswell & Plano Clark, 2007).

### **Quantitative Data Collection**

Quantitative methods were used to answer research questions one and three. Quantitative methods were used to investigate the effects of the learning design featuring rhythm and language experiences for early years students’ engagement and meaning-making in print and non-print literacies. Quantitative methods included student pre- and

post-tests and parent/guardian pre- and post-surveys. Quantitative methods were also used to investigate the relationship between rhythm performance represented by measures of synchronicity and reading rate (research question three). The study used a quasi-experimental, pre-test/post-test, comparison group design without random assignment of participants to groups. There was one independent variable of teaching approach integrating rhythm and reading with two levels of treatment: experimental group using a reading and rhythm learning design, and a control group listening to and singing song-storybooks.

Pre-test data for experimental and control groups were collected prior to the start of the learning design and post-test data for experimental and control groups were collected at the end of twenty-five learning experiences. I administered, scored, and recorded all tests. At pre-tests, the *DIBELS*<sup>TM</sup> oral reading fluency subtest was administered first to all students, followed by the *Rhythm Performance Test-Revised (RPR-R)* Part 1. Training for administering tests of oral reading fluency was provided through pilot study experiences, although the standardized tests for reading fluency and comprehension used in the pilot study were different to the ones used in this research. In addition, instruction is provided on the *DIBELS*<sup>TM</sup> website and in the downloadable scoring booklet (Good & Kaminski, 2002a). The *RPT-R* CD is accompanied by a detailed handbook and further instructions are provided as part of the computer program. In addition, the author (Flohr) clarified questions of process in email communication. Numerous practice sessions prior to the start of the research created a working familiarity and confidence with scoring procedures and processes for both tests.

School administration and collaborating teachers set up testing schedules and arranged for students to come to the testing areas. Quiet and private areas were located in each school for testing purposes and included a school broom closet, librarian's office, lunch room, a resource room, and a storage room. An efficient system was set up by teachers at all schools where two or more students waited outside the testing room while another student was inside working on tests with me. When the student in the testing room was finished, the waiting student entered and the student who completed the test returned to the classroom to ask the next student on the list to come and wait outside the room for their turn.

Students generally seemed to view the testing as a new and interesting experience. There were no instances where students refused or seemed upset at the testing experiences, although some students expressed their dislike of reading in general during the oral reading fluency tests. As much as possible, the tests were presented as experiences designed to help me with my research, rather than as evaluations or judgments of any student's ability. The computerized rhythm test in particular, seemed to be viewed as a fun game for many students.

When students arrived for the tests of oral reading fluency, they were asked to sit down at the table in a chair beside me. After introductions and discussion about attitudes towards reading and the test procedures, I asked the student to read a short passage from the *DIBELS*<sup>TM</sup> oral reading fluency subtest (Good & Kaminski, 2002a). Every student read the same passage suggested as the appropriate benchmark for that grade by *DIBELS*<sup>TM</sup>. I had the examiner copy of the passage on my clipboard positioned so that

students could not see. I asked the student to read the passage out loud with the instructions that if they got stuck, I would tell them the word so they could keep reading.

I pointed to the starting word, asked the student to begin, and began timing the reading when the student said the first word of the passage. I used a stopwatch that was discreetly attached to my clipboard for timing. If a student did not say a word within three seconds, I provided the word and marked the word as incorrect on my examiner's copy. I indicated each word incorrectly said with a slash over that word in my copy. After one minute I stopped the stopwatch and placed a bracket after the last word read by the student and thanked the student for reading for me.

If students were unable to read any words correctly in the first row of the first passage, I discontinued the reading and recorded a score of zero. For those students who could not read, I told them they could help me by playing a game if they wished. For example, I would ask them to tell me the first letter of their name and then we would see if we could find the first letter of their name in the reading passage. If that was difficult for students, I changed the game to find something related to our study that they would be successful at before leaving. For example, I asked some students if they could count how many lines there were in the reading passage with me, or count how many letters there were in the title of the passage. When the test or activity was complete, I recorded the total number of words read correctly on the bottom of the scoring sheet for each passage and student and recorded the student number on the examiner's scoring sheet. Prior to testing, I assigned numbers to each student and created electronic spread sheets with the student numbers and classroom letters. For example, Carmen might be student 12 in Classroom F at John Dewey School. I thanked each student for helping me with my

research and then invited the next student waiting to have their turn. Post-tests followed the same procedures.

Rhythm pre- and post-tests followed a similar format. Rhythm performance tests were computerized and carried out using my laptop and headphones. When students sat at the table I first asked them if they had ever used a laptop and headphones before. All children had used a computer and many had used laptops and headphones. I asked them if they had any questions about my laptop and most asked what kind of games it would play. I usually answered just one and that I would be happy to let them try my rhythm game. I let each student experiment with tapping the space bar until they expressed comfort with doing so and then I outlined the instructions that the students would hear when the game was started. I usually spent a few moments making sure the student had a comfortable fit with the headphones and when they said they were ready I started the tests.

Regardless of the electronically calculated score (not visible to students), the rhythm tests ended with computerized sounds of clapping, happy faces, and the text “Good job.” Students seemed to enjoy the clapping, visual, and text response and appeared to perceive rhythm testing as a successful and enjoyable game experience. All quantitative data were recorded in a password protected laptop computer and written tests were kept in a secure file and locked filing cabinet in my home. Data were identified by school pseudonyms, classroom letters, and student number and were colour-coded and grouped on electronic spread sheets by age, gender, and grade.

Pre- and post-surveys were sent home by classroom teachers at the beginning of the learning design and in the final one to two weeks of the study. Surveys were

anonymous in that parents/guardians did not include their names on the surveys, however; a number was assigned to each family, along with a letter for the classroom. The number and letter were placed on a visible corner of each return envelope, for example B-10. The return envelope was pre-labeled with my name and the name of the university I was attending and parent/guardians were instructed to return the survey sealed in the labeled envelope provided to their classroom teacher. The classroom teachers collected the envelopes for me to retrieve when I came to each school. When the post-surveys were sent home, they included an option for parent/guardians to fill out the original survey if they had not had a chance to do so, or to make changes to the original survey if they wished.

### **Instrumentation**

Rhythm performance was measured using Part I of the *Rhythm Performance Test-Revised (RPT-R)* (Flohr, 2004). Oral reading rate was measured using the *Oral Reading Fluency (ORF)* subtest of the *Dynamics Indicators of Basic Early Literacy Skills Sixth Edition (DIBELS™)* (Good & Kaminski, 2002a). Parent/guardian surveys were created by the researcher and all tests and surveys were administered and scored by the researcher. The survey data were transformed into numerical data for statistical analysis with the exception of open-ended questions which were coded qualitatively and recorded as part of grounded theory results. The pre- and post-tests and numerical survey data were analyzed by the University of Manitoba statistical advisory service using JMP Software (SAS Institute Inc., 2007, 2009).

The *Dynamic Indicators of Basic Early Literacy Skills Sixth Edition, (DIBELS™)*, (Good & Kaminski, 2002a) are developed as individual standardized tests for oral reading

accuracy and fluency for students from Kindergarten to Grade 3 in regular and special education. These assessments consist of seven short subtests with approximately 20 alternate forms to measure phoneme segmentation fluency, letter naming fluency, nonsense word fluency, word use fluency, initial sound fluency, oral reading fluency, and oral re-telling fluency. Only the oral reading fluency subtest was use for this study.

The *DIBELS*<sup>TM</sup> tests were chosen for a variety of reasons. They are reported to be “an outstanding measure with higher reliabilities and concurrent and predictive validities than is typical of screeners” (Shanahan, 2005, para. 8). *DIBELS*<sup>TM</sup> are inexpensive and can be freely downloaded from the *DIBELS*<sup>TM</sup> website. The print text materials seemed potentially engaging for students. Because the tests are only one minute each, they do not take up much of student or teacher time and are not as intrusive as other tests that require longer periods of assessment. The tests are efficient and provide results quickly. Each test takes one minute to both administer and score as scoring is done simultaneously and immediately following the student reading. In addition, the tests are widely used across North America and therefore produce recognizable and easily interpreted and evaluated findings for other readers. Benchmark test scores are provided in the downloadable guide. Benchmarks goals are a score of 40 in the spring of grade one, a score of 90 in the spring of grade two, and a score of 110 in the spring of grade three.

In recent years, the *DIBELS*<sup>TM</sup> tests have come under severe scrutiny and criticism. The criticisms fall under two broad headings of validity and crony capitalism (Allington, 2009). Criticisms of coercion by federal officials have been reported in association with the widespread use of the *DIBELS*<sup>TM</sup> tests, particularly in the United States (Allington, 2009). Several authorities believe that *DIBELS*<sup>TM</sup> tests are

misrepresented as tests of oral reading fluency (Allington, 2009; Samuels, 2007).

Although *DIBELS*<sup>TM</sup> tests are advertised as measures of oral reading fluency, they are limited to measures of reading rate.

Reading rate is only one dimension of the construct of oral reading fluency. Rasinski (2011) believes that an exclusive emphasis on reading rate must be excluded from discussions of oral reading fluency. *DIBELS*<sup>TM</sup> tests are used in this study to measure oral reading rate for the purposes of determining the relationship, if any, between reading rate and rhythm performance. Despite the fact that they are referred to as oral reading fluency tests in this study as named by the *DIBELS*<sup>TM</sup> creators, they are understood to measure reading rate, a singular dimension of the construct of oral reading fluency.

The *Rhythm Performance Test—Revised* (RPT-R) (Flohr, 2004) is a standardized, norm-referenced computerized test that assesses performance of steady beat or synchronicity and rhythm patterns. It is developed for use with children four to twelve years of age and is intended as a screening tool, prescriptive tool, assessment measure, and/or a research tool to assess pre and post intervention changes in rhythm performance.

The *Rhythm Performance Test—Revised* (RPT-R) Part I was chosen as the most effective and appropriate tool for assessment of beat competency that was available and known to the researcher. The *RPT-R* includes tests of beat competency in Part I and tests of rhythm patterns in Part II. For the purposes of this study, only the tests of beat competency, Part I were used. This tool is highly appropriate for this research as it was developed specifically for the kinds of research investigated in this study. In email correspondence with the author, Flohr confirmed the appropriateness of the test for this

research and described its use as part of large multi-school studies in Texas with goals similar to this research. A computerized test seemed the most likely tool to assess fine-grained differences in beat competency in objective ways.

Importantly, the test seemed appropriate for most learners as tapping on the computer space bar in time to the recorded selection was not physically demanding. In addition, it was assumed that children might enjoy the computerized format of the tests. The tests are intended to appeal to young students and include interesting visual and audio media. Scores do not appear on the screen so the tests are perceived more as games or activities by the students.

Part I of the *RPT-R* includes five tests of synchronicity. The test begins with a practice exercise where students are instructed to tap the space bar in time to the music that they hear. The space bar of the computer was adjusted to a perceived optimal depth to allow both sufficient resistance and ease of use and was used at the same setting for all students. Following the practice exercise, students tapped the laptop space bar in time to the beat of five different versions of a computer generated recording of an Irish folk-song known as “Mountain Top.” Students wear headphones to listen to the music and the instructions. Each time the song is heard, it is played at a faster tempo. The tempo used for the first test is 110 beats per minute and the tempo is increased by 10 beats a minutes with each subsequent test. Green and red light visuals and a computer generated voice indicate to students when to stop and start. When the light is red, the program stops until the student clicks the green “Go On” button on the screen. The green light signals that the student is to tap the space bar in time to the music until it stops.

The possible scores for the synchronization test range from 0-100. Any deviation from the criterion rhythmic pattern is recorded in milliseconds by the computer to generate a constant error score. The computer records a negative score for an early response and a positive score for a late response. The computer calculates an absolute error value made up of the student's deviation measurement to protect against the possibility of the positive and negative scores cancelling each other out. The computer program calculates a variable error score for the standard deviation of the constant error score and uses all the score together to determine a percent absolute error score. Greater accuracy in synchronizing to the beat is reflected in a higher percent alternate error score.

Parent/Guardian pre- and post-test surveys were created to explore possible home effects and influences, possible relationships with reading and music, values, background, and to triangulate data regarding effects of the learning design in music and reading and factors that might facilitate or inhibit the effectiveness of the learning design. The data were used to inform research questions one and two. Survey construction was guided by Thomas (1999), Czaja and Blair (2005) and Stringer (2004) to create open and fixed responses, rating scales, formatting, and coding using a cross-sectional design. A key decision guide suggested by Czaja & Blair (2005) was used as criteria to evaluate the survey questions. The criteria included these questions (p. 71):

1. Does the survey question measure some aspect of one of the research questions?
2. Does the question provide information needed in conjunction with some other variable?
3. Will most respondents understand the question and in the same way?

4. Will most respondents be willing to answer it?
5. Is other information needed to analyze this question?

The pre-survey consisted of five questions: three rating responses, one fixed response, and one dual response (Appendix K). The post-survey consisted of one fixed response and two open responses (Appendix L).

### **Quantitative Data Analysis**

The experimental and control groups were compared using matched pairs t-procedures and analyses of variance. The relationship between rhythm performance and oral reading rate was explored using bivariate and multivariate regression and correlation analyses. Quantitative data were also collected from parent/guardian surveys administered during the first and last weeks of the study and converted to numerical statistics for analysis. All quantitative data were analyzed using JMP statistical software (SAS Institute, 2007, 2009).

Matched pairs t-procedures and analyses of variance were used to compare the experimental and control groups for measures of oral reading rate and synchronicity following the ten week learning design. The experimental and control scores that did not meet benchmark standards set by *DIBELS*<sup>TM</sup> were analyzed separately using matched pairs t-procedures and analyses of variance. Associations between synchronicity and oral reading rate were explored using bivariate and multivariate correlational analyses, including Pearson *r* and *R*-squared. Correlational statistics were used to determine the strength and direction of relationships between study variables and to look for significant correlations between variables. The significance level used for rejecting the null hypothesis was set at the 5% level of probability ( $p$ -value < .05).

**Validity and Reliability.**

In quantitative research, validity refers to the extent to which the researcher “can draw meaningful inferences from the results to the population” (Creswell & Plano Clark, 2007, p. 133). Validity can be assessed through content, criterion and construct validity. Content validity refers to whether the quantitative instrument is representative of the possible items in the domain being measured. For example, in this study, the domains being measured were steady beat or synchronicity, and reading rate. The *RPR—R Part I* is intended to measure steady beat (Flohr, 2004) and therefore demonstrates content validity. In addition, Flohr reports content validity is appropriate as determined by expert judgment and authoritative music texts. A test of synchronization defined as the ability to match the steady beat of the recorded aural example represents ideal content validity for the purposes of this study.

However, if the *DIBELS™* tests are being used to measure oral reading fluency, they do not show content validity because the *DIBELS™* tests exclude other important dimensions of oral reading fluency such as prosodic elements. Content validity is claimed by *DIBELS™* on their website (<http://dibels.uoregon.edu/>) and by Good and Kaminski (2002b). In this study, the *DIBELS™* tests are used to measure only reading rate and therefore they do demonstrate content validity for this construct.

Criterion validity refers to the relationship between the instrument scores and other scores obtained from different instruments used to measure the same variable. *DIBELS™* tests are shown to have criterion validity as indicated by the high correlation (.60-.80) of the *DIBELS™* oral reading fluency measures with scores on national normed instruments such as Woodcock-Johnson and state reading tests (Barger, 2003; Buck &

Torgersen, 2003; Carlisle, Schilling, Scott, & Zeng, 2004; Elliot, Lee, & Tollefson, 2001; Good, Simmons, and Kame'enui, 2001; Hintze, Ryan, & Stroner, 2003; McGlinchey & Hixson, 2004; Shaw & Shaw, 2002; Vander Meer, Lentz, & Stoller, 2005; Wilson, 2005).

The *DIBELS*<sup>TM</sup> tests are reviewed in the *Mental Measurements Handbook* as having “strong predictive and concurrent validity evidence when compared to the Woodcock-Johnson Reading tests and other measures” (Shanahan, 2005, para. 5). Average concurrent validity coefficients were .80 for the oral reading fluency test and Predictive validity coefficients were .66 (Shanahan, 2005). The website reported concurrent validity ranges of .91 to .96 (University of Oregon, 2010).

In predecessor versions of the *Rhythm Performance Test-Revised*, the *Rhythm Performance Test* “was found to be highly correlated to teacher ratings of piano student rhythm performance ability, Pearson’s  $r = .86$ ” (Flohr, 2004, p. 19). In a study of 50 first grade children Flohr and Johnson (2001) found significant correlation between the *Rhythm Performance Test-Revised* and corresponding measures of the widely used *Primary Measure of Music Audiation Rhythm Subtest (PMMA)* (Gordon, 1979). Criterion-related validity was determined by comparing scores from the *RPT-R* with well-known measures of music audiation rhythmic tests (Gordon, 1979) but tests were not highly correlated for Part I ( $r = .25$ ). This may be explained by the fact that the Gordon tests are measures of rhythm perception while the Flohr tests are measures of rhythmic performance so in fact, are measuring different dimensions of the same construct of rhythm.

Construct validity refers to the consistency of scores and whether they measure the construct they are supposed to measure (Creswell & Plano Clark, 2007). *DIBELS*<sup>TM</sup>

tests have been criticized as not having robust construct validity for the construct of reading (Afflerbach, 2007). Flohr provides evidence for construct validity of the *RPT-R* based on a study of rhythmic timing for music and non-music majors (Flohr & Meeuwssen, 2001).

Reliability refers to measurement scores that are consistent and stable over time (Creswell & Plano Clark, 2007). The amount of error variance for test scores of *DIBELS*<sup>TM</sup> oral reading fluency and the *RPT-R* have been determined empirically and reported and published in the form of reliability coefficients for both measures. Reliability statistics are found on the *DIBELS*<sup>TM</sup> website (University of Oregon, 2010) and included as part of reviews in the *Mental Measurements Handbook* (Shanahan, 2005).

The website reported alternate form reliability ranges of .89 to .96 and *Mental Measurement* reviews reported high levels of test-retest (.92-.97) and alternative form (.92) reliability for oral reading fluency tests (Shanahan, 2005). Shanahan found the *DIBELS*<sup>TM</sup> tests to have remarkable levels of reliability considering their brevity, purpose and age of children but recommended their use with caution if used to determine educational groupings. Shanahan suggested further information regarding the discriminant validity with regard to the instructional categories used would add to the trustworthiness of the tests.

Flohr (2004) claims that the *RPT-R* computer test is able to measure rhythmic performance to an accuracy of 1/1000 of a second. Test-retest reliability for Part 1 of the test is reported to be .90 (Flohr, 2004) in a sample of 51 elementary students.

### **Internal Validity**

Internal validity is defined by McMillan and Schumacher (2006) as “the viability of causal links between the independent and dependent variables” (p. 134). Internal validity focuses on whether changes indicated by post-testing are in fact a result of the rhythm and reading experiences and not due to other causes. In this study, the use of a control group is one means of addressing some issues of internal validity.

History, statistical regression, effects from pre-testing, researcher changes (fatigue, boredom, excitement, distraction etc.), attrition, maturation, diffusion of treatment, experimenter effects, and subject and selection effects are possible threats to internal validity (McMillan & Schumacher, 2006). In particular, selection threats likely affect internal validity in this study. Groups under comparison likely were different in important ways even before the study began. Random assignment is an important means of addressing selection threats to validity (Vogt, 2007) but random assignment was not possible for this study for reasons of practicality.

As a result of non-random assignment, a number of possibilities for internal validity concerns exist due to differences in groups. It is very possible that children and groups differed in their amount and kind of activities outside of school, prior music and reading experience, knowledge, abilities, skills, pre-existing attitudes towards music and reading, and personality types. The qualities and kinds of music programs may have differed in each school, meaning that students in one school may have had a stronger rhythmic understanding than in others. Students who took music lessons, had music experiences in their homes, or were sung to, read to, or engaged in rhyming games and

word play from birth may have had experiences that created bias for test scores of oral reading rate and synchronicity.

Similarly, a lack of the experiences just described may have created bias for test scores. Regardless of background or experience, groups may have differed due to diverse attitudes towards music and reading related to a number of unknown issues. Students from homes that valued music, language, and movement may have responded more positively to experiences using music, poetry, and movement than students whose families considered these elements unimportant or unnecessary.

Some families may have valued music and reading but did not have the capacity to provide such experiences for their children, affecting ability and attitude in several directions. All groups appeared to be the same with regards to effective teaching practices, teaching beliefs, and values about the arts, music and multiliteracies; however, I did not deeply engage with classroom teaching practices other than those associated with the study, and there may be variables I was not aware of.

Groups were different in that one control and one experimental teacher had previous specialty training in music education. Differences may also have resulted from the varying years of experience and teaching among the teachers participating in the study. Other teacher differences include personality differences, teaching style and practice, ability, knowledge, background, experience, skills, and knowledge in all curricular areas that may have affected students in the classrooms. It was impossible to control for the quality and differences in teaching style, and the content in general classrooms or in the music classroom.

History effects refer to “events that occur during the course of a study that make it difficult to interpret the results” (Vogt, 2007, p. 124). In this study, history effects were likely threats to internal validity. It was not possible to control for confounding learning variables between pre-and post-tests that may have affected experimental or control groups differently. Higher post-tests may have resulted from experiences in music and/or reading at school or outside of school in the time between the pre- and post-testing period.

Statistical regression was a threat to internal validity in this study. It was not possible to control for one group having very high or very low scores on pre-tests and then scoring closer to the mean as a natural statistical phenomenon rather than due to effects from the learning design. Regression to the mean was a possibility for this study as classrooms included students with extreme scores for oral reading fluency and rhythmic competencies. In any testing, extreme scores will likely become more moderate regardless of the effect of the intervention (Bernard, 2006).

The pre-test may have represented a threat to internal validity. The pre-test, particularly the computerized rhythm tests, may have affected the participants by providing motivation for learning in music. The pre-test may then have served as a differential learning opportunity that would positively affect post-test results for some children.

Instrumentation threats to validity existed in this study. Certain researcher differences were avoided as I was the only one to administer both pre- and post-tests. This may have had the effect of ensuring that instruments, instrument implementation, and instrument assessment were used in consistent ways. However, it is likely that over the course of administering 676 pre- and post-tests, I improved my testing techniques and

skills, or alternately, became less effective due to fatigue or disinterest as a result of repetition. Either of these scenarios may have resulted in differences on the post-tests attributable to differences in instrumentation rather than to the learning design experiences.

Attrition effects that occur when participants drop out of a study were not threats to internal validity. In this study, there were no participating students that dropped out over the course of the study, although students and families that did not give consent to participate in testing did move out of the schools. One teacher dropped out of the study due to injury resulting in a series of substitute teachers and a short term teacher for one classroom, possibly affecting students in that class.

It was not possible to control for natural maturation of participants that may have affected the dependent variables. Maturation confound is likely. It is possible that changes in dependent variables may not have been the result of the learning design experiences, but rather the result of students' natural changes over time. These changes could have been due to normal age, natural growth, experience, developmental knowledge, skills and experiences maturation, support and reinforcement of constructs through other curricular materials or experiences, or changes at home. Any or all of these events may have affected post-test results in some way. However, the use of a comparison group is important in reducing the threat to validity caused by some effects such as maturation, age, and history effects.

Diffusion treatments represented a threat to validity in this study as it was not possible to prevent control groups from receiving similar experiences as experimental

groups in music classrooms or through music activities and programs outside of the school. Unintentional researcher effects were possible threats to validity for this study. I may have inadvertently shown differential treatment of subjects. I may have used different voice tones, gestures, vocabulary, means of encouragement or support, attitudes, observation, and assessment techniques from one group to another, despite the fact that I tried to avoid such possibilities throughout the study.

I may have caused some students to be apprehensive, nervous, or alternately excited or calm which could lead to confounding results. Positive results may have occurred not because of the learning design but because some students felt that I was motivating and encouraging. Similarly, some students may have experienced negative results if they did not enjoy working with me and did not find my teaching or resources to be engaging.

Subject effects were possible threats to internal validity for this study. Students may have participated just to please me, their teacher, or their parent/guardian. Hawthorne effect must be considered. Students may have changed behaviours and attitudes simply because they knew they were part of a research study and felt they were receiving some special treatment or benefits. Students may have experienced short term engagement and reading and rhythm success because of the novelty of the experience, the change in teaching materials, or the opportunity to be in new classroom groupings.

Internal validity may also have been threatened by the interaction of different treatments. Students may be enrolled in remedial reading programs or music programs outside of school that would lead to enhanced reading fluency or rhythmic competencies

either on their own or as a result of interacting or combining with the research intervention.

### **External Validity and Limitations**

External validity “refers to the generalizability of the results and conclusions to other people and locations” (McMillan & Schumacher, 2006, p. 134). The results of this study can only be generalized to Manitoba early years classrooms with a similar demographic make-up, abilities, levels, experiences, background, teaching philosophies and practice, and for schools that have regular and comparable access to music programs literacy and teaching approaches, and resource programs.

The results of this study could only be generalized to similar conditions taking into account such factors as “the nature of the independent and dependent variables, physical surroundings, time of day or year, pretest or posttest sensitization, and effects caused by the presence of an experimenter or treatment” (McMillan & Schumacher, 2006, p. 141). Because the study could never be exactly replicated in any other classrooms, the effects of this study are limited to possibilities of transferability only, as assessed against the criteria for transferability stated earlier in this chapter. The results of this study are further limited by the fact that I was responsible for data collection and analysis. Although I was informed by statistical services and second qualitative readers, I did not invite the research participants to a part of data analysis or conclusions.

### **Ethical Concerns and Considerations**

Issues relating to informed consent, confidentiality, risk, vulnerable populations, and remuneration were strictly observed according to all guidelines set by the university Education/Nursing Research Ethics Board. All protocols regarding informed letters of

consent were followed. There were no risks to subjects or third parties or ethical concerns. Participants' anonymity and confidentiality were preserved through the use of pseudonyms and confidential record keeping. Data given to second readers and critical friends did not identify any divisions, schools, teachers, or students by their real names or locations. Survey questionnaires and pre-and post-tests were identified only by the coded numbers and letters as previously described. Videotapes and audiotapes included only those children for whom consent was obtained and were erased after analysis.

All methodology and procedures related to participant recruitment, data collection, recording, analysis, and reporting, were conducted according to protocol required by the Education and Nursing Research and Ethics Board of the granting University and as required by individual school divisions and schools. Participation was voluntary and all participants knew they could withdraw at any time. I was not in a position of power over any administration, teachers, or students in the schools that participated in this research. I had previous experience teaching at one of the school sites; however, it was several years prior to the study, and administration, most classroom teachers, including those directly involved in the research, and all participating students, were new to the school since I had worked there.

\* \* \*

### **You've Got To Be Modernistic**

“You’ve Got to be Modernistic” by James P. Johnson (Johnson, 1930/2009) plays in my mind whenever I consider the mixed methods approaches used in this study. Even to 2010 ears this 1930s composition sounds new with its opening whole tone chord cascade of sound. The unique and surprising musical perspectives are mixed with the formalism of march and ragtime, the theme and variations of jazz, exciting polyrhythms and a dazzling pianistic style. Giddins and DeVeaux (2009) describe each strain as distinct from the other so that the “listener is never lulled by repetition or familiarity. The whole performance is a well-ordered whirlwind” (p. 136). The music of “You’ve Got to be Modernistic” sounds out the diverse methods presented in this chapter and the next. The methods reach back to a past century at the same time as reaching forward to a multimodal future. The chart is hopefully sufficiently well-ordered to create meaning for the unfolding of the music of this thesis.

## **Chapter Four: The Ensemble**

Resonance is indeed a function of the attunement of various distinct components of a whole. But their distinctness is crucial: resonance involves the carrying over of an impulse from one component to another.

If components are fused, a resonant relation between them is impossible.

(Zwicky, 2003, p. 47 left)

### **Introduction to the Qualitative Methods**

The sections of the band in this research are distinct, yet the resonant relation between sections creates an ensemble and synergy that becomes something greater than the parts. The distinctness of the methods is presented in this chapter and the resulting resonance is shared in Chapter Ten. The ensemble presented in this chapter includes the design research methods, action research methods, grounded theory, semiotic methods, multimodal methods, arts-based research influences, and the bricolage framework.

Musicians of 1930s swing bands were treated interchangeably to some extent. Duke Ellington, however, had a different approach. In Ellington's band, each instrumental section was valued for the unique sounds, qualities, and effects created by individual musicians. The ensemble was characterized by musical and personal quirks that stimulated Ellington's imagination. Each section contributed musical ideas in a process that was collaborative but sometimes chaotic (Giddins & DeVaux, 2009a). Despite the impression of a compositional "creative-free-for-all" (Giddins & DeVaux, 2009a, p. 224), history records the effectiveness of the synthesis of diverse musical ideas in Ellington's music. This chapter presents the methodological quirks and qualities and the unique and distinct contributions of each section of the ensemble as used in this study.

## **Design Research**

The design-based approach to educational research used in this study is intended to be at once both methodology used to solve complex problems as well as a means to provide perspective on the phenomenon itself in its particular context. This research approach is known variously as:

- “Design experiments” (Brown, 1992; Schoenfeld, 2006)
- “Design science” (Collins, 1992; Van Aken, 2004; Van Aken, 2005)
- “Design research” (Kelly, 2004)
- “Design studies” (Shavelson, Phillips, Town, & Ferrer, 2003)
- “Formative experiments” (Newman, 1992; Reinking & Bradley, 2004, 2008)
- “Development research” (Reeves, 2000)
- “Design research” (Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006; Van den Akker, Bannan, Kelly, Nieven, & Plomp, 2010)

Inquiry-based design experiments are still described as a “relatively new research approach for addressing complex problems in educational practice” (Van den Akker, Bannan, Kelly, Nieven, & Plomp, 2010, p. 5). The current definition of design research methods is consistent with the definition used in this research:

The systematic study of designing, developing and evaluating educational interventions (such as programs, teaching-learning strategies and materials, products and systems) as solutions for complex problems in educational practice, which also aims at advancing our knowledge about the characteristics of these interventions and the processes of designing and developing them.  
(Van den Akker, Bannan, Kelly, Nieven, & Plomp, 2010, p. 13)

The family of research characterized as iterative, cyclical, process oriented, utility oriented, and theoretically oriented (Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006) has come to be widely known as “Educational Design Research” (Van den Akker,

Bannan, Kelly, Nieven, & Plomp, 2010). Throughout the study, the recent umbrella term of “Design Research” is used to be inclusive of the various terms located in the literature that characterize this family of formative research.

The goal of design-based research is much more than simply describing, testing, and refining educational design (Barab & Squire, 2004). As featured in this study, design research is used to advance multiple purposes of simultaneously generating, testing, adopting, and adapting theory to contribute to and refine design, theory and practice. Sandoval (2004) describes these as “theories of practice” rather than theories to be “translated later into practice” (p. 222).

The view of theory as strongly connected to practice is a shared one; local, authentic, context is important and central to design research (Collins, Joseph, & Bielaczyc, 2004; Kelly, Lesh & Baek, 2008; Reinking & Bradley, 2008; Schoenfeld, 2006; Van den Akker, Gravemeijer, McKenny, & Nieveen, 2006). Formative and design research focuses on finding solutions to real teaching problems as they occur in their normal settings (Reeves, 2006). In searching for solutions, design-based research values processes that are:

Iterative	Organic	Innovative	Emergent	Novel
Exploratory	Creative	Unconventional	Dynamic	Multilevel
Interventionist	Collaborative	Generative	Useful	Systematic

(Kelly, 2006; Kelly, Lesh, & Baek, 2008; Van den Akker, Gravemeijer, McKenney, & Nieven, 2006).

Such processes are inherent in the kind of synergistic thinking that brings the systems of theory, research, design, and practice together to surface understandings, perspectives, and interactions not visible through the lens of one of those systems alone. Variables are interdependent and transactional rather than isolated constructs for study (Reinking & Bradley, 2008). Collins (1999) states that the goal of design research is not to control variables, but to identify them and determine how they are affected by characteristics of the situation, as well as the nature and extent of the effect. The goals and perspectives of design research are also the goals and perspectives of this study.

The systemic perspective of this study has been a feature of design research since its inception as an approach for educational research. Brown (1992) insists, “Just as it is impossible to change one aspect of the system without creating perturbations in others, so too it is difficult to study any one aspect independently from the whole operating system” (p. 143). A systemic approach necessitates qualitative, multiple methods to explore complex, diverse, interacting variables and the influences upon them (Reinking & Bradley, 2008). The emphasis is on generating findings that are integrative and not just additive.

Distinctly different frameworks are associated with the body of design research and interpretations and methodological applications are diverse (Reinking & Bradley, 2008). However, there is sufficient consensus in the literature to construct a conceptual framework for this research design. The characteristics and principles of design research that inform the conceptual framework of this study are:

- The purpose is to apply and connect research, design, theory, and practice to solve complex educational problems.

- A central goal is to connect design, theory and practice to answer what, how, why and what could be?
- Theories are humble, domain specific, working theories applicable to a particular learning process and ecology and the means to support that process and ecology.
- Research is typically innovative and design-based.
- Intervention/innovation is explored through iterative cycles of design, apply, analyze, and redesign.
- Rigorous, ongoing, systematic reflection and documentation are defining features.
- Inquiry-based approach is important.
- Design is carried out in authentic, situated learning contexts.
- Research is learner centered and collaborative (researcher, educator, students).
- Multilevel approaches are necessary to include all participants, learning ecology, and learning activity.
- A variety of methods and methodology are necessary and used where appropriate.
- The desired outcome is a useful, working artifact to solve identified research questions and problems and support design principles.
- The epistemological stance is pragmatic; the ontological stance is socioconstructivist.

(Bell, 2004; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Design-Based Research Collective, (2003); Kelly, 2003; Kelly & Lesh, 2000; Kelly, Lesh, & Baek, 2008; Reinking & Bradley, 2004, 2008; Sandoval, 2004; Van den Akker, 1999; Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006)

The three phase organizational framework used in this study is based on Cobb, McClain, and Gravemeijer (2003) and Gravemeijer and Cobb (2006). Phase One is described as “preparing for the environment” (Gravemeijer & Cobb, 2006, p.19). To prepare for the environment, the first point of clarification is the theoretical intent, followed by clarification of learning goals, and instructional starting and endpoints. A local domain-specific instructional theory is developed to incorporate the instructional activities, the conjectured learning process, and ways of supporting that process (Gravemeijer & Cobb, 2006).

The local instructional theory is informed by the available research literature, the curricula, instructional texts and whatever is at hand to be adopted, adapted, or invented. Here, local instructional theory is informed by Orff approaches to music education, picture books and classroom print text sources, the provincial Language Arts and Music curriculum outcomes for grades one to four, and classroom programming and resources shared by teachers.

The second phase of research is the design experiment. In this study, the design experiment is modeled after the cyclic process outlined by Cobb, McClain, and Gravemeijer (2003) and Gravemeijer and Cobb (2006). The intent of the second research phase is to collect and evaluate data, modify initial conjectures, and improve the instructional design (Cobb, McClain, & Gravemeijer, 2003; Gravemeijer & Cobb, 2006). This phase follows a cyclic process of design and analysis. The qualitative data are examined both during each period of instruction and in retrospect to determine what factors facilitate or inhibit the instructional design, to inform the subsequent cycle of implementation, to envision how local instructional activities might be implemented next

and for what learning, and to plan for adaptations and revisions and implement them in the next phase of the cycle (Cobb, McClain, & Gravemeijer, 2003; Gravemeijer & Cobb, 2006).

The cycle repeats, beginning with an analysis of the effectiveness of the previous cycle of implementation, then a new envisioning, followed by adapting, revising, and the subsequent sequence of implementation. This phase consists of an iterative and overlapping cycle of design, implementation, and analysis for each period of instructional design. In this study, the cycle typically repeated two to three times a week for each classroom.

Throughout the process, conjectures that drive the design and analysis become more specialized as certain tested conjectures are refuted and alternative ones generated and then tested again. This means an awareness of emergent and possibly unforeseen possibilities during implementation of the learning design is important in order to capture, cultivate and nurture new potential pathways for learning. A key and distinctive feature of design research is the deepening understanding of the research phenomenon as the design research progresses (Cobb, McClain, & Gravemeijer, 2003; Gravemeijer & Cobb, 2006).

Phase Three is termed the retrospective analysis (Cobb, McClain, & Gravemeijer, 2003; Gravemeijer & Cobb, 2006), a meta-analysis of the entire data set collected during the research process. Data analysis may take many forms; in this research it begins with data generated by grounded theory analysis (Charmaz, 2006) and draws in new dimensions and perspectives to shape and colour the bricolage as described in following chapters. The retrospective analysis is intended to reconstruct and revise the local instructional theory and interpretive framework, synthesize theoretical understandings,

and come to understand “the specific characteristics of the investigated learning ecology in order to develop theoretical tools that make it possible to come to grips with the same phenomenon in other learning ecologies” (Gravemeijer & Cobb, 2006, p. 43).

To summarize, the phases used in this study as informed by Cobb, McClain, and Gravemeijer (2006), Gravemeijer and Cobb (2006), Reinking and Bradley (2004), and as confirmed in Reinking and Bradley (2008) are:

#### Phase One: Preparing for the Environment

1. Recruitment of school divisions, schools, and teachers, and meetings to discuss purpose and goals of study, researcher/participant roles and responsibilities, and parameters of the project.
2. Ethnographic methods to gather demographic data and create description of learning ecology; teachers are interviewed for their perspectives, beliefs, values, experience, background and to establish context for the study.

#### Phase Two: Design Experiment

1. Implementation of innovation.
2. Iterative cycle of design, apply, reflect and analyze, re-design.
3. Data gathering, analysis and reflection, reading, journaling to answer research questions.

#### Phase Three: Retrospective Analysis

1. Analysis of findings.
2. Writing up results.
3. Sharing with the field.

### **Action Research**

The mixed methods paradigm used in this study also draws upon action research in order to “support democratization processes” (Greenwood & Levin, 2007, p. 265) related to music and reading, particularly for struggling readers. The underlying philosophy of social justice and the collaborative nature of action research contribute to: the knowledge base of reading and music; a critique of practice intended to improve practice; the potential for self, professional, and organizational transformation; and equitable power relations and learning opportunities for study participants (Herr & Anderson, 2005).

Action research shares similarities with design research and both qualitative and quantitative design but “is different in that research participants themselves are either in control of the research or are participants in the design and methodology of the research” (Herr & Anderson, 2005, p. 1). The collaborative qualities of action research are important to this study in order to generate collective knowledge that is contextualized, practical, concrete, and meaningful (Greenwood & Levin, 2007). Researching practice in concrete, specific, collaborative, critical, and reflective ways focuses attention on the material, social, and historical conditions that produce and reproduce certain social and educational practices (Kemmis & McTaggart, 2005). Through an understanding of the processes and conditions that result in certain social and educational practice, researchers may be able to identify ways to transform practice through other and new “intentions, conditions, and circumstances” (Kemmis & McTaggart, 2005, p. 565).

The defining feature of action research is to generate “practical knowledge useful for sustainable organizational or community change” (Given, 2008, p. 139) through

“exploratory action” (Given, 2008, p. 4). There are a plethora of terms (Herr & Anderson, 2005) and a wide range of approaches (Greenwood & Levin, 2007) associated with the diverse field of action research. Some prominent, influential strands and terms include:

- “Action research” (seminal theoretical approach widely attributed to Lewin, 1946)
- “Action learning” (Revans, 1982)
- “Teacher-research” (Elliott, 1978; Lankshear & Knobel, 2004; Stenhouse, 1975)
- “Practitioner research” (Zeichner & Noffke, 2002)
- “Educational action research” (Carr & Kemmis, 1986; Zeichner, 2001)
- “Collaborative action research” (Feldman, 1993a, 1993b, 1999).
- “Participatory action research (PAR)” (Kemmis & McTaggart, 2005; McTaggart, 1997)
- “Pragmatic action research” (Greenwood & Levin, 2007)
- “Participatory evaluation” (House, 1993; Patton, 1986)
- “Action science” (Argyris, Putnam, & McClain Smith, 1985)
- “Action inquiry” (Torbert, 2001)
- “Collaborative/cooperative inquiry” (Heron, 1996, 2001)

The umbrella term action research is used in this study for the same philosophical and pragmatic reasons that Herr and Anderson (2005) use to support their choice of the term “action research” in their guide for the action research dissertation. Action research is used to describe inquiry “*by or with* insiders to an organization or community but never *to or on* them” (Herr & Anderson, 2005, p. 3). The generic term action research is chosen

for this study because it is common and familiar to many disciplines and fields and because it focuses attention on the centrality of action without limiting the positionality of the researcher as an insider or outsider to the research (Herr & Anderson, 2005).

Action research and design research share many characteristics. Like design research, action research is research that aims to generate and transform theory through action-oriented practice (Holly, Arhar, & Kasten, 2005; Kemmis & McTaggart, 2005). Both research approaches link theory and practice to find solutions to real, complex educational problems as they occur in their normal settings (Reeves, 2000). Both research approaches use an iterative, cyclical, and inquiry approach to design and analysis.

Action research is defined as an ongoing, spiral process of evaluation, reflection, planning, and action followed by further evaluation, reflection, and replanning intended to improve practice (Hendricks, 2006; Herr & Anderson, 2005; Kemmis & McTaggart, 2005; Stringer, 2004). The same process is central to design research. The reflective, inquiry process creates capacity “to generate and test new knowledge” (Greenwood & Levin, 2007, p. 6), an important characteristic of both action and design research as used in this study.

While action research and design research share many characteristics, Reeves (2000) distinguishes between action research and design research by the goals, purposes, and priorities of the research. While action research has the potential to extend and apply learnings beyond the immediate discrete problem and context under investigation, this is not the primary goal of action research. The priority for action research is to improve the research participants’ situation in practical ways that support democratic and sustainable

social change (Greenwood & Levin, 2007). The research team or researcher/practitioner generates knowledge and internal theory related to a specific practice in order to take action to promote change in that practice (Greenwood & Levin, 2007).

By contrast, the goal of design research is to generate and construct theories and principles specifically “to guide future design initiatives” (Reeves, 2000, p. 7). The design principles are derived from studying the pedagogical goals and processes of the intervention or innovation. My goals in this research include exploring democratic ways to enhance learning for study participants, in particular for struggling readers, and ways to generate design principles that may extend beyond the control and experimental classrooms to guide future educational design for other contexts. The research goals place this study in both action research and design research paradigms.

The participatory nature of action research also distinguishes it from design research. Greenwood and Levin (2007) define action research as the conjunction of action, research, and participation. Participation is a defining characteristic of action research but it may or may not be a feature of design research. Participation in action research often means that classroom practitioners solve problems related to their practice while engaging in inquiry of the problem and practice with others (Stringer, 2007). Huang (2010) believes that action research “requires researchers to work *with* practitioners” (p. 93) and that “action research *with* practitioners *always includes* practitioners as partners in the work of knowledge creation” (p. 95).

Kemmis and McTaggart (2005) define action research in terms of participatory action: “Participatory action research is a social process of collaborative learning realized by groups of people who join together in changing the practices through which they

interact in a shared social world” (p. 563). Kemmis and McTaggart (2005) observe that while not all action researchers place such emphasis on collaboration, “participatory action research is best conceptualized in collaborative terms” (p. 563). Greenwood and Levin (2007) likewise define action research as a collaborative research strategy and process that uses multiple methods in an “action design involving local stakeholders as full partners in mutual learning processes” (p. 1).

In this study, local stakeholders are not full partners in the inquiry process but they do collaborate to shape the learning design and analyze its effectiveness. On a continuum of researcher positionality in action research, this orientation is categorized by Herr and Anderson (2005) as “outsider(s) in collaboration with insider(s)” (p. 31) or as described by Collins (1986), the “outsider within” (p. S14). As a career music and early/middle years educator, I am an insider teaching music and reading to early years students in a school setting. However, as a doctoral candidate and researcher, I assume the stance of outsider in collaboration with the research participants.

It is the researcher who establishes the action research agenda, assumes responsibility for decision-making, designs the innovation, and implements problem-solving for the cycles of research activities. Collaboration is invited through teacher reflections, observations, and participation in the learning design activities; however, teachers are not engaged jointly in the planning and experiences. Because this research does not involve local stakeholders as full partners in the research inquiry, it does not meet all criteria of some definitions of action research. However, this study is constructed to support the ideologies of action research.

The ideologies of action research and design research may differ. Unlike design-based research, action research places issues of inclusion and empowerment at the forefront of the research design. The agendas and perspectives of the least powerful are fundamental to an explicit set of action research social values (Stringer, 2007). Action research processes are democratic, equitable, liberating, life-enhancing (Stringer, 2007), and empowering (Stringer, 2004). This study was conceived as a means of providing alternate reading pathways for those students who struggle with traditional forms of literacy learning. Issues of democracy and empowerment are important for this research. The ideologies and “social principles of action research” (Stringer, 2004, p. 30) are threaded with design research principles to guide construction of a democratic learning community that does not privilege any one particular set of learners or literacies.

The philosophy of action research is important to give meaning and purpose to the theory, design research, and subsequent action. Kemmis and McTaggart (2005) argue for a view of action research that draws on diverse disciplinary perspectives and multiple research methods and techniques to “illuminate different aspects of practices” (p. 575). They believe that such an approach “will increasingly come to characterize participatory action research inquiries” (p. 575). This study moves the beliefs of Kemmis and McTaggart (2005) into action.

### **Grounded Theory**

Constructivist grounded theory techniques are used to construct codes, categories, and concepts emerging directly from the data in order to build explaining theory for what happens and why (Charmaz, 1999, 2005, 2006). The pragmatist, multiperspectival stance of a research bricoleur (Kincheloe & Berry, 2004) supports a choice of analytical

techniques that draw on a variety of divergent and sometimes conflicting approaches to grounded theory (Charmaz, 1999, 2005, 2006; Corbin & Strauss, 2008; Glaser, 1998; Strauss & Corbin, 1998). Glaser (2002) vehemently argues against my choice of Charmaz's constructivist and storying approach to data analysis:

Again, absolutely NO, the GT [grounded theory] researcher does not “compose” the “story.” GT is not description, and the unfolding is emergent from the careful tedium of the constant comparative method and theoretical sampling—fundamental GT procedures. These are not story making, they are generating a theory by careful application of all the GT procedures. (p. 4)

I do not enter into this heated debate; instead I draw broadly on the methods outlined by Charmaz (1990, 1999, 2000, 2005, 2006), Corbin and Strauss (2008), Glaser (1992, 2002), and Strauss and Corbin (1990, 1998). My results report a careful analysis using grounded theory procedures drawn from all these authorities in storying ways that move beyond descriptive capture (Glaser, 2002). I draw on Glaser's (1978, 1998, 2002) and Glaser and Strauss' (1967) notions of theoretical sampling and constant comparative methods to discover and conceptualize latent patterns in data. I adopt procedures outlined in Strauss and Corbin (1998) for conceptual ordering but choose not to use axial coding to relate categories to subcategories. Instead I follow suggestions from Charmaz (2005, 2006) to construct focused coding and processes to develop and link categories and subcategories.

Memo writing, theoretical sampling, saturation, theory construction, and reconstruction follow processes common to Strauss and Corbin (1998) and Charmaz (2005, 2006). However, the underlying assumptions of symbolic interactionism and multiple social constructed realities are unique to Charmaz (2006). Symbolic interactionism is a pragmatic theoretical perspective that focuses on “the active processes

through which people create and mediate meanings” (Charmaz, 2006, p. 189). Processes and actions are emphasized and theorizing is viewed as an interpretive practice (Charmaz, 2006).

I acknowledge that the use and integration of prior theoretical knowledge is debated in the grounded theory literature. I do not pursue the advice of Glaser and Strauss (1967) to ignore the related body of theory and fact on the research phenomenon in order to avoid theoretical contamination of emergent categories. I also walk a different path to that of Strauss & Corbin (1998) who believe that a “researcher cannot enter an investigation with a list of preconceived concepts, a guiding theoretical framework, or a well thought out design” (p. 34). Instead, I take the stance that concept and design (Strauss & Corbin, 1990,1998) may emerge from the data within a guiding theoretical and structural framework.

Strauss & Corbin (1998) acknowledge that familiarity with the literature is often inevitable; prior knowledge and the literature can be used to develop sensitivity to meanings in data, as an analytic tool, to suggest ideas for theoretical sampling, and to “provide a rich source of events to stimulate thinking about properties and for asking conceptual questions” (p. 47). Charmaz (2006) continues this theoretical conversation and recognizes that researchers, including graduate students, “often have an intimate familiarity with the research topic and the literature about it” (p. 17).

Charmaz (2006) views familiarity and foundational theoretical understanding as points of departure, useful vantage points, perspectives, sensitizing concepts, and tentative tools for intensifying research focus and developing ideas. Charmaz (2005, 2006) accompanies this theoretical awareness with a caution that preconceived ideas and

theories should not be forced upon the data. Researchers must remain open to emerging data and follow leads defined in the data.

This discussion is broadened further by alternate approaches to grounded theory. Grounded theory analysis in this research is influenced by multi-grounded (Cronholm, 2005; Goldkuhl & Cronholm, 2003; Lind & Goldkuhl, 2006), hybrid inductive and deductive coding (Fereday & Muir-Cochrane, 2006) and abductive or reflexive (Alvesson & Sköldberg, 2000; Peirce, 1965; Rennie, 2000; Richardson & Kramer, 2006) approaches to grounded theory. These approaches resolve the tension between the use of pre-existing theories and emergent theory by integrating both so that theory is “empirically, internally and theoretically grounded” (Lind & Goldkuhl, 2006).

I began by coding interviews and field note data following Charmaz (2005, 2006). Initial codes were simple, precise, short, active, taken from data or close to the data, in vivo, pursued “telling terms” and developed from line by line coding (Charmaz 2005, 2006). The second major phase in coding consisted of focused coding (Charmaz, 2005, 2006; Glaser, 1978). Focused coding was used to “synthesize and explain larger segments of data” (Charmaz, 2006, p. 57) using the most significant and /or frequent codes from initial coding analysis.

Focused coding follows analytic direction established in initial coding to categorize data in conceptual, directed, selective, and incisive ways (Charmaz, 2006; Glaser, 1978). Charmaz emphasizes that this process is not a linear one. Understandings of data were sometimes made explicit up to two years later as ongoing data analysis, reading and reflection, email correspondence with collaborating teachers, discussions

with qualitative readers employed as second reader data analysts, and critical friends repeatedly returned me to the data to study it from new perspectives.

To strive for analytic precision, I coded for “processes, actions, assumptions, and consequences rather than for topics” (Charmaz, 1990, p. 1168). Data were then compared with data following procedures derived from Boeije (2002) to find commonalities, similarities and differences. Boeije’s process for constant comparison of data includes: 1) comparison within a single interview; 2) comparison between interviews within the same group; 3) comparison of interviews from different groups. Beginning with comparisons within individual pre-learning design teacher interviews, segments of data labeled with one code were compared to other segments similarly labeled to determine if interview data were merely repeated or if new aspects about that code were illuminated.

Data segments labeled with the same code were examined for common characteristics and properties, or where different, were examined for distinguishing and defining characteristics. A similar process was applied to comparing pre-interviews within and then across control and experimental groups. Interviews were compared for common and differing codes to determine similar and dissimilar beliefs, philosophies, experiences, contexts, educational issues, concerns, processes, actions, and consequences.

Codes were raised to categories using a process of constant comparison, questioning, and memoing (Charmaz, 1999, 2005, 2006). Categories are defined as the conceptual elements that form the basis of theory (Charmaz, 2006; Glaser & Strauss, 1967). Significant and related codes were grouped into conceptual categories based on distinguishing characteristics, conditions, and context. Categories were examined and compared to determine properties of the category.

Preliminary categories were used to begin theoretical sampling (Charmaz, 2006). Theoretical sampling involves “constructing tentative ideas about the data, and then examining these ideas through further empirical inquiry” (Charmaz, 2006, p. 102). Theoretical sampling is emergent and oriented to discovery. The meaning of categories is elaborated, variation between categories is discovered, and gaps among categories are defined (Charmaz, 2006). This is not the same thing as deriving themes from recurring patterns in the data. Charmaz warns that finding patterns that merely describe themes is a common error in grounded theory data analysis. In grounded theory approaches, data gathering and analysis is aimed not at themes, but at explicit development, elaboration, and refinement of theoretical categories and their relationships and processes as they emerge from theoretical sampling (Charmaz, 2006).

Following Charmaz (2005, 2006), I searched for comments, events, and cases from field notes and journals to illuminate the initial conceptual categories. Charmaz references Peirce’s (1931-1958) theories of abductive reasoning to describe how researchers take ideas that emerge from the experience under study, develop a hypothesis, and then return to the data and experience to compare data and empirically check the hypothesis. As I compared and questioned data from field notes and journals, additional dimensions emerged. In vivo coding, focused coding, and categories developed through memoing then led to the construction of new categories.

Through memo writing, I described how categories emerged and changed throughout the data and what they looked like in different contexts and classrooms (Charmaz, 2006). I questioned if categories accounted for the “full range of relevant experience” (Charmaz, 2006, p. 108). I explored properties, parameters, and variations of

categories. I asked “what actions, experiences, events, or issues” (Charmaz, 2006, p.109) explained how, when and why theoretical categories varied. I refined categories and aimed for memo writing that became increasingly “precise, analytic, and incisive” (Charmaz, 2006, p.110).

I followed Charmaz’s (1990) three steps for using memos to raise codes to conceptual levels (Charmaz, 1999, 2005, 2006). First, I made the decision that a category reflected a significant “process, relationship, event, or issue” (Charmaz, 1990, p. 1169). Secondly, I decided to follow up the category in subsequent data collection. Thirdly, I actively looked for connections between initial categories. Categories constructed from the pre-study teacher interview data were compared with emerging categories from the field note journal, categories constructed from post-study teacher and focus group interviews and with parent surveys to construct and refine theory.

Charmaz (2006) advises researchers to stop gathering data when categories are saturated. Charmaz warns that grounded theory saturation is not the same as continuing to find repeated patterns or “nothing new happening” (p. 113) in the data. “Categories are ‘saturated’ when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of your core theoretical categories” (Charmaz, 2006, p. 113). In this study, theoretical categories did not reach saturation until months after data were collected as new theoretical insights and properties continued to emerge from data.

Classic approaches to grounded theory (Glaser, 1978; Glaser & Strauss, 1967) examine data to identify what is happening and to discover the basic social or social psychological processes that account for variations in behaviour (Strauss & Corbin, 1990). The search for a basic social process is criticized as forcing data (Glaser, 2002).

However, Charmaz (2006) believes questions about social processes can be used as starting points and can provide “a more complete picture of the *whole* setting” (p. 23). Initial pre-study interview data results were not analyzed with the purpose of discovering the basic social process. Nevertheless, through questioning and constant comparison, a basic social process of “Teaching for Successful Learning” emerged as the theoretical starting point for construction of new grounded theories and a final grounded theory model as presented in Chapter Six.

### **The Semiotic Methods of C. S. Peirce**

The semiotic data analysis framework used for this study is based on the mature stage semiotic methods of Charles Sanders Peirce (pronounced *purse*) (1839-1914). My PhD coursework in semiotic theory and practice (Deely, 1982; Eco, 1976; Nöth, 1990; Peirce, 1965, 1992; Sebeok, 2001a, 2001b) informed the choice of semiotic frameworks used to analyze and understand how the sign system of rhythm might serve as a semiotic resource for creating and communicating meaning for both music and print literacies. I chose Peirce’s pragmatic, communicative, and interpretive theory of signs (Short, 2007) because this approach focuses on *processes* for meaning-making in all modes, rather than merely the structures for doing so. Peirce’s work in semiotics was driven by a desire for naturalistic, nonreductive inquiry into how humans make and communicate meaning in the world (Short, 2007). Using Peircean methods I was able to study not just the signs that create and convey meaning, but importantly, the action of those signs, and the impact of the action on print and non-print learning.

Charles S. Peirce, along with Ferdinand de Saussure (1857-1913), is considered one of the fathers of contemporary semiotics (Chandler, 2007). Both Saussurean and

Peircean approaches have been used in semiotic music analysis, however, “it is the Saussurean tradition that has the strongest legacy in musical studies” (Atkinson, 2007, p. 115). Tarasti (2002) suggests that both schools of semiotic thought are relevant and appropriate for analysis of music and both approaches can provide useful tools and concepts. Lidov (2005) offers a challenging opinion and argues that sound is supplanted by structure and has no significance in Saussure’s approach to semiotics. A semiotic analysis reliant only on linguistic structures is inappropriately applied to analysis of music (Lidov, 2005).

Saussure’s approach develops a standpoint for language analysis and Peirce’s approach sets out to discover the how and why of knowledge (Lidov, 1999). Language is not privileged in Peirce’s semiotics as it is in the structural linguistics approach of Saussure. I assume a Peircean stance for this research; language functions as just one system among many others (van Lier, 2004). Peirce’s approach to semiotics embraces all forms of sign-making, for example, print text, sound, image, movement, and gesture “to understand how people are connected to, and experience, the world” (Turino, 1999, p. 222).

In declaring the semiotic methodological approach I assume for this research, it is also important to state what I am not using. Short (2007) warns of systematic misinterpretations of the semiotic theories of Charles Peirce that combine the fundamentally incompatible doctrines of Peirce and Saussure. This clash of doctrines manifests itself in a variety of ways, one simple illustration being the common use of the Saussurean terminology signified and signifier in discourse referring to the semiotic triad of Peirce.

To avoid such dangers I examined primary sources: the *Collected Papers of Charles Sanders Peirce* (Peirce, 1931-1958), *The Essential Peirce: Selected Philosophical Writings* (Peirce, 1992, 1998), *Peirce on Signs* (Hoopes, 1991), the correspondence between Peirce and Victoria Lady Welby in Hardwick (1977), and authoritative secondary sources. From the authorities on Peirce's work, I chose Hausman (1993), Merrell (1997), and Short (2007). When I discovered Houser (2010) I used this source to reflect on, question, and confirm methodological choices and analysis.

I consulted rival Peirce authorities (Apel, 1981; Liszka, 1996; Morris, 1938, 1968) and scrutinized models created by Boilès (1982), Nattiez (1973, 1977, 1990), and Reiner (2000). I investigated semiotic analysis specifically informed by Peirce: Agawu (1991), Hatten (1994, 2004), Karbusicky (1987), Lidov (2005), Monelle (1992, 2000), Tagg (1982, 1987, 1992), Tarasti (1994, 1995, 1996, 2002), and Turino (1999). In particular, I am indebted to Turino's (1999) application of Peircean semiotics to demonstrate the meaning-making potential of music.

In educational research, the semiotic methods of Peirce are found mainly in the area of mathematics research (Bakker & Hoffman, 2005; Radford, Bardini, & Sabena, 2007), literacy (Siegel & Wells Rowe, 2011) and music (Goble, 2009; Turino, 1999). Applications of Peirce's principles of diagrammatic reasoning informed my data analysis (Bakker & Hoffman, 2005) as did mathematical tool analysis (Radford, 2002). In this research, I use the basic semiotic tools Peirce describes in his mature stage writings to discover and analyze the sign qualities, functions, interrelationships, elements, and processes used for meaning-making in the five experimental classrooms of this study, as informed by the Peircean authorities cited.

Peirce's language and terminology has been criticized for being irritating, technical, old-fashioned, and peculiar (Lidov, 2005) yet Peirce's theories remain current and relevant to education, print literacy, music, and educational research (Albers, Vasquez, & Harste, 2011; Elliot, 2009; Goble, 2009; Lidov, 2005; Siegel & Wells Rowe, 2011). In a recent edition of the *Handbook of Research on Teaching the English Language Arts*, Siegel and Wells Rowe (2011) "believe Peirce's theory of semiotics has a surprising resonance with contemporary literacy practice and thus offers greater potential [vs. Saussure] for understanding texts" (p. 202). However, the language and tools of Peirce's semiotics is inarguably complex, occasionally convoluted, and necessitates some introductory detail to create meaning for the semiotic data analysis framework.

A description of Peircean semiotic methods begins with the sign, the tool that is central to all Peirce's semiotics' categories and typologies. The usual definition of semiotics is that it is the study of signs. Or, that "signs are the universal form of meaning" (Ehrt, 2005, p. 14) and "all the world's a sign." Peirce's famous statement is often quoted: A sign "is something which stands to somebody for something in some respect or capacity" (Peirce, 1965, 2.228). Copley (2010) offers a more nuanced definition: Semiotics is "an enduring enquiry into the boundaries of illusion and reality, a practice of interrogating signs which has borne fruit from the pre-Socratics to the present" (p. 5).

According to Peirce, signs are interpreted differently depending on their context or application (Pietarinen, 2006). The many possible ways in which signs are interpreted for meaning and the "multiple universes of discourse" (Pietarinen, 2006, p. 429) are key to the Peircean theory of semiotic communication and to the inquiry and social semiotic practices of this research. In contrast to the dyadic, arbitrary, and linguistic-based

semiotic model developed by Saussure, Peirce characterizes the meaning-making sign as triadic, active, and dynamic (Hausman, 1993).

The goal of this research is to interrogate signs. The Peircean practice of interrogating signs, or semiotics, is the study of meaning-making, how meaning comes to be, and how it is communicated in a socially constructed world. Meaning-making begins first with signs, perceived from concrete or abstract forms. Print text may act as a sign; the sound of the beat may act as a sign; a thought or feeling may act as a sign. However, a sign only functions as a sign if it is perceived and interpreted to be a sign. The act of perception and interpretation can be illustrated using the example of smoke and fire.

The illustration of smoke and fire is also used to outline the difference between the dyadic semiotic and structural linguistic semiology of de Saussure and the multimodal triadicity of Charles Peirce used in this study. The Saussurean dyadic relationship between signifier and signified is illustrated in Figure 4. In Peircean terms, the smoke is the sign or representamen and the thing to which it is referring (fire) is the object. From a Peircean perspective, the object fire cannot be seen, but the smoke is a sign that the fire exists. The meaning-making potential is not realized in Figure 4. A third element is needed to complete the sign as presented in Figure 5.



(Al\_HikesAZ, 2010).



*Figure 4.* The Saussurean dyadic relationship of the sign.

Smoke does not become an active thought-sign or a meaning-making resource, until it is interpreted in some way (Hausman, 1993). “Until a third thing is introduced into the relation—something that mediates between the two things by interpreting one as the sign of another—no genuine sign can be said to function” (Hausman, 1993, p. 59). It is this “third thing” that distinguishes the Peircean approach to semiotics and makes this approach so useful for analyzing meaning-making potentials. Peirce describes this “third thing” as the “interpretant” (Peirce, 1965, 2.228).

The term interpretant is often misunderstood and is described in various ways throughout the literature. It is important to clarify that the interpretant is not a person or

concrete thing nor can the term be translated as interpreter or interpretation. Merrell (1997) coins interpretant “translation-as-meaning” (p. 15) and Danesi (2004) calls the interpretant “ $x = y$ ” (p. 26), if representamen =  $x$  and the object =  $y$ . Hoopes (1991) describes interpretant as the “thought, to which the sign gives rise” (p. 12) and Short (2007) says “the interpretant is a response to the sign that the sign elicits” (p. 18). Monelle (1991) uses Greenlee’s (1973) definition that an interpretant is any sign that interprets another sign, for example, a thought or idea articulated in the mind, orally, or in print, or anything else that can serve as a interpretive act. I believe the definitions above support my understanding of interpretant to be an act/effect of interpretation, or a mediated effect.

This discussion and debate is crucial to this study’s methods. Understanding the notion of interpretant is central to Peirce’s semiotic theories. These theories subsequently inform Halliday’s (1985, 1994) theories of systemic functional grammar and linguistics, the multimodal theories of Jewitt (2006) and Jewitt and Kress (2003), and Unsworth’s multimodal semiotics (2008), all of which inform frameworks used in data analysis for this research. Peirce is given the final word on the discussion of the role and importance of the interpretant: “A mediating representation may be termed an interpretant, because it fulfills the office of an interpreter, who says that a foreigner says the same thing which he himself says” (Peirce, 1868, sec. 9)

Peircean theories are widely interpreted, differently defined in the literature, and use a vast array of conflicting terminology. Interpretations of Peirce’s work are complicated by Peirce’s elaborate and complex typology, many changes of conception and terminology (Short, 2007), his ever-evolving semiotic theories and many

incompletely developed ideas. However, through it all, Peirce's (1965/c. 1897) definition of the basic structure of the sign remains consistent:

A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object*. (2.228)

The smoke in the image is the sign, representamen, or sign-vehicle, standing to somebody for the object, fire. The object and sign together will create yet another sign in the mind of the person viewing the smoke. This interpretive act together with the effect created by this act is called the interpretant. The interpretant effect will be different depending on the history, background, experience, knowledge, mood, context, and a host of other factors affecting the person viewing the smoke. The effect may be individual or community and include physical response, feeling, sensation, thought, voiced ideas, or ideas expressed in any variety of modes (Turino, 1999). The smoke will mean one thing to a firefighter or community of firefighters and another to the professional photographer who captured the image of the smoke. For example, meaning mediated for the firefighter or community of firefighters in Figure 5:

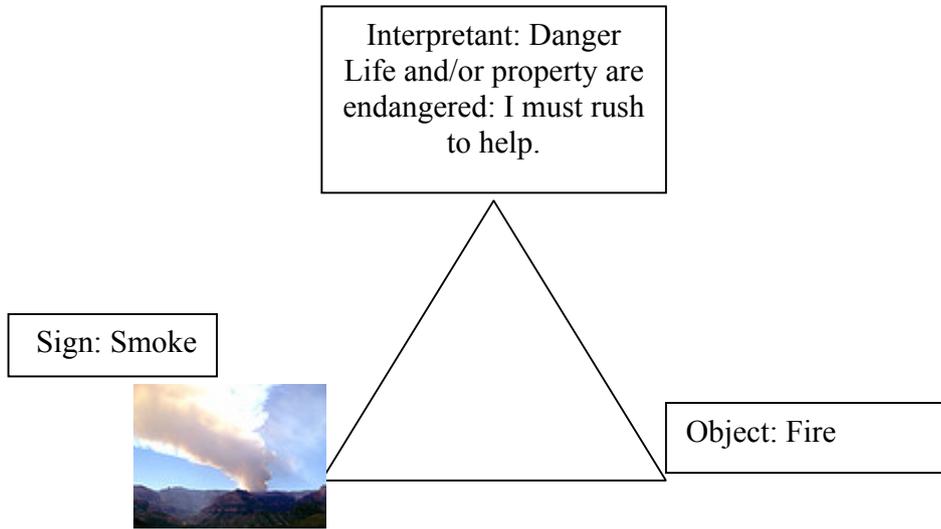


Figure 5. Peircean mediated effect from firefighter’s perspective.

Meaning mediated for the professional photographer in Figure 6:

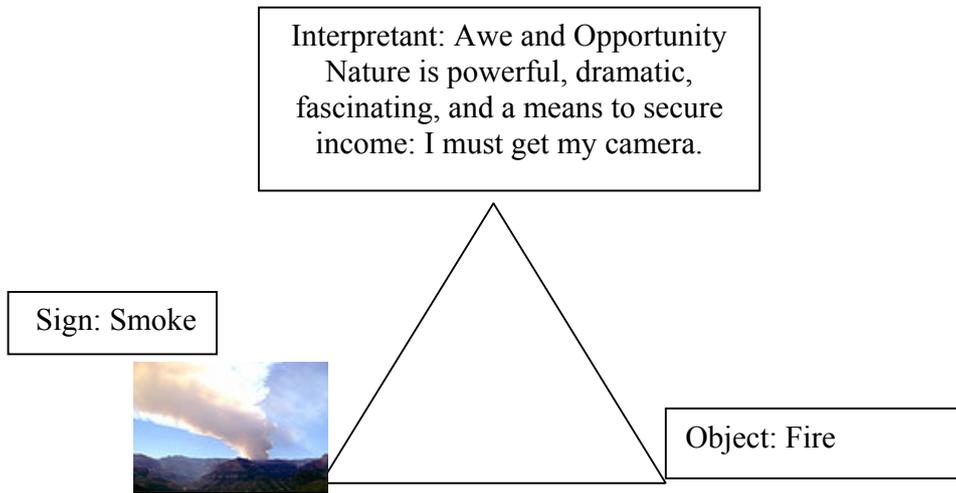


Figure 6. Peircean mediated effect from a professional photographer’s perspective.

The term “sign” is used in confusing ways in both academic and popular literature and Peirce himself uses different terminologies to mean the same thing. The word sign is sometimes used by Peirce to stand for both the mediated sign and the representamen (Chandler, 2007). As Atkin (2006) succinctly remarks, “We appear to be saying that there are three elements of a sign, one of which is the sign” (para. 1.1). Adding to the confusion, Peirce does not provide a term for the “trio of sign, object, and representamen taken as a whole” (Lidov, 1999, p. 91).

In attempts to avoid confusion about what is meant by the terminologies for Peirce’s sign, I use the Peircean term representamen, or the term sign-vehicle for the element that Peirce describes as “something which stands to somebody for something” (Peirce, 1965/c. 1897, 2.228); the term object is used to denote the element that stands for something, and I use the term interpretant to mean the act of interpretation or mediated effect.

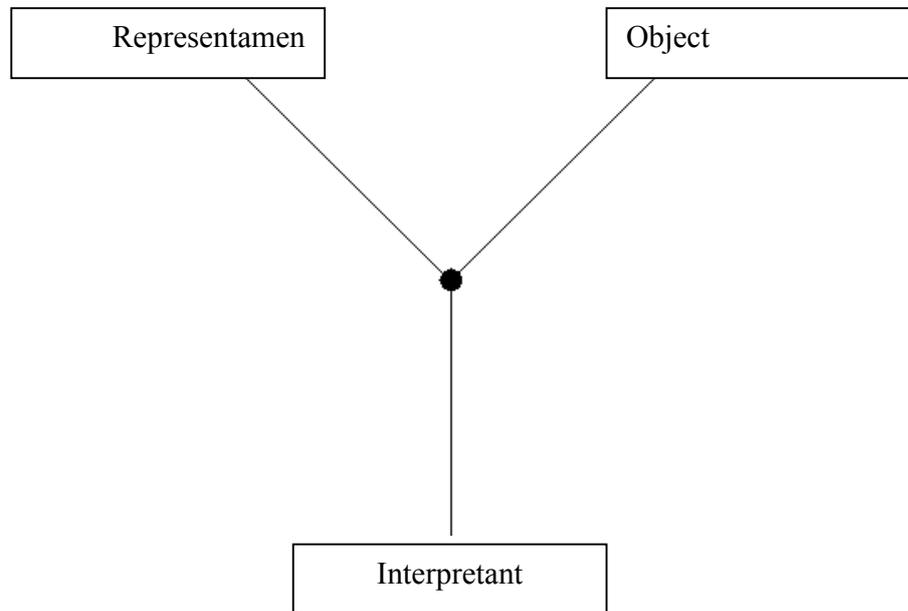
The holistic notion of the sign action together with the meaning made of the Peircean triad, I name the teirce (pronounced turse). I am supported in this by Peirce’s words to Lady Welby: “You know that I particularly approve of inventing new words for new ideas” (Hardwick, 1977, p. 23). I use the term teirce to refer to the mediated meaning of the triad, as well as the triangle and spoke-shaped diagrams of the semiotic process presented below. The term teirce is derived from the English word tierce (an interval of a third) and also serves as homage to Peirce, music, language, and the infinite, creative possibilities of semiosis.

Semiosis is inherent in the Peircean notion of triadicity. The semiotic triad is an interrelated, continually evolving, active, and infinite process. “All three sign components

are, are becoming, or will become... signs themselves in their own turn” (Merrell, p. 133). The interpretant becomes the sign-vehicle for yet another and different object in an emergent, theoretically limitless, complex, variable, semiotic process of meaning-making known as semiosis (Innis, 1985, p. 1).

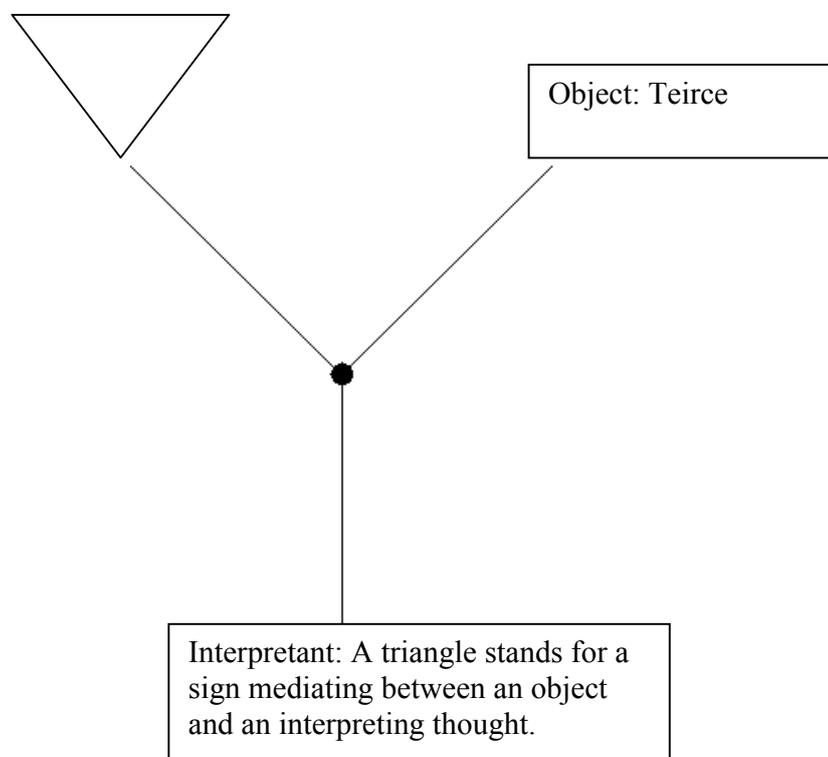
Semiosis is a crucial aspect of human meaning making and for children’s understanding of the world (Danesi, 2004). The discovery that signs are meaningful tools for socially constructed meaning-making and communicating, grants children access to their cultural knowledge domains (Danesi, 2004). Thought-signs act on one another through the interpretative process of semiosis (Hausman, 1993). It is this interpretive process, rather than a focus on discrete, isolatable elements like representamen and object, that brings together conceptual, causal, and qualitative interpretations and their interrelationships (Lidov, 2005).

There are multiple visual models used to illustrate this triadic relationship. Peirce himself did not provide a visual model and the closed triangle frequently used by authorities today, for example Danesi (2004) and Chandler (2007), is typically attributed to Ogden and Richards (1923). In this study, the evolving, outward, interrelated, changing, and interpretive nature of the sign is represented by either a tripod, spoke-shaped structure (Figure 7) adapted from Merrell (1997) and van Lier (2004), or the conventional triangle shape depending simply on which diagram is most convenient or easy to use for the purpose. However, I invert the triangle shape to keep the triadic elements spatially consistent.



*Figure 7.* Components of the Peircean triad.

The sign structure can take any form. As long as prior knowledge provides sufficient semiotic material to create an understanding of the process that Peirce says, “involves a sign, or representamen, of some kind, outward or inward, mediating between an object and an interpreting thought” (Peirce, 1965/c.1897, 1.480), any structure or arrangement that serves as the catalyst for this thinking will suffice as illustrated below (Figure 8).



*Figure 8.* Triangle used as the sign-vehicle referring to the object of teirce with a resulting mediated effect of a triangle shape taken to mean sign.

Peirce's semiotic is a highly networked system that is only meaningful when the separate and discrete parts are viewed within the comprehensive whole system for meaning-making and communicating. With the teirce established as the foundation of the semiotic data analysis framework, the teirce will now be placed within the larger context of Peirce's theories and sign classifications used in this study. Peirce conceived an elaborate, complex, and comprehensive typology of signs (Short, 2007) but only ten are considered within the scope of this study. Peircean sign classifications and categories are grounded in three universal phenomenological categories that Peirce names Firstness,

Secondness, and Thirdness (Peirce, 1998). In describing this trichotomy, Peirce is arguing for ways of being, perceiving, feeling, thinking, understanding, and communicating about and in the entire, lived world. This categorical trichotomy is considered fundamental and integral to Peirce's theories and analysis (Hausman, 1993; Short, 2007).

Peirce defines Firstness as a quality of feeling. Firstness is "sheer thisness, or existence, of things" (Hoopes, 1991, p. 10). Peirce (1998) calls this mode of being "that which is such as it is" (p. 267). Qualities of Firstness include objects, things, being, thoughts, immediate sensations and emotional responses without cognitive interpretation or analysis. The feeling of love at first sight, a sudden, sharp pain, the taste of a lemon and the yellowness of the lemon, are all examples of Firstness.

Firstness is its own entity, oneness, and when inactivated or unmediated, has no relationship with anything else. The key understanding is that qualities or phenomena are actually experienced not conceptualized (Short, 2007), as for example, the undisputed fact and experience that water is wet. Peirce uses music to illustrate the notion of Firstness (Tarasti, 2002). Our primal, sensorial or emotional response to the sound of music without any terms of reference such as knowledge of the piece, composer, context, or purpose, is Firstness.

Secondness is centered in reaction and relation and connects one thing to another as it exists in actuality and at the level of experience (Monelle, 1991). Secondness is characterized by dynamic, referential relationship between things (Hoopes, 1991). Secondness can involve action-reaction (Houser, 1992), effort-resistance (Pietarinen, 2006) and cause and effect (Short, 2007). The relationship is dyadic and dependent

(Short, 2007) as for example, the sound produced when a drum is hit. Like the category of Firstness, the modes of being in Secondness do not involve interpretation.

Thirdness is the meaning-making, communicative category. Semiosis is the paradigmatic example of Thirdness. Peirce believed the category of Thirdness was crucial for meaning-making. Peirce defines a third as “something which brings a first into relation to a second” (Hardwick, 1977, p. 31). Thirdness requires an “other” and is interpreted, mediated phenomena. It is this phenomenological understanding that moves Peircean thought away from Cartesian views on subject-object, mind-body, thoughts-emotion dualism (Barker, 2005; Merrell, 1997). Peirce describes Thirdness as the semiotic condition “by which phenomena are interpreted and thus rendered intelligible” (Hausman, 1993, p. 108).

The trichotomy of Firstness, Secondness, and Thirdness is “reflected at all levels of Peirce’s sign theory” (Tarasti, 2002, p. 10). Each phase depends on the other. A relationship cannot exist unless there is something to relate to. An interpretation can’t be made unless there are things to interpret (Hausman, 1993). This means that all signs and effects classified as seconds will also include signs that are considered first; all signs and effects classified as thirds will also include signs that are seconds and firsts (Turino, 1999). ”Each category, then, is a necessary condition or presupposition for a richer or more complex conception or category” (Hausman, 1993, p.102).

Danesi (2004) interprets Firstness, Secondness, and Thirdness as the semiotic interconnections between body, mind, and culture. Danesi (2004) practicalizes Thirdness by saying it results when “the sign itself becomes a source of knowledge about the world” (p. 18) once it enters the culture of the user, and is available and distributed for general

and practical use (Danesi, 2004). When the source of knowledge, the meaning, functions as a universal, it becomes Thirdness. This is what I believe Peirce means when he defines Thirdness as “a general law that governs possible instances” (Keane, 2003, p. 420).

**Three trichotomies of sign classification.** The semiotic framework used in data analysis includes the triadic sign and its subsequent division into yet another set of three trichotomies of sign classification, interrelationships, and function (Table 13) all grounded in the three fundamental, universal categories of Firstness, Secondness, and Thirdness. These classification types are not types of signs, but rather should be considered as modes of relationship (Chandler, 2007).

The first trichotomy of signs is the division of the sign-vehicle or representamen itself. The representamen or sign-vehicle is one of three types: qualisign, sinsign, or legisign. The second trichotomy of signs relates the representamen to its object in one of three ways: as an icon, index, or symbol. The third trichotomy of signs is the manner in which the representamen or sign-vehicle is mediated. The interpretant mediates the sign as a: rheme (possibility), dicent (fact), or argument (reason) (Peirce, 1965, 2.243-2.265).

Table 13. *Three Trichotomies of Sign Classification*

Ontological Category	Subdivisions of the Sign		
Trichotomy I A representamen is a:	<i>1. Qualisign 2. Sinsign 3. Legisign</i>		
Trichotomy II A representamen relates its object by being a(n):	<i>1. Icon</i>	<i>2. Index</i>	<i>3. Symbol</i>
Trichotomy III A representamen's interpretant mediates the representamen as a(n):	<i>1. Rheme</i>	<i>2. Dicent</i>	<i>3. Argument</i>

The classification of signs in each trichotomy moves from relative Firstness to Thirdness (Turino, 1999). The first sign in each trichotomy subdivision belongs to the category of Firstness; the second element belongs to the category of Secondness; and the third element in each trichotomy belongs to the category of Thirdness (Table 14).

Table 14. *Relationship between Ontological and Phenomenological Categories*

Ontological Category	Phenomenological Category of Firstness	Phenomenological Category of Secondness	Phenomenological Category of Thirdness
Trichotomy I A representamen is a:	1. <i>Qualisign</i>	2. <i>Sinsign</i>	3. <i>Legisign</i>
Trichotomy II A representamen relates its object by being a(n) :	1. <i>Icon</i>	2. <i>Index</i>	3. <i>Symbol</i>
Trichotomy III A representamen's interpretant mediates the representamen as a(n):	1. <i>Rheme</i>	2. <i>Dicent</i>	3. <i>Argument</i>

**Classification of signs.** The sign classification definitions and descriptions are presented in Table 15. In Trichotomy I the qualisign represents essential or inherent quality as described by characteristics of Firstness. The sinsign is the instance of an actual existent representamen; and the legisign is a general agreed upon type, convention, or habit (Peirce, 1965, 2.243-2.246; Hardwick, 1977).

In Trichotomy II the representamen and the object are all related in some way as represented by the icon, index, and symbol. This means that the representamen and object can be related in phases of Firstness, Secondness, or Thirdness. An icon, such as a

portrait, resembles or expresses similarity to the object that it stands for. An indexical sign is one in which there is a real relationship or reaction between sign and object and one affects and refers to the other, as for example, the earlier images of the smoke and fire. The symbol is a sign of law, generally or culturally accepted habit, or convention (Peirce, 1965, 2.247-2.249). Words are generally symbolic conventions, as are signs associated with specific religious, social, or political groups.

The third trichotomy features ways that the sign-vehicle is mediated and interpreted. The rheme, as a First, only refers to the qualities of the representamen which then could be related to the object in a generalized way. Peirce calls a rheme simply a class-name or proper-name. The dicent, a second, is a sign of actual existence and unlike the rheme, the dicent relationship between representamen and object is concrete and actual. The argument, a third, represents a sign of law, convention, or generalization (Peirce, 1965, 2.250-2.253). Further examples of the sign classifications are provided in Table 15 below.

Table 15. *Sign Classification Definitions*

Ontological Category	Phenomenological Category of Firstness	Phenomenological Category of Secondness	Phenomenological Category of Thirdness
Trichotomy I A sign is a:	1. Qualisign, essential, inherent quality e.g. redness.	2. Sinsign, the instance of actual, existent representamen e.g. a red dress.	3. Legisign, a habit, convention or general type determined by users e.g. colours.
Trichotomy II A sign that references its object by being:	1. An Icon, an analogous relation e.g. a portrait that resembles the object it stands for	2. An Index, an existential relationship e.g. the causal relation or reaction between representamen and object such as smoke and fire	3. A Symbol, e.g. a word or number that has a particular arbitrary generalized meaning, rule, or convention as determined by users
Trichotomy III A sign's interpretant mediates the sign as a(n):	1. Rheme, a qualitative possibility or object e.g. a common noun like car that is judged neither true or false but is simply possible	2. Dicent, an indication of actual existence affected by its object such as a weathervane	3. Argument, e.g. generally and culturally accepted convention, rule, reasoning, knowledge such as a red light means stop.

Subsequent subdivisions of the sign are beyond the scope of this study with one exception. A subdivision of the icon is used in semiotic data analysis of this study. Peirce divides the icon roughly into images, diagrams and metaphors. Images are related to qualities of Firstness; diagrams represent analogous, dyadic relationships; and metaphors represent a parallelism in something else (Peirce, 1998).

The concept of diagrammatic reasoning is derived from understandings of the function of icon as a diagram and has been used for mathematics education research data analysis (Bakker & Hoffman, 2005). Notions of diagrammatic reasoning inform semiotic data analysis of beat and rhythmic notation for this study as presented in Chapter Seven.

Any sign can be made up of multiple combinations of elements “to better comprehend the full character of a given sign” (Turino, 1999, p. 230). Ten sign combinations are in common use and form part of this study’s data analysis. Moving from Firstness to Thirdness, Peirce’s ten classes of signs based on combinations of elements from the three sign function trichotomies are: qualisign iconic rheme, rhematic iconic sinsign, rhematic indexical sinsign, dicent indexical sinsign, rhematic symbolic legisign, dicent symbolic legisign, and argument.

Peirce’s semiotic tools are applicable and useful for analysis of all semiotic systems of meaning-making and communicating, including music and print text literacies. Peirce’s conception of the sign as a “charged moment of interpretation” (Lidov, 2005, p. 129) to connect body, mind, and culture (Danesi, 2004) is what makes Peirce’s methods important. “If we care about interpretation, we may still need Peirce” (Lidov, 2005, p. 129).

### **Systemic Functional Linguistics and Multimodal Analysis**

Kress and van Leeuwen (2001) insist that a semiotics can only adequately describe a multimodal world if it includes all modes and forms of meaning-making and meaning-making potentials of the culturally produced semiosis. They ask:

What modes are used and therefore what materials are invoked, and therefore, what are the senses which are involved?... What difference in kinds of meaning is produced in the use of different modes and materials....to what extent do specific modes have linguistic analogues or translations, and to what extent (how fully) are the materials which are used articulated as modes? (p. 28)

Kendra, Classroom C collaborating teacher, posed similar questions to me (Chapter Five) before the learning design began. To answer her questions, I turned to systemic functional linguistics (Halliday 1973, 1978) and multimodal analysis (Jewitt,

2006; Jewitt & Kress, 2003). The pathway from a Peircean semiotic fervently not grounded in the structures and systems of linguistics to one that is firmly rooted in the structural linguistic tradition of Saussure (Halliday, 2003) may seem a strange one.

Although systemic functional theory originates in European linguistic traditions developed from Saussurean structures (Halliday, 1994), Halliday and colleagues (Halliday, 1973, 1978, 2004; Halliday & Hasan, 1976, 1985; Halliday & Matthiessen, 1999; Martin, 1992; Martin & Rose, 2003) moved systemic functional theory away from its Saussurean roots by focusing on social semiotic, functional, and semantic language usage rather than on a formal, syntactic, code or rule-based grammar. The conceptual framework for systemic functional linguistics reverses the traditional direction of structural linguistics (Halliday, 1985). A traditional focus on linguistics explores language forms and meanings of form. Systemic functional linguistics explores how meanings are expressed within the social context in which the forms for meaning-making are used (Halliday, 1985, 1994, 2004, 2009).

The conceptual framework is functional in three ways: 1) every text unfolds and is explained by its context of use; 2) each element in language is organically functional and viewed as part of the whole system; and 3) all languages are organized around three fundamental components of meaning (Halliday, 1985, 1994, 2004). The three fundamental components of meaning in language are ideational, interpersonal, and textual. Halliday (2004) calls these components “metafunctions” (p. 29) and describes them as the purposes underlying language use.

The metafunctions are broadly considered realms of understanding (Halliday, 1993), reminiscent of Peirce’s universal categories. Like Peirce before him, Halliday

viewed the components of his metafunctional triad working together in integrated relationships for meaning-making and communicating meaning. Ideational meaning is distinguished by logical and experiential modes of meaning (Halliday, 1993, 2004). Experiential meaning refers to the ways in which the processes of the outer world and inner consciousness represent human experience; logical meaning refers to the interdependent logical/semantic relationships between experiential processes (Halliday, 1993).

Meaning is at once both “construing experience and enacting interpersonal relationships” (Halliday, 1993, p. 101). The metafunction of interpersonal meanings includes how the language or mode positions the users of that mode and their attitudes towards the experience. The interpersonal component enables interactions between the users of the language or mode (Unsworth, 2000). The nature of the interpersonal interactions and relationships affects the ways that meaning is made, exchanged, and sustained (Halliday, 1993, 1994, 2004).

Textual meaning, the third metafunction, is described by Halliday (1993) as the multidimensional space created by the intersection of the ideational and interpersonal metafunctions. “Construing experience and enacting interpersonal relations—depend on being able to build up sequences of discourse, organizing the discursive flow and creating cohesion and continuity as it moves along” (Halliday, 2004, p. 30). Taken together, the metafunctional modes of meaning signify that “every message is both about something and addressing someone” (Halliday, 2004, p. 30) and is enabled or facilitated through the construction of the discourse or text (Halliday, 2004).

Halliday's metafunctional components and contextual variables have been related to the triads of Charles Peirce (Sowa, 2001). Like Peirce, Halliday associates the tri-functional broad conceptualization of meaning to another triad of related contextual components. Halliday (2002) maintains that "every act of meaning [metafunction] has a *context of situation*, an environment within which it is performed and interpreted" (p. 201). The context of situation for any act of meaning can be described in terms of the "*field* of social process, the *tenor* of social relationships and the *mode* of discourse" (Halliday, 2002, p. 201). Halliday (2002) operationalizes field, tenor, and mode for the analysis and interpretation of text:

The "field" is what is going on: the nature of the social-semiotic activity. The "tenor" is who are taking part: the statuses and mutual roles of the interactants. The "mode" is what part the language is playing: the rhetorical and communicative channels. (p. 283)

Field, tenor, and mode influence the act of meaning for any context of situation. The social activity and the content or theme of the field determines ideational meaning; the relationships among participants determine interpersonal meanings (Halliday, 2002). The language and role of language used in acts of meaning, whether written, oral, image, space, movement, aural or music texts, determines textual meaning.

The meaning components and contextual variables are based on systemic theory derived from Firth (1968) and Hjelmslev (1961) and drawn from ideas from the Prague School of linguists (Halliday, 1985). Halliday (2003) described systemic theory as the "study of systems and processes of meaning" (p. 436). Halliday (1994) defined the construct of system network as "a theory about language as a resource for making

meaning. Each system in the network represents a choice: not a conscious decision made in real time but a set of possible alternatives” (p. xxvi).

The set of possible alternatives for meaning-making is extended by multimodal theorists and researchers beyond just the meaning potential of language to include multiple modes or resources for making meaning (Kress & van Leeuwen, 2001). Halliday’s approach to meaning potential, like Peirce’s, is inclusive of music and other semiotic resources. Halliday and Hasan (1985) acknowledge that “there are many other modes of meaning, in any culture, which are outside the realm of language” (p. 4). Language is just one semiotic system among a range of many possible interrelated semiotic systems or modes of meaning that include “painting, sculpture, music, the dance, and so forth” (p. 4). Unsworth (2008) uses the modally inclusive perspective of Halliday and Hasan (1985) as an argument to support the appropriateness of systemic functional linguistics for multimodal theory:

This conceptualization of language as one of many different interrelated semiotic systems, and hence the assumption that the forms of all semiotic systems are related to the meaning-making functions they serve within social contexts, indicates the strength of SFL in contributing to frameworks for the development of multimodal and intersemiotic theory. (p. 2)

Systemic functional linguistics have been used to develop multimodal and intersemiotic theory in a variety of contexts, beginning with the pioneering multimodal analysis of image by Kress and van Leeuwen (1990, 1996) and the systemic functional analysis of architecture by O’Toole (1994). The work of Kress and van Leeuwen (2001) is viewed as a definitive approach to multimodal analysis and serves as the origin of the expression “multimodality” as a discourse analytic term (Iedema, 2003). A wealth of research now exists that is influenced by or uses SFL to analyze multimodal meaning-

making in various contexts, as for example: sound and music (van Leeuwen, 1999), visual art (O'Toole, 1994), image (Caple, 2008; Kress & van Leeuwen, 1996), film (Pun, 2008; Kress & van Leeuwen, 1996; Tseng, 2008), gesture and movement (Martinec, 2000), documents (Bateman, 2008), space (Jones, 2008; O'Toole, 1994, 2004; Ravelli, 2006; 2008; Stenglin, 2008; van Leeuwen, 2008), gaze (Lancaster, 2001), and multimedia and digital technology (Connolly & Kress, 2011).

Educational researchers have engaged in multimodal social-semiotic data analysis through disciplinary and multidisciplinary lenses: science (Kress, Jewitt, Ogborn, & Tsatsarelis, 2001; Lemke, 1998; Halliday & Martin, 1993; Martin & Veal, 1998), mathematics (O'Halloran, 2005), English (Kress et al., 2004), and multi and transdisciplinary learning (Baldry, 2001; Hodge & Kress, 1988; Jewitt, 2006; Kress & van Leeuwen, 2001; Unsworth, 2008).

Although multimodality is an emerging theory and methodology, there are a number of texts that guide multimodal data analysis and provide possibilities for analysis frameworks: (Baldry & Thibault, 2004; Jewitt, 2006, 2009; Jewitt & Kress, 2003; Kress, 2010; Kress & van Leeuwen, 2001; Matthiessen, Teruya, & Lam, 2010; Norris, 2004; O'Halloran, 2004; Royce & Bowcher, 2007; Stein, 2008; Ventola, Charles, & Kaltenbacher, 2004; van Leeuwen, 1999). I use data analysis methods developed by Halliday (1978) and elaborated by Eggins (2004), Jewitt (2006), Jewitt and Kress (2003), Kress and van Leeuwen (2001), and Norris (2004, 2006) to analyze the systems and processes of multimodal meaning in the learning design of this study. Primary sources were examined (Halliday, 1985, 1989, 1994, 2002, 2003, 2009) as were interpretations of

Halliday's work (Eggins, 2004; O'Halloran, 2004; Thompson, 2004; Ventola, 1991; Young & Harrison, 2004; Unsworth, 2008).

In order to evaluate the meaning potential of the multiple modes used in this study, the kinds of meanings produced, and the way in which these meanings were produced, I examined each mode for ideational meaning, interpersonal, and textual meaning as determined by the context of situation and the variables of field, tenor, and mode. I created a set of evaluative questions based on Kress & van Leeuwen (2001). For each learning event I asked:

1. What modes are foregrounded in this event?
2. What modes are used for what purpose?
3. What is the functional load of each mode? (Jewitt & Kress, 2003)
4. How are modes interpreted and by whom?

I added these questions gleaned from Kress (2003) and Kress & van Leeuwen (2006):

5. What (if any) processes are transformative?
6. What (if any) processes are transductive?

I include questions five and six to address concerns expressed in the literature that Halliday's functional linguistic approach is too producer-oriented, structurally determined, and excludes expressiveness and creativity (van Leeuwen, 2005).

Transformative and transductive processes are inherently creative. Transformation involves the reshaping of multimodal forms and structures by the user of the modal resource; transduction accounts for shifting of semiotic material from one mode to the other (Kress, 2003).

I interpret transduction to be a process of cross-modal semiosis, or meaning-making mediated across and through different sign systems. Suhor (1984) calls this a process of transmediation (1984) and the term has been used by others (Berghoff, Egawa, Harste, & Hoonan, 2000; Siegel, 1995, 2006; Sipe, 1998) to describe the process of “taking understandings from one sign system and moving them into another in order to make meaning” (Semali, 2002). The terms transduction and transmediation are used interchangeably in this data analysis framework. The processes of transformation and transduction (transmediation) result in creative, innovative, and imaginative classroom spaces (Kress, 2003).

And finally, I included a question derived from one of three theoretical notions that make up Norris’ multimodal discourse analysis framework (2004, 2006):

7. What modal density is represented?

Norris (2006) describes modal density as “the modal intensity or modal complexity that makes up a specific higher-level action” (p. 402). Norris uses the example of speaking on the phone as compared to making dinner to illustrate modal intensity. The mode of spoken language takes on high intensity during a phone conversation but may take on low intensity while preparing dinner. However, the act of preparing dinner may represent high modal density as the complex action of making dinner may require many interconnected modes.

### **Activity Theory**

Jewitt’s (2006) framework for multimodal analysis integrates activity theory (Engeström, 1987; Daniels, 2001) with Halliday’s (1978) notions of metafunctions as complementary means of data analysis. Multimodal social semiotics provides the

conceptual tools for analysis of meaning-making and activity theory focuses on the socially situated character of meaning (Jewitt, 2006). Activity theory has been widely used in educational research to explore a variety of educational issues (Ellis, Edwards & Smagorinsky, 2010; Roth & Lee, 2007).

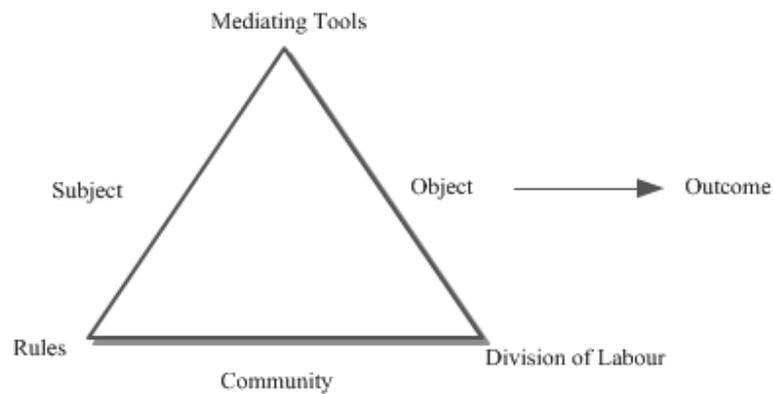
The concept of activity is the most fundamental element of activity theory (Kaptelinin & Nardi, 2006). The term activity is not equated to brief tasks or classroom experiences accomplished within a set and relatively short period of time (Roth & Lee, 2007). Activity is considered to be a coherent, stable, sustained, learning endeavor guided by an identified long-term goal (Barab, Evans, & Baek, 2004; Roschelle, 1998). I use Leontiev's (1978) definition of activity to mean "a purposeful interaction of the subject with the world" (Kaptelinin & Nardi, 2006, p. 31) and Engeström's (1996) definition of activity theory:

When I write about *the* theory of activity, I am using a double-edged notion. On the one hand, it is necessary to emphasize the unique and self-consciously independent nature of the Soviet cultural-historical research tradition, which today is commonly called activity theory (see Leont'ev, 1978; Leontyev, 1981; Wertsch, 1981). On the other hand, this tradition is not a fixed and finished body of strictly defined statements—it is itself an internationally evolving, multivoiced activity system. (p. 64)

Sociocultural theory and activity theory "provide methodological tools for investigating the processes by which social, cultural, and historical factors shape human functioning" (Daniels, 2004, p. 121). The distinction between cultural-historical theory and activity theory is so fine that the two approaches are often collectively referred to as cultural-historical activity theory or CHAT (Kaptelinin & Nardi, 2006), or reduced to simply "activity theory" (Jewitt, 2006).

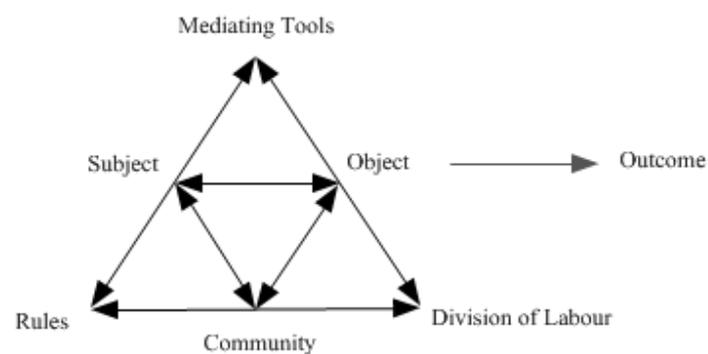
The traditions of sociocultural theory and activity theory account for learning in the same way and are historically linked to Vygotsky (Daniels, 2004). However, the traditions each have a unique focus. Sociocultural theory focuses on semiotic mediation through language and activity theory focuses on activity as the prime unit of analysis (Daniel, 2004). From the perspective of activity theory, learning is mediated by cultural-historically constructed tools (Nardi, 1996). My understanding of activity theory is based on Vygotsky's sociocultural theory of mediated action (1978), Leont'ev's (1978) emphasis of the role of context, and subsequent contextualization and development of the unit of activity by Engeström (1999, 2000, 2001).

Engeström expands Vygotsky's mediational triangle and the activity system of Leontiev to create a second generation activity theory model that includes dimensions of community, social rules, and the division of labour (Cole & Engeström, 1993). The elements in this triadic model, like Peirce's teirce, are interrelated. Engeström defines his activity system as one that integrates subject, object, tools (material as well as signs and symbols) into a unified whole with both an object-oriented production focus and a person-oriented communicative aspect (Engeström, 1996). The activity system places the subject, object, and mediating artifacts within the larger context of collaborative activity and society and gives broader and more durable meaning to the actions (Engeström, 1999, 2000) as shown in Figure 9.



*Figure 9.* Second generation activity theory model (Engeström, 1999).

Engeström (1987) uses triangles within triangles and double-headed arrows to indicate four possible levels of contradiction between the components of the activity system (Figure 10). Systemic contradictions revealed through disturbances and innovations in the activity system “offer possibilities for expansive developmental transformations” (Engeström, 2000, p. 960) and are viewed as the source of change and development (Engeström, 1996).



*Figure 10.* Components and interactions of the activity system.

In Engeström's (1987, 1996, 1999) model, the subject refers to the individual or community subgroup whose actions are under study. In my data analysis framework, the subject is considered to be the classroom community. The object is what Engeström (1996) terms the "problem space" (p. 67). It is the raw material that forms the focus of the activity transformed into eventual outcomes as the result of the subject's interactions with external and internal mediating, cultural-historical tools. The mediating tools encompass concrete, physical and material tools as well as abstract, psychological tools.

The bottom of the triangle contextualizes the nature of the activity (Barab, Evans, & Baek, 2004). The community is the larger organization or collection of individuals and subgroups sharing the same object or goal (the individual schools, school and parent community, school division, and nine classrooms of the study). The arrow points from the community to the object and the division of labor, indicating both the community members' roles related to the object of the activity as well as the division of power and status within the activity system. The arrows connecting subject, rules and community refer to the "explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system" (Engeström, 1996, p. 67).

Engeström (2001) views culturally mediated action (Vygostky, 1978) as first generation activity theory, the collective activity system (Leontyev, 1981) as second generation activity theory, and complex, interacting activity systems (Engeström, 2001) as third generation activity theory. Third generation activity theory is characterized by conceptual tools designed to understand multiple perspectives and networks of two or more interacting activity systems (Engeström, 2001). Engeström (2001, p. 136) transforms the triangle yet again as shown in Figure 11 below.

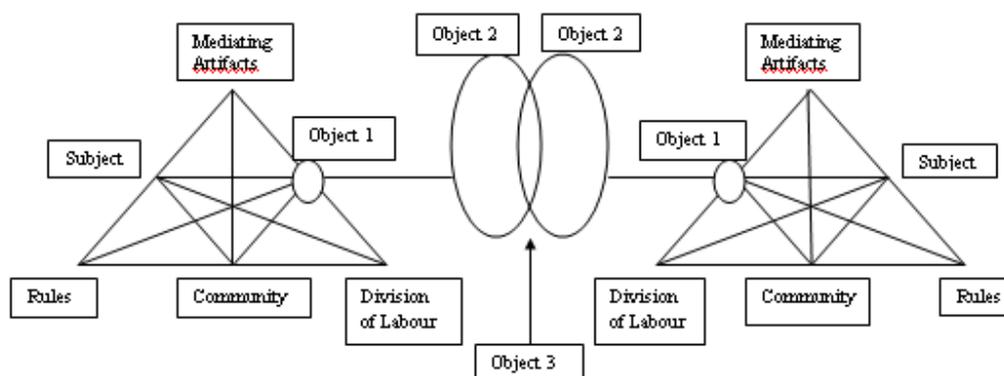


Figure 11. Engeström's third generation activity theory model.

Components of first, second, and third generation activity systems are used to create a supporting framework for multimodal data analysis in this study following these five principles synthesized from Engeström (2001):

1. The activity system is the prime unit of analysis. The activity system is characterized as a collective, mediated by artifacts, object-oriented, and part of a networked system of other activity systems.
2. Activity systems are multi-voiced. The multiple histories, perspectives, traditions, interests, and positions of individuals and the activity system must be included in interpretation.
3. The problems, potentials, and components of the activity system must be analyzed and understood in relation to their historicity.
4. Contradictions play a central role as sources of disruption, change, development, and innovation. Contradictions are defined as historically accumulating structural tensions within the activity system.
5. The possibility of expansive transformation exists for every activity system.

The framework of Cultural-Historical Activity Theory (CHAT) is a meaningful structure to analyze the roles of mediating tools as used and understood within the historical and cultural context of the classrooms for the goal of investigating beat and reading learning events. An activity theory framework is used to systematically examine change where the researcher is deeply involved both with the activity system and with the activities of its subjects or participants throughout the course of the activity (Sannino, Daniels, & Gutiérrez, 2009).

“This approach firmly locates the multimodal signs that students and teachers make in the *activity* system of the classroom” (Jewitt, 2006, p. 42). The beat and reading activity system of this study then, is viewed as a multimodal text and as a resource for meaning-making potentials analyzed using a multimodal framework (Jewitt, 2006; Jewitt & Kress, 2003; Kress & van Leeuwen, 2001; Norris, 2004, 2006), elements of systemic functional linguistics (Eggins, 2004; Halliday, 1985, 1993, 1994, 2004), and the five principles of Engeström’s (2001) activity theory. Jewitt (2006) suggests four approaches to multimodal data analysis:

1. Halliday’s (1978) metafunctions to foreground mode, analyze the semiotic resources made available by each mode, and examine interactions between modes.
2. The metafunctions as a tool to analyze how modes realize different meanings and work together.
3. Semiotic principles that work across and through modes focusing on larger scale principles such as design.
4. Activity theory as a way of thinking about interrelations between modes and meaning-making, for exploring change in relation to classroom tools, and to draw in

social and historical cultural elements beyond the immediately observed classroom interactions. I also use expanded notions of activity theory to examine the interactions between activity systems (Engeström, 2001).

### **Multimodal Data Analysis Framework**

Iedema (2003) claims that multimodality “provides the means to describe a practice or representation in all its semiotic complexity and richness” (p. 39). Iedema stipulates that multimodal analysis does not privilege any one semiotic system over another but may foreground particular semiotic systems. I use the following framework presented in Table 16 to identify, examine, analyze, compare, and interpret the multimodal semiotic resources and their associated processes and uses in this study. The multimodal data analysis framework below is used to determine which semiotic systems offer affordances for understanding concepts about beat and written language and which of these systems are foregrounded in the learning activities within and across classrooms.

Table 16. *Multimodal Data Analysis Framework*

Unit of Analysis: Experimental Classroom Learning Event					
Guiding Questions	Class B	Class C	Class F	Class G	Class I
1. What modes are used?					
2. What modes are used for what purpose?					
3. What modes are foregrounded?					
4. What ideational meaning is expressed through field? What is happening? What is the social action or topic?					
5. What interpersonal meaning is expressed through tenor? Who are the participants and what are the relationships between them? What are the social roles, status, and attitudes?					
6. What textual meaning is expressed through mode? What is the organizing role of mode? What part does the mode play? What status does it have? What is the channel of the mode (spoken, written, etc.)?					
7. How are modes interpreted and by whom?					
8. Transformative processes?					
9. Transductive processes?					
10. What is the functional load of each mode?					
11. What modal density?					
12. Mode or medium?					
13. What is the experiential meaning potential?					

### **Arts-Based Research**

I explored arts-based research and added this methodological approach to my bricolage through a/r/tography and autoethnography. The autoethnographic findings are not presented in this thesis but will be communicated in other forms. Some of the ways that the arts were used as sense-makers are shared in this thesis and used to introduce and synthesize each chapter of the thesis.

What counts as knowledge, along with the tools we use to create that knowledge, have dramatically changed (Cahnmann-Taylor, 2008). The range of tools available to researchers has broadened to include “literary, visual, and performing arts through all stages of...research” (Cahnmann-Taylor, 2008, p. 3). Cahnmann-Taylor (2008) believes that the arts have the potential to engage educational researchers and their audiences in processes that are more varied, creative, penetrating, and more accessible than previous approaches to research. Arts-based research provides new ways of seeing the world and greater possibilities for uncovering new outcomes and meanings. By bringing elements of the arts into research conversations, we may engage more complex, emotional and aesthetic responses and “speak to diverse audiences both within and outside the academy” (Cahnmann-Taylor, 2008, p. 9).

As I wrestled with analysis and interpretation, “feeling” and “hearing” the research through music, poetry, writing, and art brought new and unexpected insights. Because arts-based processes are what I use to make sense of all the world, they were my available bricolage that I used to “write” with. Thinking through the arts became an inevitable and unlooked-for part of my research process. Arts processes revealed understandings of my research that would have remained buried without the synergy of

the arts to surface and conceptualize them. My arts-based “thought experiments” were crucial aesthetics to “explore the dimensions of experience that were hidden in the push to impose reason on all levels of human endeavor” (Cahmann-Taylor, 2008, p. 4).

I used tools from both arts and science to make sense of data (Cahmann-Taylor & Siegesmund, 2008) during and well beyond the data-gathering process. I explored the self-other continuum through autoethnography (Ellis, 1999) merging autobiography and ethnography to highlight “the extent to which the researcher foregrounds his or her own reflections and experiences in a given study” (Cahmann-Taylor, 2008, p. 8-9). Through a framework of bricolage (Kincheloe and Berry, 2004) I engaged in research of my research to add new interpretations and understandings to my research synergetics.

### **Structures of Bricolage**

Doing bricolage as research means choosing from a wealth of structures, range of disciplines and theories, variety of research genres, and multiple processes and perspectives to create guiding frameworks “to examine and construct a research text” (Berry, 2004, p. 107). Kincheloe and Berry (2004) argue that a variety of methodologies, methods, and interdisciplinary perspectives do not constitute bricolage if the research still depends on traditional research discourses.

Although I employed a variety of methods, tools, and perspectives, I depended for the most part on traditional research tools for data gathering, analysis, and synthesis during the initial stages of my study. I spent a year using those research tools to analyze and interpret my data. I successfully reduced the rich, perplexing, contradictory, and complex layers and levels of research to a limited set of categories and processes. And

then, as described in Chapter Ten, analysis was interrupted by autoethnographic research and notions of complexity thinking and bricolage.

I turned to structures of bricolage and complexity to analyze my data. The research questions were used as a point of entry text (POET) and placed within a bricolage map of the study methods and new multiple perspectives proposed by Berry (2004). Berry outlines methods for threading a point of entry text through diverse theoretical and philosophical viewpoints and discourses to generate previously unrecognized ways of looking at the point of entry text. The research questions were used as the point of entry text and threaded through the bricolage map proposed by Berry as presented in Table 17.

Table 17. *Research Questions (POET) and Bricolage Map (Berry, 2004, p. 110)*

1. Point of Entry Text: The Research Questions	2. Multiple critical social-theoretical discourses	3. Traditional and contemporary research genres, methodologies/analytical tools
4. Cultural and social positionalities	5. Disciplinary/interdisciplinary departmentalizations of knowledge	6. Philosophical Domains
7. Modes of power	8. Narratological strategies	9. Western Grand Narratives
10. Contexts of human activity	11. Sources	12. Levels of engagement
13. Archaeological genealogy	14. Axiology	15. Semiotic Readings
16. Levels of privilege and oppression	17. Encyclopedic structure of bricolage	18. Methodological bricolage
19. Theoretical bricolage	20. Interpretive bricolage	21. Political bricolage
22. Narrative bricolage	23. Othering	24. Identity/essentiality, Normalizing

I threaded my POET through the bricolage map using methods outlined by Berry (2004):

The threaded return acts as a feedback loop to the initial text and changes, expands, clarifies, modifies, and challenges the existing knowledge. In the process new perspectives and knowledge about the text are produced. The bricoleur can then repeat the process by threading through a different feature of the lists and again looping back to the original text. This process can be repeated several times, each rethreading enhancing the texture of the knowledge produced. (p. 110)

I used Berry's (2004) map as a starting point to thread and loop the methods unique to my research with emerging theory and new perspectives (Figure 12).

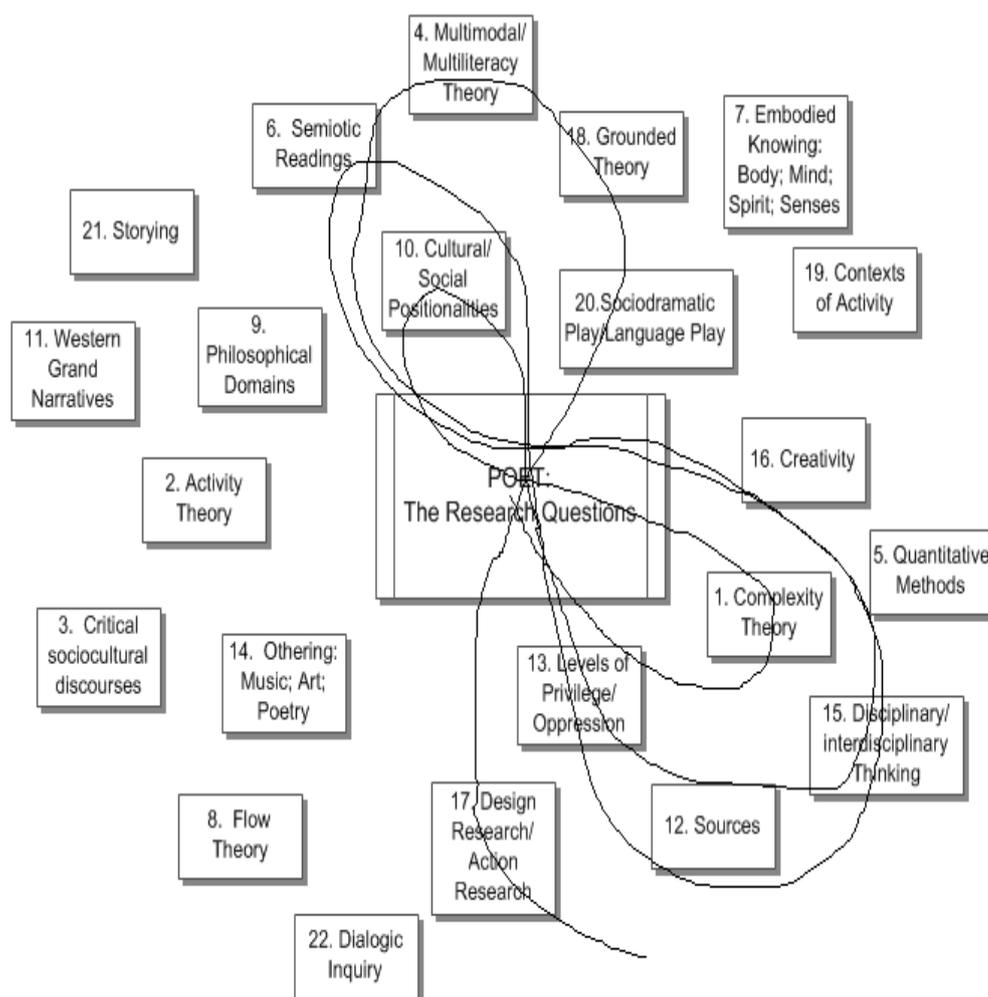


Figure 12. Bricolage map threading process (Berry, 2004, p. 112).

Following Berry (2004) I used principles of complexity theory to navigate and make meaning of the bricolage: “Self-organization, feedback looping, far-from-equilibrium, randomness, spontaneity, bifurcation points and other conditions of complexity” (p. 114-115). I explored the complexity theory literature and found applications of complexity theory in education to add to Berry’s POET framework (Davis & Sumara, 2006; Doll, Fleener, Trueit, & Julien, 2005; Mason, 2008). I applied understandings of complexity that were deepened and enhanced by the sounds of complexity thinking in music (Peters, 2006) to analysis of the bricolage. My POET was threaded with permutations and combinations of multiple discourses, voices, readings, and perspectives that confronted and questioned my findings and conclusions. The results are presented in Chapter Ten.

This, then, is my research score. The methods and methodologies are mixed and include design-based research, action research, grounded theory, semiotic data analysis, multimodal data analysis, quantitative methods, arts-based methods, complexity thinking and bricolage. I declare my theoretical bias from the outset of this research; it is not possible to separate my theoretical roots, prior teaching, and research experiences in rhythm, reading, semiotic theory, and multimodal arts education from interpretation of the data.

I assume a social, constructivist stance that positions me as an “active, not neutral, observer whose decisions shape both process and product throughout the research” (Charmaz, 1990, p. 1165). I bring pre-existing theory, experiences, beliefs, and values to my interactions with empirical data and the study participants’ constructions of their experiences and understandings. Codes used in grounded theory analysis and results are

sensitized by prior theoretical understandings but are data-driven and reported in Chapter Six. Theory-driven data analysis and results are reported in Chapters Five, Seven and Eight.

\* \* \*

### **Conga Brava**

In creating a final synthesis of the mixed methods used in this research, I took inspiration from Duke Ellington who was known for using orchestral sounds in creative and individual ways (Giddins & DeVaux, 2009a). “Conga Brava” arranged by Ellington and composed by Tizol (1940/2009), particularly helped transmediate the ways in which the distinct mixed methods could be presented to capture the unique methodological complexities in a cohesive and meaningful whole.

The exotic sounds and unusual timbres of “Conga Brava” (Giddins & DeVaux, 2009a) evoke a variety of styles including Romantic opera, Latin groove, and swing, and complicated by avant garde sounds heard in the brass. A staggering amount of territory is covered in the three minutes of the composition with new notes added to the chords “extending them into more dissonant territory and enriching Ellington’s harmonic palette. Ultimately, though, all these moments are folded back into the mood of the opening” (Giddins & DeVaux, 2009a, p. 232). This chapter presents the distinct sounds and timbres of the mixed methods. The final folding back of the moments of the mixed methods used in this research is located in Chapter Ten. The intervening chapters are devoted to the results of each of the methods used to analyze the study data beginning with the design-research/action research methods shared in Chapter Five.

## Chapter Five: Playing the Changes

Even in cases that involve analysis, *understanding* is not knowing *that* if you follow a series of steps, you will get a certain result, but seeing *how* the result is contained in that series of steps.

(Zwicky, Left 24, 2003)

### The Learning Design

In jazz, the changing progression of chords or harmonies is known as the “changes.” In harmonic improvisation, to play the changes means using the appropriate scales over top of their associated chords. Musicians need to know the tones that make up each chord so that their melodies are consonant with the harmonic foundation. However, understanding jazz theory and the associated steps and rules for improvisation does not guarantee a certain or musical result. To be successful, Marsalis says, “you must be able to hear how harmonies relate to each other and be able to articulate melodies that successfully navigate these relationships as they change” (Marsalis, 2008, p. 43).

This chapter presents the changes that were played in iterative ways over the harmonic design research/action research framework. The goal of the chapter is to create understanding not simply for the series of steps that provided results, but for how the results were contained within the series of steps and cycles of the harmonic research design framework. The changing relationships and interactions of the participants’ teaching and learning within the research design were examined using the framework described in Chapter Four. Data were examined to determine what factors facilitated or inhibited the instructional design, what modifications were required, what unanticipated positive or negative effects were produced, and how the instructional environment

changed as a result of the instructional design (Lenski, 2001; Reinking & Watkins, 2000; and Research question #2).

The instructional harmonic design, changes and processes, and impact, were understood through analyzing epiphanic and illuminative experiences (Stringer, 2004) using the classroom learning event as the unit of analysis. My theoretical sensitivities (Strauss & Corbin, 1998) were made explicit as data were interrogated using a start list of a priori codes (Miles & Huberman, 1994) created from the conceptual framework, literature review, research questions one and two, and prominent themes from the pilot study. Each phase of the design process was systematically documented to support the retrospective analysis as recommended by Edelson (2002).

Following Cobb, McClain, and Gravemeijer (2003), the local decisions made during the learning design study were documented to explicate the learning events and contribute to the development of a local instructional theory. Local decisions were based on conjectures, refutations, and revision supported by evidence from the Learning Design Journal (Cobb, Stephan, McClain, & Gravemeijer, 2001).

The data drawn from the Learning Design Journal were developed and based on frameworks suggested by Berthoff (1987) and Smyth (1986) and inspired by Zwicky (1992, 2003). The description of the learning design experiences and supporting literature were entered on the left hand side of the journal. The reflections on these were entered on the right hand side, concluding with the action planned as a result of the reflections (Woodward, 1998). Data results from the epiphanic/illuminative experiences and the Learning Design Journal form part of the first level of analysis that is later

synthesized with inductive and abductive grounded theory, semiotic, multimodal, and quantitative results in the final layer of analysis in Chapter Ten.

### **The Pilot Study**

The Pilot Study entitled “Nonmusical Effects of Rhythm in Elementary Students with Reading Disabilities” served as the first cycle of data collection and analysis in this design-based research. The pilot study involved designing instructional sequences guided by domain-specific instructional theories (Cobb, Stephan, McClain, & Gravemeijer, 2001) in music education and reading to investigate the potential for rhythm to support meaning-making in both music and reading domains. The Pilot Study was conducted from September 20, 2004 to April 8, 2005 as part of PhD program requirements for Course 129.765 Field Experiences in Inclusive Special Education. The study was carried out in a well-established Learning Assisted Centre (LAC) in an urban school in a large city school division.

The LAC program was defined as a Special Education Behavior Support Program and was the educational home to eight students ranging in age from eight to thirteen years. Acceptance into the program was by referral and based on severe to profound behaviour issues as well as severe academic challenges. The LAC classroom was self-contained, ungraded, and had limited contact with the rest of the school. Parents and guardians of six children from eight to twelve years gave permission for their children to participate in a rhythm and reading intervention as part of a one-group pre-test/post-test research design.

Student participants were identified and tested as reading at least two or more grades below level. The *Brigance Diagnostic Comprehensive Inventory of Basic Skills*

(Brigance, 1999) was used to analyze measures of oral reading fluency, sight words and comprehension. Rhythm performance skills were assessed using a researcher-designed test of beat competency. Qualitative measures included observational field notes, student and teacher interview data, and the research journal, coded and analyzed for emerging categories.

From September 20, 2004 to November 2, 2004 I worked in the classroom building relationships with students, the collaborating teacher, and educational assistants. Throughout the study, I visited the school two to three times a week on even days of the six day school cycle for one to two and a half hours in the afternoons. Prior to the intervention, I collected descriptive data and analyzed classroom materials and books for curricular connections and the hundred most common words used in the local context to inform and develop a music-based learning design based on student needs and abilities.

During this time, the collaborating teacher mentored me in administering tests for oral reading fluency using the *Brigance Diagnostic Inventory* (Brigance, 1999) as well as local school division developed annual standardized tests for English Language Arts that included measures of oral reading fluency. After a period of mentorship, I assumed responsibility for administering and assessing divisional tests for English Language Arts for the LAC classroom.

The reading and rhythm intervention was designed for 30 minute group learning events on even days in the six day school cycle two to three times a week for a total of 40 classroom visits. The intervention ran seventeen weeks from November 2, 2004 to March 23, 2005. Pre-testing and post-testing occurred one week before and one week after the intervention. Language materials were drawn from the Fry list of the First Hundred

Words (Fry, 1980) and the hundred most common words used in classroom materials and books. Rhythmic experiences were related to classroom reading materials and based on outcomes from the provincial curriculum documents for grades one and two music. An Orff-based music approach was used to focus on beat and language using elements of song, speech, movement, listening, nonpitched percussion instruments and barred instruments including glockenspiels, xylophones, and metallophones.

Quantitative results of the Pilot Study indicated that all students with the exception of one showed improvements on Brigance measures of oral reading fluency, sight words, and comprehension and on all measures of beat competency. Qualitative categories included student enjoyment, the power of the beat, adult support for rhythm and reading experiences, importance of rhythm experiences to staff and students with learning disabilities, potential for rhythm to support individual needs, abilities, and interests of students with learning disabilities, improvement in reading and rhythm for students with learning disabilities, and motivated and engaged learning in reading and rhythm for students with learning disabilities.

The improvement for students was in some cases, dramatically described by staff in the classroom as well as by resource staff outside of the classroom. Student improvement in reading and reading engagement was documented with phrases such as “remarkably improved,” “huge improvement,” and “just amazing improvement.” Data results supported a further iteration to explore the relationship between reading and rhythm using a more rigorous research design.

### **The Re-Design**

The pilot study functioned as the first iteration of the design, enact, analyze, reflect, and re-design cycle. Analysis and reflection of the pilot study led to conjecture that experiences in beat and rhythm may support both music learning and print text learning and may improve oral reading rate. To test this conjecture, a re-design created greater focus for the element of rhythm within an Orff-based music approach. Although the pilot study did focus on rhythmic experiences, other music elements such as pitch, harmony, and texture confounded data results and challenged the interpretation of positive rhythm effects for reading.

Qualitative results indicated the importance of all elements of the Orff-based experience for children as a means of engagement and as available affordances from which to make print and non-print meaning. However, the element of rhythm was identified as an essential understanding for music and print meaning-making and oral reading rate success. I concluded that revisions of the learning design needed to create greater focus for this music element.

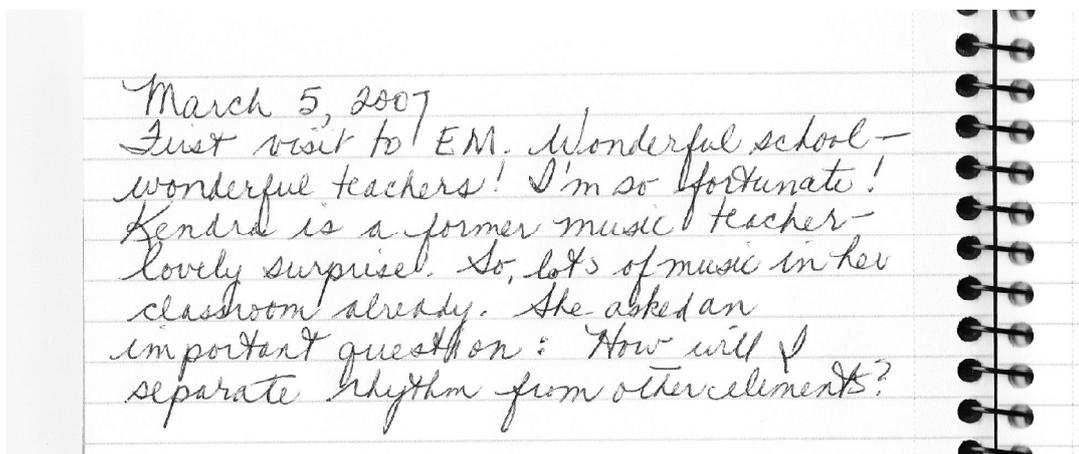
In addition, I conjectured that student success would be better supported if beat awareness and competency experiences were more carefully and thoughtfully scaffolded. Although quantitative and qualitative results indicated improvement in beat performance and competency skills for five out of the six student participants, field note data recorded many instances where students struggled with beat experiences along the way to achieving competency; a more successful scaffolding to support student learning in beat experiences was indicated.

In the re-design, experiences with rhythm were therefore planned with more purposeful and meaningful scaffolding to support focused rhythmic growth following approaches and strategies suggested by Carlton and Weikart (1994), Weikart and Carlton (1995), Weikart (1998, 2000), Frazee (1987, 2006), and Montgomery (2002). In particular, Montgomery's (2002) teaching sequence for the "development of beat awareness and beat competency during the 'sound' stage of the sound-before-symbol process" (p. 192) was adapted for the learning design. An Orff-based pedagogy of simultaneous imitation, remembered imitation, overlapping imitation, improvisation, and exploration (Frazee, 1987, 2006) was also purposefully planned for the revised educational innovation.

In re-designing the reading and rhythm learning design, I struggled with the need to focus on the element of rhythm at the expense of other important music elements. Meaningful music education experiences using an Orff-based approach typically integrate all music elements of speech, singing, playing instruments, movement, listening, improvisation, composing, and music notation. How could I create an authentic and meaningful music innovation using all the elements of an Orff-based approach and still focus on the important element of rhythm?

My concerns regarding confounding variables were further tested during pre-study conversations with Kendra, the Classroom C collaborating teacher. As I was outlining the purpose and methods of the study, Kendra asked how I would focus on just rhythm when I planned to use a variety of music elements. I explained that while various music and movement elements would be implemented throughout the study, experiences in rhythm and beat would be prominent, consistent, and the focus of every learning event. However,

her question troubled me and sent me back to the literature that informed my research proposal. I returned to Jewitt and Kress (2003) and entered this in my Design Journal:



*Figure 13.* Design research journal left hand entry for March 5, 2007.

I continued with “I thought I had this figured but now I’m thinking—what about other modes? What about movement, visual—the artifacts? How am I going to make sense of this? How can I look at one variable—what about the effect of the others?” My responding answer to these questions was:

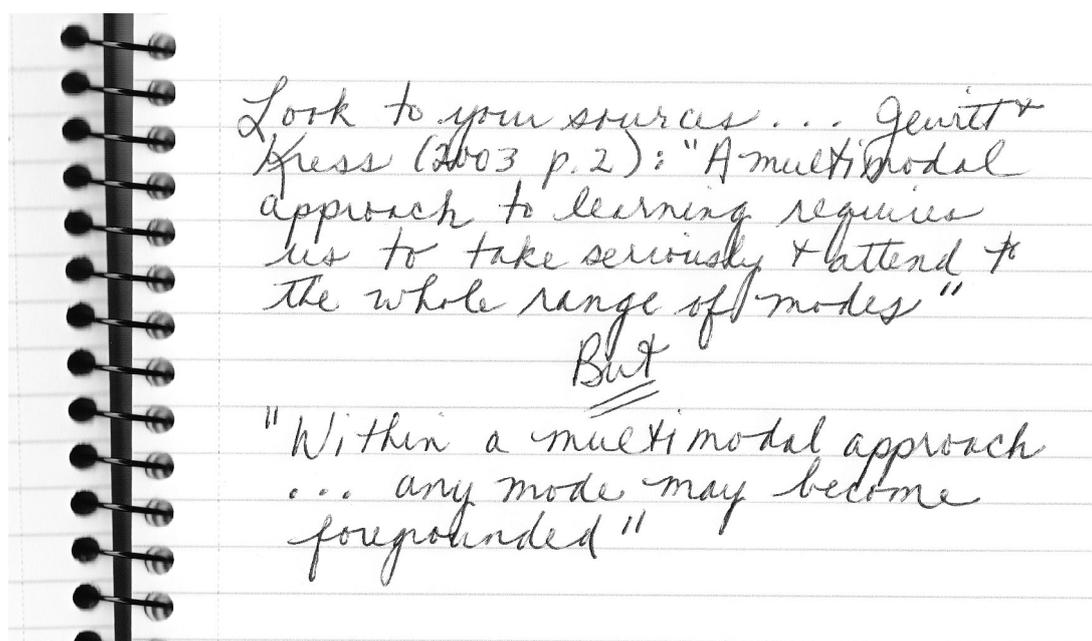


Figure 14. Design research journal right hand entry for March 5, 2007.

The entry continued, "Different modes have potentials that make them better for certain tasks than others...not every mode will be equally 'useable' for a particular task" (Jewitt & Kress, 2003, p. 3). So if rhythm and reading are the foregrounded modes-- can the data be analyzed in terms of only those 2 variables?

Action...back to Dafoe again [The University library].

I re-examined sources used to inform my research proposal and made this entry several days later:

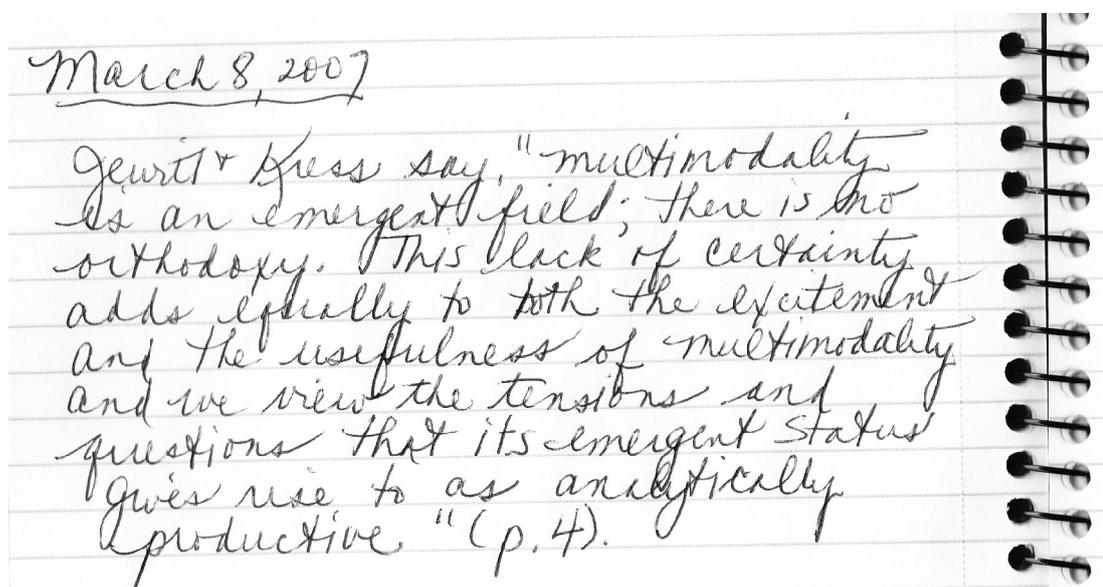


Figure 15. Design research journal left hand entry for March 8, 2007.

I considered Kress and van Leeuwen's (2001) words:

A semiotics which is intended to be adequate to a description of the multimodal world will need to be conscious of forms of meaning-making which are founded... on the meaning potentials of the materials drawn into culturally produced semiosis... All aspects of materiality and all the modes deployed in a multimodal object/phenomenon/text contribute to meaning. (p. 28)

After reflection, my answering response and action was "Find a way to scrutinize meaning potential of "all the modes deployed"—then analyze to determine affordances of each for learning rhythm and reading."

The first step into the research resulted in an epiphanic experience that transformed and broadened the design and analysis of the research. I revised my conjectures to broaden the scope of data analysis to include all meaning potentials. Only by examining the variables of rhythm and reading as used within the multimodal context,

would it be possible to determine if rhythm and reading were the foregrounded potentials that made them “better for certain tasks than others” (Jewitt & Kress, 2003, p. 3).

Other revisions included a more purposeful research-based focus on elements of oral reading fluency and rhythm, and the strategies and pedagogies necessary to support oral reading fluency and rhythm. Strategies and pedagogies suggested by the authorities in the field of oral reading fluency and music education were analyzed and integrated within the research-design. Course outlines used for teaching early years language and literacy and music education courses at Manitoba’s largest Faculty of Education were examined to ensure that pedagogical strategies and theoretical perspectives supporting this study were congruent with what was considered best teaching practices in Manitoba.

The re-design also featured a much larger sample population, both control and experimental classrooms, and pre- and post-tests for oral reading rate and rhythm performance supported by a body of published results indicating reliability, validity, and prominent in the research literature. The time length of 30 minutes was useful and workable in the particular context of the LAC classroom but in an informal survey of classroom teachers, I was advised to limit each learning event to 20 minutes to minimize challenges in finding additional time in already crowded school teaching schedules.

Results from the pilot study suggested that rhythm and reading experiences should ideally occur every day, but again, for reasons of time constraints, I planned the learning design to be implemented two to three times a week, every second day in a six day cycle for a total of 25 learning events. The 25 learning events were divided roughly into three learning phases each with a distinct focus: 1) experiences to develop beat awareness and beat competency and the introduction of speech-piece repertoire; 2) beat experiences to

support oral reading fluency and classroom curricular experiences; and 3) rhythmic and reading tools and affordances used to create authentic student speech pieces and notate beat and/or rhythm.

The re-design of Orff-based approaches (Choksy, Abramson, Gillespie, Woods, & York, 2001; Frazee, 1987, 2006; Goodkin, 2004; Keetman, 1970) was constrained by the context of use in each of the experimental classrooms. During the pilot study I had access to the school music room and Orff instrumentarium including barred instruments.

Although experimental classrooms and schools participating in the re-design all had Orff instrumentarium, school schedules did not make it possible to access the barred instruments housed in the music classrooms during the study. Instead I made and brought my own nonpitched percussion instruments and one soprano glockenspiel. The use of barred instruments is important to an Orff-based approach, however Goodkin (2004) makes it clear that the Orff instrumentarium is “just one of many strategies that can awaken musicality and one that should be preceded by generous helpings of chants, rhymes, songs, games, dances and movement experiences” (p. 95).

### The Learning Design Phase One

The new cycle for experimental classrooms began with the revised plan for rhythm and oral reading fluency learning using the interpretive framework in Figure 16 to organize data analysis.

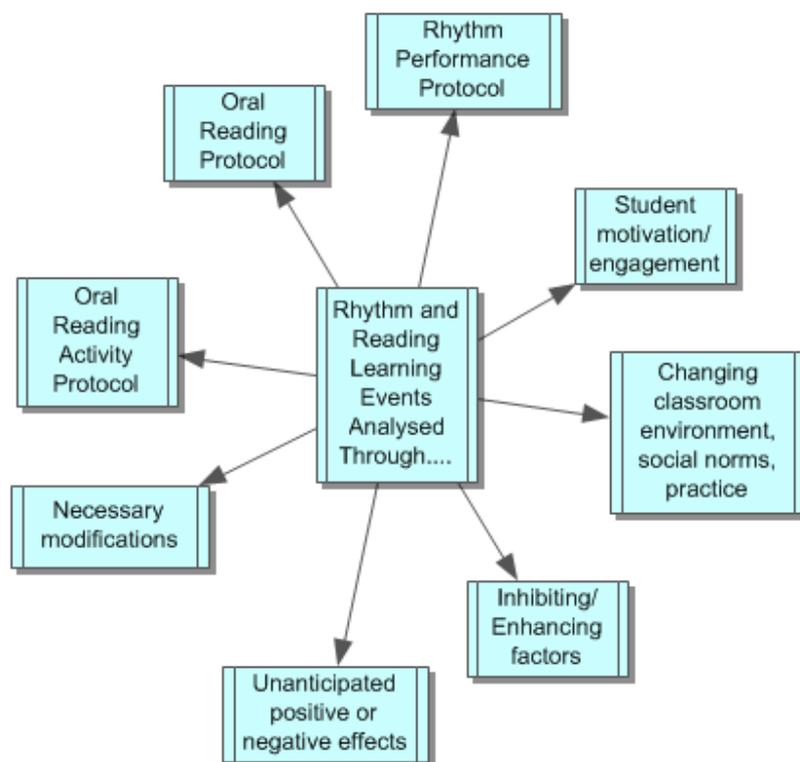


Figure 16. The learning design phase one: Interpretive framework.

**Tools and language of rhythm.** Phase One of the Learning Design focused on acquisition of the language tools of rhythm for use within the classroom learning culture to support both music and reading experiences. The first seven to eight learning events for each experimental classroom were organized around beat awareness and beat competency experiences using Orff-based approaches. During Phase One, a common body of speech-piece repertoire connected to classroom learning was introduced to all experimental classrooms. Learning events began with chants or songs designed to focus

on beat awareness such as the daily Hello Song and others (See Appendix M).

Subsequent learning events were designed to scaffold beat competency experiences and introduce tools such as body percussion, movement, and nonpitched percussion instruments to be used throughout the learning design.

Inductive Orff-based processes of imitation, exploration and improvisation (Frazee, 1987) were used to explore concepts about beat. I played “Be My Mirror” and “Simon Says” games with students to assess both beat competency in each experimental classroom and to provide opportunities for beat awareness experiences and the introduction of body percussion. I performed the beat using nonlocomotor body percussion such as clapping, patting knees, shoulders, head, floor, etc. and asked students to “mirror me” with the same motions I was doing. We experimented with different tempos, dynamics, and effort, for example, patting knees forcefully or head very lightly. When all students seemed comfortable with these beat experiences, I varied the activity with games such as “Simon Says” in which students were invited to simultaneously imitate me only on the spoken signal.

When initial beat awareness experiences seemed successful for the class, I made the game more challenging by rapidly signaling when students were to imitate beat or not. “Charoo” was one such favorite game. I began by clapping my hands and students joined only when I said the word “Charoo.” I varied body percussion so that the beat was performed using different body parts as for example, hands, knees, head, shoulders, and then floor. If students were performing the beat when they heard the word “Charoo,” the signal meant they were to stop imitating. If students were not performing the beat when they heard the word “Charoo,” the signal meant they were to start imitating. Charoo had a

number of variations. One variation used the process of overlapping imitation. We began by patting the beat together and then I would move to a different body part such as shoulders so that the students would be patting their knees and I would be patting my shoulders. Students would only move to patting their shoulders with me on the signal “Charoo.”

We progressed from simultaneous and overlapping imitation to remembered imitation (Frazee, 1987). On the cue, “Echo me,” students would echo the same number of beats or a rhythmic pattern using the same body percussion as I demonstrated for them. Echoed beat and rhythm were usually performed in groups of four or eight beats and connected to the beat and rhythm patterns used in the speech repertoire we were exploring. The body percussion games were then transferred to nonpitched percussion using the same strategies. I carried a bag of small rhythm sticks to every class and had a sufficient supply so that all students could have a set of sticks and play at the same time. I constructed the sticks from doweling and carefully examined a variety of doweling types so that when a classroom of twenty or more pairs of rhythm sticks played together, the sound was still musical and classroom friendly.

All these games were greeted with enthusiasm and smiles. There is no data record of any instance of a negative response to these initial beat experiences in any experimental classroom, despite the fact that all collaborating teachers identified certain students that might be challenged by such activities. In two classrooms the collaborating teacher and I reviewed and established protocols for dealing with specific behaviour issues in anticipation of potential difficulties. These protocols were never required during any of the Phase One experiences and only once for one student during the entire study.

All classrooms met criteria for motivation and engagement as listed in the protocols presented in Chapter Three. The majority of students in all classrooms demonstrated successful simultaneous imitation of beat.

Because the concept of phrasing is important to both reading and music, I introduced this concept early in the learning design. Rasinski (2003) includes phrasing as one of four ways to build reading fluency. Although the ability to separate, organize, and internalize text into phrases is important to comprehension, word-by-word reading is a common characteristic of disfluent readers (Rasinski, 2003). Phrasing is also critical to musical understanding so I created initial awareness for 8 beat phrases through a game we called “Do As I Do After Me.” As I patted the beat on my knees I voiced the words, “do as I do after me” so that the words fit into a group of eight beats. I then switched to patting the eight beats on my shoulders while the class performed the eight beats on their knees. The body percussion canon continued in similar fashion for several more eight beat phrases, changing body percussion with each new group of eight beats.

We improvised with body percussion “Beat Pieces” and created our own classroom Beat Pieces. Students chose their favorite body percussion to perform for eight beats followed by a new eight beat pattern using different body percussion so that the beat was performed simultaneously with various clapping and patting on knees, head, shoulders, and/or the floor. We then created the same kinds of beat improvisation and compositions using nonpitched instruments. We used egg shakers, sticks, jingle bells, woodblocks, maracas, and finger cymbals to play the beat.

Notes from the Design Journal indicate that modifications during the first week of implementation of the learning design were mainly for logistical, practical, and

organizational purposes. Collaborating teachers were helpful in suggesting improvements for seating arrangements, moving more easily through the rooms, handing out instruments, and ways of facilitating students taking turns playing instruments and sharing ideas. By the end of the first six day cycle of classes, each class had established a comfortable routine and organizational structure for our learning events. In four of the experimental classrooms, I sat on a chair at the front of the classroom group of students. Students sat either in random formation on the floor in front of me or in specific seating arrangements depending on the usual practices of the classroom. In one classroom I sometimes joined the class sitting on the floor in a large circle.

We progressed through Montgomery's (2002) beat-movement teaching sequence (Appendix N). The suggested seventeen step sequence was synthesized and adapted to meet the time constraints of the study using various rhymes created from sight word sources and sight word walls in experimental classrooms. Before the learning design began, each collaborating teacher identified a need for greater student recognition and understanding of common sight words used within the context of classroom learning and materials. Kendra, the collaborating teacher in Classroom C, shared a classroom resource for common sight words (Williams, 2005) based on the Dolch 220 Basic Sight Word list and recommended it as a useful starting point.

I experimented with sight words and rhymes from this book and created my own rhymes from the Dolch (Williams, 2005) and Fry (1980) common sight words list. We chanted the sight words rhymes and speech-pieces and performed the beat to these pieces moving hands together and alternating hands on our heads, shoulders, knees, and floor. We chanted and performed beat with and without endpoints using body percussion and

nonpitched percussion instruments. “See Saw” was a favorite speech-piece and beat activity for chanting and performing beat with a partner. See Saw is a simple eight bar chant that is commonly used in early years Orff-based approaches and included in Montgomery (2002). All words in the speech-piece with the exception of “air” and “ground” are included in the Dolch basic sight word lists:

See Saw up and down

In the air and on the ground.

The See Saw learning event was part of each experimental classroom’s Phase One learning experiences. The example below is illuminative in that embodied learning was established early in the learning design as a process common to all experimental classrooms. All classrooms enjoyed the See Saw activity and were clearly engaged with the See Saw experience and every student was able to demonstrate beat competency with a partner.

**See Saw: Classroom F, May 4, 2007.** The learning event began as usual with the Hello Song. We played a short round of Charoo and then I rested my hands on my knees in the stop position. All the children were watching carefully and stopped with me. I began patting my knees again to the slower beat of “See Saw.” The children immediately copied me. As I patted my knees I chanted the words to See Saw. The words and beats were organized as below. The diagonal line placed over top of the word or group of words indicates the beat.

/	/	/	/
See	Saw	up and	down.
/	/	/	/
In the	air and	on the	ground.

I asked the children what a see saw was and we spent a few moments sharing definitions and see saw stories. I asked the children to show me how their hands could see saw the beat and most children alternated their hands while patting their knees and exaggerated the high motion of the alternating hand raised in the air. I asked the children to stand up and show me how their bodies could be a see saw. Responses were varied. Some children alternated standing in high and low positions. Some children moved their bodies from side to side. Two girls grabbed hands and began alternating their body movement so that one child stood in a high position while another stood in a low position. I asked students to turn to the child nearest to them and show me how they could make a see saw together. At this point some of the children began to shift the chant into a pitched speech-piece alternating soh-mi.

I asked the children if they could imagine they were at the park sitting on a see-saw. We decided it was a lovely spring day, with lots of sunshine bringing the leaves out on the trees. The children sat on the floor, joined hands and rocked back and forth to the beat. By now, everyone was singing the “See Saw” chant-song. Although the children had all participated in See Saw when we were individually patting the beat on our knees, now children seemed to be even more enthusiastic about our experiences. There were smiles and laughter, and the beat was clearly shown in every pair of “see saws.” Then one overly enthusiastic participant caused her partner to complain, “Cheyenne’s stretching the beat.”

Sure enough, as Cheyenne was rocking back and forth, she was pulling her partner’s hands back as far as she could go, but in doing so, was not keeping in time with the rest of the class. “Let’s see if we can all stretch the beat,” I replied. I began to sing

“See Saw” slowly, stretching out each word. Now the beat was not only visible in the movement of each pair, but it became an entity made visible through the movement qualities of force and flow that could be seen embodied in the hands, arms, and bodies of the children playing the “See Saw” game. “Thinking bodies” I later wrote in my Learning Design Journal, remembering a concept discussed by Wright (2003):

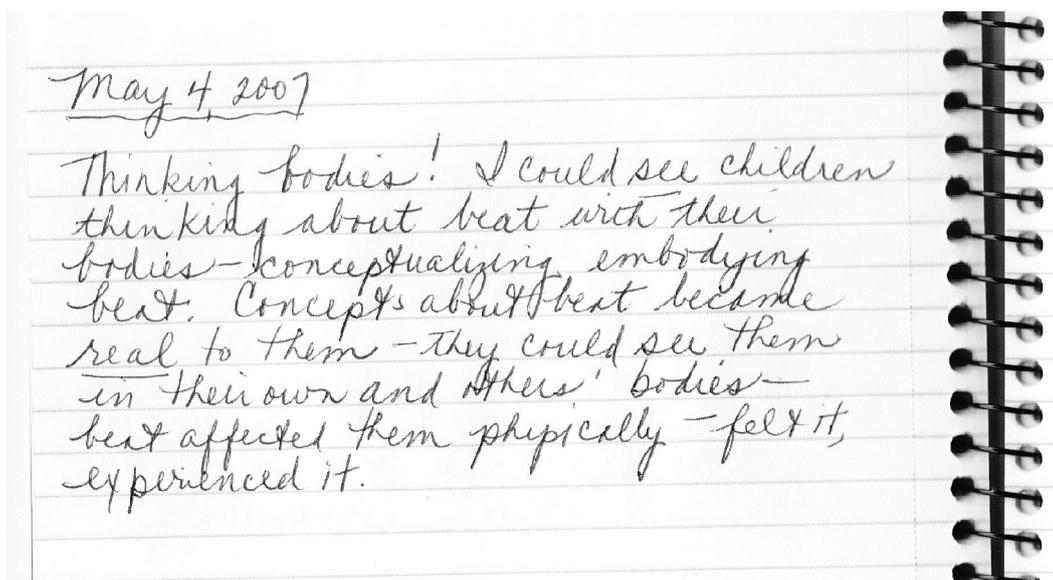


Figure 17. Design research journal left hand entry for May 4, 2007.

The accompanying reflection below affirms the importance of the body-mind connection to my planning. Subsequent learning events were deliberately constructed to involve kinesthetic action purposely chosen to help students develop conceptual understandings about beat and reading.

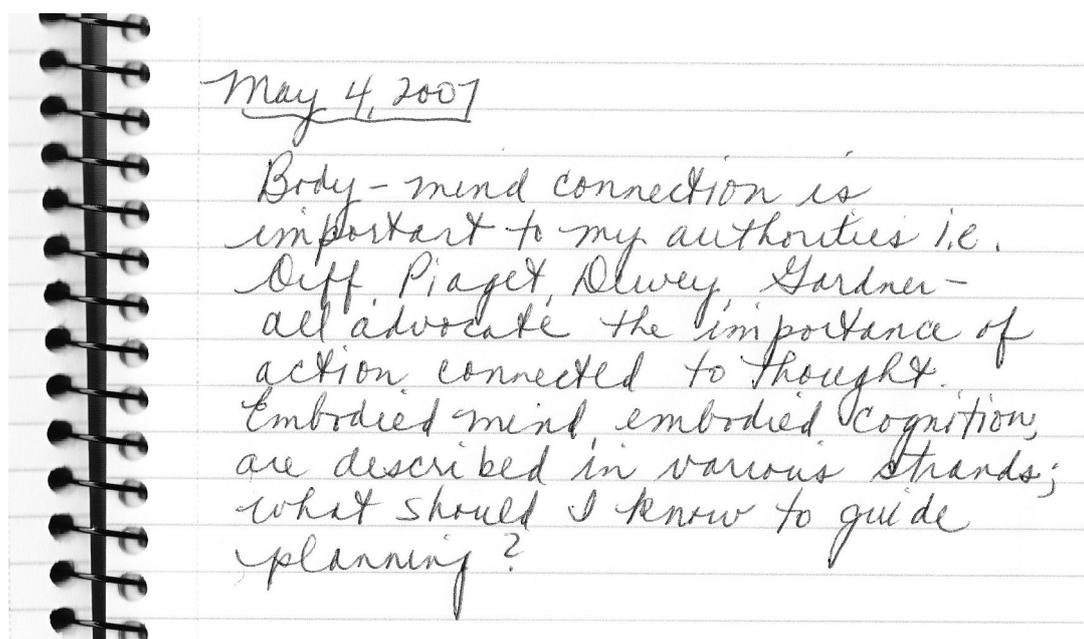


Figure 18. Design research journal right hand entry for May 4, 2007.

The action I included for this entry stated, “Check embodied cognition file for planning.” As part of research for PhD course assignments, papers, and in preparation for this research, I collected dozens of files on a wide range of related topics. I added to these files during the research and the lengthy period of analysis and synthesis that followed. The thick “embodied cognition” file included sources highlighted in the contributing theories section of Chapter One.

Bowman (2000) advocates the need to develop accounts of music and knowing that incorporate bodily knowing as a “constitutive element of mind” (p. 45). I took this counsel to heart in the ongoing development and planning of the learning design. However, I was conscious of the research focus on rhythm and expressed concern in the journal (May 4) that my study might evolve into a design for using movement, rather than rhythm, to construct understandings about music and reading. At this point in the design and planning, I was uncertain of the ways and means to foster the essential connection

between body and mind while also maintaining a clear focus on the research variable of beat and rhythm.

**Beat awareness and beat competency.** Phase One of the Learning Design continued with exploration of beat awareness and beat competency. Abramson's audio recordings that accompany *Feel it! Rhythm Games for all* (1998) and *Rhythm games for perception and cognition* (1997), were used to facilitate the adaptation of Montgomery's (2002) beat-movement teaching sequence. Students listened to recorded music in their own spaces while passing a tennis ball on the beat from one person to the next around the circle or down the rows of students. Selections from the recordings using different tempos, *accelerando* and *ritardando*, and with variations where the ball passing and beat started and stopped to match the recorded music stops and starts, were documented as highly enjoyable and successful for all classes.

Several speech-pieces and songs were used in a similar ways to pass objects to the beat while chanting or singing. We played "Star light, Star bright," "The Pie Game," "The Bone Game," the "Snail Game" and "Eh Ah." We explored beat by passing a wooden star, a fabric pie, a bone, a toy snail, and a shark's tooth around the circle or down and across the rows of students. All children expressed great enjoyment for these games and repeatedly asked for them during the study. Each classroom assumed a favorite game; Classroom F's ongoing request was for "Starlight." I describe an entry from the Research Design Journal to highlight the importance of the artifacts in this design, as well as the growing awareness and reinforcement of the importance of imagination and play for this study. The entry focuses on a class experience playing the game "Starlight, Starbright."

The traditional song “Star light, Star bright” is widely used in Kodaly and Orff-based approaches to music and found in many forms in early years children’s literature and in Montgomery (2002). It is usually sung to the time-honoured three note soh-mi-lah melody. The words to the song along with the accompanying beat structure are:

Star-light	Star-bright
/   /	/   /
First star I see tonight	
/   /	/   /
Wish I may, wish I might	
/   /	/   /
Have the wish I wish tonight.	
/   /	/   /

I used the song to develop beat awareness and beat competency and to introduce words I planned to later transfer to print text. Not every class chanted or sang every beat passing game, but all classes did sing and play Star light Star bright. We followed the usual approach in all classes, learning the words and melody through rote strategies. We performed the heartbeat to the song using a variety of body percussion and small nonpitched instruments. When I felt a class had secured words, melody, and beat, we played the game in a circle or rows, depending on the physical organization of each classroom.

The Abramson games were useful preparation for learning how to pass an artifact on the beat and most classes were very successful with these beat passing games. We began the beat passing games by passing the artifact around the circle to the chant, “Pass, and pass, and pass, and pass, etc.” The artifact would be passed using the beat that would accompany the song or chanted game and placed in the hands of the next child on the

word, “Pass.” The word “and” occurring on the subdivision of the beat, was intended to be an aural cue to each child that the artifact was about to be passed. My previous teaching experiences playing passing games over the years had taught me that children needed to learn how to pass artifacts and Abramson’s (1998) instructions for passing objects on the beat were helpful for students and teachers.

The “Star light Star bright” learning event described below follows initial experiences in passing artifacts to the beat. The star used for passing in this activity is a hand-carved wooden star, soft, smooth, and beautiful to the touch. I prefaced the activity by telling the children that the star was given to me as a special gift and that because it was made with love, I liked to pretend it would make my wishes come true. I told the children that we would play a game with my gift and they could pretend to wish on my star, too.

**Starlight: Classroom I, May 11, 2007.** After we sang “Starlight” and performed the beat to the same pulse we would use for passing, I told the children we were ready to pass around my star. “If you are the one holding the star on the very last beat of the song, you may close your eyes and make a wish on the special star,” I told children. I instructed the students to say their wish in the head and keep it special and secret. “What word do we sing on the last beat of the song?” I asked. “Tonight!” came the answer from many children in our circle. Faith shook her head and said, “No, it’s just on night,” she corrected. “Let’s see,” I offered and we sang the song and patted the beat to discover that yes, Faith was right. The last sound on the last beat was indeed the word, “night.”

William put up his hand with a very concerned look on his face. “Yes, William,” I said. “Will we all get a turn to wish?” William asked worriedly. “We won’t all get a

chance to wish in our circle because I'm afraid we'll run out of time," I explained. As the children started to express dismay, I added, "But...if we play the game and take turns around the circle without any problems, I promise that everyone in the class will have a wish on the star before they got out for recess." This seemed to satisfy all concerns and I started singing the introduction, "Starlight, ready go." We sang the song and successfully passed the star around the circle as we sang. The students watched the star most carefully to ensure that everyone was passing exactly on the beat and with great anticipation followed it with their eyes to see who would end up with the star on the word "night." Selina was holding the star on the word "night" when our song ended.

She closed both hands over the star, squeezed her eyes shut, and reverently clasped the star and made her wish. With a sigh, she opened her eyes, and I sang the introduction again, "Starlight, ready go," and off the star went around the circle again. When the bell rang, the children all cried out, "Ahhhh," in disappointment that our class was over. I responded by telling the students that we could play Starlight again the next time I came and if they wanted to wish on the star before they went out for recess they could line up at the door. Despite the fact that recess had already begun, every student lined up at the door to hold the star in their hands and make a wish before they went out.

An entry in the Design Journal notes that the classroom unit met appropriate criteria for engagement and motivation, but there was no way to tell whether they were motivated and engaged in the activity because they enjoyed the rhythmic experiences or because they enjoyed wishing on the star and pretending it would make their wishes come true. The research-based reading programs and interventions I examined in preparation for this study detailed how to "teach initial reading effectively" (Vaughn & Linan-

Thompson, 2004, p. 1) but seldom included or highlighted imaginative processes or student engagement as part of efforts to improve reading and literacy (Duke & Mallette, 2004; Samuels & Farstrup, 2006; St. John, Loescher, & Bardzell, 2003). I questioned whether this was because imagination was not considered an important factor or because imaginative teaching and learning confounded empirical results? I considered whether or not to continue planning to use artifacts and games as I had been doing up to this point, and consulted my references and critical friends. In my reflection I wrote:

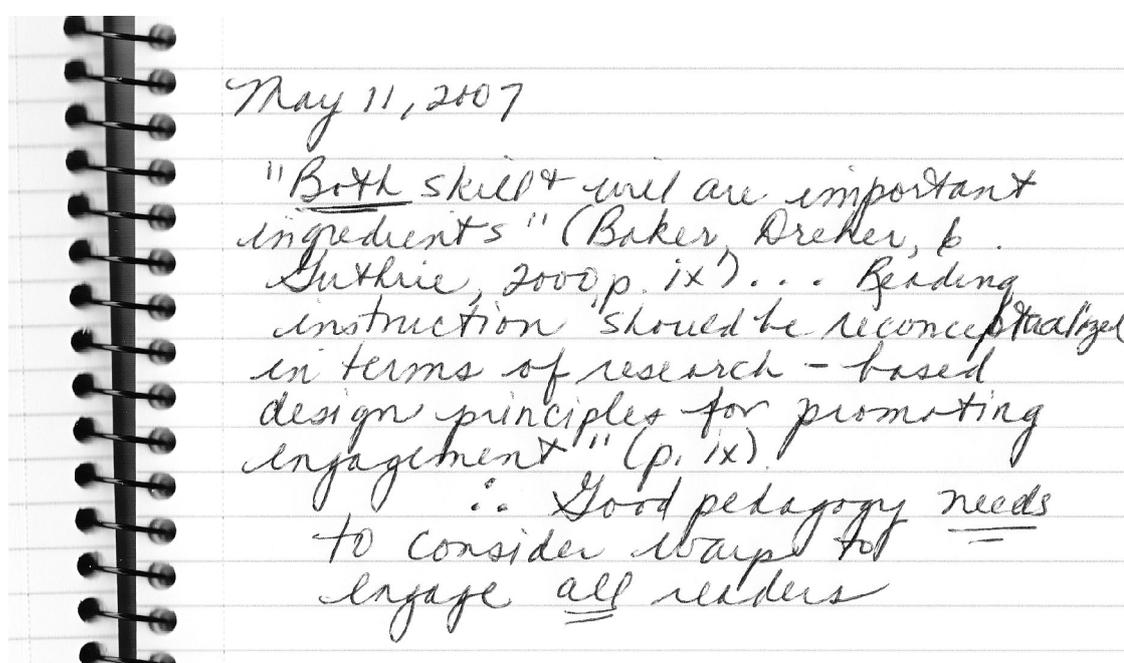


Figure 19. Design research journal right hand entry for May 11, 2007.

As part of my action I wrote: "I can't not include the artifacts and games I know will potentially engage students in reading and rhythm. It is simply good pedagogy to consider ways of designing the teaching to engage and motivate all learners so I'll continue to do so. Remember Egan!"

As discussed earlier, Egan's (2005) text *An Imaginative Approach to Teaching* was influential to this learning design. A re-reading of Egan (2005) and the literature supports for engagement, creativity, and imagination convinced me that despite the challenges and complications for variable effects, the tools and artifacts that engaged students' imagination in reading and rhythm learning, would be included in subsequent planning and as part of all data for analysis.

**Beat and movement.** The learning events of Phase 1 concluded with experiences focusing on locomotor beat-motor coordination and audiation or inner hearing of the beat. Montgomery (2002) cautions that locomotor movement to the beat while singing or chanting is one of the most difficult elements in the development sequence. I began locomotor experiences with the chant "One for ice cream, two for soda, three to walk to Manitoba." I chose this chant because the chant contains only one sound for each beat. We spoke the words and performed the beat using various body percussion and nonpitched instruments. When beat performance seemed secure, I asked students to speak the words in their heads (audiation or inner hearing) while they performed the beat. Herbie and Henry, the cone puppets, helped play inner hearing games. When Herbie popped out of his cone, students spoke the words of the chant; when Herbie disappeared into his cone, the sound of the words disappeared into the children's heads. The chant took different forms. For example, students would speak the words orally as indicated by the print text and audiate the words on the marks indicating the beat of the speech-piece: "One / / cream, two / / / / / walk to / / to-ba ! Hearing and feeling the chant as a whole in relation to its grounding in the beat was critical to the success of this activity.

We then moved the chant into the feet and walked the beat standing in one spot while chanting. Then we chanted and walked the beat using locomotor movements. We kept the chant interesting by varying where we would walk to. If students chose a place name with two sounds such as Gimli, we discovered we would need to add two beats. Each class came up with different endings such as “three to walk to Gimli right now.” We varied expression and vocal qualities. We tiptoed to Gimli and spoke the chant quietly. We chanted with crescendo, decrescendo, loudly, quietly, using varying tempos and different voice timbres. The majority of students achieved beat competency much more quickly than I anticipated, as indicated by a May 10, 2007 entry:

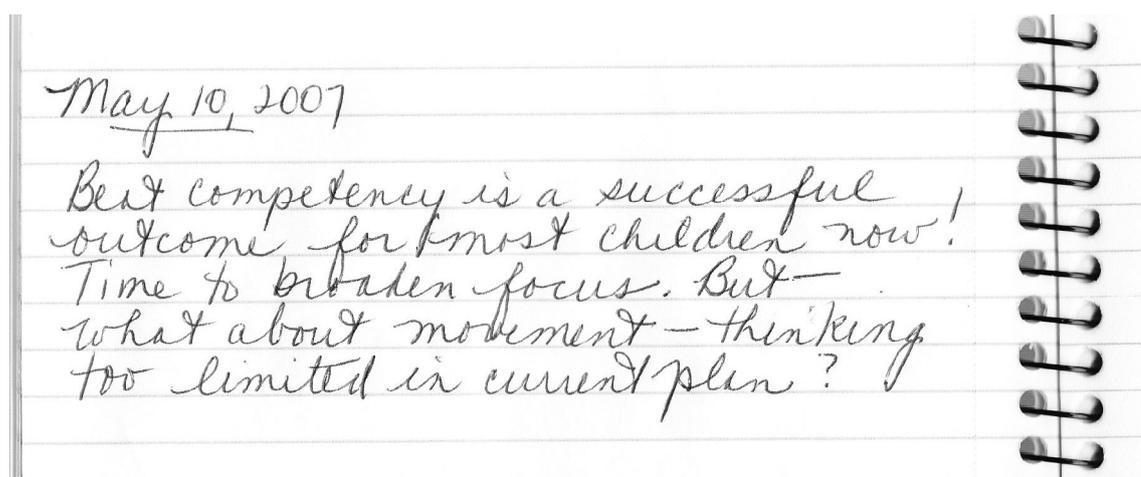


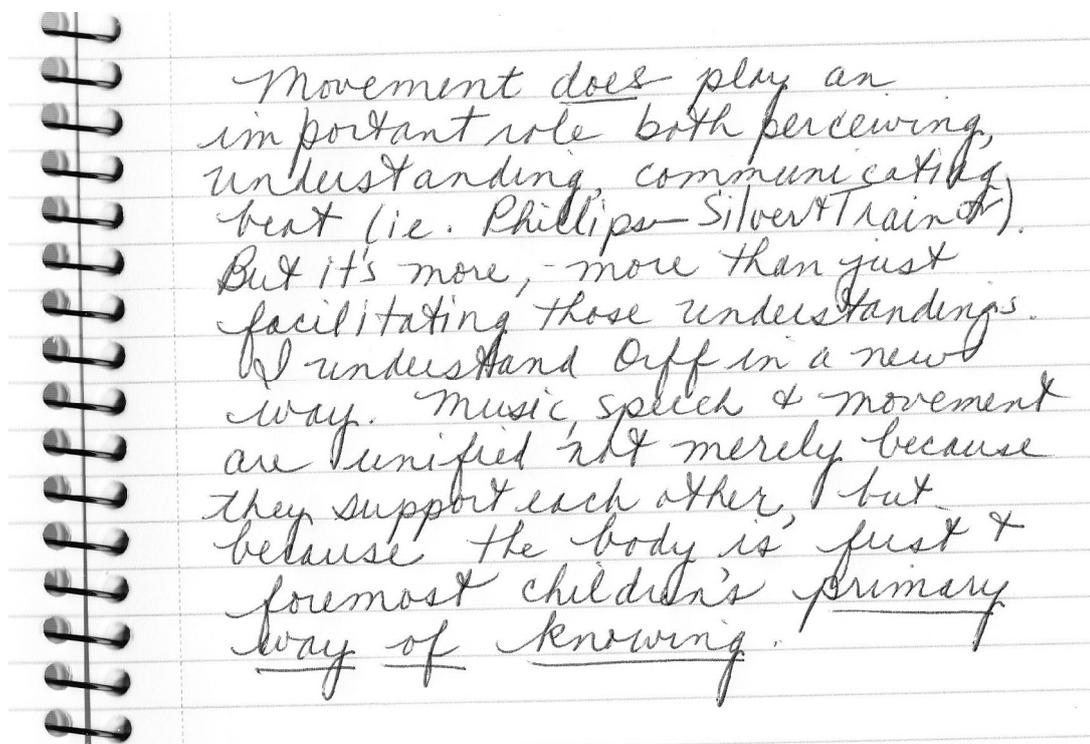
Figure 20. Design research journal left hand entry for May 10, 2007.

The “One for Ice Cream” activity and many others caused me to be struck again and again by the impact of movement on the understandings and communication of beat and speech. I noted the way moving the beat engaged all students physically and mentally. I reflected on the importance of extending movement experiences beyond what I originally planned to allow students the opportunity to feel the beat and the words of

speech-pieces and songs in physical, bodily ways. I re-examined the pilot study notes and the relevant literature and considered my previous teaching practices.

Movement has always been an important element in my Orff-based teaching approach to music education. As Frazee (1987) explains, “The importance of the kinesthetic aspect of musical performance is well understood by Orff teachers. They acknowledge physical response as the foundation upon which group music-making is laid” (p.19). Like Frazee, I often include movement as a means to an end. I have used movement to express form in music, to interpret musical elements heard in listening experiences, and in this study, as a means for furthering beat awareness and competency. Goodkin (2004) argues that the purpose of movement in the music class “is to shape the body as an instrument of expression” (p. 61) and lists six practical applications of movement in the music class “as a means to understand and perform something else” (p. 63). In the classic source *Elementaria*, Keetman (1970) devotes a section of this book to movement training and says that movement training is an essential element in a unity with music, dance, and speech, and provides “a reciprocal benefit to musical capacity” (p.107).

My focused analysis of the movement activities related to beat and rhythm experiences in this research together with comments from teachers and assistants in the classrooms, allowed me to see movement in a different way, perhaps more closely aligned with the original intent of Orff’s (1963) celebrated and often –quoted definition of elemental music: “Never music alone, but music connected with movement, dance, and speech—not to be listened to, meaningful only in active participation” (p. 72). This is the quote I referred to in the Design Journal May 11, 2007, when reflecting on the next phase of the study.



Movement does play an important role both perceiving, understanding, communicating, beat (ie. Phillips-Silver & Trainor). But it's more, - more than just facilitating those understandings. I understand off in a new way. Music, speech & movement are unified not merely because they support each other, but because the body is' first & foremost children's primary way of knowing.

Figure 21. Design research journal right hand entry for May 11, 2007.

In the reflection above, data analysis led me to conclude the importance of movement to perceiving, understanding, and communicating beat. My findings echoed those of Phillips-Silver and Trainor (2005): “Our findings provide evidence that the experience of body movement plays an important role in musical rhythm perception” (p. 1430). I continued, “But see Bowman again. It is not a matter of one or the other. One cannot be studied without the other” (Design Journal, May 10, 2007). I originally included movement as scaffolding for conceptual understanding of beat. Bowman (2004) suggests that the body is not simply scaffolding, or “something to be transcended in musical experience...It is not only indispensable in, but constitutive of all experience and cognition that rightly claim musical status” (p. 35). According to Bowman (2004)

musical experience is an embodied practice that goes beyond thinking, hearing or feeling. “We participate with our whole bodies; we construct and enact it” (p. 47).

### **The Learning Design Phase Two**

I resolved the dilemma presented in Phase One regarding which variable, movement or beat, was properly the variable under study. I concluded that beat and movement are inseparable and I moved into Phase Two of my study with revisions to include greater opportunities for movement. I developed our speech pieces and songs into games using locomotor skills and understandings to move the beat in locomotor ways with experiences such as “Rain Rain” and “Snail Snail.” We played “What will we do on a nice spring day?” and explored other speech-pieces and songs unique to each class.

Reading experiences were revised to include nonlocomotor movement experiences using body percussion and nonpitched instruments. Phase One and Two were overlapping as appropriate to the context of individual classrooms. The transition to reading print and beat diagrams occurred at slightly different times in each classroom depending on when the study began in each classroom, scheduling, and the learning context. However, by the third week of May, every class had been introduced to beat notation and print text.

During the second phase of the study, collaborating teachers provided a variety of useful suggestions for ongoing revision of print and beat reading. Suggestions included presenting the print text on the white board in as close a manner as possible to students’ usual classroom experiences of print text. I began each line with capitals and added punctuation at the end of every line, asking students to observe and follow punctuation. The layout and organization of text on the white board was revised to be similar to

classroom reading materials. Challenging words were replaced with visual images using icons in use in classrooms. Teachers suggested using different colored markers to identify key sight words, discriminate phrases, and distinguish the difference between print text and rhythmic and beat notation. One collaborating teacher suggested that the transition to reading from the beat and speech games and activities should be more clearly delineated for students and so the speech-piece “Listen” was born.

The speech piece “Listen” became the oral and physical cue for all subsequent reading experiences at the board. The speech-piece evolved through classroom use and revisions to become:

Listen! (clap clap) Listen! (clap clap)

Listen to the sounds of the words we say.

Listen! (clap clap) Listen! (clap clap)

Listen to the sounds of the words we say.

A routine of use emerged in all classrooms. To cue attention and movement to the white board for reading experiences, I would say the “Listen” speech-piece and students would add the two claps between the repeated word “listen.” Students would then join me in speaking the speech piece a second time. The routine became so familiar that after a week or so, as soon as I began the word “Listen,” children would launch into the speech-piece with me. If the piece we were about to read was from a song then the words would become “Listen to the sounds of the words we sing.” Because the speech-piece was a recurring theme and common to all classrooms, I used it as the title of the booklet of our songs and speech-pieces that I made for all children to read at school and home.

The speech-piece “Listen” evolved as a result of discussion with some classes about the sounds of the words. All beat experiences began with a focus exclusively on the heartbeat of each speech-piece or song. The initial pieces were chosen from repertoire where the sound of the words matched the sound of the beat as often as possible to avoid confusion about beat subdivision, as for example, “One for Ice Cream.” As we added repertoire, more words were chosen to subdivide the beat. At different points during the study, all the classrooms discovered that the sounds of the words did not always match the heartbeat of the piece.

I did not plan for formal instruction of beat and beat subdivision and I did not formally teach classes about rests or eighth notes in music. Discussions about beat and rhythm were emergent according to the stage and context of each classroom. Because all classrooms also received specialist music time, the terminology and use of the musical rest, ta (quarter note) and ti-ti (eighth notes) were common knowledge and became shared vocabulary used in this learning design. A typical example of beat and rhythm exploration leading to reading from the white board is described in the following excerpt. “One Two Tap Your Shoe” is a traditional song and game that appears in many different forms in children’s literature and music repertoire. The version I have used over the years is:

One two tap your shoe.

Three four tap the floor.

Five six tap the sticks.

Seven eight lay them straight.

Nine ten once again!

In all classrooms “One two tap your shoe” was introduced as a speech-piece and evolved into a pitched melody alternating between the two notes soh and mi. The excerpt below is taken from an initial introduction of the speech-piece “One two tap your shoe” and is typical of the experience for all classrooms.

**One two tap your shoe: Classroom C, May 17, 2007.** After our usual introductions and beat focusing games, I patted the beat and asked the class to echo me as I chanted the first four lines of “One two tap my shoe.” When we finished, Jeffrey reached for the bag of sticks in front of him and handed them to me. “You guessed it Jeffrey, “I said. This piece certainly needs sticks doesn’t it! But before we add the sticks let’s figure out if we’re going to play the heartbeat of the words, or the way the words go. Let’s start by patting the heartbeat as we say the rhyme.”

Together we chanted the rhyme and patted the heartbeat. A number of children patted the rhythm of the words instead of the heartbeat and after the first try, Sarah exclaimed, “That’s hard, Mrs. Peters.” “What makes it tricky?” I asked her. Sarah answered, “Because the words make you want to play them.” “Which words?” I responded. “The tapping ones,” Sarah said. I played the beat of the speech-piece on the drum and asked the students to listen for where they heard two sounds on one beat. Together we discovered that the sound of the number words (except for seven) all matched the heart beat of the piece, but the phrases with the words tap in them did not. We discovered that “tap your shoe,” “tap the floor,” and tap the sticks” all were ti-ti ta rhythm patterns.

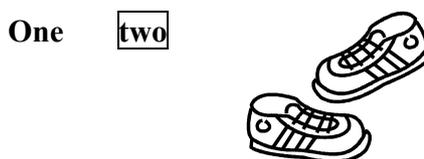
The children decided that it would be easier and sound better if we played the sticks the way the words went (the rhythm patterns) instead of the heart beat. “Okay,” I

said, “Let’s try it with our hands. We chanted the speech-piece, I played the beat, and the students clapped the words. Every student successfully clapped the rhythm of the words with one exception. “Did you notice another tricky spot where there are two sounds for one beat?” I asked. Several different possibilities were suggested but none identified the area that had been a challenge to students so I asked the class to try again and report any tricky spot back to us. Concentration was evident on all the faces as the children chanted and listened and watched for the tricky spot. “I know, I know,” shouted Bryan. “It’s seven. Seven is the tricky one.” We determined that seven was challenging because all the other number words had just one beat except for seven. As Kyle said, “you’re not expecting it to be there.”

Using “One two tap your shoe” we played a variety of games to highlight the differences between beat and rhythm following Montgomery (2002). We chanted the speech piece using our sticks to keep the beat and then chanted the speech-piece using sticks to perform only the rhythm of the words. We alternated beat and rhythm for each line and then played a game with my beat/rhythm drum. The drum is on a handle with a heart drawn on one side of the drum and crossed sticks drawn on the other side. When the drum is held up displaying the heart side of the drum facing students, students perform the beat of the piece while singing or chanting. When the drum is turned to display the crossed sticks side of the drum, students perform the rhythm of the words while chanting or singing the piece. The beat/rhythm games proved engaging for this class and all the experimental classrooms in the study.

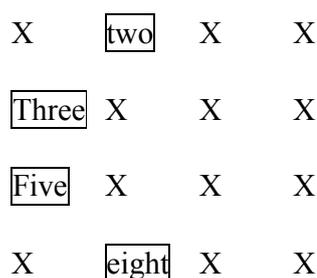
We continued to experiment with ways to highlight the beat and rhythm of “One two tap your shoe.” I asked for suggestions of other ways to play the rhythm of the words,

and we created a piece with bells, finger cymbals and triangles playing the number words and sticks playing the subsequent phrases. I thought we had the necessary scaffolding in place to see what those sounds looked like on the whiteboard and I notated the rhythms and words on the board. The number words were the reading focus so I printed them on the board and used images for the “tap your shoe,” “tap the floor,” tap the sticks,” and “lay them straight.” I drew shoes, straight line for the floor, two sticks standing upwards for the word “sticks” and two sticks lying down for “straight.” The words of the first line looked something like this:



*Figure 22.* “One two tap your shoe” line 1 print text.

We read and chanted the words and images on the board and then played the rhythms of the words using nonpitched percussion. Although children seemed to be reading the print text, many appeared to be speaking the words as memorized from our previous chanting and playing of the piece. To focus students’ attention on the print text, I drew boxes around the number words and asked students to pat the beat and speak the words in their heads (audiation) except for the words that were in boxes. One variation of this game resulted in a speech-piece reading diagram for “One two tap your shoe” presented in Figure 23. The words in boxes were spoken out loud. The uppercase X represents the beat played by teacher and students while students audiated the missing words in their minds.



*Figure 23.* “One two tap your shoe” reading diagram.

I noted in the Design Journal that students caught onto the word games very quickly and seemed to find them highly enjoyable. However, I still wasn’t certain if students were actually tracking the print and reading the words or simply saying them from memory. For subsequent print text reading activities, I revised plans to create additional focus on reading rather than on memorizing the print text. For example, I placed boxes, triangles, and circles around highlighted words in the print text. I asked students to play the boxed words with certain nonpitched instruments such as bells. Words placed in triangles were played with contrasting nonpitched percussion instruments such as sticks, and words with circles around them were played with another contrasting instrument such as a drum. We created games where students chose whether they would speak just the circled words, or just the words in boxes or triangles. We played games where the words in boxes might be spoken in one line and the words in triangles or circles were spoken in the next line.

**Distinguishing beat and rhythm.** When classes demonstrated a conceptual understanding of the difference between beat and rhythm, I explored more complex and challenging ways of distinguishing beat and rhythm to create sensitivity for the sounds of the music and the language. The use of ostinato became a regular feature in all the experimental classrooms as part of our speech-pieces activities. We created ostinati from

certain recurring patterns found in the speech-piece, such as the ti-ti- ta pattern in the “One two tap your shoe” speech-piece. Half the class would play the recurring pattern (ostinato) throughout the chanting or playing of the entire piece while the other half of the class would say and play the rhythm or beat of the speech piece. We would switch parts regularly so that everyone had a turn to experience the repeated pattern of the words or the piece in its entirety. We used the ostinato patterns to create introductions and endings for extending musical knowledge as well as for creating an aural awareness and cues for the words to come. We combined beat and rhythm parts to create small ensembles. For example, one ensemble might play the beat, one ensemble might play the rhythm, and one ensemble might play the ostinato while everyone chanted or sang the speech-piece.

We played a variety of beat and rhythm switching games including the rhythm/beat drum game. The cone puppets were also used to play beat and rhythm switching games. When one of the cone puppets popped up, the class would chant the speech-piece and clap or play the rhythm of the words. The usual instruction to students was to clap or play “the way the words go.” When one of the cone puppets disappeared into his/her cone, the students would continue chanting but switch right away to patting or playing the heartbeat.

We extended the challenge by dividing the class in half with one group patting or playing the heartbeat of the piece and the other group clapping or playing the rhythm of the words simultaneously using the cone puppets and rhythm/beat switching drum. If the parts were played on nonpitched instruments we contrasted the timbres of the instruments to further distinguish between the sounds of the beat and the rhythm of the words. When

children were comfortable with playing beat and rhythm simultaneously I challenged them to switching parts on a given signal.

When we built up a repertoire of speech-pieces distinguished by beat and rhythm patterns, I began each class by clapping the rhythm pattern of one of our songs or speech-pieces. I would ask the class to identify the mystery song or chant. Once we had a few suggestions, I would ask students to listen in their heads to the song or chant they identified to see if it was the same as the one that I was clapping or playing on my drum or other nonpitched percussion. A May 28 entry notes that students asked if they could clap a chant to me so I could guess which one they were playing and this became a regular feature in our learning events. Two or three students would each have a turn to clap one of our speech or song repertoire selections for either me or the rest of the class to guess.

I used common Orff and music education practices and sequential processes (Frazee, 1987, 2006; Montgomery, 2002) in order to reinforce the sounds of the words and the distinction between the heart beat of the piece and the rhythm of the words. We began our learning activities by chanting or singing our known repertoire together while performing the beat and rhythm using body percussion. We varied the songs or speech-pieces using different voice qualities, timbres, expression, and inflection. I would often then ask students to pat the beat of the piece and put the words in their heads. We would chant or sing while clapping or playing the rhythm, once again followed by speaking the words in our heads and clapping or playing the rhythm of the text. The next step in this process involved the entire class audiating the words with half performing beat and half performing rhythm, followed by beat and rhythm switching games. The beat and text

rhythm patterns were then often transferred to nonpitched instruments and locomotor movement used to explore beat, rhythm of the words, and distinctions between beat and rhythm.

One such example explored by all classes was “Jelly in the Bowl.” This piece is used by many Orff educators in different versions to distinguish rhythm from beat. Students began by learning the speech-piece “Jelly in the Bowl” by rote using this version:

Jelly in the bowl,  
 Jelly in the bowl,  
 Wiggle waggle wiggle waggle  
 Jelly in the bowl.

After exploring the beat and rhythm for this piece using the processes described above, I asked students to stand and show me how they might wiggle waggle in one spot. We had a variety of movement wiggle waggles in every class such as twisting side to side, up and down, and waggling arms and/or legs. Then I asked students to pat the rhythm of the words “jelly in the” on their thighs. When that was secure we added a clap for the word “bowl.” Then I asked students to keep the wiggle waggle words in their heads while they performed the movement:

Jelly in the bowl,  
 Jelly in the bowl.

(Student movement patterns to the rhythm of the words wiggle waggle wiggle waggle)

Jelly in the bowl.

Next we transferred the sounds of the words “jelly in the” to our heads and when that was secure we also audiated the word “bowl.” The resulting performance was:

Pat pat pat pat clap

Pat pat pat pat clap

(Student movement patterns to the rhythm of the words wiggle waggle wiggle waggle)

Pat pat pat pat clap.

The next step in our process was to transfer the body percussion to contrasting nonpitched instruments. The words “jelly in the” went onto sticks; “bowl” was played by finger cymbals and triangle, and “wiggle waggle wiggle waggle” was played by the egg shakers.

The words were then transferred to the white board with accompanying beat diagrams and/or rhythmic notation. Words that were familiar were expressed in print text and unfamiliar words were substituted with images or symbols. For example, the words “wiggle waggle” were represented by wavy lines. We then played the beat and rhythm of the text, read the text, and played various reading games with text, beat, and rhythms. Sometimes I would ask students to read just the words identified with boxes, circles, or triangles as previously described, or sometimes I would ask students to audiate certain lines and speak others. At other times I would point randomly to different lines for students to read or we would create our own speech-pieces from the words on the board. A similar process was used for a variety of speech-pieces in Phases Two and Three.

### **The Learning Design Phase Three**

A May 25 entry in the Design Journal refers to my concern that our activities at this stage were directed by me using more of a transmission teaching approach than a constructivist one. I was largely assuming the role of sage on the stage rather than guide

on the side (King, 1993). My study proposal was conceived and grounded in constructivist perspectives for teaching and learning that “challenge teachers to create innovative environments in which they and their students are encouraged to think and explore” (Gould, 2005, p. 99). I believed in the importance of creating an innovative environment to engage students in active rather than passive learning but I was concerned that up to this point in the study, I was the central figure rather than the students.

This concern was reinforced by conversations and remarks by collaborating teachers. The teachers were wonderfully supportive and were most attentive to the classroom environment and student behaviors. They worked to ensure the greatest potential for the study’s success, which for many, meant that students were listening quietly at all times. Frequently, teachers would begin the learning event with the warning that students were to listen carefully to Mrs. Peters and to not talk. As one teacher instructed the class after students had enjoyed an activity with much discussion and laughter, “This isn’t playtime. Mrs. Peters is here for important work.” In one occasion when classroom discussions emerged, the collaborating teacher shared strategies with me after the class on how to stop the student talking and ways to ensure they were quiet and listening throughout the learning event.

I was most grateful for collaborating teachers’ helpful support and definitely appreciated the attentive listening and concentration from all classrooms. However, I also wanted to ensure that I was receptive to children’s ideas and that I was helping them make connections between learning experiences and events. I wanted to encourage “the active construction of meaning” (Gould, 2005, p. 100). To facilitate real learning, according to Gould, I needed to provide opportunities for students to collaborate, interact,

and raise questions. I needed to give students opportunities to be leaders in our activities and to take ownership of learning activities. However, I also found that time constraints made it challenging to provide such opportunities.

Issues with time constraints featured largely in design research journal entries. An entry for a Classroom F learning event described attempts to create a speech-piece with the class. The entry documents that we spent the entire class asking questions and collaborating and experimenting with ideas for creating the speech-piece but ran out of time to actually finalize the speech-piece. By the time I returned for our next class together, the children had forgotten the ideas for the piece they were creating and the excitement and momentum of the previous class experiences was lost.

On another occasion in classroom C, the plans for creating speech-pieces with the class were derailed when the entire class was taken up with the activating experience intended to lead into the main body of the learning event planned for that day. I began the class by activating ideas using our Charoo game. When I asked who would like a turn to be a leader to choose and model beat patterns for the class, nearly every hand shot up and we spent the entire class playing Charoo so that each child would have a turn to contribute ideas and act as leader. Various strategies were employed to allow for turn-taking and equal contribution of ideas, but I frequently assumed the leadership role in decision-making to deal with the time constraints. All collaborating teachers offered to extend our time together so that we might have more than our twenty minutes three times a cycle and in hindsight that possibility should have been written into the original ethics proposal for the study. “More time” became a common heavily underlined phrase found throughout the Design Journal.

Despite the time constraints, I determined to revise planning for Phase Three to include greater opportunities for students to construct their own learning and begin with their ideas and hypotheses (Gould, 2005) rather than mine. In the Design Journal I listed some guiding principles of constructivism to shape future learning events, including “seeking and valuing students’ points of view” (Brooks & Brooks, 1999, p. 33) and “posing problems of emerging relevance to students” (Brooks & Brooks, 1999, p. 33). Phase Two data analysis indicated that most criteria for beat competency were met and that students remained highly motivated and engaged. I planned to continue the use of movement, artifacts, and games to engage students and to continue beat, rhythm, and oral reading exploration in increasingly complex and sophisticated ways using spiral progression sequencing (Montgomery, 2002).

When the oral reading fluency activity assessment protocol was held against the learning design for Phase Two, most criteria were met with the exception of “opportunities for think alouds and responding to read-alouds,” and “opportunities for authentic purpose and student choice of text.” The next phase of the study then, needed to provide greater opportunities for think alouds and student response as well as expanded opportunities for authentic purpose and student choice of text. I also decided that subsequent iterations of the design should build on Phase Two activities by using sight words and vocabulary in new ways. I planned to introduce more challenging oral reading texts and new vocabulary connected to other classroom learning.

Phase Three corresponds to the last third and cycle of the study. Unique sets of speech-piece and song repertoire connected to individual, authentic classroom purpose and oral reading fluency needs and interests were developed for each experimental

classroom. Discussions with collaborating teachers were instrumental in determining the appropriate repertoire choices for each classroom. For example, in classroom G, Tony shared the “How-to” books that students were in the midst of writing. Tony had modeled a framework for creating a How-to book that had been most successful and students were very proud of their work and excited to share their stories with me.

Students wrote books with titles such as “How to do the Dishes,” “How to take care of Cats,” “How to make Books,” “How to make hot chocolate,” “How to take care of a kitten,” “How to make a friend,” and “How to build a car.” Tony suggested using the students’ own work as a means of exploring oral reading fluency, beat and rhythm. A description of Classroom G for June 8 serves as an illustrative example of this process.

**How-to raps: Classroom G, June 8, 2007.** The first “How-to” book generated a lot of excitement in the classroom and children were eager to all have their “How-to” books read and transformed using our beat and rhythm games and activities. A challenge quickly emerged in this learning process. By this point all classrooms had acquired a range of tools to use in creating chants and games using beat, rhythm, and text but the process of creating with these tools usually took most of the class period assigned for our music time. Every child wanted to share their story and we were very slowly moving through each student’s work. After several “How-to” books, some of the excitement was wearing off, and although students were still attentive, polite, and demonstrating admirable effort, their enthusiasm was waning.

Nonetheless, students contributed a variety of ideas for interpreting Stella’s “How-to” book called “How to draw a girl.” I wrote the text on the whiteboard and used

a green marker for all the body parts words and boxed these words so that the result looked like this (4 beats per line):

First you draw the head,

Then you draw the hair,

Then you draw the eyes,

Then you draw the nose,

Then you draw the neck,

Then you draw the ears,

Then you draw the mouth,

Then you draw the body

Then you draw the legs and the

feet, the end.

We patted the beat and chanted the words to Stella's piece using a call and response approach. Children were easily able to repeat each line after me while simultaneously sustaining the beat. We repeated the piece reading it together and patting the beat. This time, the reading of the print text seemed quite challenging for many children and we were unable to establish any group flow to our reading. Several children dropped out midway through the reading.

I asked the children to listen to me clap and speak the first and second lines and tell me what they heard. The first line was interpreted as ti-ti ti-ti ta rest and students quickly discovered that each line was the same pattern of sounds except the line with the word "body." The word body was discovered to be made up of two sounds that fit into

one beat. Once we identified the recurring pattern of the words and their corresponding rhythms, the chanting of the piece seemed much easier for all children and we were successful at maintaining a flow to the print text while keeping all children engaged to the end of the piece.

I asked the children what we could do to add interest to the lines since the same patterns kept repeating. We decided the piece needed different dynamics and we experimented with various possibilities. Our final form began quietly and built in dynamics to finish very loudly so that “The End” was almost shouted. With each reading, the children became more confident and after several variations, all children were joining in and enthusiasm seemed rekindled. The final class reading was fluent, expressive, and accurate.

We then played our usual beat and rhythm games where half the class patted the beat and chanted and the other half clapped the rhythm and chanted. We switched parts and with Stella’s permission, played a mixed-up drawing piece as I pointed to different body parts words out of order for students to chant. Stella had also written a “Tip” as a number of the children had done in their stories. Stella’s tip was “Take your time, be careful, try your best” which lent itself to a lovely ostinato rhythmic pattern of ti-ti ta, ta ti-ti, ti-ti ta, rest rest.

I suggested we use Stella’s tip as an ostinato. We chanted and played the ostinato using different body percussion and the class decided that clapping the ostinato was the effect they liked best. We divided the class and half the class chanted and clapped the ostinato and the other half of the class chanted the story and patted the beat. The ostinato part worked well as long as I was providing leadership for the group. As soon as I began

helping the group saying Stella's story, the ostinato group fell apart. I tried a different approach and asked the children to speak and clap the ostinato while I said Stella's piece. This was much easier for the class and the group security that came from doing the same part all together was successful in maintaining the ostinato for the entire piece.

I then performed the ostinato while the class chanted Stella's piece. The story was just too long for the children to sustain without my help pointing to each line. When the children couldn't sustain the story independently I asked Stella if we could try a short version of her piece and she suggested what lines we could leave out. We reduced the story to "First you draw the head, then you draw the body, then you draw the legs and the feet, The End." We added movement to this variation and used two hands to touch head, body, legs and feet ending with two stamps on "The End."

This was most successful and combined with the ostinato, worked well in two parts. However, once children began adding the movement, focus on the print text was lost and we were no longer reading the words. My next step to re-engage reading would have been to transfer the body percussion to nonpitched percussion instruments and read the rhythmic notation and words from the whiteboard. However, at that point our class was over. I thanked Stella for sharing her story with us and promised Carl that we would begin with his "How-to" the next time I returned.

After our music class, Tony invited me to stay in the classroom to hear the children read their stories to each other and I gladly accepted. This was the first time I had heard the children read in some time and I was taken aback by the contrast between the classroom reading of "How to draw a girl" and the individual student oral reading. Our final efforts to read "How to draw a girl" were realized with flow, phrasing, expression,

animation, and fluency. By contrast, many of the individual oral readings I heard after the group experiences were slow, laborious, interrupted, and delivered in monotone. The difference was striking; it was as if students were now reading a foreign language that had nothing to do with their previous reading experiences using our beat, music, and movement activities. When one student was struggling to read a particular word in his story, I prompted him by saying he knew the word. “No,” he replied. “I don’t know it.” “Yes you do,” I assured him. That word is in “Baby Herbie’s Song.” “That wasn’t reading,” Jon replied. “That was just for fun.”

That night in my Research Journal, I wondered how I might revise planning to make stronger connections between our music reading activities and the classroom reading activities for these students. At least some of the students were not making connections between the words that were read easily and fluently in our group experiences and the experience of reading in their daily context. I determined that future iterations of our learning design needed to consider more carefully ways that the reading experiences explored through beat and music were made relevant and congruent to the classroom practices. I assumed that students and teacher would see that connection themselves but my assumptions proved quite wrong for this class, although other classes did seem to make connections between music-based reading experiences and classroom-based reading experiences.

Learning events in Tony’s classroom also led me to reconsider using individual student work for the group oral reading fluency experiences. Sometimes the class was engaged in the creation of speech-pieces from the “How-to” books and at other times, particularly for the How-to books that were more challenging to read, engagement

seemed less enthusiastic. The “How-to” text was appropriate for the student who wrote the book, but not always appropriate, meaningful, or relevant to the rest of the class. To add to these challenges, I felt that sometimes I was the one taking ownership for the How-to speech-piece rather than the children.

I sometimes took the “How-to” stories home to experiment with possibilities for creating a classroom composition so that in some cases, the composition became mine rather than the class’s composition. My original intention was that students would actively construct their learning using the tools we had acquired. In reality, on a number of occasions, I created the speech-piece framework. I then directed students to respond, add musical elements, and share ideas for refining my work. For example, How-to stories like Eric’s “How to make hot chocolate” were challenging to chant as they didn’t fit nicely into a regular metrical framework. They also proved challenging for many students to read. As a result, I adapted some stories for their group speech-piece use in class.

When Eric gave me permission to work with his story, I taught Eric’s piece to the class using a rote process, a call and response framework, and a swing rhythm. The words in brackets are the words chanted by the students:

First get water and you boil it (Ya boil it),

Then you get the cups [rest] (Then you get the cups [rest]),

Put the cocoa in the cups (Put the cocoa in the cups),

Put the sugar in the cups (Put the sugar in the cups),

Put the milk in the cups (Put the milk in the cups).

And you stir (And you stir),

Stir the cocoa (Stir the cocoa),  
Stir the sugar (Stir the sugar),  
Stir the milk (Stir the milk),  
And you drink (And you drink)  
Enjoy!! [Said together]

This story was too long and difficult for most children to read so we chanted it orally and read just the verse beginning “And you stir.” I asked the children what ostinato we could create that would help keep our jazzy piece moving and they came up with a simple four beat ostinato swishing hands for two beats followed by two pats on the beat: swish swish pat pat. They performed the body percussion and discovered that their spoken part coincided with the two pats. At that point, the security in oral reading fluency became noticeably stronger. The physical movement of patting the beat seemed to help many children focus and provided a secure anchor for the part they were reading. Some children stopped doing the swish movements and focused on just patting a two beat ostinato and reading their part which they did accurately and confidently.

The resulting speech-piece engaged students in meaningful beat and oral reading fluency experiences. The majority of criteria appropriate to the context for learning engagement, motivation, beat competency, oral reading fluency activities and oral reading fluency seemed to be met for the classroom unit. However, it was mainly my ideas we were experimenting with, rather than the children’s ideas. I concluded that jointly constructed class experiences using text common to the class were important and necessary for future iterations and design. My experiences in Classroom G were an attempt to use authentic text that was meaningful and relevant to students’ interest and

use. However, despite student and teacher interest and support, the feeling of natural flow proved elusive. I identified areas for revision and reflection in the Research Design Journal. My analysis of the Classroom G data raised many issues for consideration:

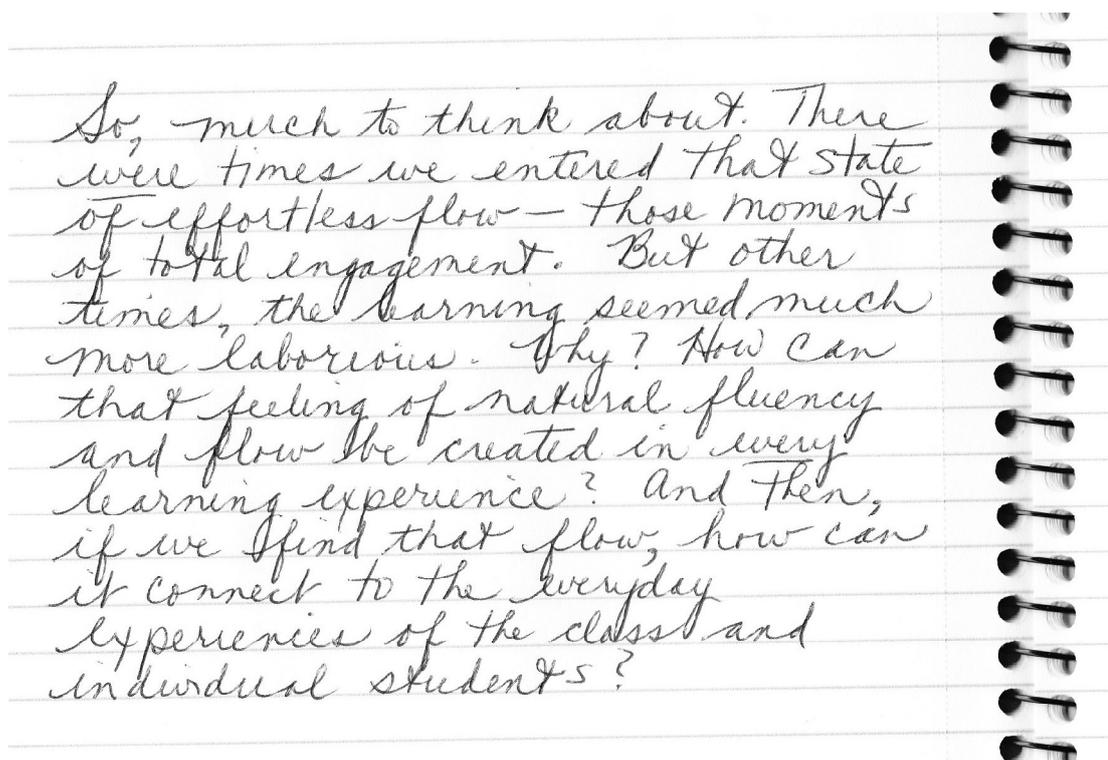


Figure 24. Design research journal left hand entry for June 11, 2007.

As I contemplated what revisions to the learning design might facilitate flow and engagement in the learning, I reflected on my previous understandings of flow related to creativity.

I've never intentionally planned with flow in mind, although I think I have intuitively applied many characteristics of being "in flow" ala Csikszentmihalyi. Now, looking closely at this data, and the indications of lack of flow I'm wondering about the educational applications of my long-ago study of Csikszentmihalyi, flow & creativity. That study was related to individuals though - is there such a thing as "group flow?"

Figure 25. Design research journal right hand entry for June 11, 2007.

I began by revisiting Csikszentmihalyi (1990a, 1997) to examine notions of flow relevant to my research design. By understanding the conditions that make children want to learn, I was in a position, as Csikszentmihalyi describes, to turn the learning events into flow experiences. In particular, I felt that I needed to pay more attention to ways I could balance challenges and skills, merge action and awareness, and establish clear goals (Csikszentmihalyi, 1997). However, I was still uncertain if individual flow experiences were theoretically appropriate to apply to the group as the unit of analysis.

I searched the literature and found helpful examples of flow theory applied to shared group experiences (Chapter Two Literature Review). I synthesized understandings of individual and group flow to mean that a flow experience could be created by

classroom groups united in attainment of an extrinsic goal mediated by the activities of the learning event to become an intrinsic goal. A balance of skills and tools (pre-existing structures) and challenges, along with immediate feedback would be necessary to transform activities into group flow experiences. My challenge was to blend all the variables of a particular learning context into a “cohesive, natural flow” (Katz & Thomas, 2004, p. 168). I immediately applied new understandings of flow to a learning experience with Classroom I.

The “Person of the Week” was a feature of Classroom I. The class began by brainstorming phrases or words describing favorite activities, foods, animals, toys, colours, clothing, likes and dislikes for a different student each week. They would draw a picture of that student in their journal and then write a short story about the student using the common vocabulary that was created through the brainstorming activity. The classroom teacher suggested that I join in the “Person of the Week” collaboration and I gratefully accepted the invitation.

**Person of the week: Classroom I, June 12, 2007.** After our usual introductory activities I turned to the “Person of the Week” brainstorming map on the whiteboard. “This looks like a song about Bernardo,” I said to the class. A number of students immediately responded to the prompt and called out variations of “Can we make a song about Bernardo?” or “Yeah, let’s make a song about Bernardo!” “Sure,” I said. “What is our Bernardo song about?” “Its about stuff Bernardo likes to do,” one student offered. “Like what’s his favorite food,” said someone else. “And other things he likes,” said Julie.

“Okay,” I responded. “Let’s see if I got this right.” I chanted, “This is a song about Bernardo. Who?” “Bernardo!” the children shouted. “Great!” I replied enthusiastically. “Can you help me just like that again?” I repeated, “This is a song about Bernardo,” and the children immediately shouted a second “Bernardo!” I said, “What does Bernardo like?” and then gestured to the children using our common signal. When it was my turn to speak or sing I used two hands to gesture to myself. When I gestured with both hands outwards to the class, students knew that it was their turn to immediately respond. Students were very familiar with this process and it was a fast and efficient way of indicating who was doing what in our classes without having to give a lot of verbal directions or lose the flow of the speech-pieces and reading.

Students then echoed “What does Bernardo like?” I gestured to myself and continued, “What does Bernardo eat?” and then gestured to the students. “What does Bernardo eat?” they responded. “What does Bernardo do?” I chanted next. “What does Bernardo do?” students chanted back. I ended with a clap followed by “I’ll tell you.” Our Bernardo chant ended up like this (Students’ responses are in brackets):

This is a song about Bernardo (Bernardo!)

What does Bernardo like? (What does Bernardo like?)

What does Bernardo eat? (What does Bernardo eat?)

What does Bernardo do? (What does Bernardo do?)

[Clap] We’ll tell you! [Chanted together].

Bernardo’s brainstorming web included these words and phrases:

- Drums
- Red and blue

- Rice, chicken, and sandwiches
- Basketball, soccer, hockey
- Spiderman game
- Tigers
- Animal book
- Superman toy

We experimented with the words from the list above. I said, “Bernardo likes” and pointed to one of the words and students read the word. After experimenting with different possibilities, students came up with this speech-piece:

He likes sandwiches, chicken, and rice.

He thinks tigers are pretty nice.

He likes drums and red and blue.

This is Bernardo, what about you?

I asked students to pat the beat and say the words in the boxes as I chanted all the other words. The children were so caught up in the activity that most students tried to read and say all the words for the chant. The excitement continued to the end of the class period and children were all ready trying to figure out who would get to be featured next in our speech-piece.

The Research Design Journal entry for that night included an analysis of assessment protocols and the flow experience. Examination of the protocols for engagement/motivation and oral reading fluency indicated that engagement and motivation was high and strategies for oral reading fluency were largely successful. Regarding the flow experience, clear goals were set from the beginning of the learning

event. The goal began with the purpose of creating a speech-piece for Bernardo, but very quickly became “autotelic, or worth doing for its own sake...something one eagerly wants to do” (Csikszentmihalyi, 1990b, p. 132).

A balance of skills and challenges created intense involvement, merging action and awareness. Students had the necessary tools to respond to the activity because we used words that were common to all students, rather than words that were unique to any one student in the class. Challenge was created by using the common vocabulary in new ways incorporating our language of music, rhythm, and beat. The new ways of incorporating vocabulary prompted me to consider another variable to student success:

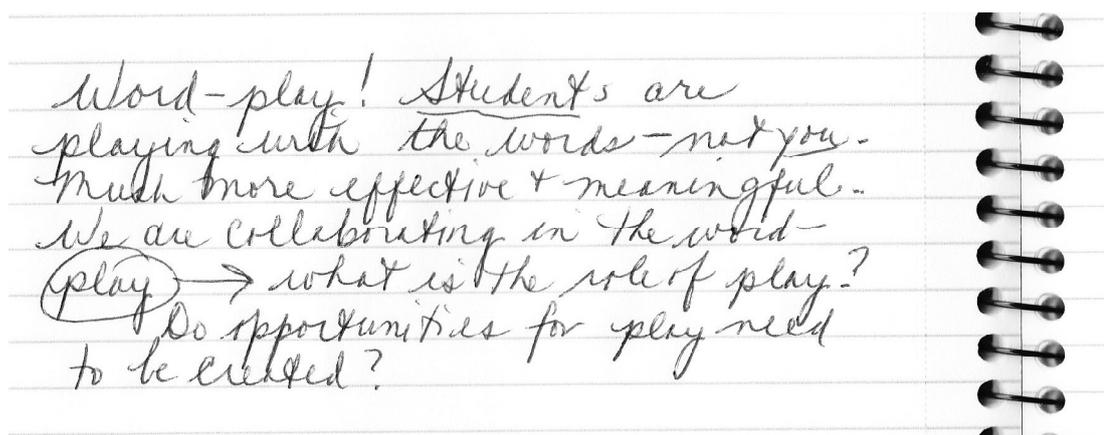


Figure 26. Design research journal left hand entry for June 12, 2007.

Play theories are included in the foundational theoretical literature that grounds this research and supports the choice of an Orff-based approach to teaching music and rhythm. However, since the Orff approach is inherently playful, I never actively considered how I might construct the learning events to include elements of play beyond assuming an Orff-based pedagogy as the framework for teaching beat and rhythm. Because of the differences between classroom experiences documented in the data, as for

example, the Classroom G and I learning events described above, I began to consider just what “play” entailed and formulated a series of questions for myself.

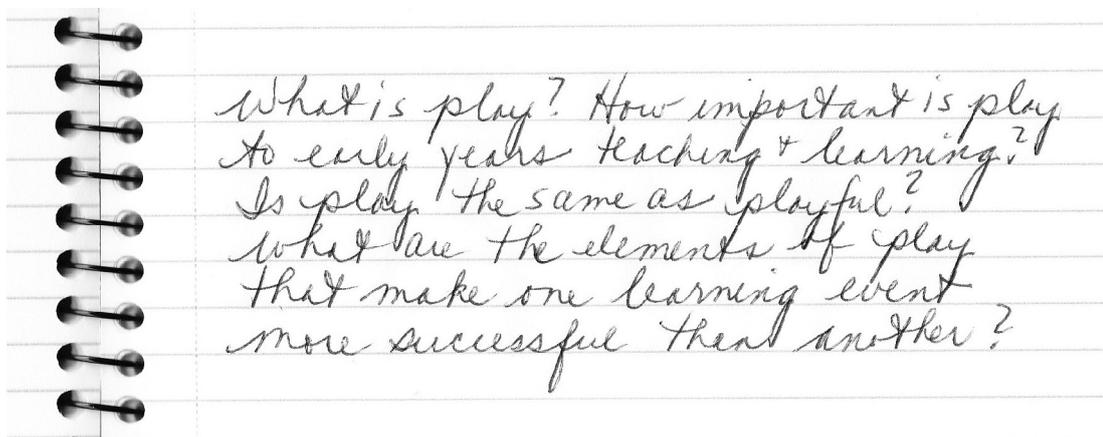


Figure 27. Design research journal right hand entry for June 12, 2007.

I examined a variety of the authorities included in the section on contributing theories in Chapter One and determined that our activities were characterized by qualities of play described in the literature. Our play activities were formed and shaped by the content and lived experiences of the research design and therefore were unique to each classroom. Although play was manifested in different forms in each classroom, the learning experiences characterized as play using criteria from the literature were those that seemed to consistently occasion the greatest student engagement.

I became more conscious of qualities of play for the final phase of the study. I examined our music games in light of Csikszentmihalyi’s (1981) caution that playing games does not necessarily mean an activity is playful or includes characteristics of play. I evaluated ways that our music games could allow for greater spontaneity, flexibility, student voice, and decision-making. These considerations transformed subsequent

iterations of this research design and my work in the field of education following the study.

**The water cycle.** Greater awareness of the importance of play led to transformation of a learning experience I planned to use in conjunction with classroom studies of the water cycle. Three classrooms identified the water cycle as a meaningful curricular connection to our rhythm, beat, and literacy activities. I have taught conceptual understandings about the water cycle using elements of music many times over my years as an educator and have honed a sequence of learning experiences that I know to be successful in helping understand the water cycle. I was very familiar with the vocabulary of the water cycle and had a speech-piece already planned to use in conjunction with the classroom studies.

I re-considered my usual water cycle lesson and viewed the experience through the lens of play. I decided to explore ways that the classes and I might collaborate to develop a meaningful learning experience using a more play-based approach. A description of a learning event in Classroom B exemplifies the revisions as well as ways that rhythm and beat experiences were connected to classroom learning in the final stage of the study.

Jackie, collaborating teacher for Classroom B, suggested I make connections to her Grade 2 Science unit on properties of solids, liquids and gases. Students were learning about how water changes from one state to another as part of the water cycle. Jackie shared a list of vocabulary used in the unit, along with a song that children were learning to help them understand and remember the water cycle. The list included this vocabulary from the Manitoba Science Curriculum General Learning Outcomes C6, D3,

and D4 and specific learning outcomes from Cluster 2-2-01 Properties of Solids, Liquids, and Gases (Manitoba Education, 1999):

- Solid, liquid, gas
- Water vapour, condense, evaporate
- Substance, property
- Freeze, melt

Additional vocabulary from the Manitoba Science Curriculum General Learning Outcomes C6, D4, and D5 and specific learning outcomes from Cluster 4 Air and Water in the Environment (Manitoba Education, 1999) included: water cycle, wind, air current, temperature, and changes of state. The target learning outcomes were General Learning Outcome D4, D5, E2 and E3 and Cluster 2-4-07 Specific learning outcome, “Describe evidence of water changing state, and recognize that these changes are part of the water cycle” (Manitoba Education, 1999).

These learning outcomes were explored through oral reading fluency and rhythm over several learning events:

- “Recognize that the states of solids and liquids remain constant in some circumstances, but may change in other circumstances” (General Learning Outcome D3, E3; Specific Learning Outcomes 2-2-15).
- “Describe evidence of water changing state, and recognize that these changes are part of the water cycle” (General Learning Outcomes: D4, D5, E2, E3; Specific Learning Outcomes 2-4-07).
- “Observe and identify examples of water in the environment” (General Learning Outcomes: C2, D5; Specific Learning Outcomes 2-4-06).

Over the course of several classes, we explored the vocabulary of the class related to the outcomes above. We began with a definition of the water cycle. Tyler suggested that the water cycle was water moving around from one form to another, so we began with “water on the move, water on the move, this is what we call the water cycle.” We played with the words using body percussion and nonpitched percussion and the children chose the percussion they thought was most appropriate for specific words and phrases. We experimented with ostinato effects such as “water moving, water moving” and divided the class playing beat and rhythm simultaneously. Jackie asked if I would teach a song she found using the water cycle vocabulary and we adapted that and incorporated it into our speech-pieces and ostinato. The song was to the tune of “She’ll be comin’ round the mountain when she comes.”

Water travels in a cycle yes it does.

Water travels in a cycle yes it does.

It goes up as evaporation

Forms clouds as condensation

And comes down as precipitation

Yes it does.

We discussed how water moves in a circle around the earth without any beginning or end and the students suggested we make a circle to show that there was no beginning or end to the cycle and to illustrate how water moved around the earth. The students brainstormed and played with various movement ideas to create evaporation, condensation, and precipitation and evolved a movement piece where the students

imagined they were the molecules of water evaporating, condensing, and falling as precipitation.

They began with a circle that travelled one direction for line 1 and turned and changed directions for line 2. Then children joined hands, walked the circle into the middle and raised arms as they sang “goes up as evaporation.” They stood on tip toes, raised their joined hands and arms as high as they could reach, and spread their arms out as they sang “form clouds as condensation.” As they “condensed” some students shivered, vibrated, and spread apart to show the molecules getting colder. For the line “comes down as precipitation” they had a great time falling randomly down to the floor as precipitation.

Each time we played the “water cycle” game we experimented with vocabulary trying out different students’ suggestions and allowing the word play to unfold naturally and spontaneously. Sometimes the word-play would involve patterns using the letters of the vocabulary words for example:

E-V-A-P-O-R- ation (repeated )

/ / / / / / / /

C-O-N-D-EN-S-ation (repeated)

/ / / / / / / /

P-R-E-C-IP-IT-ation (repeated)

/ / / / / / / /

It’s the water cycle sensation!

/ / / / / / / /

The speech-pieces students created were printed on the board for reading and then combined into new arrangements of words. The resulting speech-piece inevitably concluded with our “water on the move chant” and the movement and song piece. Students in Classroom B never tired of our “water cycle” games and Jackie their teacher, said that it was a conceptual understanding that every student mastered and sustained. Our water cycle games featured characteristics of play and met criteria for motivation, engagement, and successful oral reading fluency of the water cycle vocabulary words within the context of their use.

The water cycle play looked quite different from classroom to classroom. Over the course of the study, elements of play were combined with connections to other curricular areas in experimental classrooms to explore butterflies, dinosaurs, telling time, color words, number words, shapes, seasons, mathematics concepts, social studies concepts of community and identity, classroom stories and books, and many outcomes from the Manitoba English Language Arts Curriculum Framework of Outcomes. The Design Research Journal indicates that elements of play were most evident in Classroom B. Comments in the journal do not explain why play characteristics and motivation/engagement elements were so evident in Classroom B and I struggled to find explanatory data for this phenomenon throughout data analysis as documented in following chapters of the thesis.

Our beat and language activities consumed more time than I originally planned for. At the outset of the study, I envisioned small group composing with beat, rhythm, and classroom vocabulary related to local context for the final two to three weeks of the study. I revised the Learning Design and in the final weeks planned instead for

opportunities for students to notate the beat and rhythms for our repertoire of speech-pieces and songs (See Appendix O) to give them the tools to create and notate their own compositions over the summer.

Students were videotaped during this process and by the final week of the study, nearly every student demonstrated beat competency in performance and was able to notate the beat and many rhythms of the speech-pieces. Students seemed excited to write their own rhythm patterns and compositions in the final two classes and to successfully read our common speech and song repertoire from the booklets I made. The final evaluation of the Learning Design indicated that the goals of achieving beat competency and distinguishing between beat and rhythm were met in all experimental classrooms. Oral reading rate experiences seemed successful, motivating, and engaging for all experimental classes.

\* \* \*

## **Giant Steps**

John Coltrane's piece "Giant Steps" (1959/2009) is one that often appears unbidden in my mind when problem-solving. I know of no other jazz work that exemplifies the notion of changes quite like this work. Giddins and DeVaux (2009a) describe "Giant Steps" as "a sixteen bar composition in which almost every note of the melody is signaled by a new chord—playing the chord changes is practically the same thing as playing the melody" (p. 427). The resulting effect is one that has been described as "sheets of sound." The sheets of sound effect is transmediated for early years children in a picture book about Coltrane's work entitled "Giant Steps" (Raschka, 2002) that was used as part of control classroom experiences. Giddins and DeVaux (2009a) claim that Coltrane used the complex and very difficult changing harmonic sequence to "stimulate fresh ideas" (p. 427). The energy, virtuosity, and harmonic complexity of "Giant Steps" never fail to stimulate fresh ideas and suggest new possibilities at every listening. "Giant Steps" transmediated new possibilities and ideas for the learning design during pilot stages, re-design, implementation, revisions, and analysis.

## Chapter Six: Cross-Rhythms

Wisdom has to do with the grasp of wholes that occupy the same space, yet are different.

This life, as opposed to that. (“Oh, I see now how it is for you!”)

(Zwicky, 2003, Left 93)

### Introduction to Grounded Theory Results

Grounded theory analysis “tells a story about people, social processes, and situations” (Charmaz, 2000, p. 522). In this chapter I examine the different perspectives of those who participated in the same spaces of the study. I examine the social processes that emerged from the experiences of the study, and the context and situations in which they were formed. Although I make every effort to see how it was for study participants, in socially constructed research analysis, the researcher is always a part of the data construction. As Charmaz (2002) explains: “The researcher composes the story; it does not simply unfold before the eyes of an objective viewer. This story reflects the viewer as well as the viewed.... We can claim only to have interpreted *a* reality, as we understood both our own experience and our subjects’ portrayals of theirs” (p. 522-523).

This chapter tells the research story through grounded theory methods understood from a constructivist, multi-grounded perspective as outlined in Chapter Four. The grounded theory results are based on eighteen collaborating teacher interviews (pre- and post), twenty-seven student focus group interviews, field notes, the field note journal, the design research journal, and qualitative post-survey parent data. The diverse multiperspectival data sources form rhythmic layers in the grounded theory results. In jazz, contrasting rhythms are used to create cross-rhythms or poly-rhythms. The highly individualized rhythmic layers that make up the grounded theory results, “contrast with

one another, even as they serve to create a unified whole” (Giddins & DeVeaux, 2009a, p. 12). The chapter begins with the first rhythmic layer, the pre-study collaborating teacher interviews. The starting point for theoretical sampling is the historical perspectives, beliefs, and assumptions that collaborating teachers brought to the research setting as expressed in the pre-study interviews. Data from other qualitative sources were used to build and extend the preliminary categories and construct the final grounded theory model presented at the conclusion of the chapter. Throughout the presentation of grounded theory results, I quote from the memos written during and after the study to illustrate key categories constructed from the data.

### **Teaching for Successful Learning**

Analysis of the pre-study teacher interviews indicated that all control and experimental collaborating teachers were deeply concerned with exploring and discovering the best teaching and learning approaches to facilitate successful learning for all their students. From a classic grounded theory approach, the basic social process (Strauss & Corbin, 1990) was how to teach so that all students could learn, or “Teaching for Successful Learning.” Teaching for successful learning included the philosophies, beliefs, and assumptions that guided and shaped the practice of the early years collaborating teachers in this study.

Collaborating teacher philosophies, beliefs and assumptions affected my role as researcher-teacher and impacted the emerging research design and the attitudes and responses of the student participants. Examining the social processes of “Teaching for successful learning” helped me determine how the arts-based and multimodal learning

research design could be aligned with the teaching goals, approaches, content, resources, and outcomes identified and used by collaborating teachers.

Teacher-participants were not selected based on a common set of teaching philosophies, beliefs and assumptions, but the social process of “Teaching for Successful Learning” clearly reveals sub-processes that are shared to varying degrees by all collaborating teachers. Data analysis from the pre-study collaborating teacher interviews provided the following preliminary conceptual categories and sub-processes of “Teaching for Successful Learning:”

- Social constructivist theory about learning influences teaching and beliefs.
- Motivated and engaged learning is important.
- Teaching and learning is differentiated.
- Multimodal approaches support learning.
- Music influences person and practice.
- The arts and music support student learning.
- Teaching and learning are creative and imaginative processes.
- Diverse student attitudes challenge teaching.
- Diverse readers challenge teaching.
- Outside school influences learning in school.

**Social constructivist theory: Influences on teaching and learning.** Social constructivist theory of how children learn influenced all control and experimental teacher beliefs about and approaches to teaching and learning. All teachers expressed a belief in the importance of social constructivist, child-centered approaches to teaching. Students’ background, interests, abilities, and world-view were respected, valued and

taken as points of departure. Teachers designed classroom learning experiences so that students constructed their own learning and were active and interacting agents in the learning process, rather than passive recipients of teacher-centered and transmission approaches. Karen's teaching focused on the students as "the ones doing the learning—they're finding out rather than me just telling them stuff" (Interview #2, Control). Jackie said, "It all centers on the children...It's about the child, not the teacher" (Interview #1, Experimental). Tracy emphasized, "I believe strongly that kids learn by doing" (Interview #3, Experimental). Tony added support by saying, "All teaching should be based on the students and the needs of the learners" (Interview #8, Experimental).

Constructivist approaches include learning experiences and student tasks that are "demanding or challenging enough to engage their [students'] attention" (Gagnon & Collay, 2006, p. 14). Teachers focused planning for "deep conceptual understanding" (Gagnon & Collay, 2006, p. 14) to provide compelling and complex learning opportunities. Collaborating teachers flagged various ways to deeply explore learning through engaging and sufficiently challenging processes in nurturing and positive classroom ecologies:

*My basic philosophy is to try and provide an enriched, nurturing environment for all learners...Teaching needs to be as rich and meaningful as possible—all the multiple intelligences...problem solving, opportunities for students to create meaning. (Karen, Interview #2, Control)*

*My main philosophy would be to make my classroom as inviting a place of learning as I possibly can. To make my classroom a place where children want to be---to make it a positive place to be, unthreatening and nurturing...But for all kids, it's important to include problem-solving strategies, where kids are having to think about what they're doing—not just learning by rote—you know, make it meaningful for them. But at the same time, it's important to reinforce the learning; repetition is important, but in ways that are interesting to kids. They have to be able to apply their skills and knowledge. (Kendra, Interview #4, Experimental)*

*I believe in focusing on the process—the way we do it is more important than what we are doing. I think it's important to give children a chance to reflect on their learning and to use problem-solving strategies in teaching and learning. I think an authentic learning environment is really important, and experience-based, too. Also I use an inquiry-based approach to teaching. (Tony, Interview #8, Experimental)*

*I try and make it as meaningful, and as rich as possible with the first month really trying to find out about the kids and really tapping into the kids' interests and what grabs their attention and try and tap into it and really just continue to build on that for the entire year. I try to make it, for lack of a better word, user friendly. (Ezra, Interview #9, Control)*

**Motivated and engaged learning is important.** Student motivation and engagement are considered important elements of teaching and learning (Stipek, 2002; VanDeWeghe, 2009). Engaging, motivating, relevant, and enjoyable teaching and learning experiences were highly valued by all collaborating teachers in this study. Beliefs in the importance of motivating and engaging students in the learning resulted in teaching practices that incorporated a variety of approaches:

*If they are not enjoying school then they won't learn so I do whatever I can so that all the children want to come to school and be engaged. Do different approaches, not just one. (Jackie, Interview #1, Experimental)*

*They're pathways—pathways to engagement....It has to be engaging and meaningful; it has to be enjoyable for them. (Frances, Interview #6, Control)*

*They need meaningful experiences, ways that keep them engaged and interested. Hands-on learning. (Tracy, Interview #2, Experimental)*

*To me, when I see the smiles on faces, when I see the kids engaged and really focused on their work, 99.9 percent of the time, it's because they're having fun. (Ezra, Interview #9, Control)*

*You need to know what really engages them, what really grabs them and gets them reading. (Tony, Interview #8, Experimental)*

**Teaching and learning is differentiated.** The primary goal of differentiated teaching is to “focus on processes and procedures that ensure effective learning for varied individuals” (Tomlinson & McTighe, 2006, p. 3). Differentiated instruction is predicated on beliefs that students have varying abilities, experiences, backgrounds, opportunities, interests, needs, and supports. Learners “grow at different rates and require varied support systems to develop and deepen their understanding” (Tomlinson & McTighe, 2006, p. 4). Interview data indicates that all collaborating teachers valued, honoured, and respected student diversity. Ezra spoke for all when he stated, “I really focus on that respect for everyone” (Interview #9, Control). All teachers articulated strong beliefs in the importance of differentiated teaching and learning and voiced the importance of building on students’ interests and strengths:

*I prepare for everyone [said with great emphasis] in the class and look for ways that everyone can be successful regardless of what level they’re at, or what their strengths or weaknesses are. I try to construct the teaching and learning so that the students are engaged all the time in the learning whether or not they’re the students who finish first or those who don’t. (Karen, Interview #2, Control)*

*And different approaches for different students depending on what their levels are. I have a lot of different levels, different kids in my class so I’m trying different things a lot. (Tracy, Interview #3, Experimental)*

*I believe in using different teaching approaches for different children. Classrooms are getting more diverse all the time and certainly my classroom is full of diverse learners, so different things work for different kids. (Kendra, Interview #4, Experimental)*

*I teach in a multi-age classroom and so I obviously believe in a multi-age approach to teaching and learning. I believe it’s important to teach to all learners so teaching for diversity is important, and having an inclusive classroom where you meet the needs of all learners. (Leslie, Interview #5, Control)*

*I know kids learn in many different ways—you can’t use a cookie cutter approach—they have many different learning styles. So you have to use whatever you can to get through to them—everybody’s got their thing—you have to find it! For example, one of my students, everything is about nature...so I use flowers and*

*we use them for adding and subtracting. He won't add or subtract, but if he's counting flowers well then, its ok...It's all about what can they relate to?...What can we use to make other stuff meaningful? What is some way you could get through to them? (Frances, Interview #6, Control)*

*Another boy...is really progressing because he's engaged. He's engaged in text—anything mechanical he'll read. It took me a while to figure that out, but once I did, well, now he's engaged. It's really important to pick up on the interests of the kids. And Marie is an excellent student but she had difficulties with reading. And today...her confidence is really growing because we found ways to make reading enjoyable for her—a social activity. (Tony, Interview #8, Experimental)*

*I can't believe how differently all these children learn! They are all so different! You sure couldn't teach one size fits all to these children! You definitely have to find out what works for each child. And what works for one isn't necessarily going to work for another. And it's amazing—they do all have these different intelligences; you can see what might be one strength for one and a different one for someone else. And I strongly believe in hands-on learning and in integration. You have to make it meaningful...so that means appealing to all the different learning styles. (Rosemary, Interview #7, Experimental)*

*It's really important to have multiple strategies for teaching. No one strategy is going to fit with every student. You have to draw on their strengths and find the strategy that does that...nature is important to some—the environment. Or their stories from their elders. Or their songs and dances like from a pow-wow...I try to keep it authentic so I write with the students about what is important to me or them. (Tony, Interview #8, Experimental)*

**Multimodal approaches support learning.** All teachers attributed high value to the importance of teachers and students using a variety of available modes and literacies for meaning-making:

*A well-rounded teacher would want and need to include multiliteracies in the classroom because of diverse learners and different learning styles, so yes, multiliteracy teaching and learning is a complete necessity. I believe in teaching to multiple intelligences so teaching to kids' strengths and interests. If you don't use many different strategies and a variety of approaches, students won't be learning to their full potential—you need to reach out and grab from all their learnings which means getting to know your kids really well—for example, a phonics approach may work for some kids, but not for others. (Kendra, Interview #4, Experimental)*

*I try to bring in family literacies—pieces from the children's home lives....Students need a variety of ways to figure out meaning from text—there's so*

*much more that can be used with students than just the one way to read. (Tony, Interview #8, Experimental)*

*Multimedia provides a different viewpoint, a different way of looking at things that gives them an easier way sometimes of looking at things, so they can say, "Hey, I know that; hey I get that, I understand that....if I can take one learning outcome and show them ten different ways to get to that—I mean your path is never going to be the same—you're never going to go the same way from A to B. (Ezra, Interview #9, Control)*

Frances, Karen, and Kendra declared that multi-modal approaches to teaching and learning were essential to their teaching pedagogies:

*That's all I use! I can't express how much! (Karen, Interview #2, Control)*

*Oh, multiliteracies is very, very important!...what is the literacy that they will use to learn? (Frances, Interview #6, Control)*

Kendra believed that multimodal approaches to teaching and learning were important because in her experience, such approaches were enjoyable, meaningful, and engaging for the learners in her classroom. "Children should enjoy learning; it should be meaningful to them and engaging" (Kendra, Interview #4, Experimental).

Leslie described ways that drama motivated and engaged students and provided meaning-making opportunities for students in her class:

*They love the drama...I use Reader's Theatre and that helps them understand what it is they're reading. Sometimes when you get them to create a little Readers's Theatre from a book they'll start to understand when they translate it into another type of literacy. (Interview #5, Control)*

Collaborating teachers identified important available modes: drama, particularly Readers' Theatre; dance/movement; visual arts; music; oral literacies; literacies used in the student family's lives; comic books; photography; and information and communication technology including computers, the internet, video games, and i-pods.

Leslie pointed out that “different things will work for different kids, different interests, different strengths, abilities...” (Interview #5, Control).

**Music influences person and practice.** Teachers shared their backgrounds in music and expressed a range of interests, experiences, and expertise in music that influenced their personal lives as well as their teaching practice. Despite a wide range of music background, experience, knowledge and skills ranging from no formal music training to music specialist training, all collaborating teachers voiced enjoyment and appreciation of music and incorporated music in their classrooms:

*I love music. I love listening to music and moving to music. I love dancing to music! But singing is not my forte. I don't sing but I'm always surrounded by music. I use music to calm down, relax—at home and in the classroom. Music mentally prepares me...My background in music doesn't really go any further than the music that I took in school...I danced for many years, though...so in that respect, music was a big part of what I did, but in a different way. And so I've got rhythm and beat! (Jackie, Interview #1, Experimental)*

*Of course [with emphasis] I enjoy music! I love music! I couldn't go a minute in my house without music! And I couldn't go a day in my class without music! I love all kinds of music—I can appreciate it all. And we do all kinds in the classroom, too....The things I remember from my childhood and school were the things associated with music. (Karen, Interview #2, Control)*

*“Sure I enjoy music. I often sing things instead of saying them....I've only taken dance. And now art. I've grown as an artist. (Tracy, Interview #3, Experimental)*

*Music has always been important to me. I firmly believe music needs to be a part of all learning....I started off as a music teacher and took my Orff Level I and then taught music from 1994-1995 and then went into the classroom. And I've been in the classroom ever since. Music was always in my home when I was growing up. And I love dance, too. (Kendra, Interview #4, Experimental)*

*Music—yeah, certainly. I enjoy music. I play guitar and I've written songs and adapted poetry to songs...it's a really valuable piece to have in the classroom. It's a major form of art and a big part of my life (Tony, Interview #8, Experimental).*

*I love it [music]. Always. We sing karaoke and to me, even when I'm driving home, music is just blasting and I'm singing away and I just love it, I just enjoy it. (Ezra, Interview #9, Control)*

**The arts and music support learning.** Although collaborating teachers placed themselves on a broad continuum of comfort and familiarity with music and the arts, they all identified ways in which they valued and incorporated music and the arts for teaching and learning. Kendra's and Tracy's first words in the pre-study interviews were:

*The arts and music are important to my teaching. I believe that the arts are just as important to education as any other subject—maybe more so....I firmly believe music needs to be a part of all learning. I always share music with my students. We listen to music and sing songs together and I love song storybooks. We have clean-up songs and lining up songs. And special songs depending on the season. (Kendra, Interview #4, Experimental)*

*The arts certainly help children. I use drama and dance. When we were doing animal classification I asked them to move like the animals. You know, "How would the bird move" and they would show me and we would classify it....We do a lot of visual art—like our dinosaur unit, and that's a really important medium for them to learn through. (Tracy, Interview #3, Experimental)*

Other teachers made similar observations about the importance of the arts and music to their teaching and learning. Teachers portrayed their classrooms as communities that enjoyed music experiences and exhibited positive attitudes towards music. They observed that music engaged students in deeply felt ways, provided immense enjoyment, decreased stress and anxiety, and created classroom community and positive mood:

*It doesn't matter whether they can keep a beat or not, they all love music. They love it!! They absolutely love it! I've never had a negative response ever. My students love music in the class and love going down to music. In class any time there's music they love it, and they often ask me to come to music class to listen to them. (Jackie, Interview #1, Experimental)*

*I sing with them all day long. We sing every morning and every day before they leave....everybody loves music. They love the songs at the end of the day. They love coming down to music class. It's not a threatening place where they feel they'll be put on the spot. They know no one is going to embarrass them or they*

*have to do something by themselves that they won't be able to do—they all do it together. (Karen, Interview #2, Control)*

*And the kids like it, too. It's "oh, good!" and when they're singing they're picking up all the rhythms of the song—so we're doing rhyming words...I just think it's so calming for them, and they go, "Okay, now we're having fun." Meanwhile they're learning more when they're having fun than if they were to be sitting there going, "Oh, I don't get this." (Ezra, Interview #9, Control)*

*They love it. They get excited. They enjoy it and really get engaged. (Tracy, Interview #3, Experimental)*

*They're all enthusiastic about music. Especially for those students that struggle in other areas. For them, it's their special time when they're not struggling anymore—when they can just let go and enjoy. And especially for those students who experience frustration with reading, music might be a way in; maybe this is what will get to them—maybe that little light bulb will go on for them! (Kendra, Interview #4, Experimental)*

*I see lots of potential. They enjoy it, so they're going to be more interested in learning and doing it. (Tracy, Interview #3, Experimental)*

Collaborating teachers believed that music supports learning in many ways. They noted that music experiences made learning memorable, served as mnemonic tools, facilitated classroom behaviours, routine, and management, and provided important learning pathways for individual student needs and interests. Karen said that “Learning through the arts, through music, makes learning memorable (Karen, Interview #2, Control Classroom A). Other teachers shared similar beliefs and perspectives:

*We use different technologies, and actually come to think of it, we use music a lot, too. Like the Bluenose song that we're singing right now—they remember things through the song that don't otherwise stick, like if they were just writing those facts out. Oh wow, come to think of it, we actually do use music a lot!! I just remembered—we've sung a lot of songs or listened to CDs about different things we're studying and yeah, they remember stuff from songs and music I don't think they would remember otherwise!! Yeah—my aha moment! (Jackie, Interview #1, Experimental)*

*Yeah, I feel comfortable keeping a beat and we sing little songs in our class together... sometimes I use songs and put motions to song to help them remember*

*things. Like I might use a song like “Twinkle, Twinkle” that they all know and use different words to help them remember how to walk in the hall, or put their things away. And some students really like certain things—like art or music, and that is important for them. (Tracy, Interview #3, Experimental)*

*The kids enjoy music, too. They like poetry, they like songs—you put a music spin on it and they love it! Music—they’re very positive about it. They can remember things they might not otherwise. (Frances, Interview #6, Control)*

*Certainly there’s great potential. With music, it almost takes the pressure off, doesn’t it? With music, it’s something different. Reading isn’t that difficult thing anymore—it’s music, it’s fun, it’s enjoyable. I’ve seen students remember things from songs or music that go beyond what you might think they’d normally understand or remember. (Jackie, Interview #1, Experimental)*

All collaborating teachers recognized music as a meaning-making mode with potential to engage students and to provide new and unique perspectives and ways of knowing. Teachers described ways that music made important connections to other curricular areas, generated positive energy, and promoted a sense of well-being and a nurturing learning environment:

*We integrate music with everything! We listen to music all day long—it helps to set the mood for what I’m teaching or the kind of work we’re doing in the classroom. We use music to make connections to different subjects, to enhance visual arts, although it can be distracting, you know, if it’s not used properly....it makes connections across different learning areas. Like Math. We have a CD we listen to for Math facts. We’ve learned to multiply through the Math tango, and you hear them singing the song in the hall or while they’re doing their Math test...yes, the potential is huge. (Karen, Interview #2, Control)*

*I’m always tying music into the different curricula for example tying music into the Social Studies curriculum—we sing the songs and the students get engaged, learn about and share with the rest of the world. I teach Science through music, I use it in French, and of course, language arts—all the time! It’s in everything we do! I always end the day with a song because it’s a way to bring a sense of community and good feeling to the end of the day. Students have this opportunity to say, “I had a great moment no matter what!” We end happy and they remember that happy feeling and we build on that positive energy and build community in the classroom. Everyone can sing. They may not be able to read, but they can sure sing! (Karen, Interview #2, Control)*

Teachers observed that beat and rhythm provided a sense of security in group experiences and functioned as important cognitive tools to facilitate learning in different curricular areas:

*And I think rhythm and beat are essential. They are the building blocks, aren't they? You have to have them. That feeling of the beat and rhythm that underlies speech or it's impossible to read with continuity. (Karen, Interview #2, Control)*

*They love it [music]! They love it!! You've seen our drums in class; we've used them for so much...for so much, like for our patterns in math. And then we take the patterns in math that we do on the drums, and we then take them to music and do them in music. (Ezra, Interview #9, Control)*

*Music's got to be one of the best ways—beat and rhythms stick in their heads! It's a great pathway. I have two girls [in her classroom]. I can't get them to count to 100 unless we sing it. You have to remember the power of music to help children remember. They can remember songs and poems. But they can't remember Math or Science! But the music—the beat—they know it—and it provides familiarity because of that repetition. And repetition is so important and they don't get tired of it when it's music. (Frances, Interview #5, Control)*

*I only hack away at three or four choruses but the kids seem to enjoy it. We sometimes do movement, dancing to the songs...I encourage other people who have talents to come to the class—sing, play, whatever. The kids all seem to enjoy that....Music without question is a pathway for learning. They learn stuff right away through a song—camp songs, line-up songs, songs for our classroom routines or about what we're doing. It's pretty powerful—more than just the association of text and rhythm and beat—but that's powerful, too! (Tony, Interview #8, Experimental)*

Tony also remarked on music's affective potential and argued, “that's important—what happens to the emotions has a big effect on learning” (Interview #8, Experimental).

**Teaching and learning are creative and imaginative processes.** All collaborating teachers believed that opportunities for students to engage in creative, imaginative approaches to literacy and learning were important for a variety of reasons. Leslie discussed the impact of creative and imaginative learning through Reader's

Theatre: “I’ve really seen that with the work they’ve done in Readers’ Theatre. That’s very important to them” (Interview #5, Control).

Jackie felt that creativity and imagination were “very important. It’s an important part of everything we do” (Jackie, Interview #1, Experimental). Karen agreed:

*Absolutely. I often will create opportunities for them to create and use their imagination in all the subjects, especially language arts. I think that getting them to use their imagination now in this technology based world is so important. Kids are playing video games where there isn’t much imagination involved. The imagination is built in for them and they need to get that in their education. (Interview #2, Control)*

Tracy believed that creative, imaginative approaches to literacy were important so that students could have the opportunity to experience positive feelings and step outside of the difficult realities of the worlds they lived in. She emphasized that creative, imaginative approaches were:

*Very important for learning. Especially for these kids. It takes them away from the reality of the world for a little bit and that’s important. Anything that can take them away from the reality of their lives for awhile is good. Some of them don’t have many positive experiences in life, so they can through their imaginations, through being creative. (Interview #3, Experimental)*

Kendra and Frances, too, believed that creativity and imagination were essential elements in teaching and learning and observed that those elements were missing from some children’s lives:

*Very important. Creativity, imagination—they’re essential to learning, but...so many children are losing their imagination now. So many children have difficulty being creative. It’s being sucked out of them or they’re doing mindless computer and video games that don’t require any creativity or imagination. So we have to motivate them to use that part of their brains. And yes, it can’t help but be beneficial for them—absolutely! (Kendra, Interview #4, Experimental)*

*Well, they don’t get it at home. There’s not much opportunity for creative or imaginative play. If anything, it’s the opposite because they might just be sitting playing a video all day. They don’t have books, but they all have video games.*

*Or T.V. Lots of T.V. But no imagination. So it's important. (Frances, Interview #5, Control)*

**Diverse student attitudes challenge teaching.** Classroom attitudes toward reading varied within and across classrooms and challenged teaching for successful learning in all classrooms. The diverse attitudes presented difficulties in meeting all students' needs and interests, although every teacher had strategies in place to do so. In some classrooms, the majority of students demonstrated positive attitudes towards reading and only a few readers resisted teachers' attempts to motivate reading. Karen (Control Classroom A), Ezra (Control Classroom H), and Jackie (Experimental Classroom B) stated that their students typically enjoyed reading. Karen declared that her students:

*...overall love reading! Their favorite part of the day is independent reading time and they'll all read whenever they can during the day!" (Interview #2, Control)*

Ezra (control Classroom H) also reported that his students generally viewed reading as a positive experience:

*I have about 60% of my class that would rather go and get a book and sit down at their desk and read then go out to play." (Interview #9, Control)*

Despite the overall enthusiasm for reading in their classrooms, Karen and Ezra noted particular students for whom reading was a challenge for various reasons. Karen described a student who struggled with reading and attitude issues:

*He was at least a couple of grades below level at the beginning of the year and really at this point, is just totally turned off reading. It's a challenge to get him to even crack open a book. (Interview #2, Control)*

In experimental Classroom B, students generally viewed reading "as a positive thing" (Jackie, Interview #1) with the exception of those students who struggled with reading. Jackie varied teaching strategies to engage her struggling readers, but stated that

motivating these students was challenging. Jackie observed that while the classroom climate was positive and created a culture of reading for enjoyment, those students who struggled with reading were a notable exception, saying “It’s just those struggling ones that don’t enjoy it or want it.” Jackie noticed that the struggling readers also really struggled “with engagement and attitude issues” (Interview #1, Experimental).

Most teachers linked negative attitudes to struggling readers and observed that competent readers generally demonstrated positive attitudes towards reading. Tracy (experimental Classroom I) said,

*Well, the students who are good at reading, they certainly like to read and ask to read. (Interview #3, Experimental)*

Kendra (Classroom C) also linked struggling readers to negative attitudes and print reading competency to positive reading behaviours and attitudes:

*Many of those students [successful readers] like to have me read to them, and they like to go in the reading tent we have for quiet reading during choice time.” (Interview #4, Experimental)*

Frances (control Classroom D) noted many students did not enjoy reading themselves but did enjoy being read to. She described a variety of ways that she worked to engage her struggling readers through her dramatic readings of text. Rosemary (experimental Classroom F) also observed that the struggling readers, most of whom were boys, did not enjoy reading. She, too, read to her students in an attempt to engage all readers:

*I read to them every day. They seem to like that better than reading themselves. (Interview #7, Experimental)*

Negative attitudes toward reading presented multiple challenges for teachers. Characteristics related to negative attitudes toward reading included lack of motivation

and engagement, and distractibility. Several teachers noted that negative attitudes of struggling readers also negatively impacted other students in the classroom:

*A lot of them seem to have this attitude that reading isn't cool, that reading isn't for them. I've tried several different things already, but nothing has worked so far to get them involved, to get them interested. They seem to have decided already that they can't read so that's that. And that causes behavior problems. Because then they get distracted and then they try to distract other kids and before you know it, none of them are doing their work and there's problems. (Rosemary, Interview #7, Control)*

*For some students, it's just attitude. They have decided for whatever reason that they don't like to read, and they aren't going to. For a few others, it's attention span. They get distracted really easily, distract others, they're fidgeting, sometimes they're off—so the job is very challenging. (Kendra, Interview #4, Experimental)*

*They can't seem to focus—or want to focus. They get really fidgety; they interrupt; they really resist anything we try to do. (Rosemary, Interview #7, Experimental)*

*The good readers are the ones that see themselves as readers. But the other ones have this attitude that they're not readers and never will be. They don't seem interested. There's just no interest. I can't get them engaged. There's other characteristics, too. They're also the ones who are easily distracted. They have no attention; they can't focus. They don't have that "wanting to know." (Frances, Interview #5, Control)*

During the pre-study interviews, when teachers described challenges in teaching students with negative attitudes towards reading, I probed for characteristics that teachers associated with negative attitudes. Teachers identified several variables including stress, anxiety, frustration, fear, resistance to risk-taking, distractibility and other behaviour issues, lack of self-esteem, lack of self-efficacy, lack of self-confidence, and feeling no relevance or importance for reading in their lives:

*Well, anxiety for sure. Without a doubt, anxiety. And the more stressed and anxious they are, the harder it is for them so they start to shut down—won't take any risks at all. (Jackie, Interview #1, Experimental)*

*And for sure, anxiety, worry. You can tell because they start to pull their hair, or they're tapping their pencils, or chewing their lips—becoming really distracted which is taking them away from the reading of course. They lose focus and can't seem to get it back. (Karen, Interview #2, Control)*

*As soon as they start feeling more stressed, more anxious, you start seeing the behaviour getting less acceptable. (Ezra, Interview #9, Control)*

*They see it as something hard and actually impossible to do. So they won't try because they think, "why bother, I can't do it anyway—I'll never be able to do it anyway." So they've given up already. Which makes a bad attitude, poor motivation. They don't see any point and they won't even try. (Tracy, Interview #3, Experimental)*

*As soon as they get frustrated and frustration sets in, that affects their attitude and engagement and then that resistance starts up again....these student have attitude problems with reading. (Kendra, Interview #4, Experimental)*

*They have absolutely no confidence that they can read, so I guess, then that's going to make them act up, because they might be scared to try or else think, I can't read, so why bother? (Rosemary, Interview #7, Experimental)*

**Diverse readers challenge teaching.** All teachers reported that their classrooms included a very broad and varied range of student reading abilities. All collaborating teachers identified challenges in teaching reading to the diverse readers in their classrooms. Teachers noted students with specific learning and reading disabilities and described difficulties for students for whom English was an additional language. These challenges were complicated in some classrooms by the fact that classroom support in the form of educational assistants was increasingly hard to access.

Tony stated, "Without question I have students who have reading difficulties" and described a variety of approaches he used to meet the diverse needs in his classroom (Interview #8, Experimental). Tracy shared her teaching strategies for engaging struggling readers and commented, "I have a lot of different levels, different kids in my class that struggle with reading (Interview #3, Experimental). Rosemary (experimental

Classroom F) pointed out that there were many students in her classroom, particularly boys, with reading difficulties: “There are a lot of kids who are having difficulties in this classroom. It’s the boys for sure who have the most problems” (Interview #7).

Many teachers maintained that students who struggled with reading also struggled in other curricular areas:

*In terms of my struggling readers, it tends to make them struggle across the board—it affects everything I’ve found—the reading. It’s so hard on their confidence because it’s such a basis for everything else—even math—it’s such a basis for all the other subjects, and it’s so important to catch them up if you can, or they will struggle with everything they do at school. (Leslie, Interview #5, Control)*

In comparing the data focused on reading difficulties that challenged teaching, a common thread of persistent reading difficulties emerged. Teachers expressed frustration that repeated and varied intervention and remediation attempts to support individual reading challenges did not seem to produce substantial or lasting change in reading attitude or ability:

*The biggest problem is retention issues, retention problems. We go over and over the same things and they don’t remember. It’s the same words, the same letters, over and over again and it never sinks in. Just those basic sight words—the pre-primer words. To get them to remember them is such a challenge. (Tracy, Interview #3, Experimental)*

*I have just an amazing range of reading in my room! I have two students who are reading at a Grade 6 or higher level, and I have children who can’t even recognize the letters of the alphabet yet! Which creates huge problems for teaching. Even after hours and weeks and months of working just on the letters of the alphabet and some sounds, I still have students who look at the letters as if they’ve never seen them before. The problem is really obscure—I can’t pinpoint exactly what does and doesn’t work for them. (Kendra, Interview #4)*

*I have a really wide range of reading levels in my class. I have students that are several grades below reading level...I have another student who is really a bright student but who can’t seem to read out loud easily...This has been going on for months and months even though he’s had lots of practice and one on one. He’s*

*even had hearing tests in case that might be it. But we can't figure that one out. (Jackie, Interview #1, Experimental)*

*They have not retained many of their letters or sight words and that worries me, particularly the child in Grade 3 who is still not retaining any of his sight words and did do a full year in Reading Recovery and even after that is still very weak. We work a lot but nothing seems to be retained. (Leslie, Interview #5, Control)*

*The biggest problem is not retaining simple sight words we've been going over and over again since September. In fact, one student is actually going backwards. (Frances, Interview #6, Control)*

*I have one boy—he doesn't like to read. He's been in our reading recovery program but he's not transferring the skills to the classroom. (Tony, Interview #8, Experimental)*

All teachers targeted reading fluency, predominantly common sight words, as a particular concern for struggling readers. Teachers in each classroom reported students that struggled with identifying and reading common sight words. Leslie echoed the observations of many teachers when she outlined reading fluency issues in her classroom. She described students who were “so stuck on trying to figure out the words” they were not “thinking about the meaning” of those words. When students did retain understanding of sight words, they often had difficulties applying this understanding to reading sight words in the context of a story or larger piece of work. Ezra voiced a common concern:

*They're still at the stage where they're not able to take the sight word that they can maybe read off a list and put it into the context of the story that they're reading...They could memorize the sight words but then they weren't putting them into the context of the story. They couldn't transfer them into the book, and when they did, it was very chunky when they were reading. (Interview #9, Control)*

Several teachers identified rhythmic flow as an important, but missing component for those students who struggled with reading fluency. Leslie made rhythmic flow related

to reading fluency a focus of her poetry unit. Karen likewise described a student who struggled with reading and demonstrated issues with rhythmic flow:

*He was at least a couple of grades below level at the beginning of the year...and when I can get him to read to me, it's really choppy and he is just reading one word at a time. If I were to describe it in musical terms, I'd say no sense of phrasing. (Interview #2, Control)*

Three teachers isolated lack of beat competency as a characteristic of struggling readers:

*Some get it and some don't. The good readers, well they have a beat and they love the poems and songs we do...But for some, that beat is not there. The ones that don't get it, that don't have that beat, well they don't read our poems—our chart poems, with fluency either. (Frances, Interview #6, Control)*

Teachers noted that characteristics of struggling readers were varied, multiple, and complex. They identified a range and combinations of specific learning disabilities that contributed to student challenges and struggles with reading:

*Well, I have one student who has problems with neurological connections. And several students have good oral retention but they can't transfer their oral retention to reading. One day they'll have it, and the next day it's gone. So for them, memory games and memory skills are important—any trick to get it to click and stay there. (Kendra, Interview #4, Experimental)*

*Some students have been diagnosed with ADHD or Asberger's so that would certainly affect things. (Jackie, Interview #1, Experimental)*

As Leslie noted, the characteristics of struggling readers became part of a vicious, endless cycle:

*The student who's weaker has very little interest in reading—because he just can't read—so he won't try to read because he has very little interest in reading--a vicious circle. (Interview #5, Control)*

Teachers faced challenges not just in meeting the needs of students who struggled with reading but in also meeting the needs of students who were very competent readers and bored with simple texts. They identified students who had mastered the mechanical aspects of reading but who were not able to read for understanding:

*I've found with some of my more advanced and older readers, the challenge is to slow them down, because they read more than they can comprehend. So bringing them back a few levels is important because it's one thing to read the words, and it's another to actually comprehend what you're reading, which in the end, is the whole point of reading. So I've had a battle with some of my stronger students who say, "It's too easy for me," but it might be in terms of just reading words, but it's not in terms of what the content is. (Leslie, Interview #5, Control)*

Collaborating teachers used a variety of approaches to help students achieve reading outcomes. Teachers used strategies such as miscue analysis, guided reading, picture cues, story-telling, literature circles, buddy/paired reading, "reading around the room" and intervention approaches such as the reading recovery program. Most teachers declared that meeting the individual needs of students with multiple and varied learning difficulties was challenging when teaching the larger classroom unit. Additionally, finding the time and resources to meet the range of very diverse student needs was identified as a significant challenge by most teachers.

**Outside school influences affect learning in school.** Home environment influenced learning at school in both positive and negative ways across classrooms. Leslie stated:

*I've noticed a real correlation with successful reading and those kids who have that home support and where the family's really value reading and where they actually do the home reading and they're sharing books at home. There's a real correlation between that and their reading success in school, I've found. The ones who are weaker often don't have that kind of support or haven't had it." (Interview #5, Control)*

In Classroom B, Jackie observed that "support at home is strong" (Interview #1, Experimental) while Karen had students who were not supported at home and observed that for those students, "There are definitely home issues that affect the reading struggles" (Interview #2, Control).

Other teachers likewise noted home effects on learning and described the negative impact of emotional upheaval, uncertainty, inconsistency, poverty, anxiety, and lack of learning and reading supports at home:

*They're not into reading. It isn't something they see at home. So they don't see it as important....And they don't get support at home so that makes it even harder. And then they miss classes so it feels like we're always starting over again....The kids that don't come to school every day don't get engaged easily in any of the learning in the classroom. (Tracy, Interview #3, Experimental)*

*But you have to know, these kids have lots of different issues. They're coming to school with a lot of ugly baggage. They don't have support at home. Not conducive to learning, that's for sure. Engagement is a significant factor here. (Frances, Interview #6, Control)*

*In terms of the children, some of them haven't had a lot of exposure to books and literacy. I don't think that's particularly valued in some of the homes—or the parents themselves aren't particularly literate so they don't know how to help their children with that. (Frances, Interview #6, Control)*

Ezra observed that for several students in his classroom, “their school has been interrupted a lot” (Interview #9, Control). The interruptions appeared to affect learning. When Ezra was asked to identify the missing step between recognizing sight words and reading them in context with meaning he replied:

*Well a big one—just attendance in school. They [the students in Ezra's class] focused a lot right from Day One but they just didn't have the attendance and so they're catching on a little slower, they're developing a little slower than others or they might if they had those opportunities, more opportunities. Every single one of these children here have the ability to be just amazing readers—they just need the opportunities. (Interview #9, Control)*

Ezra specified other barriers to student learning including a lack of home reading reinforcement, not being read to at home, and:

*A lot of the other barriers are the outside factors, like they might not get the reinforcement at home; they might not get read to at home; they don't come to school consistently; those factors play such a big part of learning to read...I have*

*books for them to read at the end of every day and a lot of them take the books home, and you can tell the ones that are successful at home, because they come back and they understand what they've been reading, they understand the book, and you can tell they've had the book read to them. And that they were actually reading the book. But there's kids that come back and they have not had the same opportunity of getting that book read to them or have somebody at home that can sit with them and help them read that book. (Ezra, Interview #9, Control)*

Tony described some of the valuable, positive home influences for the students in his class, and the important ways that families contributed to their children's learning:

*It's amazing the amount of knowledge our families have—the different kinds of knowledge and literacies they have....The characteristics of engaged readers in my classroom are connected to the families. Family supports are necessary. Unless that child is going to take a book home, the literacy is not going to happen. Literacy needs to be considered an enjoyable experience at home first. The kids have to be genuinely engaged. That's important. (Tony, Interview #8, Experimental)*

### **Constructing the Grounded Theory Model**

Preliminary categories constructed from the pre-study collaborating teacher interviews were used to begin theoretical sampling (Charmaz, 2006). As grounded theory analysis continued using emerging data from additional qualitative sources, the meaning of preliminary categories was elaborated, variation between categories was explored, gaps among categories were defined, and new categories were constructed (Charmaz, 2006). Data gathering and analysis was aimed at explicit development, elaboration, and refinement of theoretical categories and their relationships and processes as they emerged from theoretical sampling (Charmaz, 2006). Four major categories emerged from the data: Motivated and Engaged Learning, Reading Pathways, Music Pathways, and Transformative Potentials. Those categories and their sub-processes are shared through the words of the experimental classrooms and their classroom teachers and parent/guardians.

### **Motivated and Engaged Learning for All: When Can We Do This Again?**

The opening twenty minutes of the learning design concluded with Classroom C's echo of my words to a simple Goodbye speech-piece. Before the class could finish echoing the final phrase, a student's voice called out, "When can we do this again?" This phrase illustrates a prominent conceptual recurring motif that connected all study participants from the beginning to the end of the study and beyond. Pre-study interviews with collaborating teachers indicated that all teachers were motivated to explore the potentials of multimodal learning, including music, to engage student meaning-making in print and non-print literacies.

Teachers contributed to rich data sources from which conceptual understandings of the processes and action of motivated and engaged learning were mined. Collaborating teachers and parents communicated that effects of engaged learning were felt by students and teachers throughout the learning design and in the year following the study. Kendra (Classroom C, Experimental) began the final post-study collaborating teacher interview by sharing that the experiences of the research design had affected her students in powerful ways:

*You've been a blessing to us. An absolute blessing. Children who would normally not engage in reading, let alone any curricular learning, were fully engaged and it was wonderful to see them enjoying it so much!...I have students who just struggled with attendance and class participation like Eric who absolutely fights learning, suddenly show up for school and participate and enjoy the activities. For lots of kids, the idea of music and learning at the same time is new and they have loved it! It really encouraged participation. Like Sam who absolutely hates carpet time and hates sitting still—can't do it. Not only was Sam sitting still on the carpet for you, but he was actively engaged. (Interview #10, Experimental)*

A useful design that supports print and non-print literacies will have no impact if the learners are not engaged in the learning (Guthrie & Wigfield, 2000). Guthrie and

colleagues (1998) believe that motivation is the critical factor in engagement that leads to reading achievement (Braunger & Lewis, 2006). Baker, Dreher, and Guthrie (2000) claim that although motivation is inherent in engagement, “engaged reading involves more than motivation” (p. 2). They refer to criteria developed by Guthrie and Anderson (1999) to define engaged reading that include the interactions of “motivation, conceptual knowledge, strategies, and social interactions during literacy activities” (Baker, Dreher, & Guthrie, 2000, p. 2).

The criteria above were integrated and synthesized with understandings developed by Stipek (2002) and Wigfield and Guthrie (1997) to create a learning motivation and engagement assessment protocol for this study (Chapter Three). This protocol was used to evaluate and inform the iterative unfolding of the research design and forms part of the declared sensitivity to a priori theoretical knowledge and grounding.

Engaged learning moves beyond surface and technical knowledge (VanDeWeghe, 2009) and involves students in deep, felt, and rich meaning-making opportunities (Caine & Caine, 1997; VanDeWeghe, 2009). Engaged learning is a necessary way forward to enable “all students to find powerful learning in their school lives” (Sterling, 2009, p. ix). The engagement perspective suggested by Sterling (2009) is a key element of this research. As stated in the initial research questions, a goal of this study was to investigate the possibilities for engaging all early years students in print and non-print literacies, within the context of inclusive classrooms. Engaged reading occurs at all stages of development (Baker, Dreher, & Guthrie, 2000). “Reading engagement is as much a goal for the child struggling to decode words as it is for the proficient reader seeking information for a class project” (Baker, Dreher, & Guthrie, 2000, p. 3). The same

understanding can be applied to music engagement. It is as much a goal for the child whose only musical experiences are school-based opportunities, as it is for the child who is privileged with private music lessons outside of school.

The processes and properties of motivated and engaged learning as defined for this study were demonstrated in many ways, beginning with the collaborating teachers' initial assumptions and beliefs regarding the potential for music and multimodal learning to motivate and engage all learners. The small voice that called out during the initial learning event described above was the first of what became a large chorus of enthusiastic participants and observers who engaged with the study as it unfolded and in some instances, long after the research design concluded. The chorus included students, collaborating teachers, substitute teachers, classroom educational assistants, visitors to the classrooms, parents, school staff and administrators, and respondents at conference and symposium presentations where the study highlights were presented.

As the grounded theory model was constructed, I probed for the conditions, processes and properties of motivated and engaged learning that emerged from field notes, teacher and student focus group interviews, and parent surveys. Several key elements emerged. Motivated and engaged learning was:

- Deep, sustained, persistent, affective.
- Important for improved attendance, active participation, and positive behaviours.
- Potentially transformative.
- Supported by teacher, school, parent, researcher values and passion.
- Fostered through novel, compelling, playful, language, beat, and rhythm encounters.

- Highly personal and relevant.
- Promoted through use of instruments and artifacts.
- A flow experience.

**Sustained motivation and engagement.** To motivate students to deeply engage in the learning, the processes, artifacts and design of the research must have impact beyond transient and ephemeral novelty effects and must be valued and perceived as something greater than simply enjoyable entertainment to enliven a few minutes of the learning day. Rosemary (Classroom F Collaborating Teacher) initially believed that the students were more successful with reading during the study “because it’s new—it’s novel and approaching it a different way.” As the study progressed, Rosemary observed ways that the research design engaged students in ever more deeply felt ways with lasting and greater power than mere novelty effects. She concluded that the research design sustained and motivated learning in ways that she regarded as transformational. Rosemary, like all experimental teachers in this study, reported the kind of engaged learning that VanDeWeghe (2009) describes as learning that “moves, shakes, and changes people” (p. 41). Engaged learning brings about understanding, changes previous understandings, brings immense pleasure, and is compelling (VanDeWeghe, 2009). Jackie illustrates this engagement perspective with remarks she made two weeks into the research design:

*It’s great. I can’t get them to write about anything else in their journal. And the struggling readers—I see them participating and getting right in this. This is so much easier and fun for them. It’s all Mrs. Peters did this and Mrs. Peters did that with us.”*

Data results from field notes, student focus groups, teacher interviews, and parent/guardian post-surveys, indicate that the research design motivated students to

engage profoundly and in sustained ways with the learning. Engagement was persistent and lasted over the length and breadth of the study; research experiences seemed compelling and provided immense pleasure for many students. In many instances student engagement was transformational and had impact that lasted well beyond the timeframe of the study. Examples of engaged learning that changed previous understandings, brought about new understandings, and had the power to “move, shake and change” (VanDeWeghe, 2009) students, are described in the following development of the grounded theory model.

There are hundreds of documented student observations and statements from students during learning events and from focus group interviews that indicate intense, sustained student enjoyment and engagement in the learning experiences. Teachers claimed that the research dramatically and positively affected specific instances of student attendance, participation, and behaviour as described by Kendra in her opening comments above. All teachers noticed, like Tracy, “that the children are really interested in reading more. They get into it more.” Some parents commented during the study and on post-study surveys that their children expressed greater interest in reading at home and greater enthusiasm for attending school because of their excited participation in the study’s learning experiences. One parent/guardian wrote, “He never used to like music before. Now he can’t wait to get to school and find out if it’s a Mrs. Peters day” (C-7).

For all classrooms, interest in the rhythm and language play experiences was sustained over the entire research design. Comments from teachers and adults in the classrooms indicated that the effect of the learning experiences lasted beyond the time I spent with classes for each learning event. Kendra observed that students in her class self-

initiated the research design experiences. “So the kids, like Jayne and Lisa, are singing them all on their own during the day or during choice time. They repeat them to themselves over and over again—it’s almost like a security blanket!” Tracy also observed self-initiated and lasting effects in her classroom. She said, “I noticed that after you did that, the kids were asking to do that when you weren’t here. They were trying to make up their own ‘Person of the Week.’ And they would use those same words in their writing and work” (Interview #14).

Motivation for engaged learning extended beyond the classroom and school walls. Post-parent/guardian survey data indicate that parent/guardians observed positive changes in reading and music for many students as reported in Chapter Nine quantitative data results. When parent/guardians were asked for their comments regarding changes in music and reading interest, comments such as “Nothing, but my child never talks about school activities so this is no surprise” (Classroom B-6) were very rare. Many parents who responded to post-surveys noticed that their children were chanting and singing the rhythm and reading materials at home:

*“Now he is coming home and singing and chanting all the Mrs. Peters’ songs and trying to make up his own—wow!” (Classroom B2).*

*“He was very interested to share the songs that you taught them, especially when he brought the music book home on Friday” (Classroom B7).*

*“He brought his music book home and shows us how to sing it and likes it with you” (Classroom C3).*

*“He is always reading and singing the handout that you provided” (Classroom F9).*

*“We are enjoying watching our daughter’s enjoyment of the songs and rhymes” (Classroom F10).*

*“She was very proud to tell us about her songs and sings them for us. She remembered them all” (Classroom G5).*

*“He is reading the book. Good” (Classroom I-18).*

*“We are hearing about the fun games and poems at home. They really liked having you come to class” (Classroom I-15).*

**Personal and relevant meaning.** Learning engagement was sustained and lasting in part due to the personal and relevant connections to the learning experiences. When students self-initiated learning and assumed ownership of the research design elements, as Tracy described above, the learning events took on a life that existed both inside and outside of the research design event. In each classroom, collaborating teachers shared ways the research design resources created personal and relevant meaning that engaged students in enduring and persistent learning.

Classroom B created chants and games inspired by their pirate study and played them at recess and in their homes as described later in this chapter. They developed and extended research materials to use in other curricular learning and with parents. Classroom I independently continued the research design process of creating raps from their “Person of the Week” journals; Classroom F experimented with pieces based on their stories and poems about butterflies as part of science learning; and Classroom C created their own variations and dramatizations of favourite speech-pieces and songs using sight word classroom resources. Tony provided evidence of personal, relevant meaning and student ownership in his classroom:

*The kids were saying the chants and singing the songs all the time—even when you weren’t around. Like Ria would start singing in the middle of class while the kids were working at their tables, and then everyone would chime in! And before you knew it, they’d all be singing together!...Sometimes they would write out your poems on the boards—or something similar—what they would remember—and they would try it with each other” (Interview #14)*

Tony noted particular resources that engaged his students and provided opportunities for personal and relevant meaning-making that sustained learning. Using stories the students had composed for English Language Arts, the students and I created speech-pieces that they called raps. Tony said,

*The kids loved hearing those chants about them. They loved it when you took their words and made raps out of them and when it was connected to them and what they were all about and what they were doing.” (Classroom G)*

At home, some students continued to find personal meaning in the materials and processes of the research design. As one parent/guardian recorded, “They write their own songs and take turns teaching other—we enjoy hearing them” (Classroom F-4). Another parent shared, “He also makes up his own songs about what he is doing. I had forgotten about your study and was frustrated with the constant noise and then saw why he was doing this” (Classroom G7).

**Transformative effects.** Collaborating teachers noted how activities of the research design deeply engaged even those students who struggled with reading and found school difficult. For many such students, changes in engagement, learning, and behaviour, were transformational. These children were able to focus, stay on task, and engage in learning in ways that were not normally apparent in their other classroom experiences. At the outset of the study, teachers prepared me with the knowledge that specific students might be challenged by and perhaps resistant to our activities. In three classrooms the collaborating teacher and I reviewed and established protocols for dealing with certain behaviour issues in anticipation of potential difficulties. These protocols were only required once when a student had a difficult experience prior to my arrival that continued into our rhythm and reading experience.

This student was one that Kendra (Classroom C, Collaborating teacher) identified as having such difficulties controlling frustration, that he physically expressed tantrum-like behaviours resulting in time spent in a room in another part of the school called the “time-out” room. Kendra shared that after Scott was taken out of the reading and rhythm experiences to the time-out room on one occasion, she was very surprised that Scott never had another similar episode for the remainder of the research period. The attention, focus, and self-control that he demonstrated during our study experiences was most unusual and transformative, at least during the experiences related to the research design.

Collaborating teachers, educational assistants, and other teachers in the school expressed surprise that students with specific behaviour challenges were able to stay focused and on task throughout the entire study. Jackie said, “I was completely surprised that these students who were low readers and writers, were so engaged, that they were participating so well and reading everything you had on the board” (Interview #11).

Rosemary, the collaborating teacher for Classroom F, made similar observations. When I first met Rosemary she shared that there were a lot of students in her classroom that had difficulties with learning and behavior issues. She mentioned students who were easily distracted, hard to engage in learning, and would subsequently try to distract other students. During our final interview I asked her how those students responded to our rhythm and reading experiences. Rosemary replied by saying:

*Well, that's what was so great, really. Because you could see how excited they were when you came. Every morning they'd come and ask if you were coming. And every time they'd see your name written on the board that said Mrs. Peters was coming, they were all excited. Even the boys! Those boys who never engaged in reading before—in May—now I can see their excitement about it. Way more kids than usual were participating and enjoying it. All the students enjoyed the activities—you could see it in their faces, for sure they did! (Interview #12)*

Rosemary offered several examples of transformative effects and shared Kyle's story with me.

*Kyle misses a lot of class because he always needs time out. And he doesn't seem to care. He seems to even try to get in time out. He just doesn't want to be a part of any learning in the classroom. But Kyle would be on his best behaviour for you because he knew what he would be missing and he didn't want to miss out. So instead of trying to get out of the activity, or sitting at the back where he would fool around, he would be listening and actually try to sit at the front. None of them wanted to miss anything so they were always good. And I'd say that day, if they weren't behaving, they would miss Mrs. Peters. So of course, they would try all day, at least until you came! (Interview #12)*

I was sorry to hear that possible exclusion from our study experiences had been used as a threat for students, but I was interested to have this data example of transformative engagement effects to compare to other classroom examples. Tony described two students who “Without question were more engaged with text than they ever have been all year. And they weren't the only ones, but they were the ones that really stood out for me” (Interview #14). Jackie, collaborating teacher (Classroom B) observed group transformative effects for her students that are described later in this chapter. Jackie declared, “It was an important part of their lives. It engaged them totally.”

Kendra and Tracy also commented on transformative learning effects for the class unit and for specific students. Tracy shared an example that echoes Kendra's earlier observations about Eric and Sam. Tracy described transformative learning for several students, including Rachel:

*Rachel is usually not focused and always distracted. Usually in class if we are reading out loud together, she wouldn't read along with us. But after you came, she would be sitting at her table singing and chanting the songs throughout the day and I would see her bobbing her head to the beat as she was working. She is actually reading now and reading out loud, and she reads ahead—she's not just following along anymore. And there are others who do the same—like Sean and Steven. (Interview #14)*

Parent/guardians described transformative experiences in their children's interest and engagement with music and reading at home. They reported examples of their children creating their own compositions using words and music, frequently reading the booklet I provided, and sharing study resources with siblings, friends, and parent/guardians. Many of these activities were noted as being surprising: "He suddenly started writing his own music with the notes over the words like Mrs. Peters" (Classroom B-17). Students self-initiated both music and reading activities: "We hear the water cycle song a lot. She is always singing, 'It's raining, it's pouring.' And she has been making up her own poems on birthday cards" (Classroom B-19). The transformative learning possibilities extended to at least a few parents in the study. A classroom B parent wrote on the bottom of the survey:

*We hear the songs and poems every day! Mrs. Peters, I would be very interested in reading the results of your study to see if there are things I could incorporate into my own Grade 1-2 classroom to increase reading and academics."*  
(Classroom B-21)

**Affective dimension.** Comments made by students and adults throughout the study illuminated an important dimension of motivated and engaged learning. The affective dimension of feelings and emotions was an integral property of motivated and engaged learning. As Rosemary discovered, "It engages their emotions, too!" Students and teachers expressed strong, positive feelings, and intense emotions as a result of research design experiences. Data results indicated that students experienced feelings of intense happiness, joy, pride, curiosity, and were enthusiastic and eager. Students commented:

*I waited and waited and waited for you to come.*

*This is the best!*

*Again—let's do it again!*

*I love everything you do. Why can't you stay longer?*

*I wish you could stay.*

*I just couldn't wait for you to come!*

*I liked every game. It feels great, Mrs. Peters.*

*You make us happy! Will you come back tomorrow?*

*It was sooooo much fun!*

*“That's too easy, Mrs. Peters. Make it harder—we can do it!”*

*We always want to know what you'll bring us.*

*I wish you could come every day. I wish we could do that every day.*

*We love it! We love you! Don't go!*

During the final focus group interview, Sherry exclaimed, “Everybody was always happy you came! You always made us feel good” (Classroom I, Focus Group Three). At all schools, students regularly greeted me enthusiastically in the hallways with hugs and smiles and it was usual to hear excited exclamations when I arrived at the classroom doors. There are several records in the Field Note Journal that describe students chanting or singing when we encountered each other walking down the school hallway.

One such memorable instance occurred at Portia White School. As I was walking down the hall on the way to Classroom H, the students of Classroom G were coming the other way back to their classroom from Phys-Ed. As we met each other, the entire Classroom G spontaneously and happily broke out into our Hello Song and continued to sing down the hall and into their classroom. Collaborating teachers often remarked how

frequently students would ask hopefully, “Is it a Mrs. Peters’ day?” Although it is likely that there were students for whom this experience was not always a positive one, there is no record in study data of any negative response to the learning design experiences. As Jackie, Classroom B collaborating teacher expressed, “All I had from parents and kids was *totally positive* feedback!—*all* the time!” In passing comments at school and in post-surveys, parent/guardians similarly noted affective qualities of positive feelings and emotions: “Takes music, loves it, loves what you do!” (Classroom B-19).

Tony said, “We *all* enjoyed having you! It’s been just great!” (Interview #14). Tony observed how important the research design was for his students “and how it affected them so strongly...All the students enjoyed the activities; everyone was interested and engaged in the activities and engaged in the text. They had a lot of fun. I had a lot of fun!” Jackie remarked that if students were away from school on a day I came, “they would come to school the next day and be so upset if they missed you and missed Herbie [a cone puppet used in the learning experiences] and wanted to know what happened and what they had missed” (Interview #14). Tracy (Classroom I, Collaborating Teacher) said:

*The kids loved having you here! They would ask every day if you were coming. All your activities really hit home with, I’d say, all the kids. They **really really** looked forward to you coming. If they knew you were coming they would shout, Yay! Mrs. Peters is coming!” (Interview #14)*

At the conclusion of final focus group interviews, I asked the students if there was any last thing they wanted to share with me about our rhythm and reading experiences. Andrea declared with great passion, “Just that it was the best time of my life when you came to our class. Please don’t leave us” (Classroom B, Focus Group 1).

**Valuing.** A variety of factors may contribute to consistent, high levels of student engagement and a lack of any issues related to behaviour. These factors likely include the high value that collaborating teachers placed on elements of the research design. They not only communicated this value to me in pre-study interviews, but they also communicated these beliefs to their students. Collaborating teachers consistently verbally supported the study learning experiences and made expectations of best behavior clear to all students. Teachers commonly asked students to “Show Mrs. Peters you’re ready to listen” or “Show Mrs. Peters how we work together as a team.” Collaborating teachers were careful not to interrupt the learning experiences with side instructions to students, but their active presence signaled to students that they were monitoring behaviours and that the usual rules of the classroom were still in place.

Collaborating teachers set the stage for a positive reception to the research design by reiterating to their classrooms how fortunate they were to have this time for exploring our rhythm and reading experiences. All collaborating teachers with the exception of some Classroom F substitute teachers participated in the learning events along with their students. Participation took different forms; two teachers joined the student group and participated in every activity along with their students; two teachers sat just behind or beside the students and participated in most activities but generally chose to observe their class during movement and instrument playing; and in Classroom F, the series of substitute teachers that initially came and went usually did not participate in the rhythm and reading experiences, although they were always invited to do so. Rosemary, the collaborating teacher hired for Classroom F halfway through the study, participated in the learning experiences whenever she had the opportunity to do so.

The majority of parent/guardians valued reading and many valued music, particularly in Classroom B as indicated by quantitative data results. The time parent/guardians spent with children at home reading the booklet from the research design, listening to them share their speech-pieces and songs, and expressing their great enjoyment at watching and hearing their children engaged in music and reading, indicates a high value is placed on both music and reading. A number of parents included a short line of appreciation for the study experience, as for example, “Thank you for coming—they loved having you!” (Classroom C-8).

**Playing with language and rhythm: Challenging fun for everyone!** A key property of the grounded theory model is that students viewed the rhythm and language play experiences as great fun, and then equated having fun with uncomplicated learning that was easily accessed by all students. As Seth explained, “Everybody was having fun. So it was easy” (Classroom G, Focus Group Two). Susie said, “Easy, easy...Because we were playing games and it was fun” (Classroom I, Focus Group One). “Easy” learning does not equate to deep, meaningful learning and that issue is examined later as part of the processes, “Sam can Read” and “The Flow Experience.” However, data results do point to powerful and meaningful learning as described throughout this chapter. Deep engagement in the learning experiences seemed to facilitate emergent, natural learning that students perceived as “fun” and “easy” despite the ever more sophisticated and complex challenges over time.

Not only did students continue to view the research design experiences as fun events even as they became more challenging, but students actively sought out additional challenges. When I played the erase games which involved eliminating more and more of

the words that cued unfamiliar or challenging text, the children would often ask to “make it harder.” Students in all classrooms seemed to be intrinsically motivated and challenged to improve both their reading and rhythm competencies.

It was exciting to watch the classroom groups listen and watch carefully to ensure the entire group was demonstrating beat competency and ending the beat exactly together. We began learning the rhythmic structure of the speech-pieces because the students asked to learn new rhythms. We often added language and print sources to our oral and print reading repertoire because students expressed an interest in new materials or suggested new materials.

The games I shared with each classroom frequently were shaped by the students’ desire to create their own variations of the game. The variations typically involved ever more sophisticated applications of our beat and rhythm experiences and understandings. These variations are outlined in other chapters but often involved students taking speech-patterns and creating their own speech and body percussion ostinati, adding movement and expressive elements, and incorporating their own and new text. Acquisition of conceptual understandings and skills seemed to serve as a springboard and inspiration for students to then use them in new and creative ways. An entry from the Field Notes Journal for May 30, Classroom C reads:

*Everyone experienced success and kept saying ‘Again—let’s do it again!’ They have moved from **me** suggesting ideas to **them**, to **them** suggesting ideas using our repertoire by building on it and adding new elements.*

The initial challenge to create learning resources and materials using language, beat, and rhythm to engage all students seemed immense. Data results from parent surveys, pre-test interviews, reading pre-tests, and focus groups identified a very wide

continuum of student ability and reading preferences. I attempted to create texts that were neither too challenging for beginning readers nor too simple and uninspiring for more sophisticated readers. As Zoe pointed out, reading is only fun, “if you’re reading things you like or want to read” (Classroom B). I attempted to address the diversity of learners by creating interesting texts and authentic texts connected to classroom learning in other subject areas and students’ own work, and by incorporating multiple and varied forms of language play into the research design.

Field notes indicate that these attempts were successful in that most students engaged with the range of rhythm and reading experiences and language play activities.

As I journalled,

*Rhythm, beat activities, print text, seem to engage all readers; everyone focused, attentive, and actively participating with seeming enjoyment. Collaborating teachers confirm—but I wish there was more time for reflection/ critical assessment with students to examine their perceptions.*

The time constraint for group and individual reflection and assessment emerged as a significant issue for me and I looked to focus groups and teacher interviews to confirm or disconfirm interpretation of field note data. Despite the diversity in reading abilities and preferences, data from focus groups, post-study teacher interviews, and post-study parent surveys confirm that playing with language, beat, and rhythm was deeply enjoyable and motivated learning for the majority of learners in this study. Jackie pointed out, “Children all seem to love music; they all respond to the beat so tying *anything* into music, into the beat, well it becomes a very natural way for them to learn---it’s a natural route in for them for reading that they are really responding to” (Collaborating teacher, Classroom B). Tracy said, “When things are sung or put to rhythm they’re much easier to remember and certainly more fun to learn!”

During focus group interviews, Zoe (Classroom B) observed that the class really liked our rhythm and reading materials, a sentiment that was expressed by many other children during the study and in focus group interviews. Field note data also indicate that students who struggled with reading engaged with the study print and non-print materials as evidenced by their active, prolonged involvement and perceived success at reading print texts. However, it was not clear if the proficient readers were as deeply engaged with the print text materials. Confident and capable readers enthusiastically interacted with rhythm and reading experiences, but it was more difficult to identify if they were as meaningfully engaged with the print resources since they could already easily read the print materials.

For example, Simon (Classroom C) was identified at the outset of the study by his collaborating teacher as reading at a Grade Six level in his Grade One classroom. He never indicated during the study that he seemed bored or uninterested and in fact, Simon was often one of the most eager participants in our activities. However, I was concerned that the print text would likely have seemed extremely simplistic to him and other capable readers.

During the focus group interview, I asked what part of the activities had captured Simon's interest and was surprised to hear that he too, enjoyed reading our pieces from the board. Simon declared that our rhythm and reading experiences were not boring for him "because we did different things to them, so it was always interesting. You were making games out of them" (Classroom C, Focus Group One).

Later in the focus group interview, Simon further articulated how the beat supported reading and why he enjoyed the experiences: "We got a pattern going and the

pattern kept the words going. And it was also more interesting than just saying the words.” This finding was echoed by other student participants during the study and at focus group interviews. Although the print text was familiar for some students, there still seemed to be sufficient challenge or interest in the activities to foster high interest and motivate active and meaningful participation.

Zoe emphasized this point during Focus Group interviews. When Andrea indicated that reading activities were successful because “we said them over and over” (Classroom B, Focus Group Three), Zoe quickly inserted, “But not in a boring way, Mrs. Peters. It wasn’t boring to say them over and over.” When I queried why it wasn’t boring and asked Craig for his opinion, Craig replied, “It wasn’t boring because we always did it in a fun way” (Classroom B, Focus Group Three). Sasha, from Classroom I made a similar observation. When I asked him what he liked most about our songs and chants, he shared, “We did stuff to them—we got to do stuff” (Focus Group One).

Throughout the study, many students expressed enthusiasm for the variety of games and the playful approaches to the rhythm and language experiences. Tad selected the element of play as his favourite aspect of the learning experiences. When I asked him what it was he liked best, he replied, “We got to play with you. You always played with us” (Classroom I, Focus Group Three). Evelyn, (Classroom C, Focus Group One) along with students in all focus groups, also targeted the element of playful learning as important.

Evelyn was highly engaged in language and rhythm play that she and other students called games. One such “game” was commonly used to start off a class. Once we had a repertoire of speech-pieces, I often began each class by clapping the rhythm of one

of our speech-pieces or songs. I would ask the class if they could tell me what song or speech-piece I was clapping. Evelyn said, “I liked it when we had to guess them—that was fun!” Classroom B Focus Group One, like all the experimental classrooms, engaged wholeheartedly in the games that accompanied many of the speech-pieces and songs. When I asked students in Classroom B why they said reading with me was really fun, Elliot answered “Cause we play all those games!” Andrea elaborated, “Like Wormie and baby Herbie and Pirate Dan!”

A number of students in all classrooms picked the amusing elements of our speech-pieces as the most engaging and fun element for them. It was difficult to tell if students thought that the pieces themselves were funny, or the ways in which we used them were funny. Collaborating teachers commented that students enjoyed our humorous, playful approaches to the speech-pieces and songs and the different characterizations we gave the various speech and song resources and materials that were part of the study. Diane said, “Your songs were funny, Mrs. Peters” (Focus Group Three). “Which ones?” I asked. Diane replied, “Well, Wrinkles, Wormie, Herbie. Well, I guess not all. Like Snail Snail, or Starlight or the ball one. Well, they weren’t exactly funny, but they’re still good. I like all of them. No, I *love* all of them.”

Students also expressed their enjoyment and use of the booklet of common speech-pieces I created towards the end of the study. Gerald said, “We like that book you gave us. I read it every day” (Classroom C, Focus Group Two). Debbie was thrilled to announce that she was able to “read that songs book by myself and I didn’t need any help!” Several children happily made that same observation. Sylvia said, “I liked the songbook. I read it to my brother. I’m going to teach him to read, too” (Classroom F,

Focus Group Two). Kendra, collaborating teacher (Classroom C) shared, “The kids loved the idea of having their own books of all the poems and songs and taking them home over the summer. I know they will read them and they’re looking forward to it.”

During the final teacher interviews, Kendra introduced another important element associated with rhythm and language play that was echoed by other teachers. Kendra noted that some students, for varying reasons, did not experience many moments of joyful play in their lives and the opportunity for them to participate and engage in learning that they perceived as fun, was an important benefit to students. She described it this way:

*Well, you presented it as games, something fun; it was very playful and the children loved playing! It was one of the few opportunities that Simon really has to be just playful at school or at home and just laugh and enjoy learning. Simon is just six and he is treated very seriously at home and treated more like a little adult. He doesn't laugh enough and my goal is to see him play, laugh, and enjoy being a little boy. So he had those opportunities with you.*

Tracy made similar observations about the importance of play, saying that some of her students had little opportunity to enjoy laughter and play in their lives outside of school. The fun and playful opportunities for learning afforded by our research design were important social and emotional spaces for those students. Parent/guardians also described the way that the reading and rhythm experiences provided important social/emotional opportunities at home. They shared short anecdotes of their children playing, teaching, and learning using study materials and resources with parents, siblings, and friends. Parent/guardians referenced playful and game-like qualities as important and fun: “She enjoys all the games and does them at home” (Classroom G-16); “She’s having a lot of fun playing the games she learned at school” (Classroom F-2).

**Instruments and artifacts.** All classes enjoyed the nonpitched percussion instruments that I brought to every class. I tried to vary our instrument use to maintain

interest and to ensure that no one instrument was associated strongly with beat or rhythm. Field notes data indicate requests for instrument play in nearly every study learning experience, and instrument use was a common topic of conversation in focus group interviews. As Elliot said, “I loved it when we sang and played those instruments with you” (Elliot, Classroom B, Focus Group One). Talia likewise expressed that it was “more fun” when the instruments were used as part of the learning experiences.

There is overwhelming field note evidence describing student curiosity, interest, and engagement with the artifacts I carried in my music bags. Classroom learning experiences were often prefaced with students asking, “What did you bring today, Mrs. Peters?” The puppets in particular served as catalysts to engagement and learning. All collaborating teachers confirmed this understanding as voiced by Rosemary (Classroom F Collaborating teacher), “They really liked your visual aids—the puppets worked really well to get them interested.” Chris spoke for many students when he identified puppets as the part of our learning experiences that he enjoyed the most. Chris said, “I liked Wrinkles [dog puppet] and Wormie [worm in an apple puppet] best” (Classroom I, Focus Group One). The puppet artifacts are detailed later in this chapter under, “Herbie and Henry” and in other chapters.

Parent/guardians occasionally referenced enjoyment of the instruments and artifacts in comments made in post-surveys. One parent/guardian said their child had been inspired to create her own puppet: “She loved all your rhythm games and songs. She made her own Herbie and uses him to teach her little brother—wish you could see it!” (Classroom B-9). Another parent described a child who came home each day to inform his parents “what was in Mrs. Peters’ bag” (Classroom F-11). Eric expressed a similar

interest and said, “I like all the things you brought in your bag.” Evelyn added, “You do bring a lot of bags. I like everything in your bags.” Talia agreed, saying, “I like it when you give us things to do from your bags.” Philip summed up many of the students’ feelings when he declared, “I liked everything what you brought” (Classroom C, Focus Group One).

**The flow experience.** The conceptual category of flow (Csikszentmihalyi, 1990a, 1997) was constructed from emerging data and shaped the research design as described in Chapter Five. Many of the conditions of flow characterized by Csikszentmihalyi (1997) were prominently featured in this research data. Students repeatedly shared comments that pointed to qualities and characteristics of flow as described in the Literature Review. Students commented on the fact that they felt able to achieve success in our learning experiences. For many children, the challenges found in the rhythm and reading experiences seemed appropriate to their abilities and understandings. Our activities appeared to stretch student’s understandings and furthered growth without “overmatching” or “underutilizing” (Nakamura & Csikszentmihalyi, 2002) students’ skills, abilities, and knowledge. By comparison, a set of experiences in Classroom G proved an exception to the notion of flow. Students in Classroom G were initially very excited to have the stories they had individually composed made into speech and body percussion pieces. Students were working on these stories during classroom time devoted to English Language Arts and in using these stories I was attempting to connect to specific classroom practices and context and to use authentic materials that were relevant and interesting to students in this class. However, data show that during some later

learning experiences exploring student stories, members of Classroom G seemed distracted and restless. An entry from the Research Design journal reads:

*Brian and Karl's piece seemed too hard to read for most students—and of course, they stopped paying attention. The ostinatos worked but they were also too challenging for many-- only a few could manage them. Maybe try experimenting with the words myself first, and then take an easier version back to the students to try out?*

Tony (Classroom G, Collaborating teacher) offered helpful insights into this phenomenon. Each student created their stories using content and text that was familiar and appropriate to each individual. The text used for one student was not necessarily familiar, interesting, or appropriate for another student. Depending on the text chosen, some speech-pieces did overmatch student skills and understandings, creating disinterest, boredom, and in some instances, anxiety. These characteristics were in complete contrast to the qualities associated with a state of flow.

However, other elements of flow were observed in Classroom G as described by Tony, collaborating teacher. There were instances during the focus group interviews that students voiced examples that illustrated characteristics of flow. Complete and intense absorption is associated with a sense of time distortion. Csikszentmihalyi (1990) describes this time distortion as typically a feeling that time has passed much faster than normal. As Casey said at the end of the ten week learning design, “Why could you only stay a little bit? (Classroom B, Focus Group 3). As I prepared to leave after a learning experience in Classroom I, a voice called out, “But you just got here!” A similar experience in Classroom G elicited the comment, “But you were only here thirteen minutes!”

Data examples point to a “merging of action and awareness” (Nakamura & Csikszentmihalyi, 2002, p. 90), another quality of flow state. This is characterized by a state of optimal experience (Csikszentmihalyi, 1990a) and interactionism (Nakamura & Csikszentmihalyi, 2002). Interactions of individuals, environment and action that afford rich opportunities for action or learning balanced by relevant and appropriate capacities for the action or learning, result in effortless, spontaneous absorption (Csikszentmihalyi, 1990a) during a state of flow. In such a state, students ceased to think of themselves as separate to the actions of the learning experiences. They became one, or merged with the learning experiences. Data examples that illustrate such a merging of action and awareness include Classroom B’s experiences with Herbie and Henry, the cone puppets, Classroom E’s experience with the princess and the tick tock block described in Chapter Seven, and Classroom D’s “Flower Song” game.

The Flower Song game was created by Classroom D using words from a classroom teaching resource. The speech-piece began with the words:

The buds come out.

The leaves come out.

The flowers come out, too.

The birds come out.

The children come out.

It’s spring for me and you!

At one point in our exploration of this speech-piece, one of the students said we needed to make the flowers coming out. I asked how we might do that and the students offered several ideas. The students suggested we could plant a garden and have it grow as we said

the words together. The game began with the gardener (me) sprinkling the soil (the mats upon which the children sat) with seeds (the children). As I sprinkled the seeds, the children rolled and tucked into “seed” position imagining they were under the soil.

I played a glissando on the glockenspiel for the sound of the sun, and then lightly played individual, random keys to illustrate the rain falling onto the garden. Then as I played the beat on the lowest bar of the glock, we quietly spoke, “The buds come out.” At that point, just a few student hands raised in the air for buds coming out. I then played the beat on a higher glock key as we spoke a little more loudly, “The leaves come out.” A few more hands raised into the air to represent the emerging leaves.

We continued through the remaining words of the poem as I played the beat on subsequently higher keys for each line of the poem. By the end of the poem, we usually ended with all children sprouted from the garden and we shouted, “It’s spring for me and you” to conclude the activity. On one occasion, Sam remained stuck in the garden, clearly an unsuccessful sprouting. I suggested to the class that he probably needed more watering and sure enough, my imaginary watering can glockenspiel did the trick. And of course, the next time we played the game, several more children failed to sprout.

With every class the game expanded and took different forms. The students took ownership of this piece and had a strong, active voice in the way it was shaped. One favorite variation involved the gardener (me) going into the garden to cut down flowers (the children) to make a beautiful spring bouquet. Each time we said this speech-piece and played the complimentary game, the class was fully and totally absorbed. The collaborating teacher and I were convinced that the students truly felt they were seeds sprouting in the garden and that they embodied the words that accompanied their actions.

Inevitably, when the class came to end, students would express the feeling that we had only just begun, and please, “just one more time.”

This loss of self-consciousness, typical of a flow experience, causes feelings of anxiety and frustration to recede as the activity is the focus of attention not the self. However, a key understanding of flow theory is that once the activity is over and self-awareness returns, the sense of self is improved. The intrinsic enjoyment resulting from a flow experience provides the motivation to persist in the activity. Certainly all children seemed to love this activity and would persist in this and other activities in many increasingly complex variations and dimensions. Nakamura and Csikszentmihalyi (2002) explain:

The motivation to persist in or return to the activity arises out of the experience itself. The flow experience is thus a force for expansion in relation to the individual's goal and interest structure, as well as for growth of skills in relation to an existing interest. (p. 92)

For Classroom D, their flow experience with the Flower Song game provided the motivation to persist and return to the activity in ever expanding forms that included reading this challenging text on the board. The Flower Song was a difficult text for many children in this Grade One class. However, no matter how challenging I made the arrangement of print text on the board, it was read with confidence and expression by the children in Classroom G.

Similarly, all classroom data suggest optimal experiences in flow. Rhythm and reading learning resulted in persistence, expansion of goals, interest, growth of skills and understandings, and a deep enjoyment and sense of reward. Students were most willing to

tackle new and ever more complex activities because they seemed to believe that the resulting deep enjoyment and satisfaction would be worth the time, effort, and attention to achieve.

### **Reading and Music Pathways: Sam Can Read!**

Mid-way through the study, I entered Classroom C and was greeted by several excited children who exclaimed, “Sam can read! Sam can read In and Out!” This was quite an event, as Sam normally struggled greatly with reading and had a number of challenges related to autism spectrum disorder. Kendra, the collaborating teacher, elaborated on the discovery. Earlier that week, as the children were printing in their journals, Sam was heard chanting quietly to himself. Kendra observed him tapping his finger to the beat over the words on the page, as he chanted the speech-piece/song “In and Out.” The chant was part of the research design beat and rhythm experiences and Sam was transferring knowledge of the chant as he created similar text in his journal, complete with beat notation. Kendra described it this way:

*He was learning and remembering—it was sinking in for him...He suddenly started singing the song and Irene said, “He’s got it! And he had. He had not only been reading the words from the song on the board with you, but he transferred that learning so he could print them all by himself. A big success for him and the other kids knew it, too.*

Sam was not the only student who experienced transfer of reading skills for print and non-print notation. Throughout the study, Kendra pointed out different children in her class that made useful connections between the research design and classroom reading. She described occasions when a child asked how to spell a word to use in a reading journal and was answered by another student singing or chanting it as remembered from our rhythm and reading experiences.

A similar effect was noted in all other classrooms. As I was preparing to leave at the end of a day of focus group interviews, Jon came up to me and said, “Guess what Mrs. Peters? I forgot to tell you. I found out I could read” (Classroom B). Sam and Jon were two of many students in the study who indicated that elements of the research design helped them read. Field notes, focus group and teacher interview data, and parent survey data point to a variety of ways that reading was perceived to be more successful than normally experienced for students in experimental classrooms. Processes that fostered and nurtured success for both print and rhythm reading included:

- Repeated readings (oral and from print text)
- Appropriate text
- Beat and rhythm used to cue, organize, and drive sounds and words
- Group synergy and beat synchronicity
- Teacher modeling
- Effective teaching strategies

**Repeated readings: I just got to know them.** During final interviews, collaborating teachers expressed belief that the research design successfully helped reading acquisition and oral reading fluency of the sight words identified as a learning need for many students at the outset of the study. Kendra stated:

*Yes, certainly they did target sight words and did reinforce those sight words and their sounds. I was always looking for whether or not the struggling learners were being helped and they were geared very well to those who were struggling. Like Sam and Keith.*

Teachers and students alike identified reinforcement and repetition as key elements in successful oral and print reading. As Jackie stated:

*For sure, repetition was key. Students like Austin need that repetition to internalize and yeah, they were able to internalize and transfer that.*

Tracy also believed that repetition was a crucial element:

*Well, you know, it's that repetition. They just need to hear those words over and over again. Just those same words over again. Focusing on those sight words.*

During focus group interviews with Classroom C, Philip said that in comparison to reading books, our activities were different because “It’s not hard” (Focus Group 1). When I asked him why they weren’t hard, he replied, “Cause they were just easy words.” Lily quickly corrected him saying, “No. They weren’t all easy. But they were still easy to read.” I asked the students if they could help me figure out why they were easy to read. Eric offered, “I just got to know them.” Tracy said, “Cause we said them over and over.”

Students in other classrooms made similar observations to those students in Classroom C. Myles (Classroom B, Focus Group 2) applied a somewhat circular argument to his explanation of why the study reading experiences were successful: “...we got to know them so we would all be able to read them together and so they got easy because we would get to know it—easy!!” I believe Myles was suggesting that the study reading experiences were successful because repetition with the support of the classroom unit was helpful in creating reading success.

Ria perceived the words used in our texts at first to be, “Sometimes hard but then they got easy” (Classroom Ib, Focus Group Two). I asked Ria how they got to be easy. Ria explained, “Cause we got used to them.” Jared added, “Cause we heard them a lot” (Classroom IB, Focus Group, Two). Ellen also found the words easy to remember “Because they stayed” (Classroom I, Focus Group Three).

For these students, the repetitive use of text seemed to be a useful scaffolding strategy for fluent oral reading. Kendra said:

*The repetition, the familiarity is important... They need that. They need ways to hear and see those same words over and over again... That repetition and doing it over and over again in ways that are appealing and interesting to them is so important.*

The ways students in every experimental classroom felt they “got to know” the print text through repeated reading emerged as a sub-process for “Sam Can Read.” Strong evidence accumulated in support of the theory of reading automaticity (LaBerge & Samuels, 1974; Samuels, 1979) that repeated readings of text leads to improved oral reading fluency for both familiar text and new text. Although theories of automaticity as an explanatory construct for reading fluency and comprehension development have been challenged in the literature (Stanovich, 2000), a large body of research confirms the benefits of repeated reading for oral reading fluency and reading comprehension (Rasinski, 2003).

Field note data confirm that repeated readings of common speech-pieces and their variations became more fluent and expressive over time. “The change in oral reading fluency over the last two weeks is noticeable. As children develop greater oral reading fluency, they also develop more confidence and are taking the initiative to try new, expressive, and creative variations of text” read an journal entry in reference to Classroom B.

In Classroom I, students demonstrated accurate reading fluency even when using new vocabulary to create chants about the “Person of the Week.” Jackie, (Classroom B, Collaborating teacher) observed transfer effect for her students: “They learned so much

new vocabulary through the songs—all their sight words—and it transferred.” Tracy described transfer effects in her classroom:

*Sure there was a connection to reading...We did a word-making activity and lots of them used the same words that you used. The students remember the words and recognize them and they are using the sight words in their own work. Like ‘up’ and ‘down’ from See Saw—this week they were putting those sight words in their writing without me asking them to do it. So now they have choices. They have these words that they know and they can choose from them to use in their own work. (Interview #14)*

Some collaborating teachers and I wondered on occasion, how many students were actually reading all of the print text written on the board and what parts they were simply reciting from memory as a result of our repeated readings and rhythm and reading activities. The responses I received from children indicated that the board games seemed to be effective at preventing students from simply reciting rather than reading the print text. When I asked Classroom C, Focus Group Two if students were really reading the words, or if they were just recalling them, Ruth replied, “No, because you changed them a lot so we couldn’t remember them.” Debbie said, “I had to watch because you would try and trick us and leave out words...so you had to watch.”

When I asked Classroom F if they could read the words, or if they just remembered them, Erica replied, “Sometimes I remembered all the words but sometimes you made different words so I had to read those” (Focus Group 1). Jackie confirmed this understanding, saying,

*They weren’t just memorizing words—they knew what they meant and how to use them in their own writing. (Collaborating teacher, Classroom B)*

Repeated readings of text and rhythm seemed to also facilitate reading of rhythmic notation. Results from class artifacts (Appendix O) and videotaping indicates that the majority of students in all experimental classrooms were able to successfully notate the

beat for our common speech-pieces and song repertoire and were developing understandings about rhythmic notation.

**Appropriate text: I know all the words.** Allington (2009) declares that all readers need appropriate, high-success texts they can read with accuracy and automaticity in order to foster oral reading fluency development. Repeated and triangulated evidence shows that students in all experimental classrooms considered the print text used in the study to be appropriate, high-success texts. Annie (Classroom B, Focus Group Three) said that our speech-pieces were “all easy to read.” When I asked her why they were easy to read, she replied, “When you know the words, easier, because how do you read a book if you don’t know all the words—how do you know them?”

Zach added another dimension to our construct of appropriate text. He shared, “*Your* reading was easy but mostly it’s not” (Classroom I, Focus Group Two). I asked why our reading was easy and he answered, “There weren’t as many words.” I responded, “You mean as many words as you usually read?” Zach replied, “Yeah, we usually have to read longer.” Zach referred here to two aspects that emerged from the data. Students associated high success text with quantities of text less than usually encountered. For example, Steven said, “Books are too much for me. Yours are okay, though” (Classroom B). Students also linked high success text to print text read in seemingly shorter periods of time than usual. For example, Carla said, “Usually reading is so long and you get hot and tired, but not with you Mrs. Peters!” (Classroom F). Jackie, collaborating teacher (Classroom B) made similar observations:

*And I think it was the combination of seeing the words and hearing what they sounded like at the same time in small bits that they could all manage. No one seemed to struggle with them.*

Spencer and Yvonne examined the importance of appropriate quantity of new words in their conversations. When referring to the printed speech-pieces read from the board, Spencer said, “That’s easy. And sometimes the book bin books are easy, but not always. And other stuff can be pretty hard and boring” (Classroom B, Focus Group Three). I asked if the materials we read in our study were easier even if the words were brand new to students. The answer was still “Yes,” and so I asked, “Why was it easier if some of the words were new for you?” Yvonne replied, “Because there weren’t so many of them. When you wrote them on the board for us to read, there weren’t so many so it was easy” (Classroom B, Focus Group Three).

Zoe added another factor for consideration. In response to Yvonne’s comments about fewer words, Zoe elaborated, “And there were lots we did know, too, so you know, easy and hard all mixed up so we could figure it out” (Classroom B, Focus Group Three). Appropriate, high success text seemed to include: mostly familiar text, with new text placed in contexts that scaffolded understanding; a small quantity of new text; short periods of time devoted to reading; and small chunks of text for group reading.

**Beat and rhythm: Organizing sound and words.** The beat, rhythm and language games served important functions in addition to engaging all students with print and non-print text. Teacher and student comments made during the study and in final interviews indicated that properties of beat and rhythm facilitated understandings about rhythm and beat and rhythmic notation as well as oral and print reading success for many students. Tony said, “It’s a very strong avenue in for reading” (Classroom G). In the final teacher interview, Tony remarked that the research design helped many students in his

class make noticeable gains in oral reading fluency. In some cases, the improvement in oral reading fluency was dramatic:

*Fluency is not something that Bobby is good at so this is **certainly** something that helped him. His overall reading skills **vastly** improved this year and were made accessible by these activities, and as I said, he certainly wasn't the only one. (Interview #14)*

Jackie, Classroom B collaborating teacher, described the effects of beat and rhythm in her classroom during her final interview:

*Something that's in a pattern is so much easier for them to handle. I saw that if it has a definite beat, a definite rhythm and pattern, that they liked it, they enjoyed it and it was easier, they could speak so much smoother. I couldn't believe how smoothly some of those kids were speaking that are usually such broken readers and normally would sound so choppy. I don't know if it's because they were doing it with the whole group helping them, but no, because when we've done group reading before, they still struggle. So it must be something to do with the steady beat and the pattern. It flowed more easily. They seemed to hear it in longer, smoother sentences...David is a good example. He is a very broken reader and speaker and his reading is so choppy, it's painful. And I noticed how students like David who can't seem to read in the classroom, could do the songs. (Interview #11)*

Kendra believed that:

*For some kids it may be the secret to getting them to read. The rhythm makes them some how catch on—they notice the words, the sounds, how they fit together. You can tell during story time, for example, or when we're reading a rhyming book—the words that they can put a beat to, that they feel the rhythm, how the words fit, they catch on, it's easier.*

During focus group interviews with Evelyn's class (Classroom C, Focus Group One), I noted how the students always seemed to know what chant or song I was clapping even if I didn't tell them the name of the piece. Evelyn declared, "That was because you could hear the words." Simon added, "Because you played their rhythm, so we could hear which words were from which song." I asked Simon if he could hear the rhythms and words in his head when I wrote them on the board. Simon replied, "Of course." When I

asked Eric, a beginning reader, if he could also hear the rhythms and words when he saw them written on the board he thought for a few seconds and then replied, “Yeah. I could hear them in my head sometimes.” Starlene explained, “When you get the rhythm in your head, the words come out in your head, too” (Classroom B).

Students shared multiple ways that beat and rhythm organized the sounds of both individual words and larger chunks of text in ways that fostered successful oral reading fluency. Gerald identified the underlying pervasive beat as a driver and organizer of the speech-pieces and songs that kept the flow of words moving at a consistent pace: “It keeps us going and we know how fast to go” (Classroom C, Focus Group Two). Celina also identified with the pace and tempo of the reading. She believed that the reading was successful because “it wasn’t so slow” (Classroom I, Focus Group Three). Without an underlying pacemaker, fluent reading seemed difficult for some students. Annie (Classroom B, Focus Group Three) expressed it this way: “Cause it doesn’t keep going you know, if you’re not doing the beat.” Zach made a similar observation and noted a further benefit to the beat saying, “the beat keeps you going... You don’t get so tired of it” (Classroom I, Focus Group Two).

Marianne said the beat “gets in your brain and sticks there. And then you can’t get it out. And it’s always there. So it’s always going when you’re reading” (Classroom F, Focus Group One). Erica added, “It opens up your brain.” Sylvia, in Focus Group Two, described the sticking power in another way: “It’s catchy! It catches you—it catches the words” (Classroom F, Focus Group One). Jeffrey, in Classroom F, believed the beat “made us listen... And then we listened to the words. And you could hear where the words went” (Focus Group 1). Lance elaborated this idea when he observed, “I always

knew where I was, so I could find myself” (Classroom G, Focus Group Three). Brian observed that when the beat was written on the board, “I knew where I was” (Classroom F, Focus Group 1). Susie further developed this concept by saying, “It [the beat] told us when to go and when to stop” (Classroom IB, Focus Group One).

Comments above, such as “you could hear where the words went” were exciting to hear discussed in focus group interviews. During the study, I tried to create both beat awareness and phonological awareness and understanding of the rhythmic properties of the words in our speech-pieces and chants. I targeted phonological awareness by asking students to focus their listening on the rhythmic qualities of the words. Since many students began the outset of the study by confusing the properties of beat and rhythm, I also actively worked to distinguish understandings of beat and rhythm throughout the entire length of the study. I had a variety of strategies for doing so as outlined in other chapters. I focused on beat by asking students to show me the heartbeat of the piece through body percussion or nonpitched percussion, and I targeted rhythm by asking students to “show me how the words go” either by body percussion or through playing nonpitched percussion instruments.

Comparative data results from focus group interviews, field note data including student reflective assessments and performance observations, allowed me to conclude that by the final week of the study, students in all experimental classrooms were able to distinguish between beat and rhythm. This understanding was not shared by all students at the outset of the study. In every classroom, data results point to a beat and rhythm phenomenon described by Montgomery (2002). Montgomery explains that “unlike rhythm, a steady beat is not always easily discernible by younger elementary school

children” (p. 190) because text compels students to focus on the sound, or rhythm of the words rather than the more abstract concept of beat (Montgomery, 2002). I observed this phenomenon in every experimental classroom as described in data from Classroom B:

*Beat is solid for In and Out—words and beat reinforce each other. As soon as we moved to rhythmical text, like See Saw, student begin patting the rhythm of the words instead of the beat—they’re patting ti-ti ta for “up and down” but telling me they’re patting the steady beat. This happens over and over again in every classroom by the same group of students.*

Field notes indicate that once students were able to distinguish between beat and rhythm as indicated by group performance of the underlying beat and rhythm for our speech-piece repertoire, it seemed that students were able to use this awareness and understandings of beat and rhythm to help them in their personal reading strategies.

Rosemary agreed and provided examples of the ways that beat and rhythm facilitated reading for her students:

*And now when the kids are reading, those that are spelling letter by letter or reading word by word are lost. But those that are reading in patterns and with the beat and hearing the accents and the strong and weak sounds, and the grouping of the words, they’re reading so much easier.*

During a focus group interview with Classroom I, Focus Group One, I asked students if there was anything about the games and songs that helped us to read the words. Mika replied, “Like the beat, right?” Throughout the study, I encountered similar types of response where students seemed to want to provide the answer they thought I would like to hear. All students were aware that we were exploring music together to see what we could learn about music and reading and I was sensitive to the possibility that students would tell me that beat and rhythm helped them to make music or read, simply because they were trying to please me. During focus group interviews I explained to students I was also very interested in any ways that the beat got in the way for them, or

made it difficult to read. The only negative response to the beat seemed to be the fact that sometimes the beat “got stuck in my head and I couldn’t get it out” (Mark, Classroom F).

So when Mika asked, “Like the beat, right?” I replied by saying, “Only if it helped you.” Mika responded, “Without it, how would we know how the words go...like when you said, “Show me how the words go.” Mika continued, “And if we don’t know the rhythm how can we know how the words go?” I asked others in the group what they thought about this. Eddie said that “It was good because I heard the words.” He went on to explain that in reading contexts outside our study, “Sometimes I stop because I can’t hear the words and I can’t get it. They’re too hard and I have to stop.” Philip likewise found that the rhythmic pattern and phrasing of the words helped organize and propel his reading. He said, “You just followed the pattern” (Classroom I, Focus Group Three). When I asked him what pattern he answered, “You know, what you said—the way the words go.”

For many students, the underlying beat and the rhythm of the words appeared to organize the flow and sound of the words. The organization of textual phrases within a temporal framework seemed to support oral reading. During group class readings of our beat notation (Appendix O) and “Listen” books (Appendix F), video data included instances in all classrooms where oral reading seemed to be facilitated when students used their fingers or pencils to either draw the beat as they spoke the words, draw or tap the beat on the page under the words, or tap the rhythm of the words on the printed words as they spoke it together.

For Casey and others, the sound or rhythm of the words was further transmediated by the use of nonpitched percussion instruments: Casey said the sticks playing the beat

“kept the words stuck together” (Classroom B, Focus Group Three). When I asked Casey how the sticks kept the words together he responded, “Cause the words stuck to the sticks.” Annie translated for me, “He means the words stuck to the beat. The beat keeps them together.” The concept of “sticking” and of the beat creating a structure within which the words fit together, surfaced in other focus group interviews. Seth observed, “It made it all fit together.” Zach added, “You don’t get stuck.” (Classroom G, Focus Group Two).

Field note data results indicate that the beat and the words were also transmediated through movement for many children as described in other chapters. Ivy said the beat “made the words walk” (Classroom I, Focus Group One). Susie responded by saying, “And talk! It made the words walk and talk! Get it! Walk and talk! Walk and talk!” (Classroom I, Focus Group One). Susie then proceeded to demonstrate as she got out of her chair and began to chant “walk and talk and walk and talk” while walking the beat around the room.

Casey perceived reading our print texts to be successful because “we did it with the beats so it all went together” (Classroom B, Focus Group Three). Zach contributed, “Yeah, because it was, like music, but reading isn’t usually like that so that’s different. It’s harder.” I asked, “Harder to read when you don’t keep the beat?” Zach agreed, “Yeah, harder” (Classroom B, Focus Group Three).

Students in Classroom B, Focus Group Two explained a similar phenomenon where a sense of beat and rhythm helped oral reading. Brenda said, “Some of the words were easy, but the new ones, well there weren’t too many...so it was easy to figure out and you could tell where they were.” I asked Brenda how she could tell where they were

and she replied, “Because they fit into the rhyme.” I tried to clarify, “How did they fit?” Brenda responded, “You know. With the beat. They just fit so you knew where they would be.”

In Classroom B, Focus Group Three, Elliot told me that I helped students figure out the words so they were able to read them. I asked Elliot, “How did I help you to figure them out?” “Because you circled them and we knew how many sounds they had,” he replied. “How did you know how many sounds the words had,” I continued. Elliot replied, “How many beats cause we were all doing the beats.” I attempted to clarify by asking, “So doing the beats helped for reading?” Yvonne offered, “It keeps the pattern going. You see the pattern.”

Many students identified beat and rhythm as intuitively useful tools to facilitate reading but were unable to articulate exactly why. Zoe, in Classroom B, said that reading the words from the study game-chants and songs was “Way easier. Way easier than reading those words in books.” When I asked her why it was easier she replied, “Because it’s easier to read songs than read books because reading songs is easier like Wormie is easier to read than Treasure Island [a picture book from the classroom reading library].” Craig agreed, saying, “Yeah, way easier to read “Pirate Dan” [study text] than read Pirate Pete! [a classroom picture book].” Jackie articulated for her students:

*The reading certainly became more fluent when it was attached to a beat. The phrasing transferred, too. The phrasing in music transferred to the phrasing in reading so they were able to read more easily. (Interview #11)*

During the final teacher interview, Rosemary summed up many of the collaborating teacher comments in the observations she made about the effects of the beat and rhythm experiences in her class. Rosemary said that as a result of the research design activities,

*...we started using the beat for all sorts of things cause they liked it and it seemed to help them stay focused and helped them learn. We are doing counting and the beat would help them keep their numbers organized. And in reading, it helped them keep their words organized. Those that had the beat could pick up the numbers and words quickly and could keep them going in a sequence. If they could keep the beat they could do it, but if they didn't have the beat they struggled with it. If they count or read to a beat they can keep it going for a longer time—they kept the flow going; the flow was maintained with a steady beat. If they do it slowly and one by one, then they struggled and got mixed up easily but as soon as they did it to a beat they could get it. It would be easy to say. So now it's interesting reading with the students. They do read with greater fluency. Like now they stop at the periods and take a breath at the periods or the commas. If they don't then they get mixed up again. Like if they're reading, 'Sam went to school. He bounced the ball high.' They can read to the period and take a breath and then they read the next sentence all in one if we are keeping the beat. But if there's no beat they just read it one word at a time and they don't breathe and they can't keep up. And now they recognize those words that you use. Like ball and bounce and high and school. Just like in your songs. They use the rhymes to their advantage. They use it to keep their reading going and before they would read the words one by one. But the nonbeat readers, it's like: 'Sam.....found.....the.....clam.....Then.....he.....ran.....' They read very differently. But for the others, even when it doesn't seem possible, it seems those kids can keep the sentences going in one breath—It's almost as if they can see the beat while they're reading—it's quite interesting! And the patterning makes it stick. (Interview #13)*

Collaborating teachers believed that the importance of rhythm, beat, and language experiences extended beyond facilitating phonological awareness, oral reading fluency, and sight word recognition. Teachers expressed their conviction that our learning experiences created important meaning-making opportunities. Students were not simply memorizing sets of words, but internalized the language and were able to use and read it in different contexts. Tony explained:

*Definitely I saw them associating the sight words that you used with their own reading and writing. Definitely they could recognize those sight words more when they saw them—they would be quite excited when they saw one of "Mrs. Peters' words" in their books, or when they could use them. They were memorizing the words, and using your activities as cues, but it was more—they were internalizing those words. I'd say knowing the songs is really important for fluency, for pattern. The rhythm and beat were really helping as another cueing system. They were functioning as an important cueing system. **Certainly** the beat*

*and rhythm facilitated oral fluency! I liked how you took the sentences and cut up the sentences and rearranged the words to have them recognize them in different contexts and to learn meaning. So it wasn't just recognition. They knew what those words were for—what they were saying. (Interview #14).*

As Jackie, Classroom B collaborating teacher said, “Things really stuck, you know.”

**The power of the collective: We said it all together and I got it.** Winston illuminated another important factor in the reading and rhythm design. In our focus group discussions about how our experiences helped students read, Winston remarked, “We said it all together and I got it.” Winston was one of many students and teachers that observed the positive effects of the group. Hailey, in Classroom F, made a similar observation: “It’s easier to learn and sing along with everyone” (Focus Group 1). Marianne noted, “It’s way more fun to do it with everyone and I like to read with lots of friends. Then we help each other and have fun” (Classroom F, Focus Group 1). Myles said, “That was fun, doing it together and making up our own rhymes together” (Classroom B). The group effect observed in this research included a sense of deep enjoyment in the collaborative process, and a close community and visible class support for individual readers and musicians in the group.

Donnie, in Classroom C agreed that the print text was, “easy to read when we did it all together” (Focus Group Two). Ruth added, “Yes, because it kept us all together at the same time, so everybody could read together” (Classroom C, Focus Group Two). I asked the focus group, “If you didn’t know the words, was it easier or harder to try them if everyone else was trying them with you?” Ruth agreed firmly, “Of course easier because everyone was helping each other so it didn’t matter if you made a mistake cause everybody did it together and we just all said it together so nobody got left behind” (Classroom C, Focus Group Two). Starlene noted that the group experience was helpful

scaffolding for those students who found it difficult to follow the print text and maintain a reading flow: “You might not know where to go, but somebody else would so you just said what they said” (Classroom I, Focus Group Three).

Eddie illuminated another dimension to this conceptual category. He said, “Everyone is doing it, too, so you do it too and you don’t worry about it” (Classroom I, Focus Group One). It seemed that the group experience caused some students to put their concerns about not reading to the backs of their minds while they were caught up in the group event. They were able to enjoy a reading experience without their usual sense of frustration and anxiety. For some students this led to a transformation in thinking about themselves as non-readers to believing that they could read after all. The notion of self-efficacy is explored later in this chapter.

There was power in the group sense of beat. The synchronicity that resulted when the entire class was united in performing the beat created an energy that was palpable. Tony shared his observations of this phenomenon in his classroom. He described how his students would be working in their table groups and one child would start a chant or beat that would act as a magnet to attract all the other children. Tony said, “They’d all get that beat in their head, and they’d all be right together and away they’d go! It brought them together you know. They loved chanting and singing together. Other examples of the power and magnetism of the beat have been previously described.

**Teacher modeling: You showed us.** Many students indicated that it helped to hear the sounds and words first before saying them or reading them. As Ralph explained, “Because you always said it first so we heard it, then you showed us so you knew what to do” (Classroom C, Focus Group 2). Collaborating teachers also noted that an initial rote

approach was a useful means of scaffolding and modeling for the students. Jon, in Classroom F confirmed this analysis. When students were discussing how I helped them, I asked in what ways I was able to help. Jon replied, “You showed us. You showed us what they [the words] sounded like and what they looked like and then we knew how” (Focus Group 1).

Sheila said, “I especially like it when you read to us” (Classroom C, Focus Group Two). When I asked her what things she liked to hear, she said “When you read your songs and poems.” Sheila was referring to my modeling of chants and songs that preceded any new learning and often introduced the learning resources for that class. I asked Sheila what it was she liked about my reading. She replied, “Cause you say it with big eyes.” Ruth added, “You make it exciting. Sometimes you say it really really loud or really soft” (Classroom C, Control Group Two). “Or those funny voices,” offered Ralph. “I liked it best when we went faster and faster and faster,” said another. It seemed that these students found expressive, dramatic reading to be helpful and engaging and the teacher-researcher modeling was useful for students’ oral reading. An early excerpt from the Field Notes journal reads:

*I wasn't sure if expressive elements—dynamics, tone color, high/low, articulation effects etc. should be introduced so early but it just seemed appropriate and natural. And what a result—the students were even more engaged and their expressive reading was so much more interesting and exciting to hear—phrasing helped, too. We organized dynamics around the phrase structures and that seemed to help flow as well.*

**Teaching strategies: What helps me.** Early in the study, Chloe (Classroom F) asked me, “Mrs. Peters, you know what helps me?” “No,” I replied. Tell me what helps you.” “Your one two ready go” she sang. From the outset of the study, I prefaced every activity, speech-piece, or song that we read from the board with some chant, such as

“One, two ready go” or “One, two, here we go.” As I chanted the introduction, I placed my finger on what we typically called the “ready star” or the “ready heart.” I would draw some symbol, usually a star, at the beginning of the first line of text or beat and/or rhythm and when I pointed to the star, students would know to get ready to chant the print or non-print text, and they would often chant “One, two, ready go” along with me.

Students noted a variety of teaching strategies that they found helpful for both reading and rhythm during the learning experiences. Sherry described the visual cue of pointing to the print text as we read or played it, as a helpful strategy: “You pointed to all the words every time so we knew where to read” (Classroom C, Focus Group Two). I asked if it was always the words I was pointing to. Ruth replied for Sherry, saying, “No, it was the beat. You were always pointing to the beat. Wherever the beat was. It was to keep us together. And then we would pat it, or play it on instruments” (Classroom C, Focus Group Two). In fact, I pointed to both the words and the beat, depending on whether my focus was on reading the print text or the rhythm and beat. The collaborating teachers and I felt that the pointing strategy helped those students who needed visual support to track the symbols in either print or beat form.

Several children identified the illustrations I used to substitute for difficult text to be helpful or at least engaging. Carla said, I always know the wiggle waggle when I see your funny lines.” Steven said, “You should take some drawing lessons but don’t worry, I can figure it out.”

Collaborating teachers, students, and visitors to the classroom frequently expressed positive comments on teaching approaches that were “enthusiastic,” “smiling,” “dynamic,” and “passionate.” Carly said, “You just make me smile, too” (Classroom F).

Kendra, collaborating teacher, noted, “You made them laugh and smile, and you gave them confidence.”

It seemed that the teacher’s passion and support was an important factor in creating a positive, encouraging, and inviting classroom environment conducive to learning the rhythm and reading materials. Moreover, my belief in the students’ ability to read and achieve beat competency seemed to affect self-efficacy for certain students. During the focus group interview for Classroom G, students shared that they understood all the words we used in our rhythm and reading experiences. Mika said to me, “You helped us didn’t you...no one didn’t know how to.” Junie added, “You knew we could read them, didn’t you Mrs. Peters?” (Focus Group One).

Classroom management was facilitated by the artifacts, primarily the puppets. They assumed a helpful voice and identity in the room. I was careful not to use the artifacts or puppets as a means of coercion, but the puppets did react to certain behaviors that helped bring about positive change. For example, if the excitement in the classroom threatened to become difficult to harness productively, the puppet might disappear into its cone or the music bag, saying “Oh, dear, too loud!”

Invariably, students would quickly readjust volume and enthusiasm so that the puppet would re-emerge. The management strategy was initially introduced as a game to encourage awareness and use of dynamics and expressive qualities in oral speech. Certain puppets enjoyed louder, more dynamic qualities of sound, and others, like baby Herbie and baby Henry, enjoyed quiet, gentle qualities of sound.

I adapted collaborating teacher’s management tools and set them to beat and rhythm. For example, Tracy (Classroom I, Collaborating Teacher) often signaled the

need for attention by saying, “Bodies are still, mouths are closed, eyes are looking at the speaker.” The class and I used Tracy’s instructions to create a rap with additional verses and body percussion. Students enthusiastically participated in the chant to a most successful conclusion each time I initiated it and we said it together.

The teaching strategies used in the study reinforced classroom learning in most classrooms, although teaching and learning in Classroom F varied with the different approaches of substitute teachers. Jackie (Classroom B, Collaborating Teacher) noticed that study strategies reinforced classroom learning and also provided students with tools and strategies that they could then apply to their independent reading:

*You reinforced those sight words and mixed things up and they saw you reinforcing some of the same things we were doing in the classroom, so they saw that these were strategies they could use. Then in their own reading, they would think about those strategies and what they could use.*

### **Reading and Rhythm Pathways: Summary**

It seemed that several factors contributed to rhythm and oral reading success. Beat and rhythm appeared to provide a temporal framework that helped to visually and orally organize and facilitate print text for children. Repeated but varied and expressive readings of text supported oral reading fluency and beat competency. Interesting print text was at an appropriate level of difficulty and manageable quantity to be successfully read. Reading resources featured a good balance of challenging and accessible text for most readers, with the easier text serving as cues and scaffolding for the more difficult text.

The beat provided security, direction, momentum, and sticking power for oral reading experiences. Properties of beat and rhythm provided temporal frameworks that organized words, phrases, and larger pieces of text. Group experiences facilitated learning of both print and non-print materials. Particular strategies were identified as

helpful, for example: rote modeling; pointing to the beat and/or words on the board; visual cues like circling key words on the board and illustrations; understanding the rhythmic construction of text; repetition in varied, fun, and interesting ways; expressive and dramatic modeling of oral reading; the teacher's engagement, passion, and belief in students' abilities; using body percussion and percussion instruments; and the language play and games.

### **Transformative Potentials**

During focus group interviews, when I asked students what they noticed about our reading and rhythm experiences, Sheldon said, "I came out different" (Classroom H, Focus Group Three). I asked Sheldon what he meant by different and he explained, "Well, you know, like reading and stuff—and it was fun." Sheldon, a struggling reader, seemed surprised to discover he had enjoyed the experiences. For Sheldon and other participants in the study, the events of the research design suggested transformative, deeply felt potentials that were described by students, teachers, adults in the school, and parent/guardians. Sarah, in Classroom B, greeted me at the door one class by saying passionately, "I *dreamed* about Herbie and Henry last night."

Experiences in the research design so deeply affected some students that they described greater confidence, self-efficacy, and willingness to take learning risks as a result. Students were able to use new ways of knowing to transmediate and communicate understandings. The processes for exploring rhythm and reading appeared to create democratic learning ecologies where some students felt "just like everyone else" for the first time. The experiences of the research design seemed to deeply affect collaborating teachers and created transformative effects that were sustained for the year following the

research. Potentially transformative effects were also constrained by a variety of factors. The sub-processes of “Transformative Potentials” are described below.

**Confidence, self-efficacy, and risk-taking: I could do it.** The transformation in student beliefs from seeing themselves as non-readers to believing themselves to be readers, is illustrated by a comment from Eddie during focus group interviews. After Eddie remarked that he didn’t worry when everybody in the class was reading together during our experiences, I probed, “What don’t you worry about?” Eddie replied, “That you can’t read. Because you can” (Classroom G, Focus Group One). Gordon added, “I didn’t think about that I couldn’t read. I just did.”(Classroom G, Focus Group One). Similar data were recorded in field notes and focus group and teacher interviews. Tracy observed that her students began to feel more like readers:

*And they enjoy recognizing the words—they really like knowing that they can read them when they see them. So then they’re participating more, they’re more successful and more of them are successful. And they feel more like readers and writers.*

Jackie said that our activities were “good for their confidence, their self-esteem” (Classroom B). Kendra also identified confidence related to risk-taking as an important property of reading self-efficacy:

*And confidence is another one. It really gave some kids confidence to take risks, to try reading something they might not normally try, or think they could do. So now, Sarah is trying to help herself in her reading; instead of saying she can’t read, she is looking at the book and trying now. She is looking towards the word wall for words she doesn’t know. She’s looking at the big picture and seeing options, strategies she can use. The others are as well.*

As Kendra stated above, other collaborating teachers indicated that the teaching approaches and activities seemed to foster a sense of risk-taking. At no time during the study, did any students express any reluctance or anxiety at participating in any learning

experiences. When I asked Classroom C, Focus Group Two if children were ever worried about saying any words wrong, Debbie answered, “Oh, no, because everyone helped.” Ralph added, “And you never get mad at anyone.” I replied that was certainly good to know. The willingness to take risks likely contributed to the many instances of students self-initiating challenging music and reading activities at home as reported in parent/guardian comments, such as this one from Classroom F: “He’s making up his own songs with the beatbox on the keyboard” (F-15).

Self-efficacy regarding reading seemed to be a striking factor in the study model. Each collaborating teacher identified students who became significantly more confident during the study: “Like Bryan who used to always say, ‘I can’t. I can’t’ and now, when you come, he says, ‘Oh I know this—I can do this—this I know I can do.’” (Kendra, Classroom C). Like Bryan, other students who prior to the study, considered themselves to be non-readers, came to believe they too, could read our research design print materials.

During the first few weeks of the study, certain students would remind me that they couldn’t read the words on the board. By the end of the study, students no longer felt it necessary to inform me that they were non-readers and could not read the text from the board. Video data evidence indicates that when reading our booklets together in class, there were also no instances of students saying they could not read the materials. However, there were data in the form of video evidence for students making remarks like, “I know this one!” or “This is easy” (from a student considered a non-reader).

Students were excited to point out to me words that they recognized on their word walls or in the post-test reading samples. In fact, some test results must be suspect

because several students were so enthusiastic about recognizing words from our study that they stopped reading to point out all the words that they now knew. For example, when I told Jan (Classroom F) that she could begin reading the post-test, she happily picked out and read only the “and” words in her test resulting in a null score.

Self-efficacy extended to student beliefs about beat and rhythm. During focus group conversations discussing things we noticed about the beat, Brian said he had something he noticed about the beat that he wanted to share. “And what did you notice?” I asked. “That I could do it,” Brian said (Classroom F, Focus Group One). Comments from students during the study and in focus groups suggested that the majority of students believed that like Brian, they could keep a beat. During the final week, I congratulated the class on being able to all perform the beat together so well. Leah replied, “The beat is easy Mrs. Peters. We’ve been able to do that forever” (Classroom C). The sense of collective efficacy for beat and rhythm was commonly recorded in the field note data for all classrooms and is documented in other chapters. Classrooms believed they were “all musicians” as one student called out in Classroom B during a beat and rhythm activity with instruments.

Emergent data revealed another dimension of collective efficacy. Group self-efficacy appeared to transfer to individuals. Individual students came to believe as the group did, that they could successfully perform and read beat, rhythm, and print text. Sam, the student who was able to read and print words from our “In and Out” chant during classroom English Language Arts time, not only saw himself as a reader, but the children around him also viewed Sam as a reader. This was a transformational effect for both Sam and the class; the students in the classroom had not previously considered Sam

to be a reader in their community. As a collective, the confidence with which Classroom C viewed themselves as readers transferred to the struggling readers and transformed individual and collective attitudes and beliefs in this and other classrooms.

**Meaning-makers and embodied meaning-making.** The research design was used to explore the meaning-making potential of music and reading across subject areas as used within local classroom contexts and through a variety of meaning-making modes as available resources. The intent was to be inclusive of all learners' need and interests and to provide a variety of resources with which to engage interest in the reading and rhythm experiences. As Spencer expressed, "Singing isn't my best. I liked playing the sticks the best. I liked the sticks. And everyone got to play, we all got turns at the same time" (Classroom B, Focus Group 3).

The rhythm sticks and other percussion instruments served as meaning-making resources for Thomas and others. Thomas observed, "I liked hearing the words when I played the sticks" (Classroom I). Other students made similar comments about the drum, the egg shakers, or the tick tock block. Talia preferred learning when instruments were used to play the songs or chants (Classroom G, Focus Group One). Many students agreed and comments such as "This is what I like" (Susie, Classroom I) were common when instruments were brought out during the study.

Many students demonstrated their enthusiasm for movement activities although focus group conversations largely focused on activities using language, rhythm, and beat activities at the board and with instruments and body percussion. This is perhaps explained by the fact that these experiences were the focus of classroom learning towards the end of the study and so were most current and relevant to students at the time of the

focus group interviews. Field note data indicate that for some students, important learnings were also made through movement experiences. These data are detailed elsewhere but Simon's comment exemplifies: "I can feel those words all over" (Classroom B).

Students demonstrated that they were able to construct and convey meaning in several subject areas through the multimodal approaches to the research design. For example, when Classroom B created a water cycle chant to demonstrate their understandings of the water cycle, Jackie observed, "Some students couldn't necessarily explain the concepts on their own, but they *could* show them, they *could* demonstrate them through the chant and the activity. *And*, it definitely tied into the Language Arts curriculum."

Collaborating teachers identified connections between the research design and language arts, social studies, science, math, physical education and health, and music. Rosemary, as a new teacher, saw meaningful connections to cross-curricular teaching and learning that she would be able to use again in her future teaching. "Yes, I'd *totally* use them!" she declared. "Especially the Science connections—like to the butterflies and the way that you picked words out of their stories and made rhymes from them. This could apply to anything they are studying like weather, animal habitats, anything!" (Classroom F).

**Democratic communities of readers and musicians: Just like everyone else.**

The reading and rhythm experiences seemed to support students in feeling that they were legitimately part of a reading and musical community even if they had not previously gained entrance to either community before. During focus group interviews, Derek said,

“I liked being able to read just like everyone else” (Classroom F, Focus Group 2). The category of “Just like everyone else” includes notions of democratic learning ecologies where every student is valued and has an equal place and voice. In democratic learning ecologies, no learners are privileged and all literacies and modalities are regarded as important, unique pathways for making and communicating meaning.

During the study classroom learning experiences, it was very difficult to tell which students were struggling readers and which were not. Jackie made similar observations, saying,

*Watching them [her students] I couldn't tell my struggling students if I didn't know who they were... They all looked and felt like real readers. It made them think so, too.*

Print text created for oral reading appeared to be accessible to all students and to create unique learning opportunities for all learners in the classrooms. The students who were sophisticated oral readers also had a place within the study learning experiences. There seemed to be sufficient variety and challenge to interest and engage advanced readers as well as struggling readers in the learning. Kendra stated it this way:

*And not just the struggling readers. It gave opportunities for everyone to have a chance to be successful and also gave those above grade readers opportunities, too. For example, Simon and Karl who are good readers and who are above grade level and academically so far above the rest; this was an opportunity for them to still participate with the rest and an opportunity for them to take turns with the others. They were able to be a part of the group and laugh and have fun along with the whole rest of the class and they usually are reading by themselves because they are so far above the rest. So the literacy is important, yeah, but there are other important components, too.*

During the final interview, Kendra elaborated on the benefits to students like Simon and the ways that the research design created equitable learning opportunities:

*He may have reading abilities like a Grade Six but he doesn't have those social skills and this intervention equalized it for him. It equalized the social*

*opportunities—everyone was equal and on the same footing. Both the social skills and the reading skills of Sam [struggling reader] and Simon [advanced reader] were evened out. It's distributing power equally in the classroom.*

All students seemed able to demonstrate beat competency by the study's end, and no student stood out as having exceptionalities at any point on the oral reading continuum although many students began the study informing me that they could not read like the other children. David, in Classroom B, was one such student. During oral reading fluency pre-tests David declared to me right off the bat that he disliked reading and was not going to enjoy our learning experiences. However, David did seem to feel a sense of belonging in our classroom experiences and was positively and actively engaged in our research design learning events despite the fact that he was a struggling reader. David concluded the study by saying, "I liked being with everyone. I liked being with everybody. It was good." Seth observed, "We did it all together so no one felt left out of knowing the words" (Classroom I, Focus Group Two). Garrett appreciated feeling competent in all areas of our learning: "I liked being able to do everything" (Classroom I, Focus Group Two). Sherry said she liked that "Everybody got to read, not just some people" (Classroom I, Focus Group Three).

**Imagining and creating meaningful worlds: Herbie and Henry.** The cone puppets Herbie and Henry took on a most unexpected and significant role in the research design. Although they were not part of the original research design and only introduced quite accidentally, they served as an important source of imaginative and creative language play, as a key means of student motivation and engagement, as a means of creating strong community, and as transmediators of personal and relevant meaning. The puppet use illustrated the value and importance of using materials that connected in

relevant and authentic ways to the learning children found important and meaningful. The puppets were only part of available resources and materials that “connected to them [the students]. The words connected to things that were important to them, like their stories, and to Herbie and baby Herbie so they were all interested because the words were important to them—they were meaningful” (Jackie, Classroom B).

Herbie and Henry began life in our reading and rhythm experiences when the cone puppet Herbie was spotted in my music bag one day by students in Classroom B. My music bag was always full of various teaching aids as listed in Chapter Eight. On this particular occasion, I had come from a teacher’s professional in-service I had given on teaching music in early years classrooms. I had used Herbie at the in-service and arrived to the classroom with Herbie still in my bag.

The students were always eager and most curious to see what would come out of my bag, and upon seeing bits of Herbie peeking out, begged to see what I had for them. Rather reluctantly, I pulled Herbie out. I had not planned to include the cone puppet in our activities and I wasn’t sure about introducing this new and potentially confounding variable. However, once the class saw Herbie, they were so excited to meet him that I was drawn into their energy and imaginative space, and we created a speech-piece/song for Herbie (see Appendix P). Because Classroom B enjoyed Herbie so much, I thought it necessary to introduce Herbie to all the experimental classrooms so as not to skew comparative results. Data consistently and prominently indicate that Herbie was greeted with enthusiasm by all experimental classrooms and the cone puppet was incorporated into our study learning experiences and games and became a source of inspiration to generate speech-pieces and reading strategies as described in other chapters.

However, Herbie's success concerned me and I analyzed my disquiet through research journaling. I worried that student engagement with the learning experiences was becoming linked to the use of Herbie rather than as a result of the rhythm and reading experiences that Herbie was being used to support. Jackie, the collaborating teacher in Classroom B, shared that she couldn't get her students to write about anything other than Herbie in their daily classroom journals. At John Dewey School students were writing poems and stories and drawing pictures of Herbie for me to take home for Herbie. Parents stopped me in the school halls to ask who Herbie was, or for details about Herbie, convinced that he was a new teacher or research assistant that had come to help with the study. I decided that Herbie needed to go on a holiday and I announced this to all classrooms.

Because the classes, particularly Classroom B, seemed emotionally attached to Herbie, I did not want to hurt any student's feelings with Herbie's decision to leave them. I attempted to think of a reasonable explanation for Herbie's departure, one that would be convincing and make sense to the students. I told all the classes that Herbie had met a wonderful lady puppet and was excited to announce that he was getting married and would be leaving shortly for his honeymoon. This strategy was a mistake in my plans to eliminate Herbie from our research design.

Students asked after Herbie at every class, wanting to know if I had news of Herbie and his wife. They begged for postcards, which I brought to two classrooms, and I discussed the classrooms' attraction to Herbie with collaborating teachers. Supporting conversations with teachers, data analysis prior to Herbie's introduction, and two Herbie-free weeks of data collection after Herbie left on honeymoon, convinced me that students

remained engaged, interested, and enthusiastic about our rhythm and reading experiences even without the cone puppet. I concluded that Herbie was a factor in student engagement and motivation, but only one of several important factors, and we welcomed Herbie and his new wife back to our classrooms.

On the day I introduced Herbie and his new wife, I dramatized Herbie calling into the bag for his new wife to come out and meet his very special friends in Classroom B. Herbie's wife was very shy and so it took some chanting of a speech-piece the children created together, to coax Herbie's new wife into the classroom. The children used a variation of the Herbie speech piece they had previously created and added a second verse.

I see a cat.

I see a bee.

I see Herbie looking at me.

I see a cat.

I see a bee.

Please Herbie's wife come

Look at me!

We chanted and performed the speech-piece and beat very quietly so as not to scare her. We chanted and performed the piece and beat very loudly to wake Herbie's wife up in case she was sleeping. We used different kinds of voices (high, low, funny, firm, pleading) to see which one might work, and finally, Herbie's wife cautiously peeked her head out of her cone. When Herbie's new wife appeared, Classroom B clapped

delightedly. Herbie announced his new wife to the class and at this point, I retreated into years of habit.

In the past, I used the cone puppet Herbie was introducing as his wife, in a song and game that I called Henry's game. But when Herbie unthinkingly introduced his new wife to the class as "Henry," the children seemed quite taken aback. "Henry," said Sarah. "What kind of name is that for a wife?" I quickly moved my voice up an octave, and Henry told Classroom B that her real name was Henrietta, but Herbie called her Henry for short. Henry was an instant hit and the couple stayed in all classes for the remainder of the study. The cone puppets took on a life of their own in Classroom B and the children continued to develop stories about them which we chanted, sang, and read on the board and in our "Listen" booklets with all experimental classrooms.

My puppets were introduced to other puppets that were housed in experimental classrooms and these classroom puppets were used to generate speech-pieces and activities unique to local classroom contexts. The puppet artifacts became an important source of imaginative language play in all experimental classrooms. The Herbie and Henry story took on slightly different forms in each classroom but Classroom B seemed to always serve as the catalyst for new directions.

Classroom B asked when Herbie and Henry would have children and the tiny cone puppets Baby Herbie and Baby Henry were born. Baby Herbie and Henry speech-pieces were created, added to our repertoire and shared with other classrooms. Classroom B said that no family was complete without a dog, and the puppet "Wrinkles" the dog arrived, complete with bone, to the class. A Wrinkles speech-piece was created, along with a game involving Wrinkle's bone. Classroom B constructed a scenario where Herbie and

Henry went out walking one day with Wrinkles and encountered a friendly worm who was scared he would be stepped on. “Wormie” the puppet arrived on scene and the speech-piece “If you ever see a worm” and “What will we do on a nice spring day” was created. The speech-piece “If you ever see a worm” was shared with different classrooms and took different shapes in each classroom. In two classrooms it morphed into a speech-piece sung to the tune of a traditional campfire children’s song called, “Long Legged Sailor.” In classroom B, the speech-piece took an unusual turn as students created a mixed meter speech-piece they called “Never never step on worms.” The first three lines were based on a 4/4 time signature (four beats in a measure) and the final line was in 5/4 (five beats in the measure):

Never never step on worms

This is something you must learn.

If you never ever learn,

You will never have a friend named worm!

The line with five beats seemed to be greatly enjoyed by the students and they usually said it with a crescendo ending with a highly accented “worm” often accompanied by some body or nonpitched percussion for added effect. They analyzed the piece to figure out the rhythmic structure of the speech-piece and were delighted to discover the last line had five beats instead of four. “Cool,” said Kyle, upon making that discovery. Wormie, Herbie, Henry and the rest of the puppet artifacts served to motivate most students in the study, although their motivating and engaging potential was observed in exceptional ways in Classroom B.

Jackie continued to share classroom journals that featured student writing about our puppets and speech-pieces, and interest in the puppets and their resulting speech-pieces and songs had not waned by the study's end. In fact, a month after the study ended, I arrived home to find a letter to Herbie in my mailbox from a student in Classroom B. She was writing to Herbie to say how much she missed him and that she read his "song" every day.

Despite teacher reassurances that Herbie and Henry were not the sole reason for students' engagement and reading success, I discussed the subject again with Jackie at the final teacher interview. I asked Jackie if she thought that students were engaged as a result of the puppets. Jackie replied:

*No, the puppets made it real to them because they told a story that became real to the kids and that they followed, but when you said they had all gone on a honeymoon, they were still totally engaged. They were always involved in the whole process—always actively learning. Using their ideas though, their stories, using their input, made them feel valued and made them feel important and then makes the learning feel more important. It **was** important to them. But not just because of the puppets. The learning was very authentic, very natural. (Interview #11)*

**Transformative teaching and learning.** Deep engaged learning created the conditions for transformative teaching and learning as a result of the research design. A number of students and teachers participating in this study seemed to experience transformative learning effects as a result of their involvement and engagement in the research design.

Transformational learning is learning that transforms fixed assumptions and expectations such as ideologies, habits of mind, attitudes and practices, beliefs, feelings, and values, and makes them more able to change (Mezirow, 2003). Mezirow (2009) believes that "transformational learning occurs in a wide variety of contexts and under

different circumstances” (p. 24). Based on criteria developed by Mezirow, transformative collaborative teacher learning occurred in the context and circumstance of this research design.

Mezirow (2009) outlines ten phases associated with the transformative learning process developed as a result of his seminal research (Mezirow, 1978) into transformative learning. Transformative learning involves:

1. A disorienting dilemma.
2. Self-examination.
3. A critical assessment of assumptions.
4. Recognition of a connection between one’s discontent and the process of transformation.
5. Exploration of options for new roles, relationships, and action.
6. Planning a course of action.
7. Acquiring knowledge and skills for implementing one’s plan.
8. Provisional trying of new roles.
9. Building competence and self-confidence in new roles and relationships.
10. A reintegration into one’s life on the basis of conditions dictated by one’s new perspective (Mezirow, 2009, p. 19).

Mezirow (2009) notes that this pattern of transformative learning varies in different contexts. Many of the phases outlined by Mezirow are identified with teachers that participated in this study. While my research design was not described by any collaborating teacher as a “disorienting dilemma” (Mezirow, 2009, p. 19), it did serve as a pedagogical problem that teachers and students explored with me. Final interviews with

collaborating teachers served as a means of self-examination and a critical assessment of assumptions that in some cases, revealed that new knowledge and skills had been acquired with the intent to use them to explore new possibilities for teaching and learning.

Kendra said:

*You've made us even more aware than ever of how important and how powerful music can be...I'll certainly revisit this in September and make it a part of my reading program—part of my guided reading. These are certainly things I could do in small groups with poems and songs and games...And it could carry through into all parts of the curriculum easily. (Interview #10)*

I followed up with Kendra a year later to confirm my interpretations and to determine if the research design had any lasting impact. She replied:

*Wow! It is strange to read your email today. My class was just discussing memories from Grade One and Two. (I looped with the class). Your name came up just this morning followed by "In and out, In and out, o-u-t and that spells out...This year I implemented a home-reading program using the songs we sang in class. The children were encouraged to practice with their parents at home using the song lyrics. They were very excited about sharing these songs at home. You need to know, ALL of my kids know/remember the songs from last year. It had a definite impact on them. (Personal Communication, June 28, 2008)*

The email from Kendra confirmed for me that the research design created sustained and lasting impact for students and teacher and was indeed transformative for her and for some of her students. Kendra had taken the processes and resources I developed in the research design and used them to plan and pursue a course of action trying new out roles for music, rhythm, and language. Kendra's description of the reintegration of music, rhythm, and reading expressed confidence and competence, aligning with Mezirow's phases for transformative learning. Taylor (2008) believes that "without experiences to test and explore new perspectives, it is unlikely learners will fully transform" (p. 11). Kendra took full advantage of the opportunity to test and explore new perspectives and based on the data, experienced a deep and lasting transformation.

Jackie, the collaborating teacher for Classroom B, also indicated that the research design was transformative for her.

*I really can't believe how much I've learned!...I've seen what music can do in ways that I never imagined! I guess what has changed for me is now having some idea of how I can use music to connect to other areas of the curriculum—language arts, social studies, science, I've really seen the value of music in the classroom and now I'm looking for ways of using it—noticing possibilities and ways that I had never ever thought of before!...I'll definitely look for opportunities to use music in my future programming and now I think about it more. I think back to "Simple Machines" [Science outcomes] and I think about what I could do, too. (Interview #11)*

When I followed up a little over a year later, Jackie confirmed that the transformative learning effects were sustained. "Of course I included music in my classroom this year!" (Email August 14, 2008). Jackie described her new grade two class and that she extensively used our music and rhythm activities from the previous grade one experience, to the enjoyment of all her new grade two students.

During the last few weeks of the study, Classroom F was able to secure a full-time teacher for the classroom, following a round of short term substitute teachers. The teacher that was employed had just graduated from her University teaching degree program. In the short time she participated in the study, she described a number of transformative experiences. She began the final interview by stating,

*I've really enjoyed it—it's been great for me! And for the kids! I'm glad I got the opportunity to be here and see all this! I knew how important music and multiliteracies were before—I had heard that but now I got to see that acted out in a classroom, so it made the theories more real. I would certainly include music and the arts in my future teaching...certainly now I would feel more comfortable doing that. But I'm still not sure how do it right, though. But I'd try. (Interview #12)*

I followed up with Rosemary a year later as well, and asked her if she had been able to

use any of our learning in her subsequent year of teaching. Rosemary had only worked half time as a Grade Six teacher, but nonetheless, detailed several projects she had undertaken with her Grade Six students that connected to the research design. Rosemary shared, “I did include many activities where the students could create a song or a rhyme to present their findings on a research topic. I also had the students create a mosaic song...It was really fun and extremely interesting to hear!” (July 28, 2008, Personal Communication).

Tony also viewed the research design in transformative ways. He said:

*I see a direct application to what I'm doing. And there's a huge motivation factor. And it's group-oriented which I like—and kid friendly. It's non-threatening. The kids aren't afraid to take a risk, to try it all together. Yes, I certainly would apply this to my own teaching.*

A year later, Tony shared the sustained transformative effects:

*As for incorporating songs and music this year our class definitely included music on a regular basis. We even wrote a song about our community to the music of “All you need is love” by the Beatles. Regular instruction also included simple songs to promote the use of common sight words and letter blends. (Personal Communication, June 26, 2008)*

Tracy shared her transformative understandings:

*Definitely I would use your ideas. I used chants and songs and poetry before but never like you did—I never added beat or emphasized keeping the beat like that. I have used the drum for syllables but now I see more ways that I could use it. (Interview #14)*

Tracy, too, included ideas from our research design in her subsequent year of teaching and said:

*I used beat and rhythm with movement and the children had opportunities to use instruments to create music while their peers danced. It was a wonderful year! (Personal Communication, August 8, 2008)*

### **Classroom B: Transformative Effects Unexplained**

There are multiple theoretical orientations to transformative learning (Taylor, 2009). Mezirow's theory of transformative learning (1978, 2003, 2009) focuses on the individual as a unit of analysis. A second framework informed by Freire (1970), connects individual and social transformation (Taylor, 2009). Taylor (2008) elaborates alternative conceptions of transformative learning including notions of holistic approaches to transformative learning. Holistic approaches include a range of ways of knowing such as affective, physical, spiritual, intuitive, and somatic learning. Holistic transformative learning also centers on the role of relationships within the transformative learning processes (Taylor, 2008).

When this research is viewed through a lens of holistic approaches to transformative learning, a further process is layered onto the grounded theory model. Transformative learning in this model extends beyond the individual student or teachers to the classroom unit as documented in semiotic data and multimodal data results. In particular, the social unit and ecology of Classroom B experienced transformative learning that extended beyond the walls and relationships of the classroom to affect "other individuals who play a significant role in the life of the student" (Taylor, 2008, p. 13). Jackie, the collaborating teacher for Classroom B, gave an example of widespread transformative learning effects as a result of the research design. One of the classroom resources that we developed, unique to Classroom B's local context, was a chant to convey understandings of the water cycle. Jackie describes the effect of this experience:

*The students did the water cycle chant at our student-led conferences and the students did the chant for the parents and taught it to the parents and then the parents sang along, too! And everyone was doing the water cycle chant!*

The water cycle chant was only one example of exceptional, sustained, and transformative effects as a result of the research design experiences. Jackie, and several teachers and educational assistants at John Dewey School were intrigued by how the students of Classroom B took their rhythm and speech games out onto the playground at recess times and played them all recess long. The principal and parents of John Dewey stopped me in the school hallways to tell me that they heard students or their children chanting our speech-pieces, playing the games, and singing the songs outside of the classroom and at home. Jackie shared:

*The parents all said that all they heard at home the whole time was the songs and the poems. They all learned the water cycle at home and played the games. The children were singing and playing the games at recess, too. It became something that they would all do together at recess. (Interview #11)*

One Classroom B parent who was a local radio announcer, was so interested in the effects of the reading and rhythm experiences that he asked me to appear as a guest on his radio show. Comments from the Post-Study Parent Survey indicated transformational learning effects unique in quality and number in Classroom B. The exceptional transformative group effect in Classroom B is mirrored by the quantitative data and was a significant challenge for interpretation of results. As a result, research analysis was interrupted to interrogate this phenomenon more deeply. The “interrupted framework” is synthesized as part of Discussions and Conclusions.

### **Was it Reading? Constraints and Inhibiting Factors**

Several different categories emerged from the data that suggested possible constraints and inhibiting factors. One such conceptual category was classified as “Not real reading.” Numerous data compared over the course of the study and from focus groups indicated that some students did not equate the reading experienced during the study with the reading experienced in their daily classroom use or lives. The data suggest that a number of students perceived the idea of reading to be hard work, uninteresting, and something difficult. If the experience was fun, interesting, achievable, and presented in the form of a game, it was not counted as “reading” by some students. This perspective seemed to serve to facilitate reading transfer for certain students and to inhibit reading transfer for others.

As reported elsewhere in this chapter, some students who perceived the rhythm and reading activities as fun and enjoyable learning activities, discovered that without the usual stress and anxiety of learning to read, they were able to transfer understandings about print text gained during the research study to their everyday learning in the classroom and at home. Other students did not make those connections and saw the research rhythm and reading experiences as unconnected and distinct to their classroom learning.

During a focus group interview with Classroom B, I asked Focus Group 2 if they found our study reading experiences to be fun or boring. Robert immediately responded by saying flatly, “We didn’t do any reading with you.” I replied by asking him, “What about the poems and songs that you read from the board with me?” Robert held his ground: “That wasn’t real reading. That was just for fun.” Robert felt so strongly about

this point that he brought it up yet again later in the focus group interview. When other students were discussing how much fun the speech-pieces, songs, and poems were, Robert reiterated, “That’s why it wasn’t real reading, like I said. Cause we were always laughing and it was too much fun.”

The conceptual category of “Not real reading” emerged in several other focus group interviews. In Focus Group Three, Zach also challenged the idea that our rhythm and reading experiences were real reading. When I asked what the group thought about the reading we had done together as a class, Zach retorted, “Do you call that reading?” I suggested that it was real words we were reading from the board or from our “Listen” books, and Annie offered, “But that was music, not reading. I countered with, “But didn’t it involve reading words?” Annie continued the argument with, “Yeah, but is it still reading if you aren’t reading whole stories?”

When we discussed these issues during focus group interviews with Classroom C, Lily asked, “But your reading is different reading, right Mrs. Peters?” (Group 1). When I asked Lily how it was different, she replied, “Well like songs and games is different to reading books and stuff.” Lily’s comments point to limitations and constraints of the study, further explicated in “Discussions and Conclusions.” Some students may not have transferred learning about reading from our music experiences to their classroom reading experiences because they were not able to make meaningful connections between these experiences. Constraints and limitations are thus included as a category in the final grounded theory model. The final grounded theory model for experimental classrooms is presented in Figure 28 below.

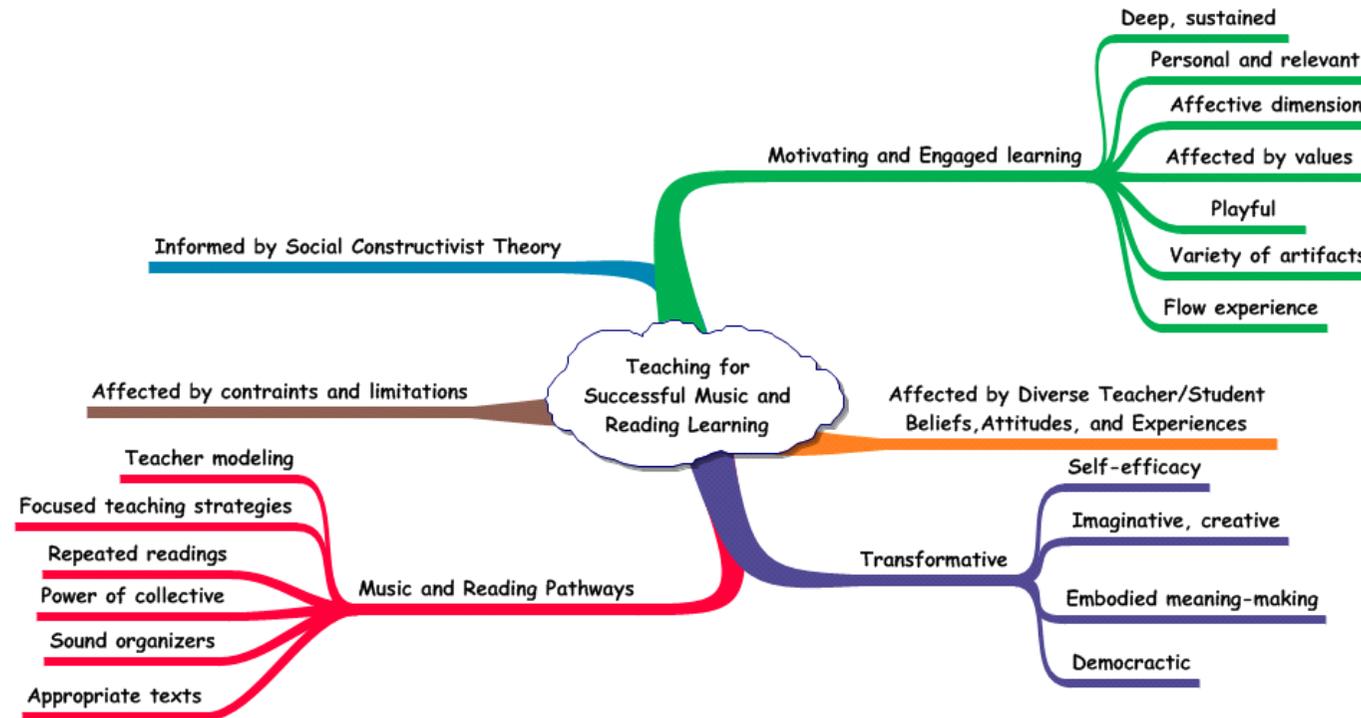


Figure 28. Grounded Theory Model.

**Control Group**

Despite the very different teaching approaches and materials used, several conceptual categories constructed for the experimental groups were also common to the control groups. The common categories were: motivated and engaged learning for all, reading pathways, democratic communities of readers and singers, and transformative teaching. Although control and experimental groups shared these common categories, sub-processes were different for control groups. The grounded theory model for the control group classrooms is presented in Figure 29 followed by a description of the categories and their sub-processes.

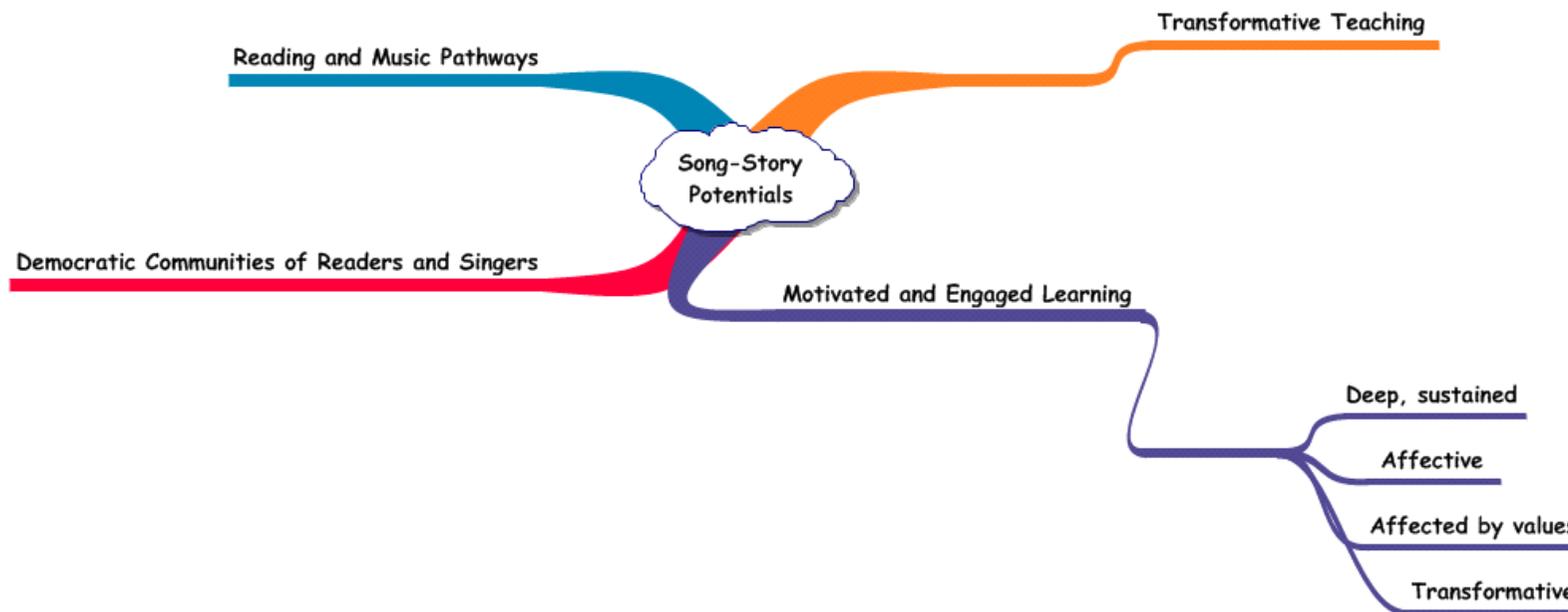


Figure 29. Grounded Theory Model for control classrooms.

### **Motivated and Engaged Learning for All**

The category “Motivated and engaged learning for all” appeared to be equally meaningful to control and experimental group participants. Comments from student focus groups, teacher conversations and interviews, and parent/guardian surveys indicated that the experiences of singing song-storybooks as a classroom unit deeply engaged and motivated many students in sustained ways.

**Deep, sustained, motivation and engagement.** During the final teacher interviews, all four teachers of control classrooms targeted class motivation and engagement as a particular highlight of the experiences listening to and singing the song storybooks. Karen (Control classroom A collaborating teacher) focused on the ways that the song-story experiences engaged students in both music and reading and was appreciative of the professional learning opportunity to observe her students:

*I've really enjoyed this opportunity to observe my children engaged in both music and reading. I don't often get a chance to just sit back and observe my kids and I learned a lot about my kids I never knew before! And I was so interested to see that the kids who aren't usually interested in reading, really got into your song-stories. They were all so involved, so interested. It was a part of the day that they really looked forward to! They would even miss gym just to hear your songs and stories!*

Frances (Control classroom D collaborating teacher) observed that engagement was partly due to the fact that the experience of singing was a natural one for students:

*It's been very useful for these kids. Every kid preferred the stories when they are sung like you did. They love how the song will tell the story. It gets all of them interested and involved. Engagement is such an important part of it all and they pick it up a lot quicker when it's enjoyable. It's so natural for children to sing—so they respond very positively...The music, the songs, it's something the children are always natural at wanting to do...They were all very engaged—at least half or more engaged than they would be normally.*

Catherine a student in Frances's classroom, agreed saying, “I just love singing those songs!” (Classroom D). Collaborating teachers supported engagement in music as a

prominent social process throughout the control experience. Frances voiced surprise that her students enjoyed the singing experiences. At the beginning of the study, Frances shared that several of her students did not enjoy going to music class and she had been concerned about their reaction to the singing activities. However, during the final post-study interview, Frances stated that all her students without exception enjoyed the singing opportunities throughout the study.

Leslie (Control classroom E collaborating teacher) voiced her astonishment that her students could sing so well and with such enjoyment. In trying to identify whether the experiences were engaging because of the choice of resources or because students enjoyed the singing process I asked focus group E, “Was it the books you liked, or singing the songs?” The group immediately replied together, “Both.” Cheryl added, “It’s more fun when it has the song to go with it, you know, more enjoyable” (Focus Group E).

Other focus group comments also pointed to deep engagement in both the reading and the music experiences. The choice and variety of texts seemed to engage students as did the opportunities to sing in an unrehearsed and natural way. Students frequently shared their enjoyment in the choices of print text. Steven (Classroom D) said, “I like everything that comes out of your bag!” Matt (Classroom A) commented, “I like the kind of books you brought. I wish we could read those all the time.” Kara exclaimed, “Your books are the best!” (Classroom H). Susan (Classroom A) said, “You made us want to read them again and again and again!”

Students reported being engaged in the learning because turning the stories into songs was more interesting. The classroom teachers all made similar comments. Kyle (Classroom A) pointed out that engagement in learning had a positive effect on classroom

management: “It’s really good for kids because everyone joins in and everyone listens. Everyone is always listening to you. Nobody was fooling around like they usually do.” Tia in classroom H agreed: “And nobody ever fooled around. We were always paying attention cause nobody wanted to miss hearing the stories and songs and everybody joined in and it was really great and good for kids.”

Students in every focus group commented that they enjoyed the song storybooks because they had an opportunity to “do something” (Olivia, Classroom E). Many students seemed to view reading as an activity that was normally passive and did not directly involve them in the process. Students repeatedly voiced their appreciation of being able to participate in different ways through our song storybooks activities. Rhonda said, “Stories with songs are good. They give us something to do” (Classroom H). Sylvia said, “It was more fun to have stuff to do with the books—like singing with you instead of just sitting there” (Classroom A).

Comments from control classroom parent/guardian post-study surveys indicate that the positive effects for engagement were sustained and extended beyond the classroom walls to the home environments. The second question in the post-survey read: “During the past few weeks, has your child’s interest in music changed? If so, in what ways? Parent/guardians noted their children were listening to music more at home, they were asking to go the library or the local bookstore to get the same or similar books as used in our study, they were asking for music lessons, they were singing at home more, they were singing to siblings, they were reading song-stories to siblings, they were making up their own song-stories and they were more interested in school music, although it wasn’t clear from several surveys what was meant by school music.

Post-survey question #3 asked: What have you heard from your child about our music activities? Parent/guardian responses were generally positive and included the names of specific song storybooks that their children liked or mentioned.

Parent/guardians stated their children really enjoyed the experiences, they thought some of the song-stories were pretty hysterical, they looked forward to the experiences, and that parent/guardians were enjoying sharing the experience with their children at home. One parent/guardian enthusiastically wrote “It’s great—we’re bonding over Stompin’ Tom now—got my CD’s out!”

**Transformative effects.** Transformative effects were identified for specific students in three out of the four control classrooms in the study. Karen, collaborating teacher for Classroom A, noted her surprise (in the quote above) that some students who normally weren’t interested in reading, would offer to miss their favourite subject to read and sing our stories together. Leslie (Control E classroom collaborating teacher) observed transformative effects for several students in her classroom including one boy with autism spectrum disorder:

*You really touched everyone. Even Austin, our little autistic child seemed to really gain from this experience. He has a hard time sitting still for stories but doing them in musical ways really captured his attention and allowed him to engage musically helped him find success in reading. It allowed him to focus and engage and he really seemed to very much enjoy all the activities. All the kids loved it!*

Leslie also observed transformative effects for students who were confident readers in the classroom and inspired to further extend their literacy skills:

*I saw children in my class who weren’t normally engaged in either music or reading before that were really engaged with what you were doing. I saw all sorts of enthusiasm and it spurred students into areas which were really unexpected for me. Some of the kids, as you know, took your song storybooks and used them as a model and made their own stories up. A lot of reading and writing went on as a result.*

In her comments, Leslie was referring to a number of students in the classroom that had been excited and inspired by our song storybook time together. On one occasion when I arrived to the class, several children came up to me to show me the storybooks they had written at home. They asked if they could read their stories to me and since I was fortunately early to that class, I was happy to have the opportunity to hear and see their work.

Their writing was sustained throughout the remainder of the learning design and the song and story writing seemed to take on a life of its own. Before long, many students in the class seemed to be writing stories and song-stories and asking me to read or sing them. A highlight in this experience was the day one of the very reluctant readers and writers came shyly up to me and asked if I wanted to read his story about “Bud the Spud.” His story was inspired by a song storybook about a song written by Stompin’ Tom Connors called “Bud the Spud.” Jason’s story was a first for him and represented transformative learning for this student.

**Affective dimension.** All control classroom teachers commented at various times on their students’ emotional engagement with the song-stories and with the experience of singing the stories together. They commented on how excited students would be to learn that it was a song-story day and how disappointed they were if we ever had to re-schedule. On one occasion, a number of students from Classroom D offered to cancel their field trip so that they wouldn’t miss our time together.

Students in the control classrooms often shared how the song-stories made them feel. They responded emotionally and positively to beautiful books, scary books, mystery-themed books, humorous books and books that engaged affect in a variety of ways.

Frequent comments were made about student enjoyment of the “funny” songs as many of the resources were written to be humorous. Enjoyment wasn’t limited to the humorous and entertaining qualities of the song-stories, though. During a focus group interview, Kate said, “When you used a sad voice I cried, it was so sad.” Kate said this with a rather wistful expression, as if she found pleasure in the reminiscence. In every group, someone commented on the voices I used for the story characters. I usually gave each character a different vocal quality when I sang their part and tried to give them some kind of emotional dimension. Gaby said, “I like how you made them real—with so much expression and then we could feel it, too” (Classroom H).

Frances (Control classroom D) provided evidence of shared emotional engagement. She noted that the enthusiasm that I had for the song-story experience inspired student enthusiasm: “Your love of it, your enthusiasm, it shows and the children see it, and they feel it, too. You could tell from their body language. They would move forward—try to sit closer to you.”

**Valuing.** As described in experimental grounded theory results, a variety of factors may have contributed to consistent, high levels of student engagement and a lack of any issues related to behaviour. Collaborating teachers in control classrooms, like those in the experimental classrooms, seemed to place a high value on the goals and purposes of the research design. They communicated this value to me and to their students in similar ways as presented in grounded theory results for valuing in experimental classrooms. All control collaborating teachers participated in the learning events along with their students although participation took different forms. Two teachers sat with their classroom groups and sang along with every song-story. Two other teachers

listened to the stories while sitting at their desks observing the students or occasionally marking or preparing for classes.

The majority of parent/guardians valued reading and many valued music, particularly in Classroom B as indicated by quantitative data results. The time parents/guardians spent with children at home reading the booklet from the research design, listening to them share their speech-pieces and songs, and expressing their great enjoyment at watching and hearing their children engaged in music and reading, indicates a high value is placed on both music and reading. A number of parents included a short line of appreciation for the study experience, as for example, “Thank you for coming—they loved having you!” (Classroom C-8).

### **Reading Pathways**

The experiences of singing stories together seemed to create pathways into reading and music learning for a number of students in the control groups, including those children who struggled with reading. The specific skills and strategies mentioned by control classroom teachers and students included ways that the songs made reading easier, helped with memory, promoted flow and fluency, enhanced comprehension, helped to focus attention on the text, introduced and reinforced vocabulary, and ways that the experiences created sensitivity to the sounds of language and music. Collaborating teachers and students in focus groups indicated that it seemed easier for students to read when they were following my model.

Carmen (Classroom A) said it was easier to read in a song and her observation was echoed by a number of students in the focus group interviews. When I asked Carmen why it was easier to read in a song, she replied, “Cause it just makes the words go.” Ezra,

(Classroom H collaborating teacher) made a similar observation. Ezra believed that reading was facilitated because the students got caught up in the story. The momentum and energy of the song created a flow-like experience where students were released from the constraints of worrying about the difficulties of the text and the rigours of word by word decoding. Ezra observed that the songs helped students remember vocabulary, enhanced comprehension, and were useful as focusing strategies for students:

*They kids enjoyed the song-storybook activities because they get caught up in the story—the kids are more into it when you add elements of song and those different voices you use. It's a memory aid, too—the song helps the kids keep track of the story and remember it. And they are good focusing strategies, too.*

The other collaborating teachers also noted the effects that singing had for memory and attention. Frances observed that singing the songs helped retrieve ideas, thoughts, and knowledge that “you thought were long gone.” She noted that the song stories and the vocabulary of the stories stayed with students due to the “sticking power of the songs.”

In a Classroom D focus group, Greg said that he could read all the stories that we sang together. Then he added that everyone in the class could read the stories I brought. As there were a number of struggling and non-readers in the group, I was curious about the processes Greg observed. I asked, “Do you mean everyone can read because they’ve heard all the words before so they could remember them when we sang them together?” Greg answered, “Well, the kids that can’t read don’t know the words but they learned them from hearing us sing them together and then they see them and they remember them so then they can read them.” Dorian (Classroom E) said that it was a *lot* easier to read a song than read a story. I asked the group if it was possible to make reading too easy—

“wouldn’t you get bored then,” I asked. Kylie replied, “If it wasn’t easy, who would want to read?”

The song-stories also seemed to be effective avenues into a variety of curricular areas. A deliberate attempt was made to choose repertoire that supported the classroom programming and context. For example, I chose resources about tadpoles, communities around the world, aboriginal communities, butterflies, math concepts including counting, concepts about print, dinosaurs, spiders, farms, and penguins. Control classroom teachers commented on the ways that the song storybooks effectively connected to their curricular programming or classroom themes in meaningful ways. Leslie said that the use of song storybooks enhanced “the themes we had going on” (Leslie, Classroom E). Karen said that the storybooks provided meaningful connections to her language arts, social studies, and science curriculum and that she now had ideas to use for further connections in her own teaching.

### **Democratic Communities of Readers**

Austin was one of several students in the control groups who experienced unexpected reading and singing engagement. As with the experimental groups, the control class experiences seemed to support students in feeling that they were legitimately part of a reading and musical community even if they had not previously gained entrance to either community before. On numerous occasions, students who were not successful readers came up to me to say they loved reading my books with me. On one occasion after class, Carly said, “I can read your books you know.” The significance of Carly’s remark wasn’t apparent to me until Rosemary, the classroom teacher told me that Carly normally refused to read and that she considered Carly a non-reader.

At the outset of the study Frances (Control Classroom D collaborating teacher) had cautioned me that she had many struggling readers in her classroom who were not engaged in the reading process and who were classified as non-readers. The quantitative data for Classroom D supports her claims. At the final interview, Frances remarked how powerful the song-story experiences had been in her classroom to engage non-readers with the reading process. She particularly noted improvements for two children in the class. The control class experiences appeared to create unique opportunities for many students in Classroom D and especially for Darren and Yvonne, to perceive themselves and for others to perceive them, as readers and part of a reading community.

The control class experiences also created positive community effects that bonded students together in common, enjoyable, collaborative, and unifying experiences. Frances remarked, "I thought they would be problems for you, but they loved this and enjoyed every time you came. The whole group was always engaged and for this group that was awesome!" The other control classrooms had similar responses. All control classrooms seemed to greatly enjoy the experience of coming together as a group to sing the storybooks together.

Mike (Classroom A) said, "I liked it that our whole class got to be all together with you." The group effect of students coming together to sing the storybooks seemed to create a sense of energy and synergy that was sustained throughout the length of the study. There is no record in the field note data that indicates students were bored, restless, or not engaged with the control group experiences. Students always greeted me excitedly when I arrived to the classroom and expressed disappointment when it was time to go.

### **Transformative Teaching**

Experiences with the song storybooks appeared to inspire possibilities for changed teaching. Leslie said that she enjoyed the experiences as much as the children did and that she looked forward to implementing the ideas she observed. She shared, “I’ve got lots of ideas to use for next year.” After a year Leslie had not had any opportunity to put her ideas to practice as she had taken a leave for the year but in her email the year after the study she said, “I do often think of the activities and the musical stories you did with the class, and do plan to use these activities when I return to the classroom. I found them especially useful with younger struggling readers” (email, July 22, 2008).

Ezra agreed, saying:

*Oh, I had a blast! I learned so much! More just from observing all this—for myself it was a definite learning experience. I would never have thought to do this with songs and stories like this—it was awesome!...The kids loved your books and now I have all sorts of new ideas to use for next year!...I just see new ways I could use music like the ways you sing the stories.*

When I checked back with Ezra a year later, his enthusiasm for singing with the children had not waned. In an email he shared how music and singing together with his students had shaped his teaching in the year following the study experiences in his classroom:

*I have added a new instrument to my tool belt and as of this Christmas got my first guitar. I am so addicted and enjoy playing the songs so much I use it in my classroom with the kids every day. Whether it is through sing alongs or musical activities where movement and cooperation are the forefront we are using the guitar on a daily basis (Email, June 25, 2008).*

Frances, the collaborating teacher for Classroom D, began the study with a strong belief in the importance of music and the arts. At the conclusion of the study, I asked her if her beliefs had changed as a result of the control classroom experiences. She replied that her beliefs had been strengthened by the study experiences: “I have the same beliefs

even more so since I've seen how much the children enjoy the music." A year later,

Frances was still inspired. She said:

*I still believe, probably more than ever, that it is very important for music, movement (dancing, etc.), art (drawing, colouring, painting, etc.) to be included in my daily teaching in some way, even if it is for a minimal amount of time...last summer I bought a large music/dance book which included a pile of CD's geared towards early learners...I used that book all of the time throughout the year...My students this past year loved it and asked for it all of the time...We had so much fun. (Email, July 15, 2008)*

Maureen's feedback a year later was also still positive. In referring to her plans for the coming year she said, "Let's just say I will be integrating music every chance I get and I know the children will have a valuable year learning what they need through the arts!" (Email, June 26, 2008).

**Was it reading?** Like some students in the experimental groups, members of the control group felt that the experiences singing song storybooks were not real reading. Despite the fact that we "read" from print text and the students read the text with me, certain students in every classroom believed if reading was fun, then it wasn't real reading. In their minds, reading was associated with hard work and was often boring and tedious. When Carmen expressed her interest in our song stories, Cindy replied back, "Yeah, but that's not like really reading." When I asked her why not, she answered, "Because that's not like reading—it's just singing the songs." I persisted and pointed out to Cindy that although we were singing, we were still reading the words on the page in order to sing. Cindy remained unconvinced: "But then it's fun so it's not like real reading. It's not like work, you know." In another classroom Josh (Classroom E) supported this thinking when he claimed that our experiences together weren't really reading. When I asked him how our song stories were different to real reading he responded, "Cause you're not reading, like really serious stuff. It's just singing songs."

**Summary: Control Group**

Control group experiences singing storybooks together generated some of the same conceptual categories and social processes as did the reading and rhythm experiences in the experimental classrooms. Control group experiences promoted motivated and engaged learning for many students in the control classrooms. As Ezra, the collaborating teacher for control classroom H shared, “The learning is so much more enjoyable and you and the kids get more into it. It’s more upbeat, more positive.” These positive results were likely affected by the positive values placed on the experiences by students, teachers, and parent/guardians.

Experiences in the control classrooms also produced transformative effects for both students and teachers, although the data do not show the dramatic transformative effects that the combined teacher, student, and parent/guardian data show for the experimental classrooms. Likewise the affective experiences common to both classrooms were not as pronounced in the control classrooms.

Opportunities for personal and relevant meaning-making were limited to connections to classroom curricular learning and to the ways in which some students extended the learning by writing their own song-stories. I chose the resources, although there were times when I repeated song-stories that were particular classroom favourites or requests. Since we all shared the same song-story together, there were no alternative affordances for learning for those students who may not have enjoyed reading and singing the stories, or for whom the print text was challenging. However students were invited to sing along rather than being asked or told to do so. Students had a choice to sing along or

not, as they pleased and some chose not to, although in especially repetitive or easy to sing/read segments, the entire class usually joined in.

There were no opportunities to use artifacts or instruments, and imaginative, creative play was not a feature of the control classroom experiences. Movement experiences were limited to following the directions that were inherent in the song-story books, as for example, “If you’re happy and you know it, clap your hands.” Although examples of improved self-efficacy were documented in the control classroom data, the instances of self-efficacy were not as widespread as those found in the experimental data. However, in both control and experimental classrooms, the data indicate that most students found membership in the reading communities of our study in enjoyable and deeply engaging ways.

The students of the control classrooms seemed just as disappointed as the children in the experimental classrooms when our time together came to an end. When I asked Cheryl for her final comments at the end of our focus group interview, she said, “Just that we’re really sad you won’t be coming anymore and will you please, please, please come again next year?” In another focus group Tom said, “I like the days you come and all your stories and I don’t want you to stop coming.” Dorian said, “We *loved* when you came to our class. We don’t want you to go. Ever never ever.”

\* \* \*

### **Rhythm-a-ning**

The music of Thelonious Monk was used to transmediate grounded theory results for several reasons. Monk was known for his scrupulous attention to details (Giddins & DeVeaux, 2009a), his eccentric personal characteristics, his musical integrity, and his “gift for collating bits of music and renewing them in his own way” (p. 386). The grounded theory analysis was an attempt to pay scrupulous attention to the details and nuances of the data. The data were analyzed through the unique lens of the classroom and individual participants so that participants’ own way of meaning-making was honoured and recognized.

“Rhythm-a-ning” by Thelonious Monk (1962/2009) is an example of diverse perspectives synthesized in a meaningful whole. The tune is based on three well-known jazz tunes and chord changes over a solid harmonic and rhythmic foundation (Giddins & DeVeaux, 2009a). The ensemble tightly weaves their playing by responding to rhythmic and melodic ideas introduced in the piano parts by Monk in the same way that I have attempted to synthesize the ideas and interpretations of the various study participants in the grounded theory results presented in this chapter.

## Chapter Seven: Playing Inside

Lyric coherence is not like the unity of systematic structures:

its foundation is a heightened experience of detail,  
rather than the transcendence (excision) of detail.

(Zwicky, 1992, p. 120)

### Semiotic Data Results

In jazz, “playing inside” refers to improvising within the tonal harmonic framework and progressions of the piece. The details of the harmonies are heightened and elaborated as the melodic improvisation explores the potential of the underlying chords. In this chapter, the details of the classroom learning events are explored and interrogated using Peircean semiotic methods. Peircean methods allow analysis of both verbal and nonverbal tools and structures of meaning-making learning events.

Eight episodes are chosen to exemplify data analysis and insights into semiotic meaning-making at different key stages of the research design: 1) first encounter with beat; 2) initial attitudes about print text; 3) mediating artifacts; 4) diagrammatic reasoning; 5) artifacts, imagination, and semiotic chaining; 6) transmediation and transformation; 7) the power and potential of beat as “the force”; and 8) shared understandings about beat and rhythm. The episodes presented here illustrate the processes used to construct the findings of the semiotic potential of the beat reported in the concluding section of this chapter.

The semiotic data analysis is intended to examine sign function within the context of the classroom learning events. Data analysis probes underlying meaning beyond the mere use and appearance of the sign-vehicle to examine how the sign-vehicle functions to

create meaning or not within the classroom context. Turino (1999) declares that “the first step in any semiotic analysis is to determine what is the sign, what is the object, what is the effect, and to whom in any instance” (p. 224). The starting point in the semiotic data analysis for this study then, is to determine sign, object, and effect for the initial constructs of rhythm and reading of the design research study.

### **First Encounter with Beat: Classroom G, April 24, 2007**

The first analysis example is Classroom G’s initial encounter with beat on the first day of the learning design described in the design-research journal for April 24, 2007. Grounded theory analysis determined response codes for initial rhythmic experiences in all experimental classrooms. Classroom G is chosen because it is a representative example for analysis of initial encounter with beat. This data sample exemplifies the various understandings of beat with which students began this study and also serves to introduce and demonstrate how Peircean data analysis is applied to the learning events in this study.

As described in the design research journal for April 24, 2007, I began the initial classroom learning experience by singing the Hello Song and clapping the beat to the song. I invited the children to join me and following our experience, I asked the children to close their eyes and tell me what sound my hands were making as I sang the song a final time. Recorded responses included “no response” from a number of students, “enjoyable sounds,” “noise,” “clapping,” “the beat,” and “sound of the song.”

In this initial experience, responses indicated that children in the five experimental classrooms began the study at various stages of Firstness, Secondness, and Thirdness. The children who interpreted the sounds of clapping the beat as “enjoyable sounds” could be

considered in a Peircean stage of Firstness. Enjoyment was an immediate emotional response to the sound of clapping without relationship to any other elements of the teirce and therefore unmediated. In Peircean terms, those children were in a monodic state of “sheer thisness” (Hoopes, 1991, p. 10). Without interpretant, clapping sounds for these children did not serve as an active thought-sign or any meaning-making resource. Using Peirce’s ten sign classifications, the qualisign represents the inherent qualities of Firstness. Turino (1999) points out that every chain of semiosis begins with the qualisign, or pure quality embedded in a sign.

The interpretant of “noise” could also be an immediate perceived sensation of noisiness related to Firstness, or it could be regarded as an instance of actual noise. When interpreted as an instance of noise, a state of Secondness is suggested as children move from “passive consciousness of quality, without recognition or analysis” or Firstness, to “an external fact, of another something” (Hoopes, 1991, p. 185). The children who responded “noise” established a causal, indexical relationship between the sign-vehicle of sounds and the object of hands moving together as object. The motion of the hands caused the sound that children heard when their eyes were closed. The representamen of sound refers to actual, specific instances of the sound of clapping, moving it up the hierarchy of Trichotomy I from qualisign to sinsign. The object is in physical co-occurrence with the sign, making it an indexical relationship, and the resulting interpretant is the idea of noise.

The children who responded that the clapping sounds were “the beat” or “the song” indicated a likelihood they already had moved along the dynamic continuum from Firstness and Secondness to Thirdness. They had moved from “passive consciousness of

quality, without recognition or analysis” to the external facts and relationships of Secondness, to “synthetic consciousness binding time together, sense of learning, thought” (Hoopes, 1991, p. 185).

In this case, the sign-vehicle of clapping sounds was more mediated using a higher dicent-indexical-legisign function. In this first beat experience, some children were already able to interpret the clapping sounds as meaning-making resources for understandings about beat. In Trichotomy I, the legisign refers to the sign-vehicle as a general class of sound that is recognized as steady and consistently and regularly patterned. From Trichotomy II, the indexical relationship refers to the causal relation between the object of clapping hands and the sign-vehicle of patterned sounds. The concept of dicent from Trichotomy III refers to the way the sign is interpreted as actually affected by its object (Turino, 1999). The interpretant of beat is considered a dicent because the sign is actually affected by the object of hands moving together to create the patterned sound understood to be beat.

The children who responded that the sounds were “the song” may have mediated the same representamen and object to make sense of the experience in different ways. These children may have had a deeper understanding of the beat to be an underlying pulse of the words or musical elements of the song. The same sign had various objects and operated in a range of ways for different students depending on their backgrounds, prior experiences, and knowledge.

Data from Classroom G were chosen as it contained responses documented in all five experimental classrooms for the initial learning experience. Data from Classroom G also included a unique example under the coding response of “other.” When I asked the

class what sounds my hands were making, Anthony's verbal response was a happy cry of "Mrs. Peters, Mrs. Peters!" followed by his loud and enthusiastic applause. For Anthony, the representamen sound was concretized as the object Mrs. Peters, which in Anthony's case, meant he was happy, to my great relief. I hoped that Anthony and other students who enjoyed our activity would become a sign-vehicle for others in the class who might take enjoyment as the object with an interpretant to mean that Mrs. Peters' visits and research design would be a positive experience and something to look forward to.

Anthony's data can be analyzed as an example of rhematic-icon-sinsign. The interpretant was a feeling of enjoyment, a qualitative possibility neither true nor false and therefore a rheme. The representamen sound was a specific and actual instance of patterned sound and therefore a sinsign. The object, the idea or thought of Mrs. Peters, was an icon or sign function that may have indicated a similarity, resemblance, or analogy. Turino (1999) points out that the "degree, basis, and even accuracy of resemblance is not so much at issue as the fact that resemblance calls forth the object when perceiving the sign" (p. 226).

In explanation, Anthony enjoyed our rhythm pre-tests very much. Once I finished the rhythm pre-tests with Anthony and recorded his scores, I let him try some additional tests while we were waiting for the next student. He thought these were great fun and over the pre-testing period he asked a number of times if we could do the beat games again and even showed up once trying to pretend he was another child who needed to do their rhythm pre-tests with me. Anthony apparently created an analogous relationship between the thought of Mrs. Peters related to beat and the sound understood to be beat as found in the beat games that he enjoyed so much. His response seemed a fitting example

of Peirce's definition of a thing perceived that "excites an idea naturally allied to the idea that object would excite" (Peirce, 1992, p. 13).

It is also possible to analyze this example as a complex sign containing iconic and indexical relationships. Taking the beat as the sign-vehicle, the thought or idea of Mrs. Peters as the object, and enjoyment as the interpretant, an indexical relationship could exist between the sign-vehicle and object. Because of the beat games I played with Anthony, the co-occurrence and presence of Mrs. Peters and the sound of the beat created a causal reaction/relation between sign-vehicle and object resulting in excitement. When the indexically related sign-vehicle and object are present once more, the feeling of enjoyment is again indexed.

To conclude, data from the first experience with beat and rhythm for Classroom G indicate that the teacher/researcher and students began the research design making different sense of what I perceived to be the simple sound of the beat as we clapped it together. The same learning event in all classrooms using the same representamen resulted in a wide range of interpretants. This initial classroom encounter with beat revealed a number of individual differences; the data indicated no "community" interpretant or shared understandings in evidence at the outset of the research for any experimental classroom.

Initial beat experiences represent both unmediated and mediated learning about beat and rhythm. In this learning event, all children in the class were focused on the same shared sign-vehicle and object. This sign served as the first semiotic chain recorded for the study. The interpretant of one sign serves as the representamen of a new sign which in turn generates yet another sign in a potentially unlimited process of semiosis. An

important semiotic chain was initialized in this first class that lasted beyond the limits of the study. When some students mediated understandings of enjoyment from the sign of the sounds of clapping, these positive and emotional responses served as yet another sign for other children in the classroom to mean the research design would prove to be enjoyable for students.

The teirce in Figure 30 represents some of the students' mediated effects of the hands clapping. The sound heard while the children's eyes were closed is the representamen or sign-vehicle. The object to which the sounds may have referred is the hands coming together. The same shared sign and object resulted in varying interpretants including possibilities such as noise, enjoyment, beat, and the underlying pulse of the song.

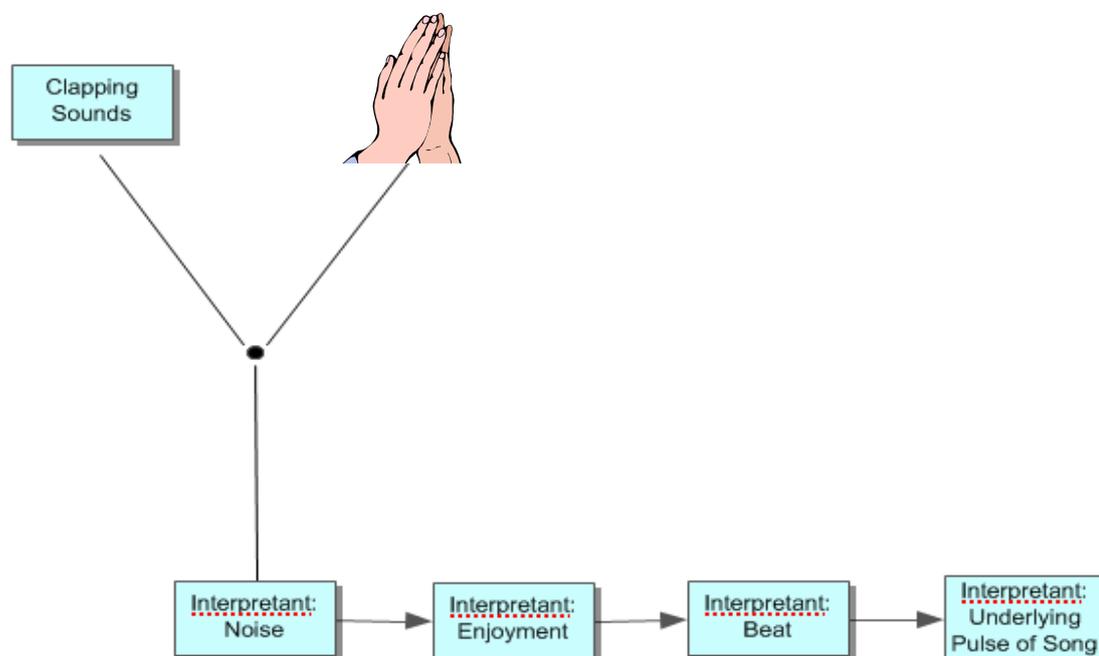


Figure 30. Possible mediated effects for first encounter with beat.

### **Initial Attitudes about Print Text**

After each individual oral reading fluency pre-test, I recorded the comments children made about reading in response to my initial and follow-up questions concerning how they felt about reading and why. As documented, the reading responses varied greatly and were coded simply, “positive attitude,” “negative attitude,” and “neutral attitude.” The comments articulating the “why” were coded, “reading is easy/good reader,” “not a good reader/can’t read,” “enjoyable activity,” “difficult/challenging activity,” and “other.”

For some children, the representamen of reading stood for particular reading genres such as fantasy, cartoons, Julie B. Jones books, Harry Potter books, books about cars etc. The mediated understanding was some qualitative possibility of enjoyment, interest, excitement, comfort, and security. Reading is a generally known class of phenomena and therefore a legisign. The reading genres are considered symbols, words with particular generalized meaning. The resulting qualitative possibilities for reading are best represented as a rheme or rhematic-symbolic-legisign. Higher sign categories subsume those below them, so this sign is simply referred to as a rhematic-symbol to avoid redundancy since all symbols will also be legisigns (Turino, 1999).

The rhematic-symbol is an example of the interdependence of Peirce’s universal categories. Legisign and symbol are states of Thirdness; the rheme is a state of Firstness. The categories are not disjunctive states of being in the world (Merrell, 1997) but are “mutually penetrating, a constantly folding in and over one another” (Merrell, 1997, p. 86). The emotional and sensorial qualities of Firstness are tied up with the meaning-making category of Thirdness; it is not possible to isolate and analyze understanding,

knowledge, interpretation, or communication without sensorial and emotional being and other qualities of Firstness and Secondness.

When asked why they liked or enjoyed reading, some children stated that reading was easy for them (rhematic-indexical-legisign). Conversely, many children who said they disliked reading, or mediated it to be boring, frustrating, stupid, painful (“makes my head hurt”), or gross, etc. (rhematic-indexical-legisign) identified reading as a difficult endeavor.

Some children viewed the legisign representamen of reading as a sign-vehicle that referred to an object of print text that was sometimes pointed to on the paper during our brief conversations, or perhaps imagined. The experiences of the oral reading fluency pre-tests indicated that for some children, print text was iconically mediated as nothing more than black marks on a page. For other children, print text was interpreted on a continuum of letters, words, information, entertainment, invitations, or whole worlds of possibility and meaning.

Semiotic data analysis from the initial encounter with print text indicates that children started the research design with a very wide range of meanings, attitudes and understandings about print text. The notion of reading resulted in varying objects, interpretants, and sign functions, revealing many individual differences and no “community” interpretant or shared understandings. The possibilities are summarized in the figure below. Throughout data analysis reporting “R” stands for representamen, “O” stands for object, and “I” refers to interpretant. Because the positioning of teircean sign elements is arbitrary, I move the teirce according to how best to show relationships between the elements of the teirce as in Figure 31.

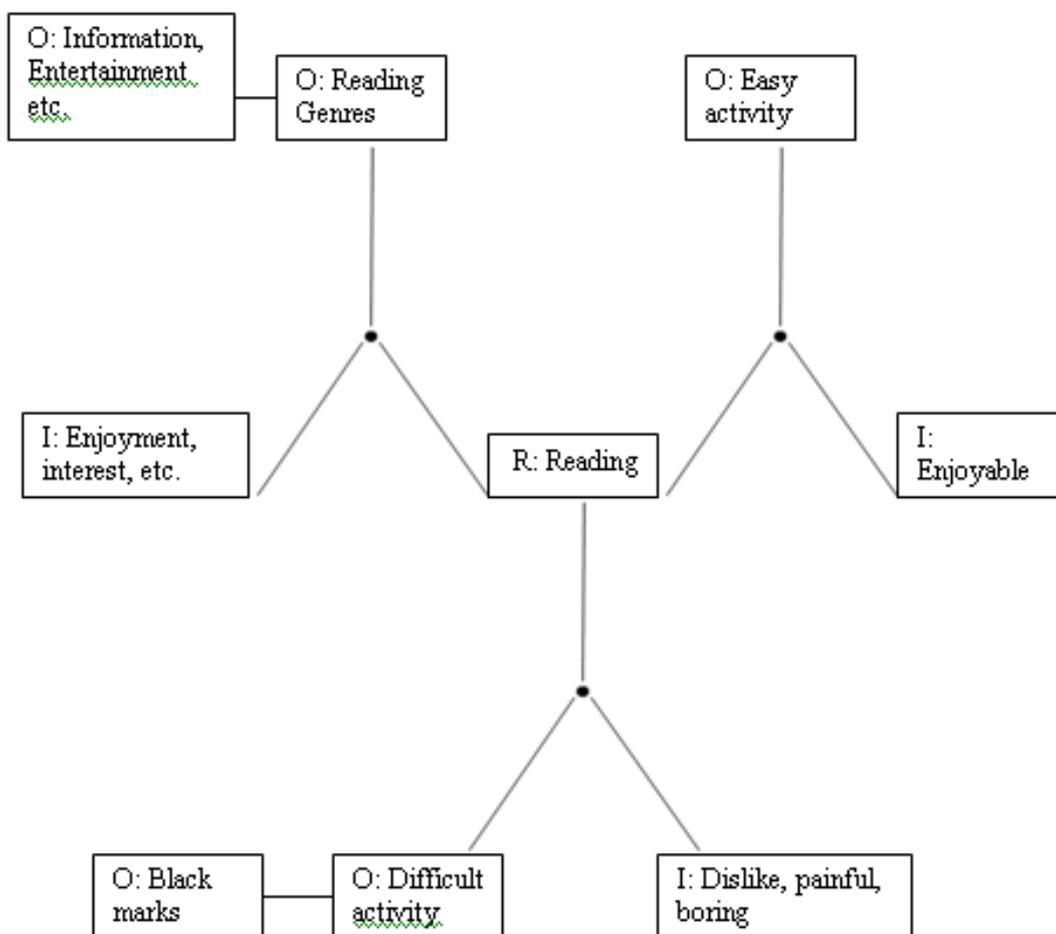


Figure 31. Possible mediated effects for first encounter with reading.

### Mediating Artifacts: Classroom B, May 2, 2007

Artifacts were included in the original learning plan for use in specific, limited ways. Study artifacts planned for the research design included small, nonpitched rhythm instruments, and a variety of teaching aids such as a ball, star, pie, and a small drum for signaling activities. The learning activity for the speech-piece “Bounce High” is chosen as a representative example of artifact use in all classrooms. “Bounce High” was part of all phase one experimental classroom learning experiences and incorporated a ball as a

mediating artifact. Through this learning event, the beat was kinesthetically embodied and cognitively internalized to mediate conceptual understanding of the beat for children in Classroom B.

On the day of this learning experience, the collaborating teacher had arranged for us to meet in the library so that we had a generous space and were able to make a large circle. We began by sitting in the circle and singing our Hello Song to the beat. We then chanted the speech-piece, “Bounce high, bounce low, bounce the ball to Shiloh.” In previous learning events, we had experienced the underlying beat of Bounce High through body percussion and nonlocomotor movement. Now I was going to use the ball to help us “see” the beat. As this conceptual understanding was something I hoped that children would discover during the playing of the game, I only introduced the ball as another way to play the game, rather than telling students this was an artifact to help us see and experience the beat.

We began by chanting the piece in several timbre and dynamic variations, taking turns to choose the locations we were going to bounce the ball to, as for example “bounce the ball to Shiloh,” “bounce the ball to Brandon,” “bounce the ball to India,” etc. Then we stood in our circle with me in the center. On the words, “Bounce high” I bounced the ball to a child in the circle. On “Bounce low” the child bounced the ball back to me. On “Bounce the ball” I then bounced the ball to the next child in the circle and that child bounced the ball back on the words, “Shiloh.” To keep the chant interesting, the children changed where we were going to bounce the ball to after four repetitions of the chant. “Bounce high, bounce low, bounce the ball to Steinbach” was the next choice. Inevitably, through use, the chant took on qualities of pitch by way of a simple three note mi-soh-la

melody. At one point, one of the children dropped the ball. Caroline called out, “Ah, Brent wrecked it—he dropped the ball!”

“Remember what we discussed,” I said. “Balls drop from time to time; it’s not a problem. We just pick it up and keep going.”

“But now we’ve lost the beat,” Caroline said.

Aaron replied, “Just pick it up and get it going again.”

Lizzie asked, “Can we make the beat go faster?”

“How would we make the beat go faster?” I questioned.

Lizzie replied, “Just bounce the ball faster.”

Steven asked, “The ball is the beat?”

“No,” Lizzie replied. “The ball’s showing us the beat. It’s in the ball. Watch the ball.”

“No, Lizzie” said Samantha. “It’s in the words.”

Lizzie immediately corrected this assumption with the remark, “It’s the ball *and* the words---can’t you tell?”

“Well, let’s see,” I quickly countered and got the ball going again. This time the whole class seemed to be watching and listening for the beat in the ball and the words. They began patting their knees in time to the beat and the ball as the ball went around the circle. They discovered if they patted faster they could affect the tempo of words and ball and started patting faster and faster until we couldn’t keep up anymore and the game dissolved in laughter.

“See,” Lizzie said.

When we began our learning activity, the ball was generally considered to be a sign vehicle for an object of use that meant a variety of games and activities the children had previously experienced. At the moment when the ball dropped and Caroline said we lost the beat, the ball artifact became a semiotic resource, a means of objectification for shaping and embodying meaning (Bakhurst, 1995; Daniels, 2004). Caroline's comment that we lost the beat when the ball was dropped led to new perceptions for the children about the function of the beat as related to music and oral language modes. At this point in our learning event, the teircean interpretant for the sign-vehicle of ball changed for many children to mediate an interpretant of showing the beat.

As the "Bounce High" game continued, it became clear that more and more children were watching the ball to "see" the beat, and enjoying its connection to the words by making us sing them faster and faster. The children indicated they understood that the beat was underlying the words. The pitched quality of the chant disappeared as the children focused intently on the words and beat. The melody shifted back into a spoken chant and the children began to articulate the words very deliberately and with accents, as if by accenting the words they would keep the ball going in a steady rhythmic pattern. It was impossible to tell whether the words were driving the beat, or the patting beat was driving the words.

Because we were increasing the tempo, the ball dropped several more times. When the children began chanting before we had the ball and beat in play again, Josh shouted, "Wait, wait—not yet—the ball hasn't started." By the end of the game, every child was chanting rhythmically and patting the beat on their knees, clearly engaged in

the semiotic act of perceiving the beat represented by the ball, as an underlying pulse to support the words of the song.

The ball on its own was not a semiotic mediator. It did come to serve as a semiotic resource for meaning making however, by the way in which it was used to externalize and internalize concepts about beat. The ball enabled the children to objectify and actualize the beat. It also enabled children to internalize the beat which they were then able to express by patting their knees and rhythmically chanting the words. The artifact ball helped mediate understandings about beat for music, oral and written language purposes as used in the social world of our classroom.

The sign-vehicle of ball is drawn and re-drawn in Figure 32 to show how the object and the interpretant changed for children throughout this learning activity. There are many possible ways that new learning was mediated and only some of those possibilities are represented here. The ball began as the sign-vehicle with an object of use for throwing, catching, kicking, and hitting, in games such as dodge ball, basketball, soccer, or baseball. After Caroline's remark, the ball served as the sign-vehicle referring to the bouncing of the ball mediated as the beat.

As the learning event progressed, the entire triad may have rotated for learners as shown in Figure 33. When the children focused so intently on the chant that they began to speak the words in a very deliberate and accented manner, the speech-piece may have functioned as the sign-vehicle referring to the beat and mediated to mean the underlying pulse of the speech-piece and game. When the focus then transferred to the children's efforts to affect the speech-piece by patting the beat faster and faster, the underlying pulse may have served as the sign-vehicle, referring to the speech-piece and mediated to mean

the beat as represented by the ball moving faster. In discovering the beat's ability to control the speech-piece, many children likely ended the experience viewing the beat as a sign-vehicle referring to the underlying pulse mediated to mean the speech-piece.

A variety of interpretant possibilities can be considered. For those students who mediated understandings further up the semiotic chain and interpreted the sign-vehicle ball as the beat, the artifact ball served as a dicent-indexical sign. Some students may not have ended the experience with that understanding. For them the ball as sign-vehicle may have served as a rhematic-icon, suggesting the possibility of the idea of beat. And for the others who took the ball out of the room with them at the end of class and spent recess playing "Bounce High," the beat was the likely sign-vehicle, the ball was the object, and the interpretant was the "This is fun!"

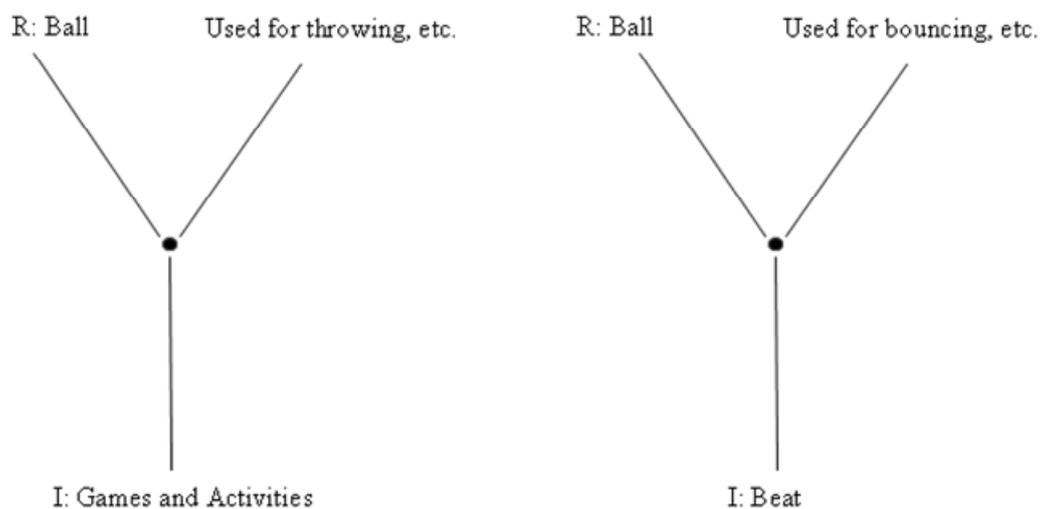
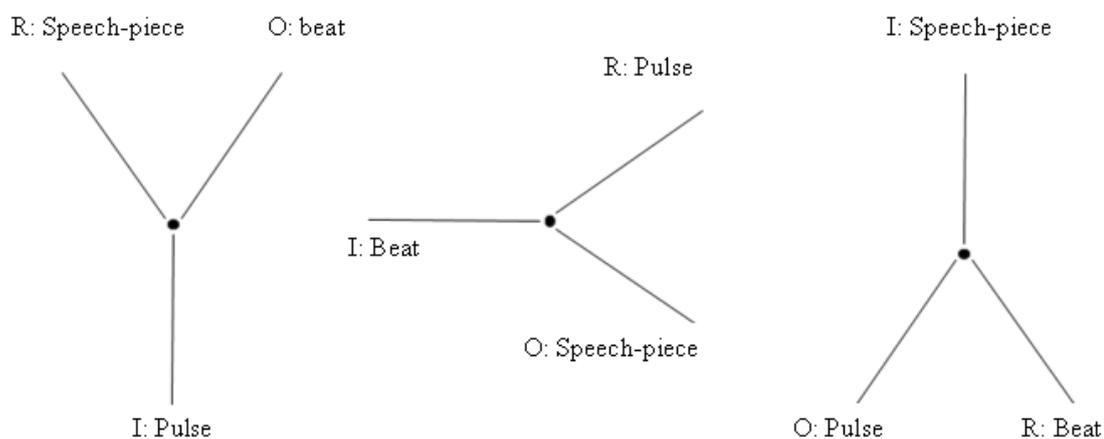


Figure 32. Changing interpretant possibilities for ball used in "Bounce High."



*Figure 33.* Rotating teirce to illustrate new awareness and understandings.

### **Diagrammatic Reasoning and Transmediation: Classroom C, May 3, 2007**

After several classes internalizing and performing the beat of the class speech-pieces, I was confident that the children in Classroom C were ready to begin reading the beat together with print text. Classroom C and D began the study earlier than other classrooms as previously explained, so they reached this stage earlier than other experimental classrooms. I chose the speech-piece “In and Out” as the first piece read on the board with all experimental classes. “In and Out” is an example of the potential for transmediating understandings about beat and oral and written language in this study. In this data example, transmediation is achieved through a process Peirce describes as diagrammatic reasoning (Bakker & Hoffman, 2005).

We began the class by chanting “In and Out” using body percussion and small nonpitched percussion instruments to keep the heartbeat, as we were now calling the beat of the pieces:

In and out. In and out. O—U—T and that spells out.

We followed those experiences with the game “In and out.” The children in this class had progressed through many of the stages Montgomery (2002) describes for beat-movement sequencing and could comfortably travel from space to space walking the beat. For this activity, the students stepped the beat while walking in a circle holding hands. The students all followed one direction while I stepped the beat walking in the opposite direction outside their circle. I tapped the shoulder of the child who was in front of me on the last word of the speech-piece, “out”. The child who was tapped then turned outwards and rejoined hands with the children on either side of him, who were still facing inwards.

We started the chant up again and the circle of children continued to walk the beat facing inwards except for the one child who had been tapped “out” and was now facing outwards. Each time the chant stopped, the child in front of me would turn outwards when tapped, until the entire circle was facing outwards and then we usually laughed and sat down. After a couple of rounds, I would usually tap several of the children who were close to me to turn outwards at the same time to avoid having our “In and Out” game consume the entire class period.

We were very familiar with the game and words and all children demonstrated secure beat competency when accompanying the piece with body percussion or nonpitched percussion. The words in the chant were mostly from the list of sight words that all children were working on, so the vocabulary was comfortable for them, too, with the exception of the word “spells.”

After we sat down, I handed out sticks to each child. I asked the children to chant the song again for me and keep the beat with their rhythm sticks. They did so quite

happily, despite the fact that we had chanted it already over half a dozen times. As they chanted and played the beat with the sticks, I drew a line on the board for each beat. When we had finished, I asked the children what was on the board. Without any hesitation, the children answered as a group, “The beat—you drew the beat!” “Oh,” said one little boy. “So that’s what it looks like.”

I asked the children if they would like to play the beat and they enthusiastically got into their ready position with their sticks. I asked them how we would know when to start together and Carmen said we needed a signal. I suggested we use a heart for the signal because we were playing the heartbeat of the song and the idea was accepted by all. I drew a heart shape in front of the first beat and we all counted, “1-2-let’s go” and played the beat together while I pointed to the beat diagram on the board. I was rather astonished that we all stayed together and that when we got to the final beat everyone finished at the same time and stopped at once, indicating that they had actually been watching the beat diagram. The class had read the notated beat with concentrated focus and seemed delighted to have played and ended together. They asked to play the beat a second time and we repeated the process to equal success. “We can read music now!” a few exclaimed.

I asked the children to put their sticks away in my music bag and while they were doing that, I printed the words of the song over top of the lines representing the beat, spatially fitting the words over the appropriate beats. “Now what do we have?” I asked. This time the answers were a little more varied. Several students knew right away that the words were the “In and Out” chant but I also heard, “words” and “letters.” “Is it homework?” Sophie asked. After I confirmed that the words were their “In and Out”

chant, I suggested, “Let’s see if we can read it together.” Eric called out to me, “But Mrs. Peters, you forgot I can’t read.” I pointed to the O—U—T in the last line. “Can you read O-U-T,” I asked. O-U-T,” Eric tried. “Yep,” he said. “Okay,” I replied. “That will be your part.” The children read the words from the board as I pointed to them, and we chanted “In and Out” together. When we arrived at O-U-T, Eric shouted out O-U-T as loudly as he could. Once again, the children seemed delighted that they had been successful. At this point there was no way of telling which of them were reading and which of them were just chanting from memory the words they knew so well, but most ended the class *thinking* that we could read both music and print text.

The line drawings on the board that represent the beat in this activity are icons. As a sign-vehicle, the lines on the board are related to the object of beat by way of similarity (duration and equal intervals of sound) and analogy. Peirce defines diagram as an icon of relations aided by convention (1903, 4.418). As a rudimentary diagram, the lines on the board fall into one of Peirce’s three rough subdivisions of the icon that Peirce terms “hypoicons” (Peirce, 1992, p. 274). Peirce uses the example of an algebraic equation to describe diagrams, explaining that a diagram “makes quantities look alike which are in analogous relations to the problem” (Peirce, 1992, p. 13).

Peirce develops the notion of diagram by describing its function and construction: “It should be carried out upon a perfectly consistent system of representation, founded upon a simple and easily intelligible basic idea” (Peirce, 1903, 4.418). The lines on the board representing the beat fall under Peirce’s description of the purpose and design of a diagram. The system of lines is used consistently in this study to represent the basic idea of beat in an example of diagrammatic reasoning at its most fundamental level.

The use of the word diagram in this context is akin to the use of the word sign in semiotics. Just as Peirce's sign reaches far beyond the meaning and imagery of the indexical stop sign, the concept of diagram is not limited to the notion of a simple and commonly used diagrammatic image associated with the realm of Secondness. The diagram that Peirce conceives for diagrammatical reasoning is a complex sign that includes indexical, iconic, and symbolic elements described as inference using schemata (Bundgaard & Stjernfelt, 2010).

It is the aspect of symbolic convention that allows the diagram to be mapped onto other domains. "A diagram only becomes functional when it is accompanied by a symbolic instruction of what the diagram refers to and which rules should pertain to our understanding of the relation between its parts" (Bundgaard & Stjernfelt, 2010, p. 70). The lines on the board meet these criteria. Despite the simplicity of the diagram in this learning activity, the lines on the board serve as a complex icon and functional diagram.

The lines on the board are indexical in that they direct the children's attention towards the lines and therefore the sound of the beat and the print text. They are iconic as previously described and they are symbolic in that they have a particular generalized meaning and convention for both music and possibly reading. The data used in this example demonstrate what the diagram refers to and which rules pertained to our understanding of it.

Hoffman (2005a) contends that "abstract concepts become visible in *signs* and in their *use* in mathematical activity" (p. 335). Data analysis indicates the same process occurred in this example of reading beat and print text and in the more complex examples that followed in this study. The beat, an abstract concept (Montgomery, 2002) became

visible using the sign-vehicle of the notated, straight lines as part of our learning activity. The lines on the board indexed the silent and audiated beat that created the temporal framework for the speech-piece. In this example, the children may or may not have been reading the words on the white board, but most were observed reading the lines and playing the rhythms. The children seemed to follow the beat diagram closely but of course, some may have internalized the temporal structure of the speech-piece to know when to stop rather than because of reading the beat diagram.

Our diagram of the beat facilitated construction of beat understanding and was also meaningful to some children in representing the underlying beat of the words for “In and Out.” The diagram of the beat inferred the sound and duration of the beat, as well as the flow and temporal placement of the words. This first encounter with beat diagrams suggested a potential for beat diagrams to map and transmediate understandings of beat onto the domains of both music and reading, actualizing Peirce’s belief in the importance of cognitive diagrams described by Bundgaard and Stjernfelt (2010): “Peirce places cognitive diagrams (schemata) at the most basic level of cognition and action, facilitating, in turn, the construction of very different semiotic systems (vision...verbality, to a large extent learned and cultural specific; gesture, pictures, singing, etc.)” (p. 72).

Siegel (1995) conceptualizes the generative process of transmediation as:

A special case of semiosis in the sense that learners use one sign system to mediate another. When a learner moves from one sign system to another, semiosis becomes even more complex in that an entire semiotic triad serves as the object of another triad and the interpretant for this new triad must be represented in the new sign system. (p. 461)

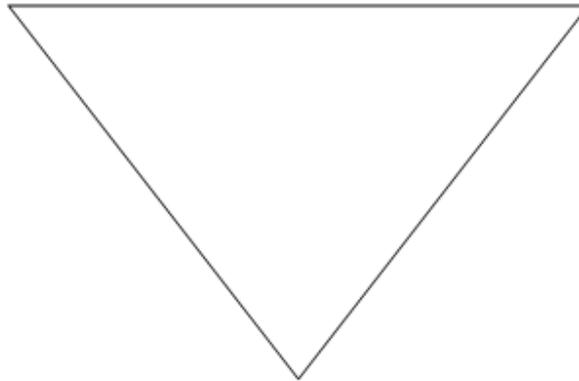
The sign systems of music and reading are both used in this data example. In the sign system of music, the beat represented by the beat diagram functions as the sign-

vehicle that points to the object of the speech-piece print text. The resulting interpretant differs from child to child and may or may not be mediated to mean the words of “In and Out.” In the sign system of reading, the letter symbols serve as the sign-vehicle pointing to the object of the speech-piece print text. Again, the resulting interpretant differs from child to child, but the second data sample indicates that for some children, the letter symbols are mediated simply as meaningless marks on a page or board.

Following Sipe (1998) and Siegel (1995), when the letter symbols on the board are interpreted through the sign system of music, the entire semiotic triad with beat as the sign-vehicle, becomes the object of a completely new triad. The resulting transformed sign “opens up something new” (Eco, 1976, p. 44). For some children, that “something new” may be understandings about written language as illustrated below using Sipe’s (1998) model of triangles embedded within triangles.

R: Beat Diagram

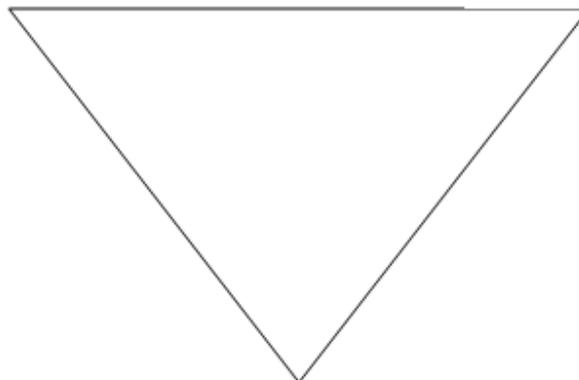
O: Words of speech-piece



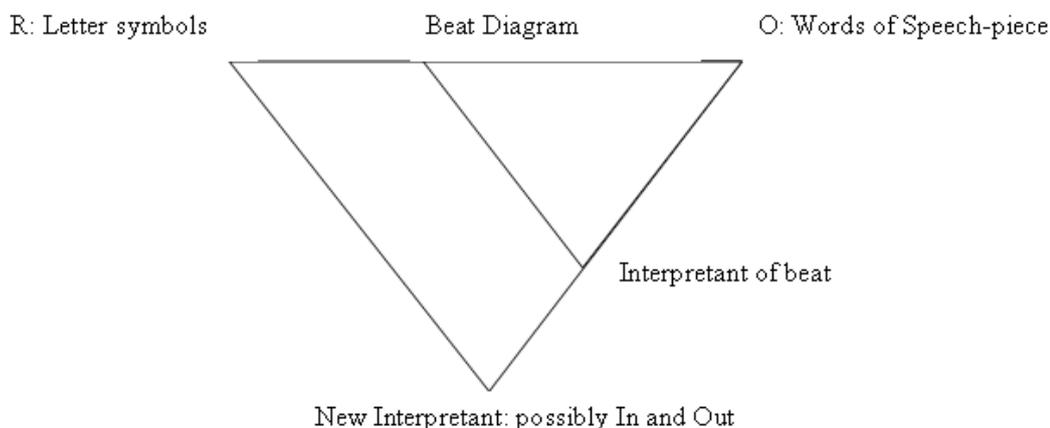
I: In & Out, underlying pulse,  
beat etc.

R: letter symbols

O: Words of speech-piece



I: In & Out, black  
marks, etc.



*Figure 34.* Transmediation effects of beat experiences for reading understanding.

Transmediation may not have occurred for all students. However, most students believed they could read the words. Self-belief or self-efficacy was noted in this and subsequent data analyses, setting up a positive indexical relationship between our beat experiences and oral and written language.

### **Semiotic Chaining: Classroom F, May 14, 2007**

I began introducing a variety of small nonpitched percussion instruments as tools to reinforce the beat after the third learning experience. A learning event with nonpitched percussion instruments and Classroom F is chosen as an epiphanic and non-representative event to illuminate a change of direction in this study, to illustrate rhematic importance, emergent learning potential, and the importance of artifacts for imagination, engagement and semiotic chaining in this study.

On the day of this learning event, Classroom F was having a very difficult time settling down. They had just come in from recess and had carried a playground quarrel into the room and our time together. I had promised we would use percussion instruments

that class but I was concerned that adding instruments would escalate the already unsettled nature of our classroom. I decided I would bring out just one instrument called a tick tock block. When the children wanted to know what the tick tock block was, I told them they could each have a turn to hold it, play it with the tick tock stick, tell us what they thought it was, and then pass it along to the next person in our circle. The resulting mediated understandings represented all three universal categories and all of Peirce's ten classifications beginning with a First sensorial response of "It's cold" (due to the fact that it was in my instrument bag next to my lunch bag and ice pack).

My intent in passing around the tick tock block was to have a guiding conversation leading to the discovery of the tick tock block as part of the woods family. I then intended to use the tick tock block to represent the beat as related to a clock, the sound of horses' feet, and whatever sounds the instrument suggested to the children. The sound would then be transferred to nonlocomotor and locomotor movement moving to the beat of the tick tock block as clock, horse, etc. Instead, our activity took quite a different turn and became an example of the infinite possibilities of semiosis. The semiotic process that led to the tick tock block being perceived as a sign with meaning-making potential followed a similar process described by Peirce (1998, p. 274-275) and elaborated by Merrell (1997, p. 136-137) that I adapt for my analysis.

Our circle time exploration of the tick tock block began in a state of Firstness as the tick tock block lay in my hand. Merrell (1997) says that "Position is firstness. It is monadic, without relation to anything else and without change" (p. 139). The tick tock block in my hand was merely a physical object without relation to anything or mediated through interpretation; it was a qualisign, just something in our room that had no

connection yet to anything we were doing or to the children's experiences. "What's that?" asked one of the children. "Is it an instrument?"

In that instant, we moved in understanding from "the raw sensation of a [tick tock block] as a physical object" (Merrell, 1997, p. 136) or qualisign, to the tick tock block becoming "an acknowledged image in the mind of a [tick tock block]" creating "an index as yet unrelated to anything else" (p. 136). Once the image of a tick tock block was related to the actual, conscious, and intentional existence of the physical object, it became "a rudimentary sinsign" (p. 136).

As the tick tock block moved around the circle, the children's concept of the tick tock block moved back and forth through states of Firstness to Thirdness as their understanding about the object changed and grew. They first perceived the object as a physical phenomena or sensation in space lying in my hand and then distinguished it as a semiotic object. Nicole, who held it first, perceived its coldness. Another child noticed it was made of wood. Another child said it was something hard. The beige color, the shape, the slit in the wood, and its smoothness were noted. Michael sniffed the tick tock block and said, "It smells like my Granddad." The children discovered it was something you could make a sound with and they noticed the quality of the sound. In classifying the object, the children moved in understanding from the object as a sinsign to the object as a general class of things (legisign) that sinsigns belong to.

Some children described the properties of the object and for others, the object engaged their imagination. "This is my Mom's curler," one little girl said, as she proceeded to show us how to use the tick tock block to roll her hair up. The block became a hammer, a drill, a corkscrew, the letter T, a vacuum cleaner, and a water

fountain. “No, said Stephen. “This is just a music instrument. You just play it. Like this.” And he proceeded to demonstrate, playing a steady pattern of beat on the tick tock block. The children immediately began patting the beat on their knees until Stephen stopped playing.

This led to conversations about the sound quality of the instrument, resulting in several children taking off in different imaginative directions as the tick tock block instantiated a semiotic chain of ideas and meaning-making that was only interrupted by the end of class. The sound of the tick tock block referenced as object, the sound of horses’ hooves then mediated to be the princess riding off to save the prince captured by the dragon. When the tick tock block was passed to the next child, it ceased to function as a sign. Instead, the student continued to make the sounds of the horses’ hooves and the interpretant of princess saving the prince became the sign vehicle referring to the object of prince in trouble mediated to be caught in the dragon’s den. The next student flew the tick tock block through the air demonstrating the dragon flying above his den. The dragon’s den interpretant newly served as the sign vehicle referring to the dragon, mediated to be danger to everyone in the kingdom because the dragon had threatened to burn the land in revenge for being attacked by the farmers. The semiotic chain continued as the princess developed a plan for dealing with the dragon and the danger to the kingdom. The next child stood the tick tock block upright on its handle on the floor pretending it was the princess saying, “I have a plan. Listen to me.” The plan involved lecturing the dragon on bullying and the importance of being kind to people, securing the release of the prince, and then offering the dragon his own land next to the princess’s kingdom. This land was rocky and uninhabited so a perfect spot for dragons to live. As

the last child took the tick tock block to the air once more to fly the dragon off to his new home, our class period ended.

Throughout this learning event, we moved from the initial qualisign experience through all of Peirce's ten classification modes, weaving back and forth from mode to mode as required by the children for their story. Hardness, colour, smell, and smoothness were qualisigns. The qualisign tick tock block became a sinsign when it functioned as an actual, existing artifact for use in our learning event. The tick tock block functioned as an icon when it demonstrated similarity and shared a property or attribute with something else such as the hair curling rod or the clock. It served to index beat when it caused the students to begin patting the beat upon hearing the instrument played. And then we entered Thirdness when John told us, "No," the object was a musical instrument, in other words, a symbol articulated linguistically as a generally and culturally accepted convention for use in our classroom.

At this point we were able to talk about the class of instruments known as woods and the sign-vehicle tick tock block became for us a legisign. We were able to discuss the wood instruments "as a general sign, the use of which is guided by social conventions and individual habits of thought" (Merrell, 1997, p. 136). We named the instrument as a tick tock block and I asked the children why they thought it might be called a tick tock block. "Because it's a clock," came the immediate reply from Lorelie, elevating the tick tock block to yet another class of things called metaphor.

From the object lying in position and space in my hand at the beginning of class, we had explored all the ways a sign can function according to Peirce's classifications. I adapt Merrell's model (based on Peirce, 1998, p. 275) to illustrate, substituting the words

tick tock block and wood instruments for balloons, the word clock for soap bubbles, and the attributes of clocks for attributes of bubbles:

A tick tock block (sinsign-symbol-word) is the member of the class of wood instruments (legisign, index-symbol, word), which, when elevated to and interacted with the class of clocks (legisign, index-symbol, word) reveals some particular attributes (timbre, regularity and duration of sound, use as a particular tool for timekeeping) that render clocks like (as qualisigns, icons, words) tick tock blocks. Tick tock blocks and clocks can be made the subject and predicate respectively of a sentence relating one class of signs to another class by way of various sign types. And all this having been developed out of the initial raw sensation of a beige object in my hand (Adapted from Merrell, 1997, p. 137).

The tick tock block in this analysis acted as a catalyst for semiotic chaining leading to unique meaning-making opportunities. The semiotic chain in this analysis began with the tick tock block as the sign-vehicle. At first as the tick tock block progressed around the circle, the sign-vehicle remained the same with a wide variety of objects and interpretants. The tick tock block became an increasingly complex sign. It functioned in both iconic and indexical ways when it was used to represent the princess's horse. As an icon, the sound of the tick tock block shared similarity with the sounds of the horses' feet; it described the sounds of the horses hooves. The tick tock block also functioned to index the princess riding on her horse; it served to locate the princess within the story. Rather than explain that the princess was riding on her horse, the playing of the tick tock block acted as an index to point to the princess on her horse and the action in the story.

The tick tock block was the catalyst for a semiotic chain of interpreted, mediated learning as each interpretant became in turn, a new sign-vehicle for yet another interpretant in an infinite chain of semiosis as illustrated in Figure 35. This and many other instances of imaginative play and artifact use served as important catalysts for engagement and for semiotic chaining leading to eventual understandings about beat and written language. Children began at different places along semiotic chains leading to reading and music literacies and they accessed different semiotic affordances for these learnings.

At the time, I thought this learning event had seriously run off the track. Data analysis of subsequent learning events indicated the importance of affordances for semiotic chaining, learning engagement, and imagination. The opportunity to make imaginative, emotional, personal connections in the realm of Firstness helped create positive indexical relationships with artifact use, beat and reading experiences. The entire class period I allocated to advance understandings about beat, rhythm, and literacy but used instead to imagine with the tick tock block and the princess, wasn't wasted after all. As described in the Research Journal, this learning event altered the path of my research design to allow space for the inclusion of other artifacts used in a variety of emergent, imaginative ways that I had not originally planned for in the original research design.

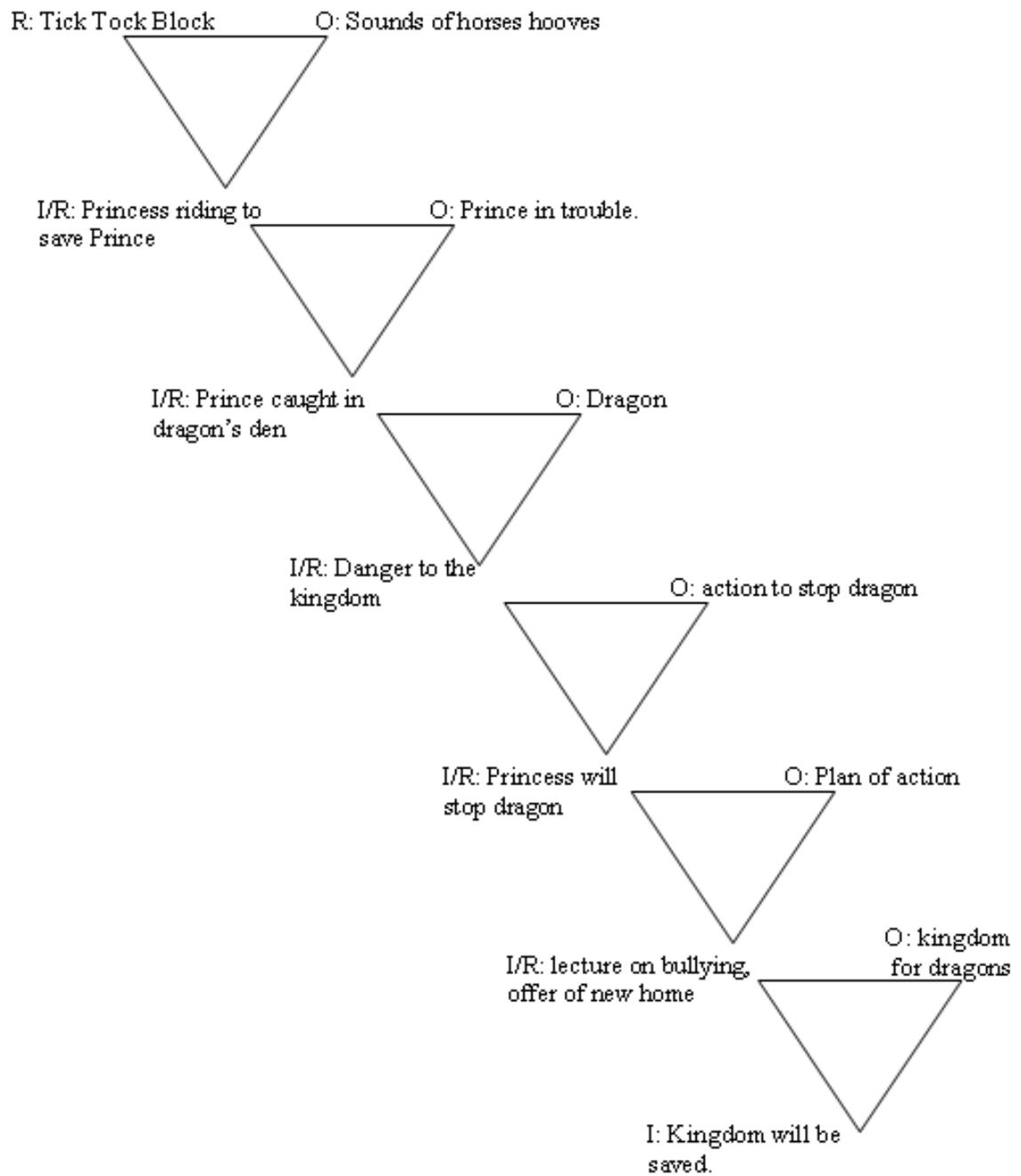


Figure 35. Semiotic chaining inspired by the tick tock block.

**Transmediation and Transformation: Classroom B, May 28, 2007**

At one point during the study, Classroom B was studying pirates. The classroom teacher shared the pirate vocabulary the children were using and we created a variety of speech-pieces using the vocabulary of the class. This data sample exemplifies the way in which the social-culture of the classroom shaped processes of transmediation. The power of transmediation lies in the fact that connections between sign systems are not pre-existing; generative thinking (Seigel, 1995, 2006) is necessary to take what is known in one sign system and recast it within another to open up new meaning-making possibilities (Berghoff, Egawa, Harste, & Hoonan, 2000). This data example illustrates generative thinking and the role of imagination as part of that generative process. It also demonstrates further elaborations of diagrammatic reasoning, and the ways in which emotional engagement, classroom identity, and belonging were indexed through the learning events.

One of the books the students were reading featured a character named Pirate Dan and the children asked to make a piece about Old Pirate Dan. I wrote “Old Pirate Dan” on the board with a line for a beat under the word Old, Pirate, and Dan. We always grouped the words in lines of four or eight beats each and I wondered if the children would realize that although we had four sounds in “Old Pirate Dan” we actually only had three beats, since the word pirate was a subdivision of the beat. Sure enough, several children were quick to point out that we were missing a beat. “Why?” I asked. “We have four sounds.” “But two of them are fast ones” came the answer. We patted the beat and chanted the words and discovered that yes, pirate had two sounds that fit into one beat. “That’s a ti-ti,” one of the children offered. Colin suggested that the words “Old Pirate Dan was a

really mean man” might work and I wrote that sentence on the board. We chanted it and patted the beats. “We’re *still* missing a beat!” Cyndi exclaimed in amazement, as now our words fit into seven beats. “Well, let’s add some more,” I said and we brainstormed suggestions until we had four lines of eight beats each, discovering along the way that we needed to split the word “until” between two lines and add a clap to the end of the speech piece if we wanted to keep eight beats on each line:

Old Pirate Dan was a really mean man he  
sailed his ship around and round un-  
til a pirate child he found so  
Look out everyone here he comes! (clap)

Once we had the speech-piece finished, the children immediately launched into chanting the piece and patting the beat on their knees without any prompting from me. “Works,” said Colin.

“How do we show that Dan is a mean pirate,” I asked next. “Like this,” Paul said and started to pat his knees as hard as he could. “No, no, like this,” said Colin and he proceeded to get up and stomp around the room. “Yes,” I agreed. “That looks pretty mean.” Do you all want to try being Dan?” There was a chorus of agreement and I played Dan’s “mean heartbeat” on the drum while the children stamped it throughout the classroom. I watched the feet closely and was gratified to see that every single foot was successfully on the beat. By this point in time, we had played many drum games, so the children knew that when the drum stopped, their feet stopped.

“Now we have to find a pirate child,” Sylvia called out. We brainstormed what would happen when the pirate child was found and came up with Pirate Dan’s game. The

game began with just one Pirate Dan stamping around the room in his sailing ship. The rest of the children in the room were the pirate children, tip toeing the beat as they didn't want Pirate Dan to hear them and make them work on his pirate ship with him.

The whole class chanted Pirate Dan while they walked the beat around the room stopping on the final word "comes!" If any child was in arm's reach of Pirate Dan when the piece stopped, that child joined Pirate Dan to work on his ship. On the next chant, the two pirates then stomped around the room looking for pirate children to help work the ship. Those two pirates then tapped whoever was in arm's reach at the end of the next round of chanting until every child in the room eventually became a pirate working on the ship. As often happened, the children turned the chant into a melody singing back and forth on soh and mi.

Once the children knew the words for the speech-pieces and games we played, reading the print text became meaningless because they could recite the words from memory. So we played a variety of games with the print as described in the design research journal. On the class following the creation of the "Old Pirate Dan" game, we played several reading games with "Pirate Dan." We began by reading and chanting the entire speech-piece from the board while patting the mean beat. Little by little I erased the words until there were only four words left. I often deliberately chose to keep words that were off the beat so that the children wouldn't use the beat groupings as cues for saying the words from memory. After we played a few reading games, the words that remained were:

/ Pirate / / / mean / /  
 / / / / round / / Un-  
 Til / / / / found /  
 / / / / comes!

The children frequently asked me to challenge them with new and difficult ways of arranging the words. After a successful reading of the above configuration and my exclamations of how impressed I was that they all could read so well no matter how I arranged the words, Simon said, “But Mrs. Peters, it’s not really hard at all. This is like cheating reading.” “What do you mean?” I asked, truly puzzled. “Because the beat is telling us when to read and where the words are” replied Simon.

“Let’s see if you can read these words without the beat helping you then,” I suggested. I erased all the beat diagram lines leaving the words on the board.

pirate mean  
 round Un-  
 Til found  
 comes!

I asked the children not to pat the beat, pointed to our ready heart and said, “One, two let’s go.” The children read the words shown above outloud and audiated the missing words. They kept perfectly together and ended with a huge shout of “Comes!” at the end. My amazement was absolutely sincere. “How did you do that?” I asked. Simon replied

for the class, “The beat was still there, Mrs. Peters. You just couldn’t see it.” The children had clearly internalized the beat and used it to construct a guiding temporal framework for the speech-piece. The children mediated beat as a useful meaning-making tool and resource for oral reading of print text.

Semiotic data analysis also shows that the beat took on new and other semiotic functions in this example. This was the first time that the beat assumed a character of its own. From this point on, the children often initiated the game of “Old Pirate Dan” not by asking for the piece by name, but by playing the “mean heartbeat.” The loud and accented way in which the beat was played was identified with the character of the piece and the piece itself. As such, the way the children played the beat became an icon for “Old Pirate Dan.” The beat in this class conveyed the character and personality of “Old Pirate Dan” and indicated how the character would move and act. It also served as a catalyst for imaginative play. In this function, the beat was transmediated as a rhematic-icon for Pirate Dan, as a dicent index for the aural and print text of the speech-piece, and as an argument meaning the convention and norm defined linguistically as beat.

The mean beat of “Old Pirate Dan” also acted as a powerful and emotional indexical sign in our classroom resulting in engagement and community. Whenever the “Pirate Dan” beat was heard in subsequent classes, the same feeling of strong and positive community was indexed. This semiotic effect was not unique to the experience of “Old Pirate Dan.” Beat experiences were repeatedly analyzed to index positive and engaging community effects for this classroom.

Even the thought of the beat experiences acted as a sign-vehicle to create similar indexical effects. The collaborating teacher observed that the children often talked about

our experiences and wrote about them in their journals when I was gone. Other teachers and education assistants reported that the children frequently played the games at recess. Parent/guardians shared similar experiences and described games and chants the students played with family and friends in their homes. The wealth of powerful community indexical effects for Classroom B was unique to this classroom, although semiotic data analysis indicates positive indexical relationships for community in all classrooms using the sign-vehicle beat, as exemplified in the next episode from Classroom F.

“Old Pirate Dan” functioned as a complex semiotic learning event as illustrated in Figure 36. Beat experiences functioned in iconic, indexical, and symbolic ways. Iconical relationships were forged through image, diagram, and metaphor. The sign-vehicle of beat was interpreted as rheme, dicent, and as argument. Semiotic chaining leading to the dimensions of Thirdness was evident in the creation of the Pirate Dan Game. Semiotic chaining was also evident in growing understandings about beat, rhythm, the subdivision of the beat, and the way it mediated concepts about print and reading. Positive emotional engagement, classroom community, identity, and belonging were indexed through the beat experiences of “Old Pirate Dan.” The use of the sign systems of music, oral language, written language, movement, drama, and visual systems resulted in a choice of unique available affordances and entry points for transmediation opportunities to create new meanings about rhythm and reading.

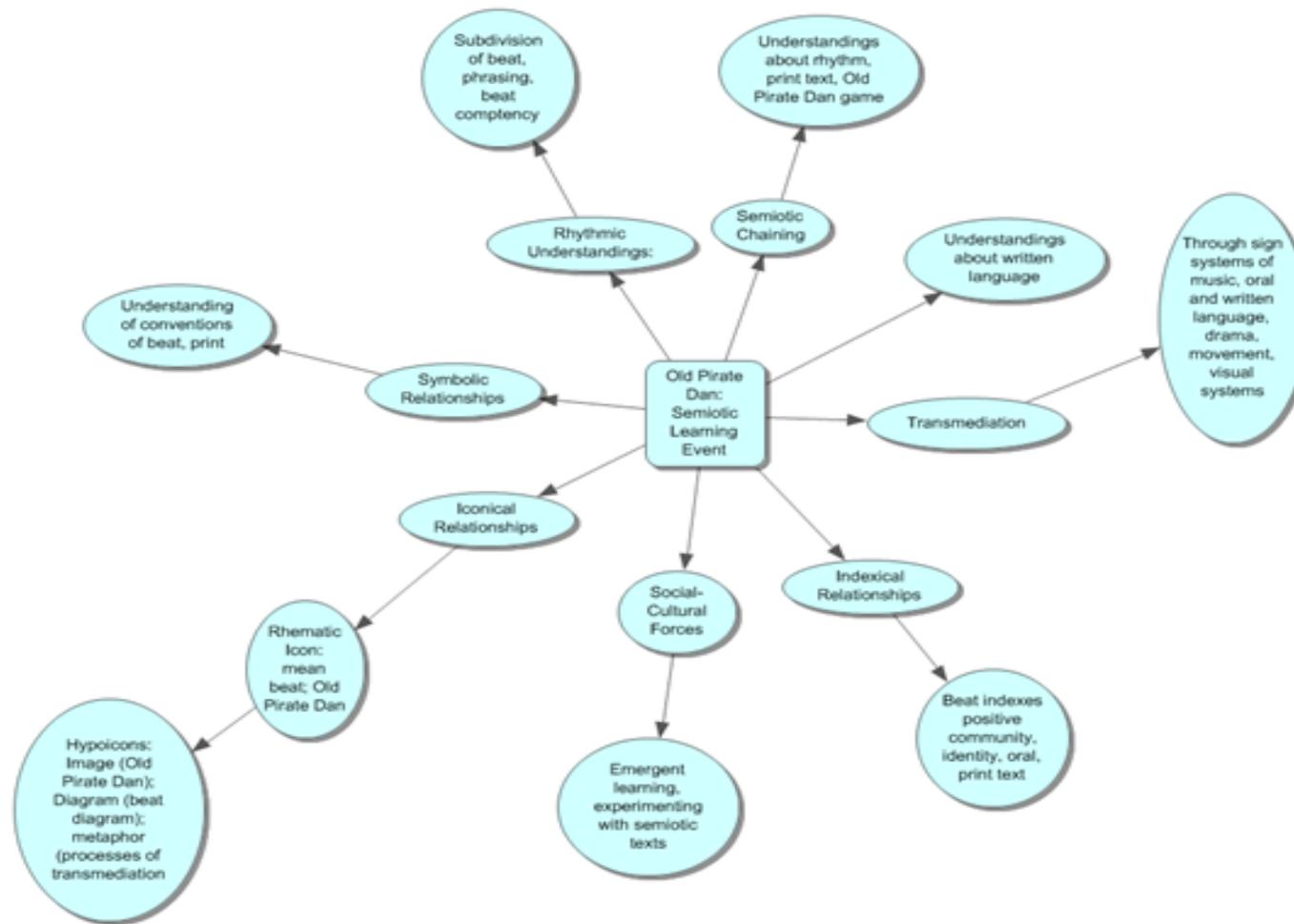


Figure 36. Elements of "Old Pirate Dan:" A complex semiotic learning event.

**The Force: Classroom F, June 6, 2007**

Beat functioned as a powerful synchronous force in all classrooms. As a dicent-index, synchronous beat events were unifying, community building experiences. As a rhematic-iconic legisign, the idea of beat related to the notion of collective force bonded students together in direct, physical, sensorial, and emotional ways.

For several weeks, we began every class using different body percussion to perform the beat to our opening Hello Song and repertoire. We walked the beat, bounced the beat, played the beat, characterized the beat, visualized the beat, drew the beat, and internalized the beat. Beat was part of every activity in our learning events.. On this day, I was stopped in the hall by the principal and our chat extended just into the children's Mrs. Peters' time. As soon as the waiting students saw me in the doorway, in one unit they all began to pat the beat that typically accompanied our Hello Song. As I sat down, the beat continued and the children independently launched into our introductory song. Every child actively participated and all seemed engaged and interested.

Performing the beat through body percussion was an automatic response at this point in the study and the Hello Song was also a comfortable and apparently enjoyable ritual. As the Hello Song ended, I placed my hands on my knees in the stop position that signaled to the rest of the class to stop patting the beat. It was usually a very successful signal and most times, the class would all finish exactly together when I put my hands in the stop position. This time, however, Michael kept patting the beat, very vigorously. "Michael?" I questioned. Michael grinned broadly up at me and said, "I can't stop! It's the force!" likely referring to the Star Wars movie phenomena.

“You’ve got the force, do you?” I replied. “Okay, let’s see how strong the force is with you. Everyone pat the beat like Michael,” I directed. Once the whole class was patting the beat together again, I told them I was going to see if my force was stronger than theirs. I patted my beat just off the pattern of their beat. Within a matter of seconds, entrainment occurred, the children began following my different temporal beat, and soon we were all patting together again. The children thought this was great fun and we tried “the force game” several more times.

I asked the students what other special powers “the force” could give us. The children responded with a variety of possibilities. The force could help you play instruments, run, dance, count, remember, and read words and play beat diagrams. For the remainder of the class, the children kept referring to the beat as the force, and when the educational assistant arrived at the door to take them to Phys-Ed, they all got up still patting the beat. “Let’s put the force in our feet,” I suggested and the children all went to the door to line up, marching the beat as they went. As Steven stomped the beat out the door, he turned back to me and called out, “May the force be with you!” As I sat in my chair in the carpet area, recording the experience before I left, I could still hear their feet as they marched down the hall. When the educational assistant walked back into the room she said, “I don’t know what you do to those kids,” she said. It’s the only time I ever see them getting along and working all together at something.”

Beat acted as a complex sign in this and other classrooms in iconic, indexical, and symbolic ways in realms of Secondness and Thirdness. As an iconic sign the beat took the form of metaphor in this data sample. The beat was “the force” that bonded students together in direct, physical, sensorial, and emotional ways in a collective experience of

synchronicity leading to shared understandings as a rhematic-iconic sign. In the realm of Secondness, beat indexed a powerful, direct sense of connected community, mediated as a rhematic-indexical legisign third to create understandings of belonging, identity, and purpose. As a symbol, the sign-vehicle of performing beat stood for the linguistic symbol beat mediated in the realm of Thirdness as an argument or convention understood to be the underlying pulse that regulated and governed physical activities such as running, dancing, and playing instruments and cognitive activities such as counting, reading print text and music notation. The qualities of the beat characterized as “The Force” are presented in Figure 37 below.

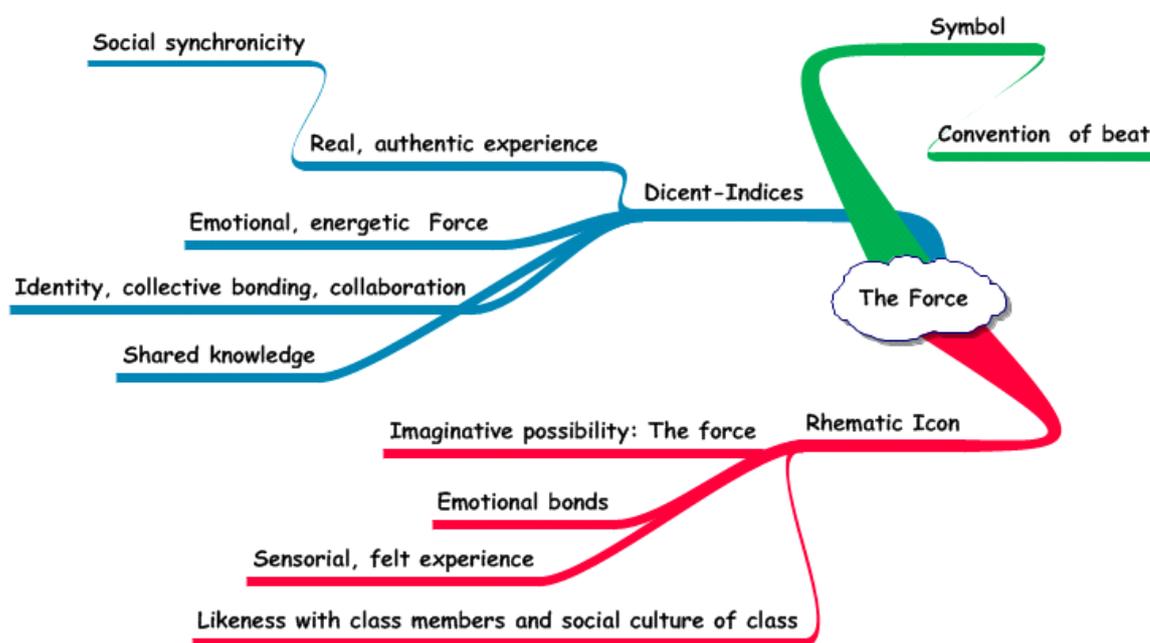


Figure 37. Qualities of the beat as “the force” in experimental classrooms.

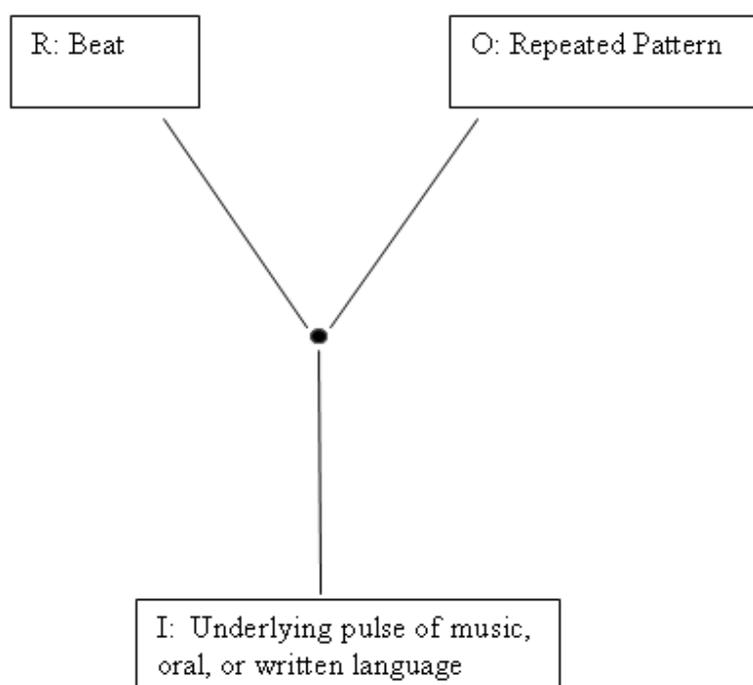
**Shared Understandings: Classroom I, June 22, 2007**

In the final week of our classroom learning events, I gave each child in the study a booklet of twenty of the speech-pieces and songs that were common to all classes (Appendix F). We read the chants and songs together and I told the children they were welcome to color the illustrations and take their booklets home to keep and read through the summer. Analysis of the videotape of this learning event indicates that children were still at different points of a reading continuum. The sign-vehicle of reading continued to have a wide range of objects and interpretants among all classrooms.

As Classroom I was reading their booklets together, Carolyn worried that she couldn't remember playing "One Two Tap Your Shoe." "Let's show her," Sara suggested. I didn't have my bag of sticks with me that day so I suggested we just use our hands for the part of the sticks that we normally used for the piece. After one time through, I asked the children what sounds are hands were making. "The beat, the beat," they all shouted in chorus. "I think they get it," said their teacher. Carolyn said, "Now I remember. I just needed the beat to tell me again." And Steven said, "I just like that old beat."

I ended the research design with the same question I asked students in the first data example previously described. When I asked children what sound our clapping hands made at the beginning of this study, I analyzed a variety of possible objects and interpretants. The study began with many different understandings of and attitudes towards beat and print text literacies in all experimental classrooms. By the end of the study, all classrooms arrived at a place of shared understandings regarding beat experiences, a Thirdness that Danesi (2004) describes as "a source of knowledge about

the world” (p. 18). By the end of this study, beat had become an available and generalized semiotic resource in all experimental classrooms. The sound, idea, or image of the beat was taken to refer to a repeated, recurring pattern that was understood by all classrooms to be the underlying pulse of both music and language (Figure 38) and served as the temporal framework for reading print text for many students. The notion of beat mediated and transmediated a variety of understandings about music and reading based on the generalized, common, and shared understandings of the musical concept of beat.



*Figure 38.* Beat understandings are generalized and common to all experimental classrooms.

### **Mediating Artifacts**

Artifact use was planned for practical purposes to enhance rhythm, beat, and language experiences in this study. Artifacts were initially used as unmediated tools but became ever more complex signs and assumed the function of semiotic mediators throughout the unfolding of the learning design. The importance and impact of artifacts as identified through semiotic data analysis extended well beyond the original purposes conceived for artifacts. Artifact use provided multiple and unexpected ways for students to engage with beat and print text.

Artifacts used in this study served a variety of functions. Artifacts were initially used as tools for specific tasks such as illustrating beat, giving directions, varying speech-pieces, or as inspiration for creating or supporting speech-pieces. Artifacts such as nonpitched percussion instruments were used for practical purposes based on their material qualities. As a sign-vehicle, sticks, woodblocks and tick tock blocks were used iconically and indexically to create the sounds of clocks or horses' feet. Balls were used to bounce; puppets were used to create the sounds of characters featured in speech-pieces; finger cymbals were used to create the sounds of twinkling stars or the sun. Artifacts were examined and interpreted for their material, sensorial, and imaginative qualities.

Herbie the cone puppet was an important tool used to distinguish between rhythm and beat and to facilitate various reading and beat games. Through social use, Herbie acquired additional meanings and interpretants and became something much more than a material, external tool. Herbie indexed positive beat experiences then indexed to positive oral language experiences then indexed to positive reading experiences creating an unexpected but effective process of semiotic chaining. Once Herbie was serendipitously

introduced into the learning events, children asked for him on every occasion. The strong and positive indexical association grew and strengthened with use as the students developed Herbie's story to include a wife, children, and friends.

The cone puppets Herbie, Henry, baby Henry and Herbie, Wormie, and Snuggles, created important semiotic links as a result of their functional use and their imaginative and creative play potentials. They served as catalysts for exciting and unexpected semiotic chaining in all experimental classrooms. The story of Herbie and his family initiated a semiotic chain incorporating movement, beat, oral language, and print text experiences that wove unbroken throughout the entire learning design and extended beyond the length of the study.

Artifacts served as semiotic mediators in all ways described by Peirce's ten sign function classifications. Artifacts mediated and communicated understandings about the beat and language through use and the ways in which children interacted with the artifacts. For most of the children in this study, any nonpitched percussion instrument or body percussion that played a steady, repeated pattern of equal duration and interval of sound became the sign-vehicle referring to the object of beat interpreted to mean the underlying pulse of a written or aural speech-piece. For many children, artifacts also became important semiotic resources for a variety of other meaning-making possibilities. Hoffman (2007) believes that artifacts, concrete objects, or representations are "far more important for the development of knowledge than anything else" (p. 193). Certainly for this study, artifact use was found to be far more important for the development of knowledge about beat and rhythm than ever imagined during the planning of the design research.

### **The Semiotic Potential of Beat for Experimental Classrooms**

According to Peirce's conception of the sign, beat can function as any component of the triad. In this study, beat acted as representamen, object, and interpretant. As a sign-vehicle, beat took on a variety of objects and interpretants throughout the study. The beat representamen related objects such as nonpitched instruments, beat diagrams, images, songs, chants, artifacts, the sounds of language, music, and print text.

The beat was important to the students in this study at all levels of Peirce's phenomenology. The sign-vehicle of beat was realized as each of Peirce's first Trichotomy of concepts: qualisign; sinsign; and legisign. Beat began for many children as a qualisign, a sensory and emotional response in the dimension that Peirce describes as Firstness. In the category of Secondness, specific occurrences of the beat fell into the category of sinsigns. Beat then came to be interpreted by the social-cultural classroom groups as a legisign and third, when the classroom communities recognized these specific beat experiences as being part of a larger and general category of underlying pulse common to all music and aural and written speech pieces.

The sign-vehicle of beat was related to various objects in all three ways specified by Peirce's second trichotomy. Beat-object relations were analyzed as combinations of iconic, indexical, and symbolic experiences. Peirce divides iconic signs into image, diagram, and metaphor (Bundgaard & Stjernfelt, 2010). As an image, the beat as sign related to objects by shared qualities of sound. The sound and sensation of beat was related iconically to the shared qualities of the underlying internalized beat of specific speech-pieces and games associated with each learning event. The sign-vehicle of beat diagram and its object of beat shared structural relationships. The lines on the board

related to its object by way of similarity (duration and equal intervals of sound) and analogy. The concept of beat was related metaphorically to its object, for example, the “force,” and served as a metaphor for particular social behaviors, learning event activities and through transmediation, as print text for some children.

The student sign-users came to index a variety of meanings in relationship to the operation of the beat-sign-vehicle. Beat began as an indexical sign for shared classroom experiences associated with the learning design. As it acquired different objects, beat indexed enjoyable, collaborative experiences and relationships. It came to index successful reading events, self-efficacy, positive community effects, emotional and imaginative engagement, and specific classroom identities. Hearing the beat, feeling the beat, seeing the beat, audiating the beat, as well as the idea of beat, indexed positive student feelings and responses.

To complete the second trichotomy of beat-object relationships, the Peircean notion of symbol relates sign and object through language. In this study, all classrooms were quickly able to move from physical beat performance experiences to naming those experiences as keeping the “beat.” Beat became a convention or habit in the study classrooms, satisfying Peirce’s definition of symbol (Hardwick, 1977).

Peirce’s third trichotomy classifies the sign-vehicle in relationship to its interpretant and object. The classifications of rheme, dicent, and argument are evident in data analysis. When the interpretant of the sign-vehicle of beat represents possible qualities of the object, the sign is understood to be a rheme. Rhematic interpretations of beat were analyzed in learning events that featured imaginative and creative experiences. As an icon, the sign-vehicle of beat functioned in a relationship of similarity to the

“force,” experienced in a direct, physical, and sensorial way. As a rheme, the sign-vehicle of beat functioned in a more mediated way so that the experience of beat referred to the object of the imagined and felt “force” with an interpretant meaning of a powerful, metaphysical and unifying individual and classroom energy.

Dicent sign-types were analyzed in all classroom learning events. Dicent signs include beat experiences interpreted as being authentic, real, and actually experienced. The concept of beat was kinesthetically embodied and cognitively internalized as a real and natural phenomenon that meant the underlying pulse of rhythm, oral language, and print text experiences. For some students, print text was a dicent-index for the object of beat because the sense made of print text was that it was actually affected by the beat.

Once internalized, beat provided a guiding temporal framework for aural and written speech-pieces. The temporal framework created by the underlying beat allowed children to see print text within the whole, meaningful context of the speech-piece rather than as isolated, disconnected letters, words, or phrases. Beat affected the reading of print text by organizing the print text structures. When words were visually fragmented on the board as exemplified in the data samples, the children did not read them in isolation in the random way they were visually represented. Although the words were presented in a seemingly haphazard manner, the internalized beat provided the temporal glue and framework that allowed the children to still hear and feel the missing print words to facilitate the flow and patterns of the words within an organized, contextual framework.

Argument, the final concept of Peirce’s third trichotomy, is a sign “whose Object is a General Law or Type” (Peirce, 1965, 2.253). In this study, the term and concept of beat became a generalized culturally accepted symbol, convention, rule, and knowledge,

or what Peirce would call type or law, to establish a state of Thirdness. Conceptual understandings of beat as the underlying pulse of rhythm and reading experiences were used by all children in the study for the purposes of meaning-making and communicating in music and print text literacies. Beat became a source of knowledge about the children's world of music and aural and written language systems, once it entered the classroom culture and was available and distributed for general and practical use (Danesi, 2004).

The signs just described in this analysis, although identified by their prominent functional element, are actually made up of combinations of elements from Peirce's ten basic sign types described in methods. Peirce classifies signs according to their properties and characteristics, but categories of sign-use overlap, intermingle, and function in multiple layers of mediation and chains of semiosis as indicated in the data analysis samples. Beat was perceived at times as an icon in instances of direct, less mediated relationship such as the sign-vehicle of a loud, accented beat referring to the object of "Old Pirate Dan." When the concept of beat was perceived to be a possible and general "force" then imaginative, qualitative, and rhematic characteristics were important and the sign is best described as a rhematic-iconic-sinsign. Further along the chain of semiosis, beat was understood to be a sign of habit or convention for all classrooms, then defined as a rhematic-iconic-legisign.

Complex iconic signs featured prominently in data analysis. The sign-vehicle of beat created a likeness with other beat sign-users in the experimental classrooms, resulting in a strong sense of social identity. Beat experiences were central to all classroom learning events and so defined and unified the collective group. Consistent and repetitive synchronous beat experiences seemed to be interpreted as giving comfort,

security, reassurance and belonging. Students shared that they liked “that beat” and that it helped them in a variety of ways. After two weeks, beat seemed embedded in the classroom culture; classrooms began performing the beat to speech-pieces without waiting to be invited to do so and often spontaneously began to pat the beat as soon as I entered the room.

The beat was fundamental to how we communicated, how we moved, played, chanted, sung, and read rhythm, oral, and written language in our classroom learning events. As a rhematic-iconic legisign, the sound or idea of beat is related to the synchronous and collective force bonding students together in direct, physical, sensorial, and emotional ways leading to shared understandings of beat. These understandings involve beat as a general type of sign known as the underlying pulse of rhythm and reading experiences. The sign-vehicle of beat was mediated as a convention or law of underlying pulse that regulated and governed physical activities such as running, dancing, and playing instruments, and cognitive activities such as counting, reading print text and music notation. By the end of the study, beat became a symbol for all classrooms. When the term beat is taken to be a linguistic noun meaning a general type or class, the noun used as sign-vehicle functions as a rhematic-symbolic-legisign or rhematic-symbol. Beat as a symbol was an important sign function for meaning-making in both print and non-print literacies in this study.

Results of data analysis indicate complex indexical legisigns were also important sign functions for building positive community and identity to facilitate learning in many classrooms in this study. The “Hello Song,” speech-chants, songs, and beat movement activities came to index positive relationships with the teacher/researcher and the

classroom communities. Beat indexed a powerful, direct sense of connected community, mediated as rhematic-indexical legisigns and dicent-indexical legisigns to create a strong sense of unity, identity, and purpose in many classrooms. The data sample of “The Force” exemplifies different beat functions of rhematic-icons, rhematic-indexical legisigns, and dicent-indexical legisigns operating together.

When beat experiences related sign-vehicle and object through qualitative similarity and indexed creative, imaginative, emotional, and sensorial interpretants, beat functioned as rhematic-iconic and rhematic-indexical legisigns. When beat experiences indexed direct, energetic, and real experiential and emotional interpretants, beat functioned as a dicent-indice sign. Beat experiences combined iconic and indexical legisigns so that hearing, seeing, feeling, or imagining the beat simultaneously produced a powerful combination of both emotional and directly experienced physically real interpretants. Such iconic and indexical relationships created positive understandings of the beat experiences for many children, which then served to attract other beat sign-users in the experimental classrooms and support use of beat experiences in the learning design.

Beat experiences created opportunities for students to communicate with one another and with the teacher/researcher in indexical ways common to all participants. Construction of these common communication patterns, experiences, and interpretants created a sense of identity, belonging, and purpose in varying degrees for all experimental classrooms. For example, Classroom B was united in their knowledge and understanding of beat actualizations and transformations in many speech-pieces and associated games they created such as “Old Pirate Dan.” “Old Pirate Dan” moved from the classroom learning event to the recess period, creating a particular bond and sign of identity for this

classroom. Classroom C strongly identified with the Flower Song; Classrooms F and G strongly identified with beat games associated with the puppets, and Classroom J created unique, identifying beat chants for each child in the class. All classrooms experienced the beat as a real “force” that created unity, belonging, community, democracy, purpose, and common vocabulary.

In this study, artifacts and beat experiences functioned at all levels of Firstness through Thirdness and in all combinations of Peirce’s ten sign function classifications depending on their use and student perceptions. Beat was part of a semiotic triad for which the interpretant was the underlying pulse of rhythm and reading experiences. For some children the interpretant of beat experiences was oral language and for others it was reading. The sound of the beat, the beat diagram on the board, the embodied beat, or even the idea or thought of beat was transmediated to mean print text for some students in every classroom. For all classroom units, beat was a synchronous force that mediated identity as a community of learners engaged in reading and rhythm experiences.

The transmediation potential of rhythm was realized in part due to the power of Firstness and Secondness to create strong emotional and experiential connections to the learning communities sharing identity, community, and purpose. When oral and written language were perceived and interpreted through the sign system of music and rhythm, new objects and interpretants resulted that expanded ways of understanding concepts about music and print texts for many children in this study.

\* \* \*

### **You've Got to be Modernistic**

"You've Got to be Modernistic" (2002/2009) is Jason Moran's cover of the 1930's piece of the same name used to transmediate understandings of Methods presented in Chapter Three. The 2002 version was used as a transmediating resource for semiotic data results as the new listening emphasized how the same experience or source can be viewed very differently from one person to another. The original 1930 piece by James P. Johnson is in the style of a ragtime march and sounded modern even to 2010 ears through the use of the whole tone scale and augmented intervals. In Moran's hands, the dissonances are carried to further extremes.

Giddins and DeVaux (2009a) suggest that Moran has given Johnson's work a radical transformation through Moran's elusive, unconventional style and maverick innovations. Although Moran begins the piece with the same opening bars and theme of Johnson's version, Moran's take is a whole new journey. Likewise, semiotic data analysis revealed that the same rhythm and reading design represented a different journey and experience for each student in this study. Students made different meanings of the same events and activities. What served as a sign-vehicle for one student was an object for another and an interpretant for yet another student. Whatever the mediated interpretation made of the learning experiences, common to all was an ultimate generalized understanding and use of the "force" of the beat.

### **Chapter Eight: Playing Outside**

The capacity for tool-use determines rhythms that are as ‘natural’ a part of human lives as the spinning of spiral orb webs is of the lives of barn spiders, or the weaving of pouch nests is of the lives of Baltimore orioles.

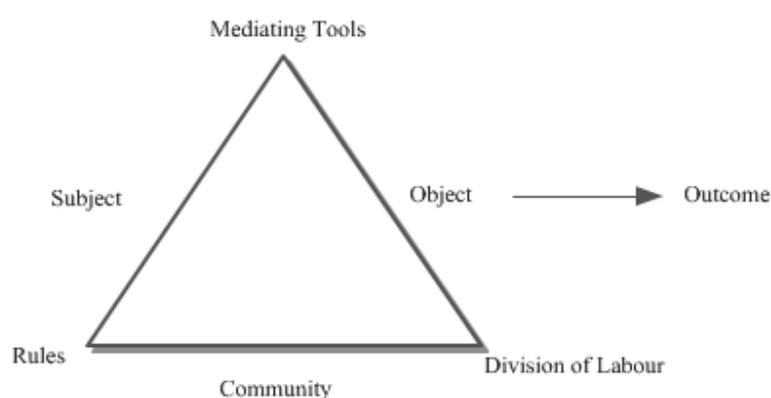
(Zwicky, 1992, p. 264)

#### **Multimodal Data Analysis Results**

Multimodal semiotic data analysis results present multimodal tool-use in this study. Tools included multiple modes for meaning-making and communicating as well as the mediating artifacts used in experimental classrooms. Certain modes and tools became a natural part of the daily rhythms of the experimental classrooms throughout the course of the study. Beat and oral language were foregrounded in every learning experience and determined the rhythm and pulse of the learning design for all experimental classrooms. By the final phase of the study, imaginative play generated by the use of the puppet artifacts became a regular feature of each experimental classroom, although to varying degrees. The multiple mode use reported in this chapter extends beyond the two key variables of oral reading and rhythm as reasoned in Chapter Four. In moving outside the reading and rhythm tonality, the chapter is playing “outside” the harmonic progression from a jazz perspective.

Multimodal semiotic data analysis was used to determine and evaluate meaning-making potentials including the primary semiotic resources of oral and written language and beat. Data for all experimental classrooms were analyzed using multimodal data analysis and the data analysis framework described in methods.

Engeström's (1996, 1999, 2001) second generation activity theory model was used to place the multimodal learning events and Learning Design in the context of the social, historical, and cultural elements of the classroom ecologies. The experimental classroom communities were each considered an activity system as represented by Engeström's triangle in Figure 39 below.



*Figure 39.* Experimental classroom activity system.

The subjects were the groups of individual students, teacher, and teacher/researcher participants who together engaged in the activity and goals of the research design. Parent/guardians were also a part of the research design but are not included as participants in the learning events of the activity system as their participation was restricted to survey responses before and after the learning design. The mediating tools (Table 18) included multiple modes, small, mostly nonpitched percussion instruments, artifacts, physical classroom resources, and curricular classroom resources. As the learning design was constantly being shaped through an iterative process of

analysis, mediating tools also included interviews, conversations, field notes, audio/video recordings, journal, texts, databases, internet, email, phone, and critical friends.

Table 18. *Mediating Tools Used in the Study*

<b>Modes</b>	<b>Small percussion</b>	<b>Artifacts</b>	<b>Classroom Resources</b>	<b>Reflection Tools</b>
Sound	Drum	Ball	Classroom and spaces within classroom	Teacher interviews, conversations, feedback
Visual	Sticks	Star	Whiteboard, markers	Conversations, feedback from other adults in classroom and school
Movement	Finger Cymbals	Snail	Pointers	Field notes
Gesture	Tick Tock Block	Bone	Magnets	Audio/Video Recordings
Gaze	Glockenspiel	Puppets	Curricular resources	Research Design Journal
Music (Rhythm, melody, timbre, form, expressive elements)	Bells	Tooth	Student Work	Academic Texts
Speech	Eggs	Felt Hearts	Classroom Themes	University Databases
Oral Language		Umbrella		Internet
Written Language		Small drum for signals		Critical Friends
Dramatic, imaginative play				Email/phone

The objects included the goals of the learning event, meaning-making through music and print literacies, and collaboration with teachers. The outcomes are the Results

of the Data Analysis. The Learning Design community includes the University of Manitoba and advisory committee, the school divisions, the parent/guardians, the schools and principal, the collaborating teachers, the four control and five experimental classroom learning communities and their students, educational assistants, parent volunteers, and the researcher. The vertical division of power and status began with the University of Manitoba's approval to proceed with my research and the granting of an Ethics certificate, each Divisional Superintendent's permission to undertake research, and permissions from the school principals, collaborating teachers, parent/guardians, and the children.

The horizontal division of tasks included: the collaborating teacher's responsibility for his or her classroom and students, providing feedback to me, participating in and observing activities of the learning design, helping to facilitate pre- and post-reading and beat competency tests, and participation in pre- and post-interviews. My responsibility and task was to interview teachers, administer pre- and post-tests, teach the beat and reading events, and to collaborate with classroom teachers, schools and school principals, school divisions, and the University of Manitoba. The students' responsibilities were to participate in pre- and post-tests, learning events, provide feedback, and participate in focus groups. The parent/guardian responsibilities were to fill out and hand in pre- and post-surveys. We all followed the rules, conventions, and norms of each classroom and school, and the guidelines that I set out for each action and activity in the learning event and design. The principals, collaborating teachers and I all shared values concerning the importance of print literacies, the arts and music, and constructivist

approaches to teaching and learning. The children and parent/guardians did not all share the same values for music and reading as indicated by other data results.

Two learning events were selected to exemplify representative multimodal use and transmediative potentials in this study. A phase one learning event examining beat awareness and a phase three event exploring transformation and transmediation potentials illustrates multimodal learning at two different stages of the research.

### **Beat Awareness Classroom I May 3, 2007**

From an activity theory perspective (Engeström, 1996,1999, 2001) the object for this learning event was: 1) to create beat awareness; 2) to develop body awareness and a set of movement tools to mediate beat competency; and 3) to aurally and orally learn a speech-piece for the eventual goal of reading it from print text. Mediating tools included the modal resources of oral language, beat, and movement.

The subject, community, rules, and norms are as previously described. In all learning events, I tried to follow the rules, norms, and values of the individual classrooms. Classrooms in the study had very similar rules, norms, and values that were typically ones I used in my own teaching, so it was a comfortable and natural process to follow the rule, norms, and conventions of schools and classrooms.

Roles and responsibilities were clearly defined in this and all learning events in the learning design. Collaborating teachers allowed me to assume the role of teacher in the classroom for the duration of our learning event. When I arrived to the classroom and sat in my chair, I was in charge of the learning event and the collaborating teacher assumed the role of observer or participant, along with the children. In this data example, the teacher participated at the back of the group until the movement began. At that point,

the teacher assumed an observer stance and after the locomotor activity, rejoined us on the carpet for the next part of the learning event. The children seemed to move naturally from their classroom roles as participating students in their collaborating teachers' class to participating students in my "music" class or Mrs. Peters' time.

Rules, norms, and values for our beat and reading learning events were mostly established as required. For example, the first time we patted the beat, I told the children their hands stopped when mine did. From that point on, whenever I wanted the children to stop body percussion or playing nonpitched instruments, I would place my hands on my knees and the children would know that it was time to stop. In this learning event, I established that our feet would stop moving as we moved through the classroom when the sound of the beat stopped.

According to CHAT principles, historicity must be considered. Based on the data I collected before the study began, I knew that beat experiences would be familiar to all children through their school music program. I also knew that body awareness was a general learning outcome in the Phys-Ed and Health program. Some of the vocabulary was familiar to students; *in*, *it*, *your*, and *hand* are from the first three hundred words on the Fry sight word list (Rasinski, 2003). The word targeted in this speech-piece for future print reading, was "your," #21 of the first hundred Fry words. There were individual perspectives, traditions, interests, positions, and aspects of individual and classroom historicity that affected meaning-making but were unknown to me. Different meanings were mediated in unique ways at various temporal locations in the learning event for different children.

**The learning event.** First beat and reading events in all classrooms were designed to focus on and create beat and body awareness while introducing reading repertoire. “Feel the Beat” was a game introduced in the first learning event and played in all classrooms using variations of the data example below. As I entered the classroom, the collaborating teacher called out cheerfully to the children, “Mrs. Peters is here. Let’s show her how quickly we can get ready so we can see what she has for us today!” The children promptly organized themselves and I began our class as usual sitting in a chair in front of the board in the classroom with the children sitting on the floor in front of me. The tables were arranged in the classroom behind the children sitting on the floor. I smiled a welcome to the children and without any speech introduction I launched into our Hello Song, patted the beat on my knees and the children joined in. By this time, most of the children were able to sing with me and all were patting the beat. I inserted the learning goal for the day into the Hello Song:

Hello everybody yes indeed, yes indeed, yes indeed.

Hello everybody yes indeed, yes indeed my neighbour.

Today we’re going to feel the beat, feel the beat, feel the beat.

Today we’re going to feel the beat, yes indeed, my neighbour.

Immediately after our Hello Song I began chanting:

Feel it in your hands

Feel it in your feet

Feel it in your body you’ve

Got the beat!

I clapped my hands to the beat of the first line (4 beats per line), alternated stepping my feet from my sitting position in the chair for the second line, wiggled my body from side to side in my chair for the third line and patted my knees for each word of the fourth line. The children spontaneously joined me in the actions so by the end of the chant the whole class was doing the actions with me. “Again!” shouted Kyle. “Here we go,” I responded and we played the game together again. Not everybody had caught all the words and many children were just clapping three beats instead of groups of four, so after we finished the second time, I asked the children to echo each line after me. I watched the class carefully as I modeled the actions and words and as the children imitated me. All eyes were fixed my way and I scribbled in my notes, “everyone concentrating!” We played a new “game” with the words where I varied the dynamics and timbre of the words for the children to imitate. We chanted, clapped, stamped, and patted fast, slowly, quietly, loudly, with scary voices, and with happy voices. Stamping was a challenge from a sitting position so when the beat and words were secure, I said, “Let’s try it standing up now.” We repeated our game from a standing position, and experimented with different levels in space for “Feel it in your body.” Some children twisted their bodies from side to side in as low a position as they could crouch, others would stand upright, and still others would twist at various points in between. When we were finished, Carly said excitedly, “I’ve got it, I’ve got it, I’ve got the beat!” There was a chorus of “me, too,” and “I can feel it, too!”

“Let’s see if we can move that beat, then,” was my reply. I told the children that whenever we chanted, “Feel it in your feet,” we could move our feet wherever we wanted in the room but we had to stop on the words, “Feel it in your body,” and do our body beat

in one spot. We had a brief conversation to review what the students already knew about personal space and how to move through the room without bumping into chairs, table, and each other, and we agreed we would stay in our personal bubbles as we moved throughout the room. After one try, one of the children raised her arms to the sky on the last word “beat” in a celebratory gesture, eyebrows raised and with a big smile and the other children quickly copied her on the next round of the piece. We tried several variations of tempo, dynamics, and mood (i.e. tiptoeing the beat sneakily) and all the students seemed to be having great fun successfully performing the beat and chanting.

One boy in particular was deeply engaged in the activity. Dustin was taking this activity very seriously and would accent the words hands, feet, and body quite loudly, firmly, and most determinedly while doing the appropriate action. He seemed to be emphasizing to himself the different words for the body in association to their parts, clearly indicating understanding of the vocabulary and its meaning. He could be heard above the others chanting, “Feel it in your *HANDS!* Feel it in your *FEET!* Feel it in your *BODY!* You’ve got the beat.”

The final form looked like this: Children began in a standing position in their own space in the room and clapped the first four beats of the chant. They walked in any direction and at any level in space for 4 beats, then stopped and twisted their bodies from side to side for 4 beats at different levels in space. The children chose a variety of different ways to move their bodies for “feel it in your body.” They ended with 2 pats and their arms stretched upwards for the last word. The word “beat” became extended as children stretched out the word with their voices as they shimmied their hands above their heads.

As the children moved through the room and around the tables and chairs, the beat could be seen to move in different directions, at varying levels, and with different motions resulting in a unique version of the speech-piece every time we enacted it. I asked the children if they wanted a challenge and wondered to them if they knew the piece well enough that they could perform it without any words. There was enthusiastic and positive response so I asked the students if they would say the words inside their heads, but show the beat and the actions. We decided we needed a signal to start and that we would do the piece four times, each time a different way, and on the last time speak just the words, “You’ve got the beat!”

I began chanting the signal, “One, two, three, four, let’s go once more!” and then all the class began clapping, stamping, and moving the beat without any words. Most of the children were able to stay together simply by watching each other and they were very excited when we all ended together shouting, “You’ve got the beat!” Karmen suggested one final version of the chant. “We should do it one more time,” she said, and say “*We’ve got the beat!*” As I was leaving at the end of the class, Ian came up to me, looked me squarely in the eye, and said quietly, “I *did* feel it you know. I *did* feel that beat.”

**Multimodal data analysis framework.** The primary modes and media involved in this learning event roughly in order of appearance were space and place, melody, sound, speech, oral language, rhythm, gaze, gesture, voice quality, movement, timbre, and dynamics. The purpose and function of each mode is presented here in order of appearance. Modes are analyzed using the guiding questions displayed in the multimodal analysis framework (Table 19).

Table 19. *Multimodal Data Analysis Framework Classroom I, May 3, 2007*

<b>Multimodal Data Analysis Framework</b>	
<b>Unit of Analysis: Experimental Classroom Learning Event</b>	
<b>Guiding Questions</b>	<b>Class I</b>
1. What modes are used?	Space and Place; Music (melody, rhythm, timbre, dynamics, tempo); Sound; Movement and Gesture; Gaze; Oral language; Voice quality.
2. What modes are used for what purpose?	Speech for teacher/student communication; rhythm to convey measured time and underlying pulse of words; timbre, dynamics, and tempo for student engagement and as a means to vary, repeat and reinforce speech-piece; sound to convey sound of beat in various media i.e. clapping, stamping, sound of words; movement for embodying and translating the beat and the words of the speech, interpreting meaning of words, and to establish movement skills to use in future learning events; gesture for directions, to indicate space, and as an expressive element to interpret response to speech-piece; gaze and gesture to indicate interest, focus, intent, direction in space; oral language to articulate speech-piece; voice quality to indicate interest, engagement, enthusiasm; and space and place as both constraint and vehicle for movement representing and interpreting speech-piece and purpose of learning; creativity and imagination to create variations of the movement/beat/speech-piece.
3. What modes are foregrounded?	Oral Language; Rhythm/Beat; Movement; Gaze; Sound as a medium
4. What ideational meaning is expressed through field? What is happening? What is the social action or topic?	Oral language is used to represent a speech-piece about beat. The field of possible meanings includes: knowledge about a speech-piece and beat using assumed, common knowledge; knowledge about rhythm and movement to represent the pulse of the speech-piece using assumed, common knowledge; beat awareness (Music); learning outcomes from the Movement GLO (Phys-Ed); and learning outcomes from Learning Outcome 2 (English Language Arts). Gaze is being used to indicate meanings of attention, engagement, and intent.

table continues

5. What interpersonal meaning is expressed through tenor? Who are the participants and what are the relationships between them? What are the social roles, status, and attitudes?	Modes are structured to express interpersonal meanings of collaboration between teacher/students and the student community. The teacher has the position of power which is shared with students as the learning event progresses. Modes position children as active and willing participants in the learning event. Children appear to enjoy interactions.
6. What textual meaning is expressed through mode? What is the organizing role of mode? What part does the mode play? What status does it have? What is the channel of the mode (spoken, written, etc.)?	The foregrounded texts of oral language and rhythm are created to be interactive and face-to-face, and students and teacher actively explore the texts together in a variety of ways. Cohesion is realized through the concept of beat and the speech-piece repeated in a sequential, spiral fashion using different modes. Oral language and rhythm assume the greatest status within a variety of modes and channels.
7. How are modes interpreted and by whom?	Modes are interpreted by the teacher as a means of giving direction (speech) and sharing discourse (speech), to create awareness of body, space, oral language, and rhythm, and to evaluate student engagement and understanding (gaze, gesture). Modes are interpreted variously by children. Generally the mode of oral language is interpreted to convey understanding of speech-piece; speech is used to share ideas and reflection; rhythm is interpreted to convey understanding of the pulse of the speech-piece, and gaze is interpreted as encouragement to enjoy and participate in the learning event.
8. Transformative processes?	The learning event begins with children sitting at the carpet and the teacher sitting on a chair in front of them. This is transformed to nonlocomotor movement and transformed again to experience the same learning through locomotor movement with transformational variations. Transformative processes give rise to processes of creativity, imagination, and innovation.
9. Transductive processes?	Oral speech is transmediated into nonlocomotor and locomotor movement. Rhythm is transmediated through nonlocomotor and locomotor movement as well as through speech. Group and individual processes of creativity, imagination, and innovation are inherent in transmediation.
10. What is the functional load of each mode?	The modes of oral language, rhythm, movement, and sound share the functional load. The informational

table continues

	load is not carried by speech, gaze, or other identified modes.
11. What modal density?	Oral language is a high density mode throughout and by the end of the learning event, oral language, rhythm, movement, and sound become high density modes, making this a complex activity and a learning event of high modal density.
12. Mode or medium?	Medium: Timbre, dynamics, and sound are used as material resources to convey other modal meanings.
13. What is the experiential meaning potential?	Based on the provenance of oral language, rhythm, and movement sign systems, the experiential meaning potential of oral language, rhythm, and movement to create conceptual understanding of beat, body awareness, and knowledge of the speech-piece is high. Based on the provenance of gaze and gesture, the experiential meaning potential of these sign systems to create understanding of attention, engagement, and intent, is high.

Ideational meanings were determined by the context of situation of the classroom learning event. The field of discourse refers to what was happening in the first learning event of the study. The student and teacher/researcher participants were engaged in activities that focused on beat and body awareness. The participants explored a speech-piece and movement game called “Feel the Beat.” The interpersonal meanings refer to the ways interactions were enabled in this learning experience. The teacher/researcher was in a position of power over the student participants. Student participants assumed equally positioned social roles.

The tenor of discourse in this context of situation was instructional and collaborative. The teacher/researcher instructed students in the tools and language of music and movement and accepted suggestions from the students for ways of using those tools. All participants seemed to enjoy all modes and interactions. The textual meanings achieve coherence and connectedness (Christie & Unsworth, 2000) through the

integration and consistent use of a variety of interactive modes as indicated above for this context of situation. Oral language and rhythm were the modes of greatest status.

The learning event began with the mode of space and place. Space has been successfully established as a mode with meaning-making potential (Ravelli, 2006, 2008). Sites themselves can be considered texts that function within given social and cultural contexts (Ravelli, 2008). The text of space and place of school and classrooms told us we were at a place where teachers and students were involved in multidisciplinary teaching and learning using varied and rich literacy resources. Children therefore treated our rhythm and reading learning experiences as part of the teaching and learning function, rather than as entertainment, recreation, or free play.

Interpersonal relationships in this space and place and for all learning events were framed within the role and relationship of teacher/researcher and student. In my role in this space and place, I was not the children's friend or a visitor/volunteer for the day. All collaborating teachers introduced me to the classrooms as someone who would be working with the children for the rest of the school year. In this space and place, I assumed the stance and natural authority of a teacher and the children were my students.

The textual metafunction and local mode of discourse focus on the local resources of space and place for shaping meaning-making and for prioritizing, fragmenting, or creating cohesion for the learning event (Ravelli, 2008). In this illustrative learning event, the organization of the space and place constrained beat and movement activities to available spaces around the tables and chairs unless we moved furniture to create larger spaces. In all classrooms, space was provided for the classroom group to gather together

in front of the board but the normal classroom space indicated that work sitting on chairs at tables was prioritized.

Melody in the form of the Hello Song was the next mode presented in the learning event. Melody was only featured in this one instance so has little functional load, modal density, or status, although melody contributed to high modal density taken together with the other modes that made up the overall leaning event. The ideational meaning and field of discourse involved activating learning, establishing a focus for beat, and introducing the learning goals. The interpersonal meanings and tenor referred to positive relations and attitudes between all participants. The enthusiastic response and participation by all children in singing the song indicated that students interpreted this mode as an enjoyable experience. The mode of discourse involved linking melody to other modes through integration of nonlocomotor movement and rhythm performance with the melody and singing of the song.

The resource of sound overlapped with the mode of melody, rhythm, and movement. In this learning event, we primarily heard the sounds of speaking and singing voices, and the sounds of body percussion. The question of whether or not to consider sound as a mode or medium is one that is debated in the literature (van Leeuwen, 1999). Kress and van Leeuwen (2001) regard medium in two ways: as material, cultural resources “used in the production of semiotic products and events” (p. 22) and as material resources found in nature such as our physical vocal apparatus. A mode is considered to be a “regularized, organized set of resources for meaning-making” (Jewitt & Kress, 2003, p. 1).

Kress and van Leeuwen (2001) believe that media become elevated to the status of mode when that media cease to be regarded as functionally specific material realizations and become abstract grammars involved in the process of semiosis. In this study, I assume the stance that sound can be classified as either mode or medium, depending on its context for use and the ways in which it is used by the study participants. In this learning event, sound functioned as a medium for the modes of speech, oral language, rhythm, and movement.

Speech may be considered a semiotic, modal resource distinct from the modal resource of oral language, raising yet another modal/medium debate that is played out in the literature (Barthes, 1977; Kress & van Leeuwen, 2001; Kristeva, 1980). I assume a pragmatist stance once again, and view both language (written or oral) and speech as potential modes depending on use, context, and interpretation. In this learning event the ideational purpose of speech was as a medium to convey directions to students and a means of sharing ideas and reflecting on learning, and as a modal resource for semiosis.

Speech was not foregrounded in this learning event. Speech had low modal density and did not contribute significantly to the modal load in this learning event and most other learning events in this design. The textual function of speech was organized so as not to create emphasis on verbal explanations or teacher talk. Student speech was encouraged to communicate ideas and to respond to learning events but the modal load and density for student speech was low in comparison to the modal resources of oral language, rhythm, and movement. The ways that speech was organized for use in the learning event affected interpersonal function and tenor of discourse. The learning event was designed so that tenor was focused on student interactions as they constructed their

own meanings through active participation and processes of multimodal semiosis rather than through exchange of dialogue.

The ideational function of the oral language mode was realized through a speech-piece about feeling the beat. A number of outcomes were met from the English Language Arts curriculum as for example from General Outcome 2--Understand Forms and Techniques: “Experiment with parts of words, word combinations and word patterns for a variety of purposes,” and “appreciate repetition, rhyme, and rhythm in shared language experiences such as action songs, word play” (Manitoba Education and Training, 1996, p. 26).

Oral language was based on everyday knowledge. This was an important feature of this research learning design. Technical, specialized knowledge was not required for any music or language experiences. Beat and rhythm were not taught from a theoretical point of view and language was not taught from a phonics base or any other specialized perspective. I did not teach children that there were four beats in each line of the speech-piece. I didn't practice new vocabulary or print text with students in isolation prior to the learning activities in which they were the focus. Beat and oral language understandings were constructed together as we experienced the speech through collaborative beat and movement activities.

The tenor variables of interpersonal function focused on interactive and collaborative processes within a whole group experience. The teacher was positioned as the authority welcoming input and feedback from students. The power was unequally distributed between me and the students, but the power was equally distributed between members of the class. The data example shows that neither rhythm nor oral language

privileged any student over another. All were equally able to participate successfully to speak the speech piece and represent the beat. The whole group activity brought the class into close physical contact with each other but student contact was not interactive and there was no discourse between students. Students indicated high affective involvement through voice quality, verbal responses, and facial expressions.

The textual metafunction of the semiotic system of oral language was realized through integration of modes. The mode of oral language was one of several modes working and interacting together to transmediate understandings expressed in one mode and transformed through another. Oral language was one of several mediating tools in this learning event. Anything that mediates the children's action on the space, material, or constructs under study, is considered a tool (Jewitt, 2006). Oral language was a tool used to transmediate beat awareness and body awareness. Beat and movement were tools used to transmediate understandings about the oral language, thus creating a coherent whole from the linked use of tools and modes.

Rhythm, specifically the beat or pulse of the speech-piece, together with oral language, contributed to modal load more than any other semiotic system. Rhythm and oral language were foregrounded in this learning event with high modal density and high experiential meaning potential. The data example indicates that children interpreted rhythm to be the underlying pulse of the speech-piece. The ideational meaning function and the field of rhythm represented the underlying pulse of the speech-piece. In doing so, Music curriculum outcomes of "recognize, identify, and perform with others a steady beat" (Manitoba Education, Citizenship and Youth, 2008, p. 12) were met. Interpersonal

functions and textual functions were similar to oral language and described above.

Rhythm was one of several interacting modes and tools in this learning event.

Gaze and gesture were important modes used to evaluate the ideational metafunction of student engagement, interest, understanding, and focus through interpersonal interactions of positive social and affective communication. For example, the final gesture assumed by the classroom of hands raised high in the air for the concluding word “beat” was a celebratory one that I interpreted and coded as a positive, affective response. Lancaster (2001, 2003) describes ways that the mode of gaze can provide important meaning-making for the researcher in contexts where the use of language is minimal.

I noted intensity of gaze, stability of gaze, gaze focal points, duration of gaze, expressions of gaze, and whether gaze was non-directed or directed and transactional (Jewitt, 2006; Lancaster, 2001, 2003) to determine that children were actively and purposefully engaged in and intent on our learning event and that they were enjoying the learning. At the end of the learning event, when Ian came up to tell me that he really *had* felt that beat, it was the intensity of his gaze and voice quality that convinced me that this had been an important meaning-making event for him. Gaze and gesture contributed to the whole by communicating learning engagement and an affective dimension of the multimodal learning.

Voice quality also made an important contribution to the multimodal whole by communicating learning engagement and affect. A case may be made for voice quality acting as a mode in this learning event. The voices of children and the collaborating teachers frequently conveyed purpose, encouragement, enthusiasm, and a sense of

positive energy through voice qualities such as emphasis, tone quality, vocal intensity, expressive qualities, raised pitches, and patterns of rise and fall. Throughout the course of the study, I was informed by children, collaborating teachers, or adults in the room that my voice conveyed similar qualities. The collaborating teachers also used voice quality to convey to their students that the research design and each day's learning event would be enjoyable and valuable.

In this learning instance, Kyle, along with others in the class, indicated enthusiasm for our learning event by vocal tone qualities. Although vocal quality did not play a part in contributing to the modal load of this learning event, it played an important part in meaning-making for both the students and teacher-researcher. Students responded to my encouraging vocal quality and I responded to theirs. Since we did not have time outside our learning event to dialogue our understandings (with the exception of the focus groups), I frequently evaluated and noted voice quality to determine student engagement and enjoyment. The interpersonal function of this mode was important for assessing engagement and motivation for this study.

The mode of movement is well established in the literature (Jewitt, 2006; Martinec, 2000). Movement was foregrounded in this learning event and all children participated in the movement activities. Movement shared the modal load along with oral language and rhythm, and increased in modal density as the learning event progressed. The movement began as nonlocomotor movement: patting, clapping, stamping, moving, and twisting the upper body. The movement was then transformed to locomotor actions travelled throughout the classroom, and extended through varying directions and levels. Movement was used here to represent, interpret, and communicate the words of the

speech-piece, understandings of those words, and the underlying pulse of the speech-piece. Movement was used not only to transform the initial chant of the piece into nonlocomotor and locomotor movement; movement also served to transmediate the speech patterns and the pulse of the speech-piece. The content of the oral language sign system was translated or mediated through the sign system of movement and then further transmediated through the movement to show the pulse of the speech-piece, demonstrating an effective semiotic chain.

The movement mode was foregrounded in this learning event, shared functional load with oral language and rhythm, and was of high modal density throughout the learning experience beginning with the nonlocomotor movement. Movement was a well-established semiotic mode with high experiential meaning potential in this data example. Movement was used to embody the beat and words of the speech-piece, to interpret understandings of the vocabulary of the speech-piece, and to establish movement skills to use in future learning events.

The ideational meaning and field of movement focused on learning the words and the meaning of the words of the speech-piece as well as creating awareness for the underlying pulse of the words through movement. Eggins (2004) explains that field varies along a dimension of technicality from specialized knowledge to commonsense or everyday knowledge. Here, the field of the movement mode was based on the everyday knowledge of body awareness, space awareness, and locomotor movements that are part of the Manitoba Physical Education/Health curriculum for early years.

The learning event met several specific learning outcomes from the Grades 1-4 General Learning Outcome of Movement including “recognize the terms associated with

moving in various directions and at different levels,” “recognize time, force, and flow,” “explore basic movement skills and concepts in group activities and cooperative games,” and “experience moving to different rhythms applying movement concepts in simple rhythmic activities” (Manitoba Education and Training, 2000, pp. 36, 38, 48, 54).

The movement mode brought the class into close physical contact with each other as they had to navigate around tables and chairs and one another in different directions and at various levels. Their physical contact was not interactive; they were careful to stay in their own spaces as they travelled around the room. The movement mode created high affective involvement. Students indicated by voice quality, verbal responses, and facial expressions that they were committed to the learning and in some instances emotionally affected by it in a positive way.

The textual metafunction and mode of the semiotic system of movement involves spatial/interpersonal distance and experiential distance (Eggins, 2004; Martin, 1984). The spatial/interpersonal distance in this example can be described as high visual contact, low aural contact between students, and moderate aural contact between students and teacher resulting in immediate feedback from teacher, and feedback from students in between elements of the activity. Cohesion was realized through the movement mode in that the movement reinforced and transmediated beat and speech used in other parts of the learning event.

The role of movement was to serve as reinterpreted or newly interpreted beat and speech text through a social process of nonlocomotor and locomotor action. By the end of the learning event, students had interpreted and transmediated understandings of beat and

oral language through movement as indicated by the final performance where speech was audiated and internalized through the movement.

Timbre, dynamics, and tempo were used as media in this learning event. They have the potential to function as modes, but in this instance, they were not used for meaning-making purposes. Timbre, dynamics, and tempo were used to vary, repeat, and reinforce the speech-piece and provided enhanced opportunities for performing the beat. There was no particular meaning-making significance in using the voice loudly, quietly, slowly, quickly, or in different vocal timbres in relation to the meaning of the words of the speech-piece or for understanding the beat. Timbre, dynamics and tempo were used to engage students in the learning and to successfully keep their interest and focus.

**Classroom I summary.** The results of this semiotic multimodal data analysis example indicate that the multiple modes of space and place, melody, sound, speech, oral language, rhythm, gesture, gaze, voice quality, and movement combined and interacted together to reshape, transform and transmediate new meanings about rhythm, oral language, and movement for some children in this high density multimodal learning event. Rhythm, oral language, and movement were valuable semiotic resources for meaning-making that shared the functional load to internalize learnings about beat and oral language for some students.

The interpersonal meaning and tenor of this learning event was an interactive, collaborative learning experience with the teacher positioned as the authority welcoming input and feedback from students. Eggins (2004) follows Poynton's (1984) suggestion to divide tenor into dimensions of power, contact, and affective involvement. The semiotic resources or modes of rhythm, oral language, and movement, used in the collaborative,

interactive ways described in this learning event were inclusive of all children and did not privilege or disenfranchise any particular student group or individual. In this learning event, the power was unequally distributed between me and the students, but the power was equally distributed between members of the class. All students were equally able to participate successfully and all voices were welcome for input and reflection dependent upon our constraint of time.

Interpersonal relationships examined particularly through the modes of gaze, gesture, and vocal quality indicate that these multimodal experiences were enjoyable for students and engaged learning, interest, and motivation. The multimodal design facilitated some student reflection and feedback but speech functioned at low modal density in this learning event.

As important sources of transformation and transduction or transmediation, the modes of rhythm, oral language, and movement gave rise to creative, innovative, and imaginative processes during the learning event. What began as an oral speech-piece chanted by the teacher was transformed into a classroom speech-piece with nonlocomotor actions creating a beat accompaniment, transformed again into a speech-piece with locomotor actions and beat accompaniment, and transformed yet again into a speech-piece with locomotor actions, beat accompaniment, and variations. Throughout the transformation process, the speech-piece was newly created with every experience of the piece as individual students used the media of timbre, dynamics, tempo, directions, levels, and expression to transmediate their unique understandings of the beat and the words of the speech-piece.

The modal resources of speech, beat, and movement interacted and exchanged functions for meaning-making throughout the learning event. At the beginning of the event, the speech patterns may have played a role in mediating beat for some children. The physical sensation or concept of beat may have played a role in mediating speech for a different set of children. At another point in the learning event, body percussion or locomotor movement may have played a role in mediating speech or beat for one child while speech or beat helped another child feel the beat and walk it across the room.

Kress and van Leeuwen (2001) describe experiential meaning potential as the meaning potential of signs to turn action into knowledge as a result of using the sign. Through the processes and experiences of using the semiotic resources of rhythm, oral language, and movement, students involved in this learning event used a variety of modes as tools for semiotic innovation (van Leeuwen, 2005) to create new understandings about rhythm and oral language and to create new practices for doing so.

#### **Transmediation Potentials in Classroom B, June 4, 2007.**

Student knowledge of beat, oral language, and oral reading was reshaped, transformed, and transmediated throughout the study through new practices of multimodal design focusing on kinesthetic, oral, aural, imaginative, and musical experiences. The data analysis that follows is representative of the transformational, transmediative process of this learning design, foregrounding the modes of rhythm, oral language, oral reading, and imaginative play.

Using Engeström's (1996, 1999, 2001) triangle, the object for this learning event was for the classroom unit to read the speech-piece "Herbie" on the board and to achieve the outcome of beat competency by performing the underlying beat of "Herbie."

Mediating tools included the modal resources of oral language, beat, nonlocomotor movement, the Herbie puppet, image, diagram, and small nonpitched percussion instruments.

The subjects, community, rules, and norms are described previously. By this point in the research design, our routines were well established. Students knew signals for starting and stopping chants, and body percussion and movement. Students knew to lay their instruments down in front of them when they were finished playing and to pick them up and place them in the “ready position” when directed to begin. Roles and responsibilities remained the same as previously described. In this data example, the teacher participated with the class sitting on a chair behind the back row of children.

The historicity of this learning event includes previous experiences with the vocabulary of the speech-piece using a variety of the beat and reading games previously described. All children had prior experience playing the nonpitched percussion instruments and were very familiar with the use of body percussion to perform the beat. Students had used body percussion and nonpitched instruments to read beat notation from the white board and had read previous speech-pieces from the white board using a combination of image and words. Student had explored various oral versions of the Herbie speech-piece they had created together. The targeted words for oral reading were “I,” “see,” “a,” “at,” “me,” from the first hundred words on the Fry sight word list (Rasinski, 2003) and “look” from the second hundred words on the Fry lists. As before, individual perspectives, traditions, interests, positions, and aspects of individual and classroom historicity likely affected meaning-making but were unknown to me.

**The learning event.** As described elsewhere in the thesis, Herbie evolved unexpectedly and accidentally when one of the experimental classrooms discovered the puppet in my bag. Herbie, his eventual wife Henry, and their puppet children took on a life of their own and were the source of many stories and chants in our classrooms. The puppets were loved by all classrooms but became an important part of the classroom culture for Classroom B. The collaborating teacher remarked on a number of occasions that she couldn't get the children to write about anything else in their journals. This data sample is taken from Classroom B but is a representative example of this particular application of the "Herbie" speech-piece used in other classrooms.

As I walked into the classroom, the children and collaborating teacher were waiting expectantly for my arrival and greeted it with enthusiastic smiles and comments. I sat down in my chair at the front of the classroom and I began the class as usual with our Hello Song. We all sang together and performed the beat using various body percussion. I often used the Hello Song as a way of introducing the focus of the learning event or as a way of acknowledging particular events or occasions in the school or classroom such as holidays or birthdays. After one round of the Hello Song, Geoffrey asked if we could sing hello to Herbie. We sang:

Hello to Herbie yes indeed, yes indeed, yes indeed,

Hello to Herbie, yes indeed, yes indeed my neighbor.

I reached for my bag and called into it, "Herbie, Herbie, are you there Herbie?" When Herbie didn't immediately come out, the children all joined in calling for Herbie with variations on: "Herbie, Herbie, come out, we miss you!" I reached in the bag for Herbie and slowly pulled out the cone puppet's stick and pretended Herbie wouldn't come out.

“Looks like he’s still sleeping,” I said. “I think you’ll have to sing his song to wake him up.” The children all sat up, patted the beat on their knees and chanted together:

I see a cat.

I see a bee.

I see Herbie

Looking at me.

I gave another tug on the cone puppet’s stick. “Looks like you’ll have to say it louder. I don’t think he heard you.” So the children chanted and performed the beat for Herbie’s speech-piece again. In different classrooms the Herbie and Henry chants took various forms. In some classes they remained spoken word chants. In other classrooms they took on more of a pitched flavour. Classroom B’s version of this Herbie song was an alteration between soh and mi or a minor third.

I took the cone puppet out of my bag and maneuvered the stick so the Herbie puppet rose slowly out of the cone. “What did you all have to wake me up for anyway,” I voiced Herbie. “Cause we wanted to play with you Herbie,” came the reply from the children. “Well, of course I’d like to play with you, too, but I’m moving slowly this morning,” said Herbie. “I’m still a little sleepy. That dog (Herbie pointed to Snuffles in the bag) kept me up all night. Okay, get ready now.” By this point, the beat had become such an internalized concept that the children were able to collectively establish the beat together, clapping or patting on their knees, without any prompting or modeling from me.

The Herbie game they were getting ready to play involved internalizing the words and beat at a signal from Herbie. When the puppet came out of his cone, the children chanted the Herbie song out loud and patted the beat. When Herbie disappeared into his

cone, the words and the beat also disappeared inside the children's heads. We varied tempo, dynamics, expression, and different body percussion, and I tried to make Herbie disappear and reappear at unexpected times so that children were not simply using the metric structure of the piece as cues for when to say or not say the words. Herbie's unanticipated appearances and disappearances meant that students needed to use the beat to fill in the missing words. The words below indicate where the children spoke the words, and the lines indicate where the children internalized the words:

I see a \_\_\_\_\_  
 \_ \_ \_ a \_ \_ \_  
 \_ see \_ \_ \_ \_  
 \_\_\_\_\_ \_ me!

The children then asked to create their own piece as they had done in previous classes. We took turns choosing what Herbie would see in the classroom, without requiring that the words rhymed. For example, one version was:

I see a book.  
 I see a lunchbag.  
 I see Herbie  
 Looking at me.

After a few versions of this particular Herbie game, Herbie said to the children, "Hey, I'm doing all the work here. If I have to pop up and down in this cone all day, then you have to, too!" The children jumped to their feet and we played the game again with the children jumping up and down when Herbie did. They would stand for the words, and sit, or as close to sitting as they could get depending on the number of beats, for the spots

indicated by the lines above. After a few rounds, Herbie announced that he was tired and wanted to play a new game. He asked the children if they would like to play with some instruments, and the reply, as always, was enthusiastic. I brought out an assortment of small, nonpitched instruments and handed out bells, sticks, finger cymbals, egg shakers, and assorted wood and tick tock blocks.

We had played the instruments game before in a number of variations so the children knew what I meant when I asked, "What kind of piece should we make today?" The students decided that the sticks and wood instruments would play the heartbeat for "I see a" (2 beats), the bells would play the heartbeat for cat, rest (2 beats), the finger cymbals would play for bee, rest (2 beats), the egg shakers would play for "Herbie" (2 beats), and everyone would play the four heartbeats for "Looking at me, rest."

By this point, all the classrooms had discovered that the speech-pieces we played with not only had their own heartbeats, but that some of the words took up different amounts of the heartbeat. They discovered that some words like "looking" or "see a" were two sounds that fit into one beat, or that there were spaces between words when the heartbeat kept playing without any words. I never formally taught them about rests or eighth notes in music, but when the discovery was made that the heartbeat played without words, I explained that it was a point for the words to rest. All classrooms gradually adopted simple rhythmic terminology such as rest, ta, and ti-ti. A quarter note was known as a "ta" and a pair of eighth notes or words with two sounds for each beat was known as a "ti-ti."

Because of our prior experiences, the children knew that in this instance they were playing the beat and not the rhythm of the words. The final form of their percussion piece looked like:

I        see a    cat (rest).

Sticks sticks    bell    bell

I        see a    bee (rest).

Sticks sticks    finger cymbal finger cymbal

I        see        Her—bie

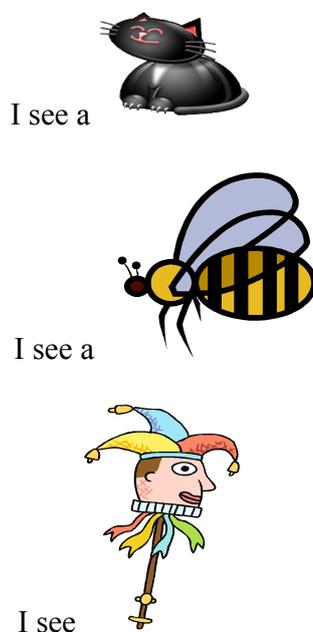
Sticks sticks    eggs eggs

Looking at me (rest).

All instruments played the final four beats together.

Throughout the performances, I waved Herbie back and forth with one hand to “dance” the beat to the children’s composition and cued the bells, finger cymbals and eggs with my other hand. By the fourth performance, the children had a working and well-integrated ensemble in place and were all playing at the appropriate times they had designated. Herbie got very excited and began jumping up and down in his cone cheering the children. Then he announced he was exhausted and needed to take a nap. I asked the children to place their instruments on the floor and I put Herbie back in his bag. I told the children I thought they were ready to see Herbie’s words and wrote the speech-piece on the board using pictograms for the less familiar words like cat, bee, and Herbie. The

children usually laughed at my pictograms and today was no exception. Fortunately, Microsoft clip art can help me out in this instance:



Looking at me.

*Figure 40.* Print and visual text for the Herbie speech-piece.

I notated the beat under the words using the straight lines previously described. I placed a ready heartbeat at the beginning of the words and said, “Let’s see if we can play Herbie’s heartbeat.” The children picked up their instruments and we played just the heartbeat under the words. The class all ended together which indicated several possibilities to me: Some students may have internalized the words and used them as a cue to end the beat together; other students may have followed and read the lines on the board to know when to end and still others may have simply followed the rest of the class to end when a neighbor did. However, the certainty with which the entire class ended

together convinced me that many students were either reading the beat notation and/or audiating the words.

As I conjectured that many of the children were actually tracking the rhythmic notation in the correct direction and from line to line, I asked them to put their instruments down and try reading the words. The speech-piece was well-memorized at this point so it was impossible to know if students were actually reading the print text, but the children certainly *thought* they were reading, as some exclaimed excitedly after the first read. "I can read Herbie, I can read Herbie!" Stephen shouted.

Several children wanted to erase the pictograms and replace them with the words. I erased the images and printed in the words cat, bee, and Herbie. "I knew that's what Herbie would look like," Shannon said. "Let's see if we can play Herbie first," I suggested. I wanted the children who might be unfamiliar with the new words to have a chance to experience them and embody the sounds and feelings of the words before reading them outloud. I asked if the woods could play cat, the bells and finger cymbals play bee and the eggs play the word Herbie. I said it once with the instruments accompanying the appropriate words. Then we all spoke the Herbie speech-piece reading the words and letting the instruments play the sound of cat, bee, and Herbie for us resulting in: "I see a (sticks). I see a (bells/finger cymbal). I see a (eggs) looking at me. Using x's to stand for the instruments and the words they are representing, the sound of the piece could be written like this: "I see a (X). I see a (X). I see (X X) looking at me."

I asked the children to put their instruments down and then played our "erase game." I erased all the words and pictograms except for I, see, and me. It looked like this:

I see a \_\_\_\_\_

I see a \_\_\_\_\_

I see \_\_\_\_\_

\_\_\_\_\_ me.

I guided the children at first by pointing to the words and spaces in time to the beat and then the children asked if they could read by themselves. I just started them off with the ready heart and they read the words on the board and audiated the pulse for the words that were missing so that the words were being read maintaining the 16 beat structure of the original piece. The children asked if they could read Herbie's whole song for him, so I wrote all the words on the board, including cat, bee, and Herbie, and pulled Herbie out of the bag to watch and listen to the children read his song to him. He was appropriately grateful and enthusiastic and very sadly sang the Goodbye Song to them as it was time to go.

**Multimodal data analysis framework.** The primary modes involved in this learning event roughly in order of appearance are space and place, melody, sound, imaginative play: oral language, speech, rhythm, gaze, gesture, non-locomotor movement, voice quality, visual image, and written language as presented in Table 20. For this learning event, the modes are not analyzed in the approximate order of their appearance as it is more meaningful to present results for the foregrounded modes in their integrated context of situation and use.

Table 20. *Multimodal Data Analysis Framework for Classroom B, June 4, 2007*

<b>Multimodal Data Analysis Framework</b>	
<b>Unit of Analysis: Experimental Classroom Learning Event</b>	
<b>Guiding Questions</b>	Classroom B, June 4, 2007
1. What modes are used?	Space and Place; Music (melody, rhythm, instrumental timbre, dynamics, tempo); Sound/Timbre; Imaginative Play; Movement and Gesture; Gaze; Oral language; Voice quality; Visual Image & Diagram; Written Language.
2. What modes are used for what purpose?	Speech for teacher/student communication; rhythm to convey measured time and underlying pulse of words; instrumental timbre, dynamics, and tempo for student engagement and as a means to vary, repeat and reinforce speech-piece; sound to convey sound of beat in various media i.e. clapping, stamping, sound of words; timbre of nonpitched instruments; nonlocomotor movement for embodying and translating the beat and the words of the speech, interpreting meaning of words; gesture for directions, to indicate words and rhythmic notation on board; gaze and gesture to interpret and accompany puppet's movements and indicate interest, focus, intent, direction in space; oral language to articulate speech-piece; voice quality to indicate interest, engagement, enthusiasm; and space and place as both constraint and vehicle for beat and reading learning event; creativity, imagination, and innovation to create variations of the speech and beat piece.
3. What modes are foregrounded?	Oral Language; Rhythm/Beat; Sound/Timbre of instruments; Gaze/Gesture; Dramatic, Imaginative Play; Written Language.
4. What ideational meaning is expressed through field? What is happening? What is the social action or topic?	Oral language is being used to represent a speech-piece about Herbie the puppet using classroom sight words. The field of possible meanings includes: knowledge about a speech-piece and beat using assumed, common knowledge; knowledge about rhythm to indicate the pulse of the speech-piece using assumed, common knowledge; a variety of outcomes from the Manitoba Music curriculum; and learning outcomes from Learning Outcome 1, 2, 4, and 5 (English Language Arts). Gaze is understood to mean attention, engagement, and intent. The diagram of the beat is used to read and perform the

table continues

	beat and to anchor and provide visual and temporal structure for the written words. Written language is used to read the speech-piece about Herbie on the board.
5. What interpersonal meaning is expressed through tenor? Who are the participants and what are the relationships between them? What are the social roles, status, and attitudes?	Modes are structured to express interpersonal meanings of collaboration between teacher/students and the student community. The teacher has the position of power which is shared with students as the learning event progresses. Modes position children as active, enthusiastic, interactive, and joyful participants in the learning event.
6. What textual meaning is expressed through mode? What is the organizing role of mode? What part does the mode play? What is the channel of mode (spoken, written, etc.)?	Textual meanings of oral language and rhythm begin with the chanting of the Herbie speech-piece and performing the underlying beat. The text of oral language and rhythm are created to be interactive and face-to-face, and students and teacher actively explore the texts together in a variety of ways. Cohesion is realized through modes of beat, oral and written language transformed and transmediated using different modes and media. The text of gaze is read by both teacher and students to interpret engagement, attention, encouragement, and intent.
7. How are modes interpreted and by whom?	Modes are interpreted by the teacher as a means of giving direction (speech) and sharing discourse (speech), to evaluate student engagement and understanding (gaze, gesture); to create knowledge about beat, oral and written language; and to engage children's interest and motivation (imaginative play). Modes are interpreted variously by children. The mode of oral language is interpreted to convey understanding of speech-piece; speech is used to share ideas and reflection; rhythm is interpreted to convey understanding of the pulse of the speech-piece through body percussion and instruments, gaze is interpreted as encouragement to enjoy and participate in the learning event; written language is interpreted as a mode for reading the speech-piece; and imaginative play is interpreted as inviting learning and motivational.
8. Transformative processes?	The learning event begins with a speech-piece in oral language mode. This is variously transformed with nonlocomotor movement, expressive vocal elements, instruments and associated timbres, and by written language and rhythmic notation. Transformative processes give rise to processes of creativity, imagination, and innovation.

table continues

9. Transductive processes?	Oral speech is transmediated through nonlocomotor movement, the sound of instruments, imaginative play, and written language. Rhythm is transmediated through nonlocomotor movement, speech, and written notation. Group and individual processes of creativity, imagination, and innovation are inherent in transmediation.
10. What is the functional load of each mode?	The modes of oral language, rhythm, and sound, imaginative play, and written language share the functional load. The informational load is not carried by speech, gaze, or other identified modes.
11. What modal density?	Oral language and rhythm are high density modes throughout and by the end of the learning event, written language adds to the high modal density of this learning event.
12. Mode or medium?	Medium: Timbre, musical expression, nonpitched percussion instruments, and a puppet artifact are used as material resources to convey other modal meanings.
13. What is the experiential meaning potential?	Based on the provenance of oral language, rhythm, and written language sign systems, the experiential meaning potential of oral language and rhythm, imaginative play; and written language to create conceptual understanding of beat and oral and written knowledge of the speech-piece is high. Based on the provenance of gaze and gesture, the experiential meaning potential of these sign systems to create understanding of attention, engagement, and intent, is high.

Ideational meanings were determined by the context of situation of the classroom learning event. The field of discourse refers to what was happening in the first learning event of the study. The student and teacher/researcher participants were engaged in activities that focused on beat, rhythm, and print text reading of the speech-piece “Herbie.” The interpersonal meanings refer to the status of teacher/researcher in a position of power over the student participants. The tenor of discourse in the context of situation was instructional, collaborative, and interactive between teacher/researcher and students. The teacher/researcher instructed students in processes for using the tools and

language of music and movement and accepted suggestions from the students for new ways of using those tools. All participants seemed to enjoy all modes and interactions. The textual meanings achieve coherence and connectedness (Christie & Unsworth, 2000) through the integration of a variety of interactive modes as indicated above for this context of situation.

The learning event began using the mode of space and place. The meaning potentials of space and place as analyzed in the previous example remain the same for this data sample. Melody in the form of the Hello Song was the next mode presented in the learning event. Melody had greater functional load or modal density in this learning event as compared to the previous learning event because Herbie's speech-piece acquired pitched dimensions (soh-mi) during the rhythm and language experiences. However, the field of melody was not the main social activity or topic of this learning event. The participants purposefully engaged in melody at the beginning of the learning event, but only in incidental ways after the singing of the Hello Song.

Interpersonal interactions were realized through tenor in emergent ways. The students were not asked to sing the Herbie speech-piece. However, because the speech-piece appeared to naturally assume melodic dimensions of soh and mi, melody acquired significance as an important means of classroom interaction with classroom members and with the speech-piece. Students appeared to enjoy the singing experience and it seemed to be a natural social process. Textual meanings were realized through the mode of melody because melody played a role in creating cohesion and connectedness by facilitating students' interaction with the aural and print text. Although melody was not designed to be an interactive process other than as used in the Hello Song, the mode was

used in spontaneous ways that engaged students and meaningfully connected elements of the learning event.

The semiotic modal resources of sound and timbre took on greater importance in this data example as compared to the first learning event because a variety of nonpitched instruments were featured along with body percussion, the speaking and singing voices, and the sound of Herbie's voice. Ideational meaning as expressed through field centered on sound as both medium and mode. The medium of sound was used in the production of beat and Herbie's voice. As a mode, or semiotic resource, sound was used to create meaning for beat and certain oral and written words in the speech-piece through association with different instrument timbres.

Sound was important to tenor and interpersonal interactions. The sound of instrumental timbres facilitated student interactions with each other and with the teacher/researcher when students offered suggestions for appropriate and meaningful timbre application. Sound also facilitated student interaction with print text. The shared social and cultural classroom use, context, and interpretation of the semiotic resources of sound and timbre created textual cohesion and connectedness for the understanding of beat, oral, and written language throughout the learning activity. The sound of the beat and the language were transformed through a variety of instrumental timbres which served to transmediate the sound of the beat, words, and written understanding of specific words.

The sound of Herbie's voice brought the puppet to life and was a medium used to engage children in imaginative play and to motivate learning in this learning event. Imaginative play may be considered a mode in this example. Imaginative play in this

context of situation was made up of an organized set of semiotic, meaning-making resources articulated through social and cultural use. Imaginative, dramatic play is a unified, unifying semiotic system (Kress & van Leeuwen, 2001) with a supporting body of literature in the fields of play (Brown, 2003; Elkind, 2007; Lytle, 2003; Roskos & Christie, 2007), imagination in teaching and learning (Egan, 2005; Egan, Stout, & Takaya, 2007), drama and imaginative play (Baldwin & Fleming, 2003; Hendy & Toon, 2001; Schneider, Crumpler, & Rogers, 2006) and creativity in early childhood (Wright, 2010).

Dramatic, imaginative play was an important semiotic resource in this learning example and in many other learning events in this learning design that featured use of puppets, artifacts, creative play, and creative construction of speech and rhythm pieces. Data from this learning event and documented elsewhere in this thesis indicates that some children transformed and transmediated print and non-print learning through imaginative play and creative and innovative learning processes. These processes became part of a semiotic chain that created further learning opportunities and increased student motivation and engagement.

Interactions between children and Herbie through imaginative play associated with the puppet created important interpersonal meaning for students. Students assumed active social roles in their relationship with Herbie that generated interactions with print text and created pathways for student entry into the world of reading. Children were keen to talk to Herbie, to show Herbie what they could do, and to play with Herbie. Herbie became part of the community of learners and just by popping out of his cone, could encourage positive interactions among and between children. As the teacher/researcher, I

assumed a certain social distance from students. However, when I voiced Herbie, there was very little social distance between the puppet and the children. They identified strongly with Herbie and seemed to separate the cone puppet from me. The connection to Herbie, the cone puppet and his family created positive feelings of affect and helped mediate many teachable moments and learning opportunities for us all.

Herbie also contributed to textual cohesion. He loved to play the beat, speech, and reading games and so helped wind the thread of beat, oral, and written language learning throughout the learning event. Herbie and the imaginative play associated with the artifact contributed to the modal load and the high modal density of this learning event in many important and useful ways. Herbie served as a mediating tool for imaginative play, my instructional needs and for the children's learning and social needs in our rhythm and reading activities.

Although simple and basic, the visual mode of image and diagram was also an important modal resource for meaning-making in this learning event. Kress and van Leeuwen (2006) analyze diagrams in *Reading Images* and provide convincing evidence that image and diagrams can say some of the same things as language but in different and sometimes more accessible ways. Abstract ideas and ideas presented in language can be "visually realized, made perceivable and communicable" (Kress & van Leeuwen, 2006, p. 50) through image and diagram. Ideationally, my crude facsimiles of a cat, bee, and Herbie represented the meanings of the words cat, bee, and Herbie. The beat diagram objectified and actualized the sound and feel of the beat and related the beat spatially to the words, creating a visual and a temporal framework that structured and mediated the children's understandings of the written language of the speech-piece.

Kress and van Leeuwen (2006) analyze the use of straight lines used in image. Straightness, they say, can be used to convey a vast range of meanings depending on the values given them in specific social –cultural contexts. Meaning derived from basic geometrical shapes is also motivated by the geometrical qualities we perceive in objects found in the natural and constructed environment. Basic shapes can be altered for different meanings; horizontal or vertical elongations or tilting can affect meanings.

I had no awareness or knowledge of the impact a straight line could have prior to designing my study. I was grateful then, to discover that the straight, vertical line that I used to diagram the beat was a neutral, non-hierarchical shape. Basic geometrical shapes convey directionality and can act as pointers (Kress & van Leeuwen, 2006) so placing the vertical lines representing beat underneath the written language created the effect and meaning of pointing upwards to the words for which they provided temporal and visual structure.

Interpersonal meanings expressed through tenor included particular social roles involving power, contact, and social distancing. The use of the whiteboard to draw image and diagram beat immediately placed me in a position of power and social distance as this artifact is so strongly associated with the power, roles, and responsibilities of the teacher. There is a certain social distancing that is created by placing information on a whiteboard both in perception as a result of social and cultural provenance and perception, and as an actual and physical distance that exists from the board to the students.

The placement of the image and diagram on the board above the students sitting on the floor also created social distance and a feeling that the activity and the contents on the board held power over them. Jewitt (2006) claims that a relation of equality occurs

when a visual image is placed at eye level; a relation of power over the viewers is created when they must look up to the image; and a power relation is given to the viewers if they look down at the visual. However, the affective attitude created by the images used in this learning event and throughout the study was one of humour, as most students found my drawings so dreadfully executed they were perceived by students to be funny. The beat diagrams therefore seemed to have a neutral affect on power relations.

Gesture was associated with the visual mode. Gesture was used for pointing to the ready heartbeat, the beat diagram, the visual images, and the written language of the speech-piece. In this case, gesture was an important medium but did not indicate any particular ideational meaning. Gesture may have had interpersonal meaning if it helped make students feel more connected to the learning and communicated engagement. Gaze once again was a valuable mode for me to assess student engagement, interest, understanding, and focus through the interpersonal metafunction as previously described.

**Classroom B summary.** Imaginative, dramatic play, the visual mode of diagram, written language, the beat of the speech-piece, and oral language were the main contributors to modal load. Rhythm and oral language were foregrounded at the outset of this learning event with high modal density and high experiential meaning potential. By the end of the learning event, written language and the visual mode were of equally high modal density and the apparent perceived success of the reading event suggested the visual and written language modes had high experiential meaning potential.

The field of ideational possibilities for music, rhythm, oral and written language included multiple outcomes from the Manitoba Music and English Language Arts curricula. Student responses indicated they interpreted the visuals and diagrams to

represent the underlying beat and words of the speech-piece. Students demonstrated that they made connections between the oral language and written language speech-piece. Rhythm, oral language, written language, and image were based on everyday knowledge rather than specialized knowledge that privileged any particular group of children. Teaching time was not used for theory, drill, fact-based question and answer, or sounding out or spelling words. Beat, oral, written, and visual knowledge were constructed together as we experienced the associated learning activities.

The tenor variables of interpersonal function for the key modal resources positioned learners in equal positions of social power. As the teacher, I represented social power over students except when I voiced Herbie. The modes functioned together to create interactive, collaborative and whole group experiences. Students indicated high affective involvement through voice quality, verbal responses, and facial expressions.

The textual metafunction and mode variables of the key semiotic modal resources worked to create a cohesive textual composition of beat, oral and written language learning. Modes intertwined and overlapped to reinforce, transform, and transmediate learnings from one mode to the other or in combinations. Creative and innovative processes were a result of the transformative and transmediative learning, creating semiotic chains linking one process and interpretation to the next.

Speech did not contribute significantly to modal load or density. It functioned as a medium to convey directions to students and as a mode when students shared ideas and reflected on activities and learning. Dynamics, tempo, musical expression, and nonpitched percussion instruments were used as media in this learning event. Dynamics, tempo, musical expression, and nonpitched instruments were used to vary, repeat, and

reinforce the speech-piece and provided enhanced opportunities for performing the beat.

Voice quality was considered a mode that conveyed meaning to both teacher and students.

### Summary Findings

Table 21. *Summary Findings to Represent Multimodal Learning in the Study*

<b>Multimodal Data Analysis Framework</b>	
<b>Unit of Analysis: Experimental Classrooms: Learning Events</b>	
<b>Guiding Questions</b>	<b>Common Classroom Data Analysis Results</b>
1. What modes are used?	<ul style="list-style-type: none"> <li>▪ Space and Place</li> <li>▪ Music (melody, rhythm, instrumental timbre, musical expression, tempo, form)</li> <li>▪ Sound, Sound/Timbre</li> <li>▪ Dramatic imaginative Play</li> <li>▪ Movement</li> <li>▪ Gesture and Gaze</li> <li>▪ Voice quality</li> <li>▪ Oral language</li> <li>▪ Visual: Image, Diagram</li> <li>▪ Written Language</li> </ul>
2. What modes are used for what purpose?	<ul style="list-style-type: none"> <li>▪ Space and place facilitate and constrain learning events</li> <li>▪ Rhythm conveys measured time and underlying pulse of speech-pieces used for oral and written language.</li> <li>▪ Melody, instrumental timbre, dynamics, tempo, form and other musical expression are used for student engagement and as a means to vary, repeat and reinforce oral and written speech-pieces.</li> <li>▪ Sound mediates beat in various media i.e. clapping, stamping, sound of words; timbre of nonpitched instruments</li> <li>▪ Speech is used for teacher/student communication and directions.</li> <li>▪ Movement (non-locomotor and locomotor) is used to embody, transform, and transmediate beat and speech-piece words and understanding of words.</li> <li>▪ Sound together with timbre interprets meanings of words.</li> </ul>

table continues

	<ul style="list-style-type: none"> <li>▪ Teacher gesture is used for directions, to indicate words and rhythmic notation on board,</li> <li>▪ Student gesture and gaze are used to interpret student interest, focus, intent, engagement and enjoyment;</li> <li>▪ Voice quality indicates interest, engagement, enthusiasm;</li> <li>▪ Oral language is used to articulate speech-piece</li> <li>▪ Visual mode is used to transform and transmediate oral to written language</li> <li>▪ Written language is used to read speech-pieces printed on board</li> <li>▪ Dramatic, imaginative play is used to engage students in learning and provide new realities in which learning can take place.</li> </ul>
3. What modes are foregrounded?	<ul style="list-style-type: none"> <li>▪ Oral Language</li> <li>▪ Rhythm/Beat</li> <li>▪ Written Language.</li> </ul>
4. What ideational meaning is expressed through field? What is happening? What is the social action or topic?	<ul style="list-style-type: none"> <li>▪ Learning events vary in ideational meanings; they all construct some reality of beat and oral and written language in the students' cultural and social world and in doing so, meet curricular outcomes from the Manitoba Music, Physical Education/Health, English Language Arts, and other curricula.</li> </ul>
5. What interpersonal meaning is expressed through tenor? Who are the participants and what are the relationships between them? What are the social roles, status, and attitudes?	<ul style="list-style-type: none"> <li>▪ Modes are structured to express interpersonal relations of collaboration between teacher/students and the student community. The teacher has the position of power. Modes position children as active and socially/culturally equal participants in the learning event.</li> </ul>
6. What textual meaning is expressed through mode? What is the organizing role of mode? What status does the mode have? What is the channel of the mode (spoken, written, etc.)?	<ul style="list-style-type: none"> <li>▪ Modes interact and overlap in all the learning events to create a cohesive text that communicates, transforms, and transmediates information and understanding about oral and written language and rhythm/beat.</li> <li>▪ Textual meaning is generally interactive, face-to-face, and students and teacher actively explore texts together in a variety of ways.</li> </ul>
7. How are modes interpreted and by whom?	<ul style="list-style-type: none"> <li>▪ Modes are interpreted by the teacher/researcher, students and collaborating teachers.</li> <li>▪ Students interpret rhythm/be <u>table continues</u></li> </ul>

	underlying pulse or heartbeat of the speech-pieces and songs used for oral and written language.
	<ul style="list-style-type: none"> <li>▪ Students interpret oral and written language as communicative processes with a wide range of individual abilities and interests.</li> </ul>
8. Transformative processes?	<ul style="list-style-type: none"> <li>▪ All modes are used as part of transformative processes.</li> </ul>
9. Transductive processes?	<ul style="list-style-type: none"> <li>▪ The modes of oral and written language, rhythm/beat, imaginative, dramatic play, and movement were primarily involved in transductive/transmediation processes.</li> </ul>
10. What is the functional load of each mode?	The modes of oral and written language and rhythm share the functional load. Imaginative, dramatic play is part of the functional load for some classrooms.
11. What modal density?	Learning events all have high modal density. Oral language and rhythm are high density modes throughout the study and oral and written language and rhythm are the high density modes by the end of the study. In some classrooms, imaginative, dramatic play is also a high density mode.
12. Mode or medium?	Medium: Material artifacts as listed at the beginning of the Chapter
13. What is the experiential meaning potential?	Based on the provenance of oral language, rhythm, and written language sign systems, the experiential meaning potential of oral language and rhythm, imaginative play; and written language to create conceptual understanding of beat and oral and written knowledge of the speech-piece is high.

This semiotic multimodal data analysis indicates that learning events in this study were highly multimodal. However, the variables of oral and written language and rhythm shared the functional load and represented the highest modal density in all learning events. The multiple modes of rhythm, oral and written language, movement, melody, timbre, musical expression, gesture, gaze, speech, place and space, voice quality, and imaginative, dramatic play combined and interacted together to reshape, transform and transmediate new meanings about rhythm and written language for children in this study.

Outcomes from the Manitoba Music, English Language Arts, Physical Education/Health, Social Studies, Math, and Science curricula were met in various classrooms throughout the study. Rhythm, oral language, and movement were valuable semiotic resources for meaning-making that shared the functional load to internalize learnings about beat, oral and print language, and outcomes from other curricular areas for many students.

The semiotic resources or modes of rhythm, oral and written language, and movement, used in the collaborative, interactive ways described in these learning events were inclusive of all children and did not position any particular student group or student in positions of power. Children were equally privileged in all learning events.

Interpersonal relationships examined particularly through the modes of gaze, gesture, and vocal quality and imaginative, dramatic play indicate that these multimodal experiences were enjoyable for students and teacher/researcher, and engaged learning, interest, and motivation. The multimodal design facilitated some student reflection and feedback but speech functioned at low modal density in this and all learning events.

### **Contradictions**

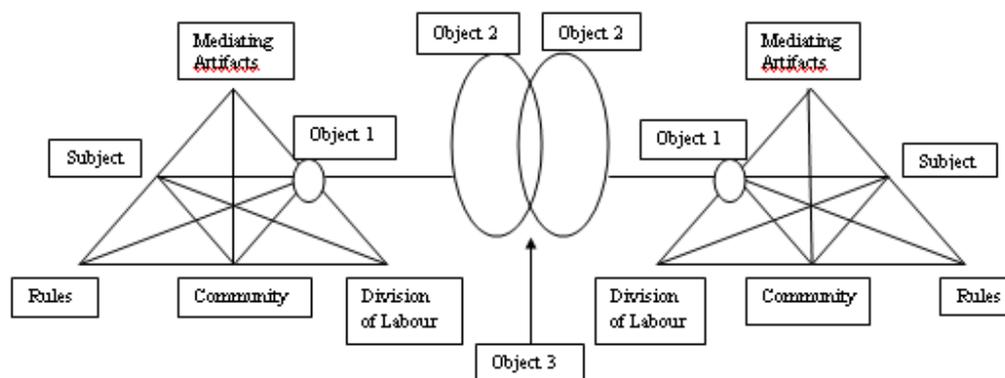
Engeström (2001) describes contradictions as central to Activity Theory. Contradictions serve as “driving forces of change” (p. 133). Engeström points out that “contradictions are not the same as problems or conflicts” (p. 137). Contradictions are described as structural tensions or disturbances that have the potential to create opportunities for innovation, transformation, and reconceptualization (Engeström, 2001).

The data example just described illustrates an emergent direction in this study generated as a result of contradiction between rules, subject, and object. My object in our

learning events was to explore ways that beat experiences mediated reading. I planned for a limited set of artifacts used in the research design, but did not plan to use the puppets or all the artifacts I normally use in my teaching. I was concerned that introducing additional artifacts would confound results and contribute to bias and noise in the study. The students however, had a much different object in mind. Once they discovered Herbie, they were very keen to introduce the cone puppet, his family and imaginative play into our learning experiences. The contradiction between the researcher's object and the students' object served as a change agent in this study to bring about new imaginative, innovative, and creative meaning-making opportunities and ways of meaning-making for all students in experimental classrooms.

Contradictions were also noted between different classroom activity systems. Emergent learning experiences took the study in directions that I did not plan for and created results that I struggled to analyze in Classroom B. Emergent, collaborative and imaginative learning was a feature of Classroom B in the last phase of the study. However, students in other classrooms did not assume the same ownership for idea generation and activities as did the students in Classroom B and similar emergent, student-driven learning experiences did not occur in other classrooms to the same extent as in Classroom B. In particular Classroom G did not develop the emergent student-directed dynamics that were featured in Classroom B. I used Engeström's third generation activity theory model as a way of probing classroom differences and to investigate contradictions between the Classroom B and G activity systems. The Engeström (2001) third generation activity system model is shown again in Figure 41 as reference for the following discussion.

Figure 41. Engeström's third generation activity theory model comparing classroom activity systems.



Object one in each classroom refers to the stated object of the learning experience to create pathways for print text reading of the Herbie speech-piece and for beat competency. Classroom B's object two was to incorporate the cone puppets in the beat and rhythm experiences as a source for imaginative play and to generate ideas to create stories, speech-pieces, and games featuring the cone puppet family and their friends. Classroom B greatly enjoyed these activities and wished to continue them throughout the study. Classroom G's object two seemed to align with the object one of the study.

Classroom G appeared very happy to participate in any activity that I shared with them and were willing to be directed as to goal, purpose, and direction for the learning activities. They enjoyed the games and puppet experiences and offered suggestions for their use and development when asked, but did not assume ownership for the direction of the learning or the use of the puppets in the learning activities. Classroom B and G shared an object three of willingly, actively and enthusiastically participating in the learning events, but did so in different ways. All classrooms in the study shared an object three of active, participatory, and engaged learning through ways unique to each

classroom. Each classroom had specific activities that they particularly enjoyed, identified with, and repeatedly asked for. Activities in each experimental classroom were uniquely recreated with every iteration of the learning experience.

Contradictions in the activity systems served as “driving forces of change” (Engeström, 2001, p. 133) that resulted in revisions to the learning event planning and to data analysis. In particular, an examination of contradictions between the Classroom B activity system and the activity systems found in other classrooms, led to interrupted frameworks and a re-analysis of data through the lens of complexity thinking as described in Chapter Ten.

\* \* \*

### **Ko Ko**

Charlie Parker is associated with what is known as modern jazz or bebop. “Bebop was famous—and sometimes reviled—for its complex, dissonant harmonies” (Giddins & DeVaux, 2009a, p. 299). In 1945, Parker (1945/2009) recorded what many consider to be the first example of bebop. “Ko Ko” heralded a modern way of thinking about jazz with much of the same kind of impact in the jazz world as the New London Group’s (1996) multiliteracy paper created for educational thinking around the world. Ko Ko inspires and transmediates the new understandings and perspectives that are generated when multiple modes and artifacts are used together in different ways as available resources and affordances for making and communicating meaning.

## Chapter Nine: Call and Response

Clear thought enabling us to *see*.

Alternatively, clear thought enabling us to hear.

Clarity as a form of synaesthesia rather than synaesthesia as a form of confusion.

(Zwicky, 1992, p. 114/116)

### Introduction to Quantitative Results

This chapter presents pre- and post-test findings from the *Oral Reading Fluency (ORF)* subtest of the *Dynamics Indicators of Basic Early Literacy Skills Sixth Edition (DIBELS™)* (Good & Kaminski, 2002a) and Part I of the *Rhythm Performance Test Revised (RPT-R)* (Flohr, 2004). This chapter also presents findings from the parent/guardian pre- and post-surveys.

The quantitative results are the clear thoughts that contribute to understandings generated by the qualitative data. The quantitative data results are presented in the form of a jazz call and response. In call and response, a musical idea or statement made by an individual or group of performers is answered by a responding musical statement or idea by another musician or group of musicians. Here, the pre-tests for beat competency and oral reading rate serve as the call and are answered by the post-tests for beat competency and oral reading rate after students have experienced the learning design.

### Descriptive Analysis

Pre- and post-tests were administered to 169 students. There were four control (Table 22) and five experimental (Table 23) classrooms in grades one to three. Pre-tests were administered one week prior to the start of the learning design in each classroom and post-tests were administered the week following the conclusion of the learning

design. The overall level of significance alpha, was set at 5% for all statistical significance tests.

Table 22. *Control Classrooms and Participants*

School	Classroom	Grades	Numbers of Participants
John Dewey	A	3	22
Emily Murphy	D	1	16
Jean Vanier	E	Multiage Grades 1-3	17
Portia White	H	2	18

Table 23. *Experimental Classrooms and Participants*

School	Classroom	Grades	Numbers of Participants
John Dewey	B	2	23
Emily Murphy	C	1	15
Jean Vanier	F	1	17
Portia White	G	Multiage Grades 1-3	22
Portia White	I	Multiage Grades 1-2	19

Descriptive analysis was used to determine if control and experimental groups were balanced for gender and age. Gender was well-distributed and balanced. Experimental classes were made up of 54% female and 59% male; control classrooms were made up of 46% female and 41% male. Tables 24 and 25 indicate a disproportionately high number of nine year old participants in the control group and a disproportionately low number of nine year old participants in the experimental group.

Analysis of pre- and post-test scores was conducted with and without the nine year old group to determine possible effects of this disproportionate group.

Table 24. *Participants by Age*

Age	Control N	Experiment N	Total
6	17	22	39
7	26	42	68
8	16	28	44
9	14	4	18

Table 25. *Percent of Student Age in Control and Experimental Groups*

Age	Percent in Control Group	Percent in Experimental Group	Percent of Total Participants
6	44	56	23
7	38	62	40
8	36	64	26
9	78	22	11

Analysis of variance (ANOVA) was conducted to determine gender effects for rhythm and oral reading fluency pre-tests. There were no significant effects for gender for rhythm pre-tests. Rhythm pre-tests were not statistically different for males and females in this study (Table 26). There were no significant effects for gender for oral reading fluency pre-tests. Oral reading fluency pre-tests were not statistically different for males and females in this study (Table 27).

Table 26. *Rhythm Pre-tests by Gender: Means for Oneway Anova*

Gender	Number	Mean	Std. Error
Female	78	78.78	1.29
Male	91	78.96	1.19

Table 27. *Oral Reading Fluency Pre-Tests by Gender: Means for Oneway Anova*

Gender	Number	Mean	Std. Error
Female	78	57.44	5.37
Male	91	54.54	4.98

Analysis of variance (ANOVA) was conducted to determine gender effects for rhythm and oral reading fluency post-tests. There were no significant effects for gender for rhythm post-test scores. Rhythm post-tests were not statistically different for males and females in this study (Table 28). There were no significant effects for gender for oral reading fluency post-test scores. Oral reading fluency post-tests were not statistically different for males and females in this study (Table 29).

Table 28. *Rhythm Post-tests by Gender: Means for Oneway Anova*

Gender	Number	Mean	Std. Error
Female	78	81.87	1.10
Male	91	82.45	1.02

Table 29. *Oral Reading Fluency Post-Tests by Gender: Means for Oneway Anova*

Gender	Number	Mean	Std. Error
Female	78	62.10	5.57
Male	91	58.38	5.16

Effects of the rhythm-based multimodal learning design on oral reading fluency and rhythmic performance for control and experimental groups were determined through matched pairs t-tests and analyses of variance. Differences in oral reading fluency and rhythm performance are described by classroom and school.

#### **Rhythm Performance Pre- and Post-Test Scores**

Table 30 presents means for rhythm performance pre- and post-tests by class for all experimental and control classrooms. Figures 42-50 show the distribution of pre and post rhythm scores by classroom.

Table 30. *Means for Pre- and Post-Tests Rhythm Performance Test by Class*

Class	Group	Number	Pre-Test Mean	Post-Test Mean
A	Control	22	86.23	86.05
B	Experimental	23	80.91	83.96
C	Experimental	15	80.0	86.67
D	Control	16	73.81	73.56
E	Control	17	84.35	84.71
F	Experimental	17	78.35	83.94
G	Experimental	22	73.55	79.55
H	Control	18	78.11	80.0
I	Experimental	19	73.74	80.57

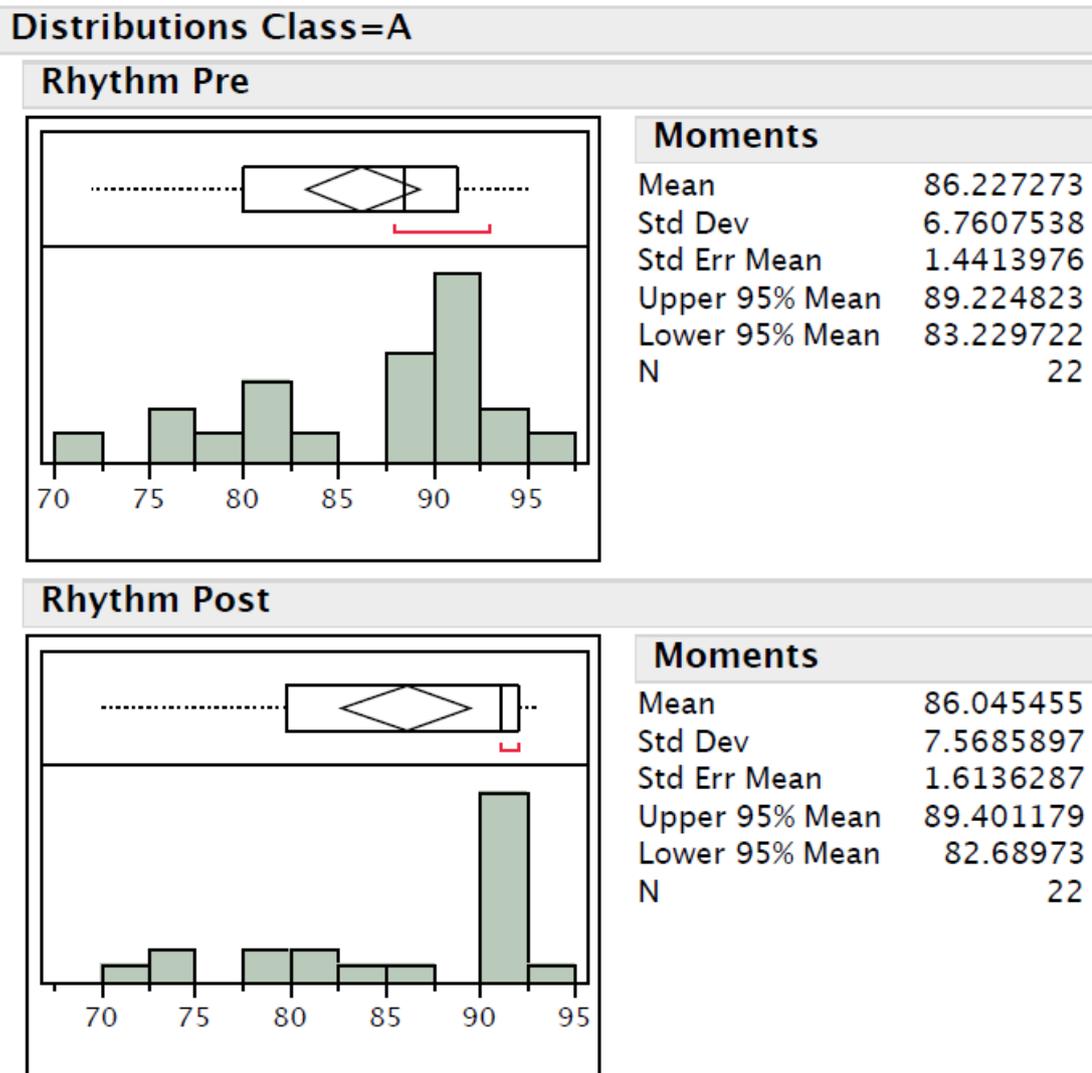
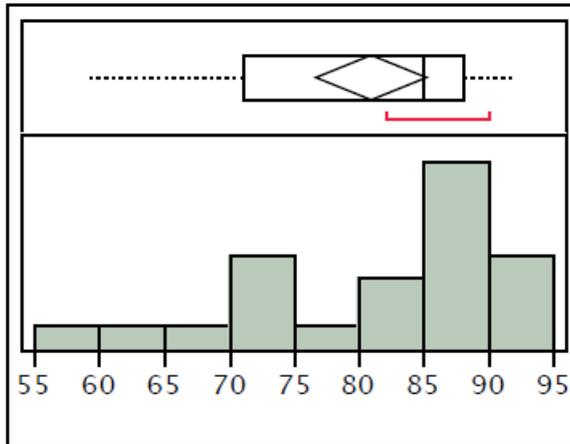


Figure 42. Rhythm performance pre- and post-test distributions for classroom A control.

### Distributions Class=B

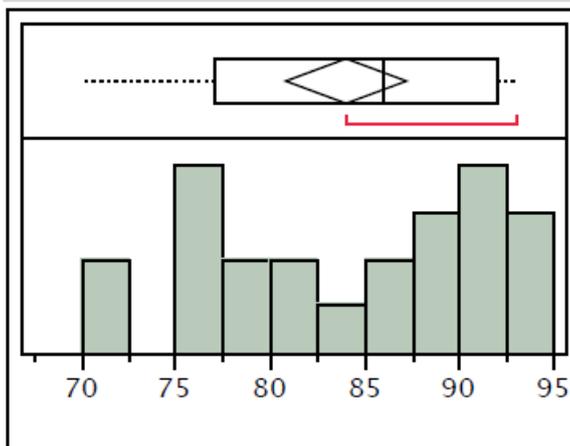
#### Rhythm Pre



#### Moments

Mean	80.913043
Std Dev	9.7650259
Std Err Mean	2.0361487
Upper 95% Mean	85.135757
Lower 95% Mean	76.69033
N	23

#### Rhythm Post



#### Moments

Mean	83.956522
Std Dev	7.351427
Std Err Mean	1.5328785
Upper 95% Mean	87.135517
Lower 95% Mean	80.777526
N	23

Figure 43. Rhythm performance pre- and post-test distributions for classroom B experimental.

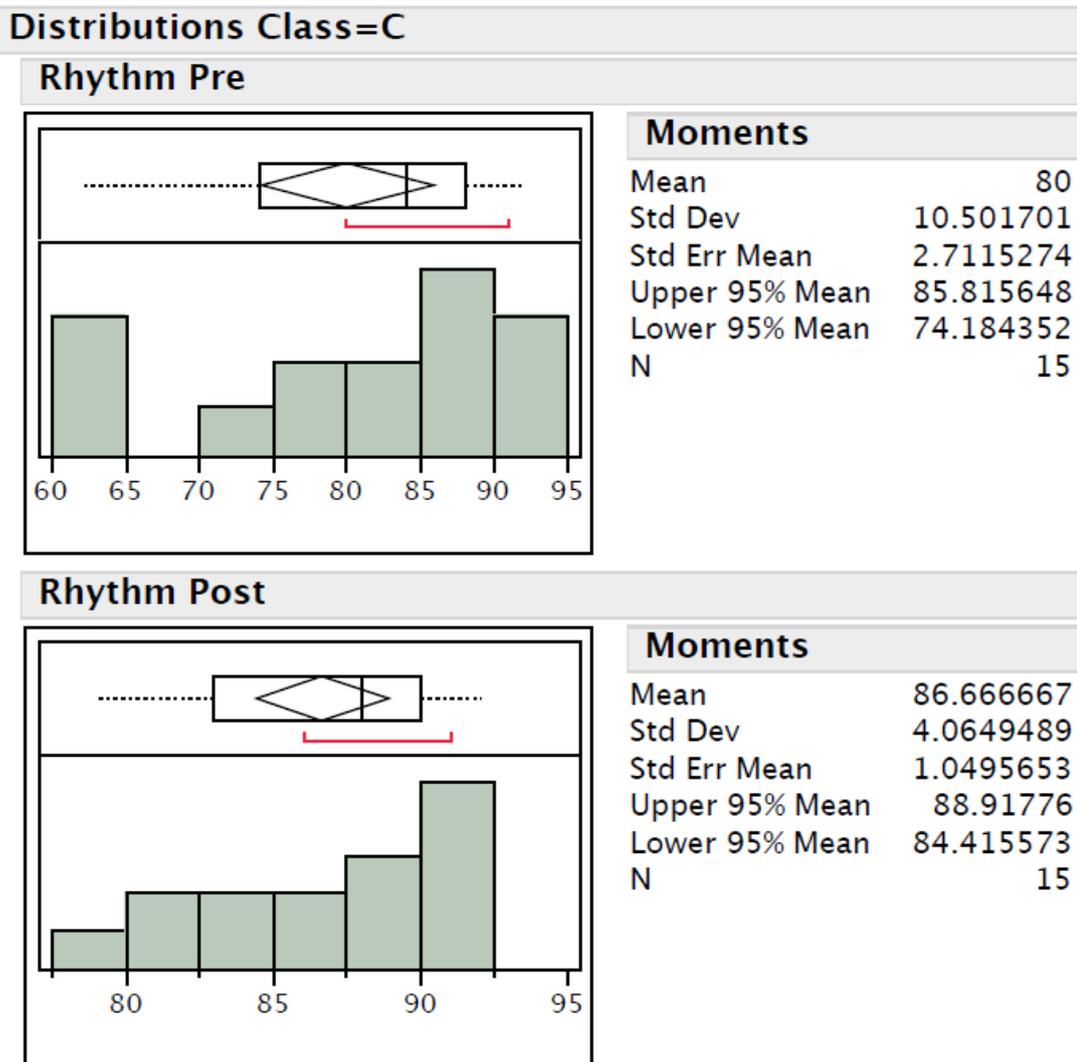


Figure 44. Rhythm performance pre- and post-test distributions for classroom C experimental.

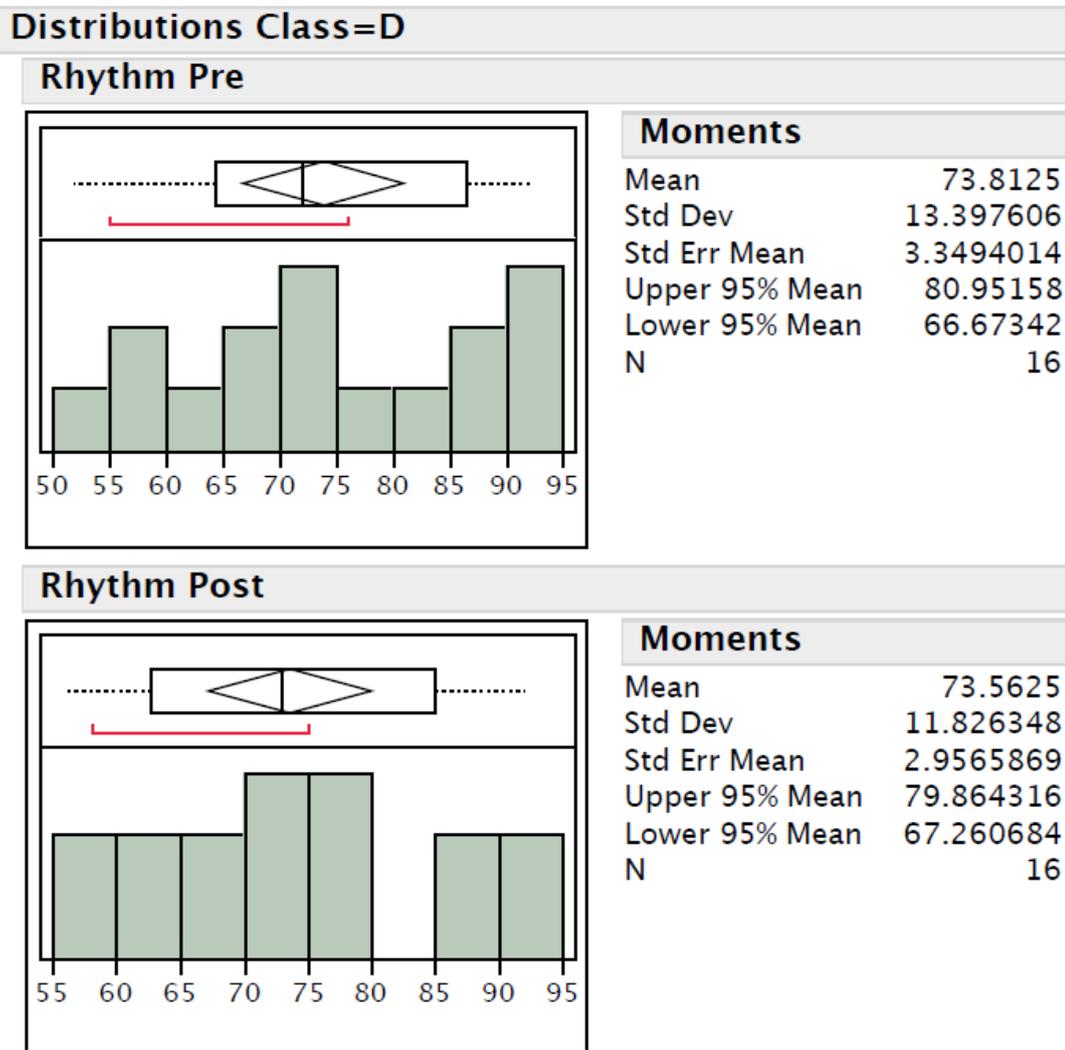


Figure 45. Rhythm performance pre- and post-test distributions for classroom D control.

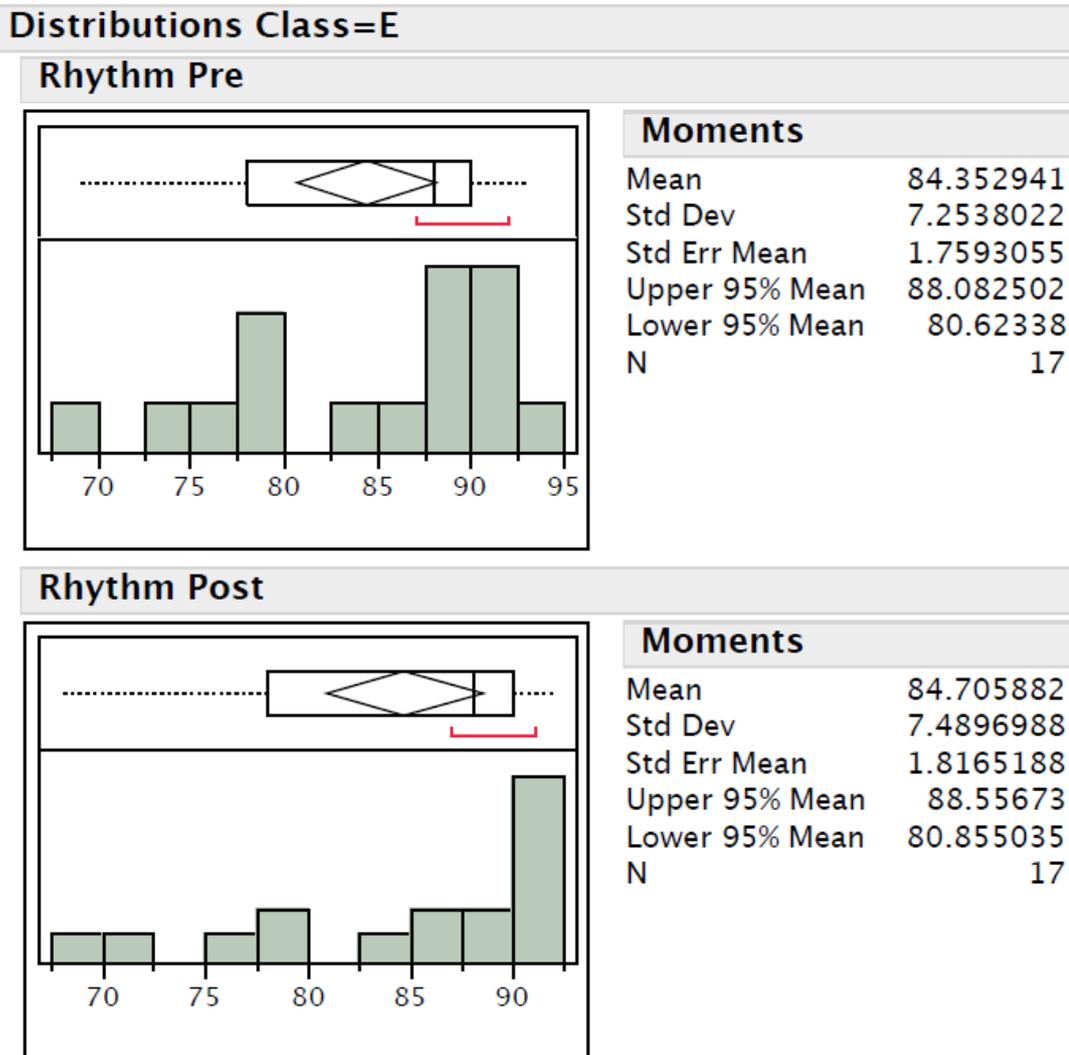
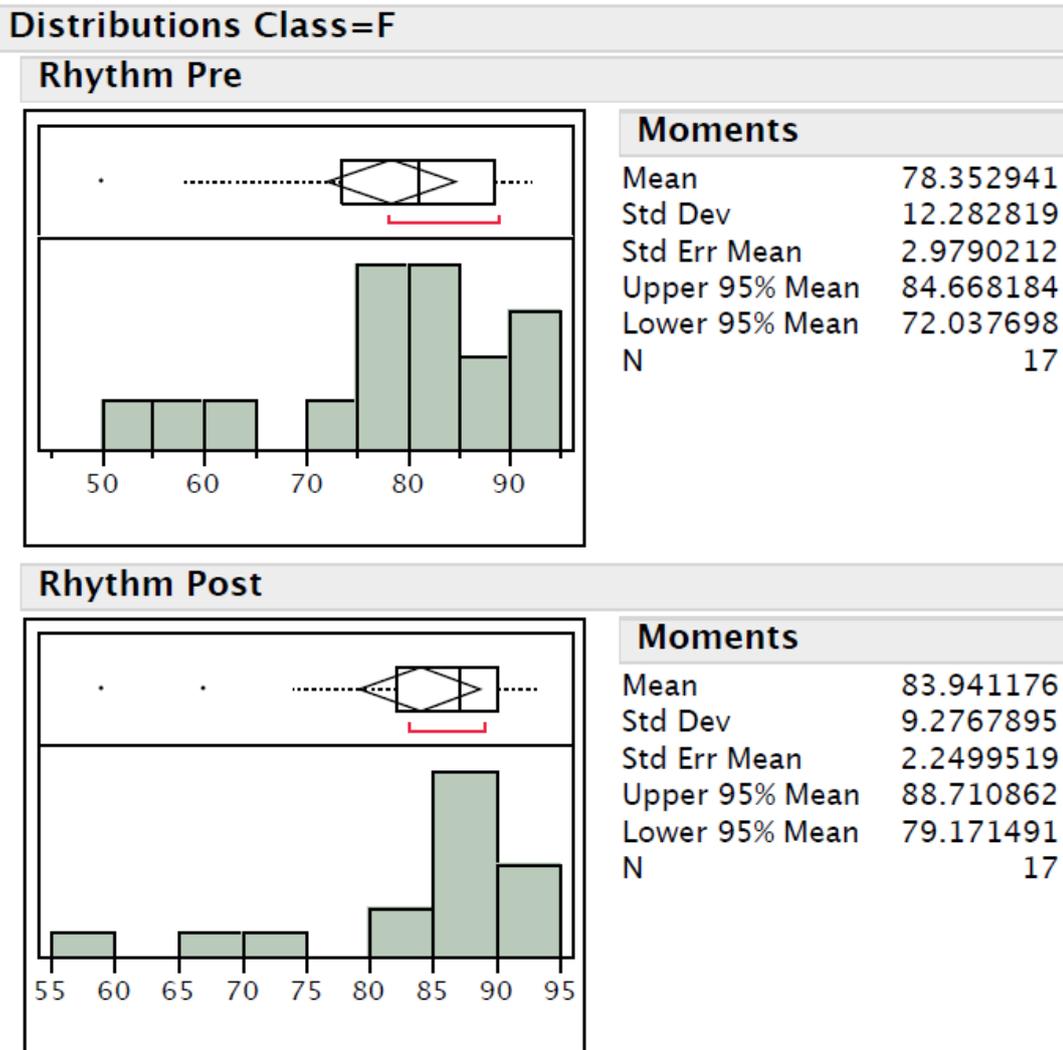
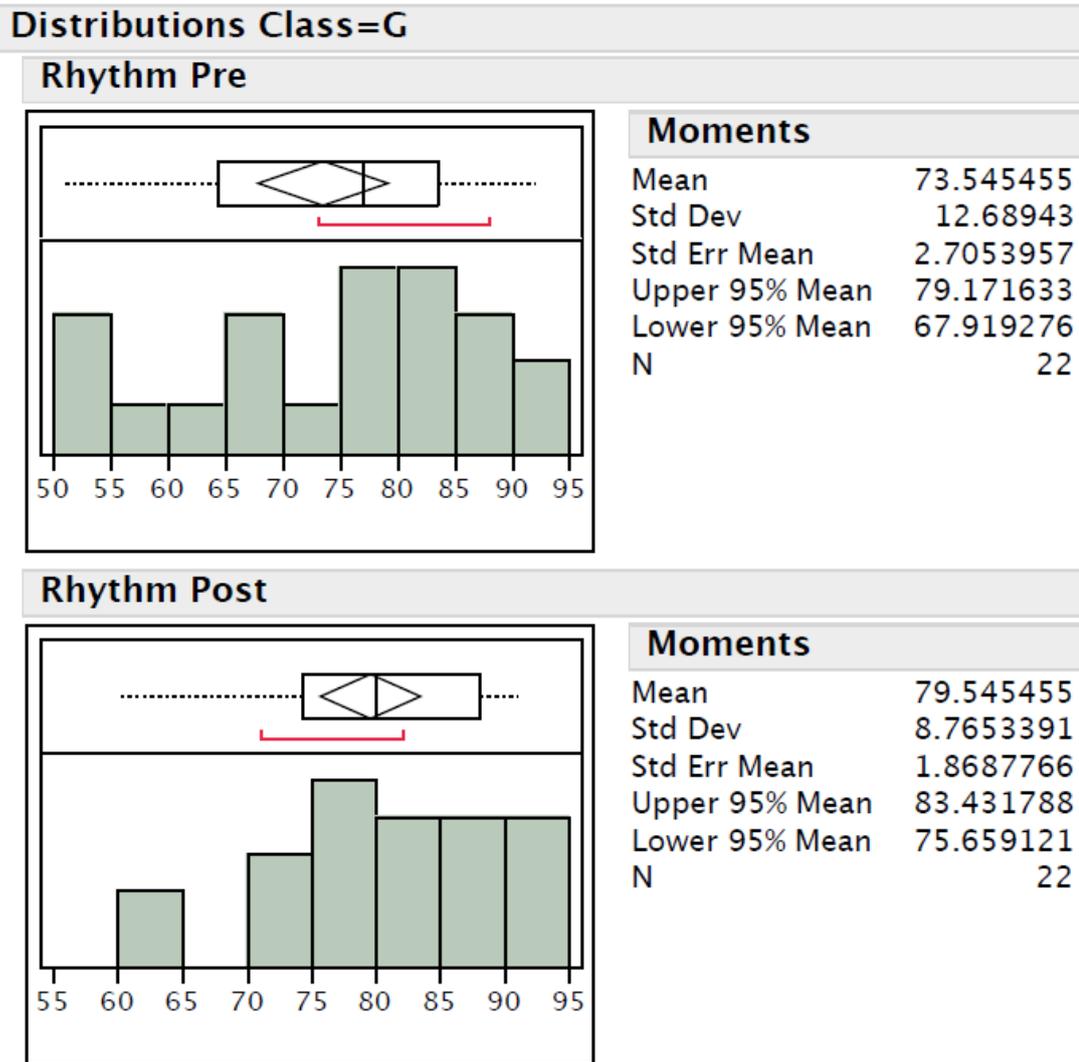


Figure 46. Rhythm performance pre- and post-test distributions for classroom E control.



*Figure 47.* Rhythm performance pre- and post-test distributions for classroom F experimental.



*Figure 48.* Rhythm performance pre- and post-test distributions for classroom G experimental.

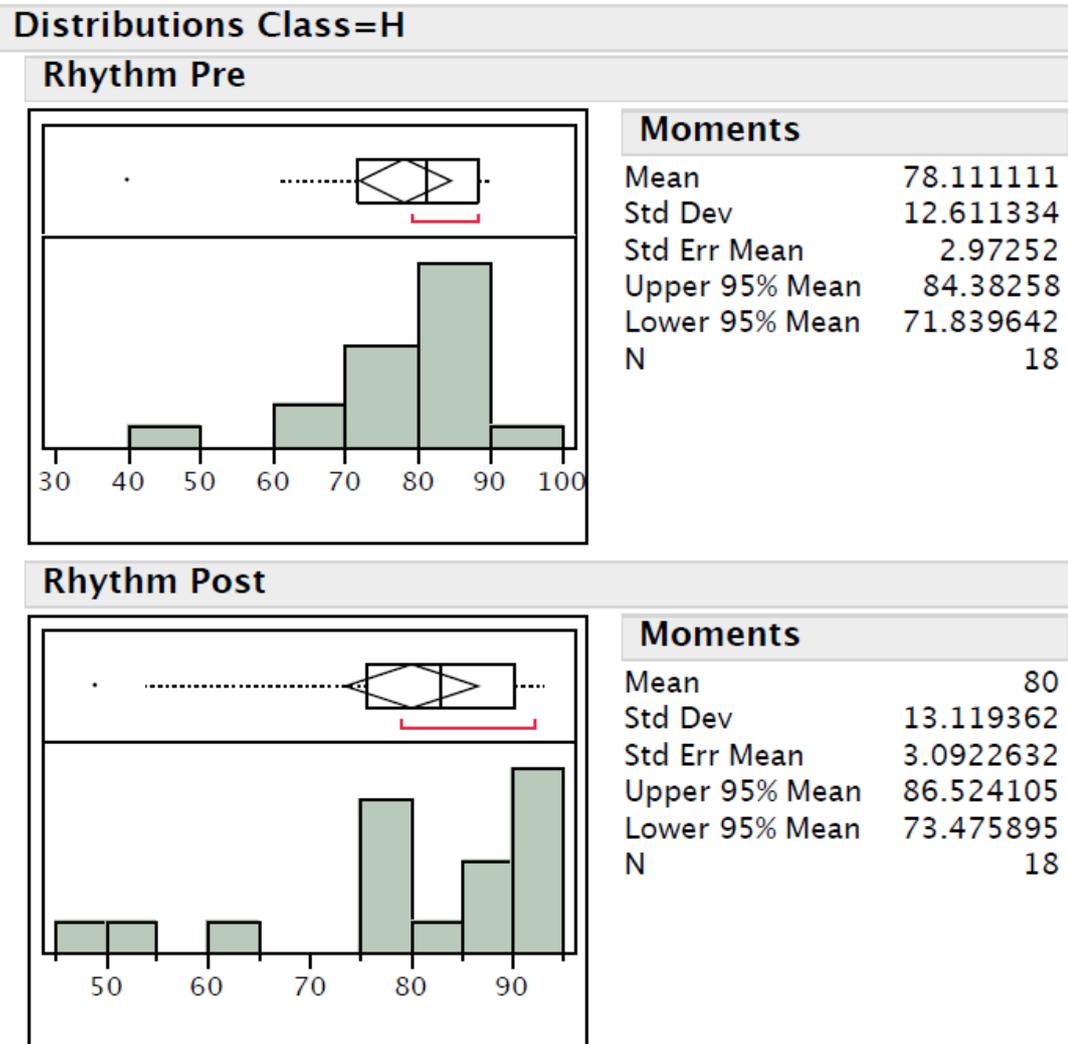
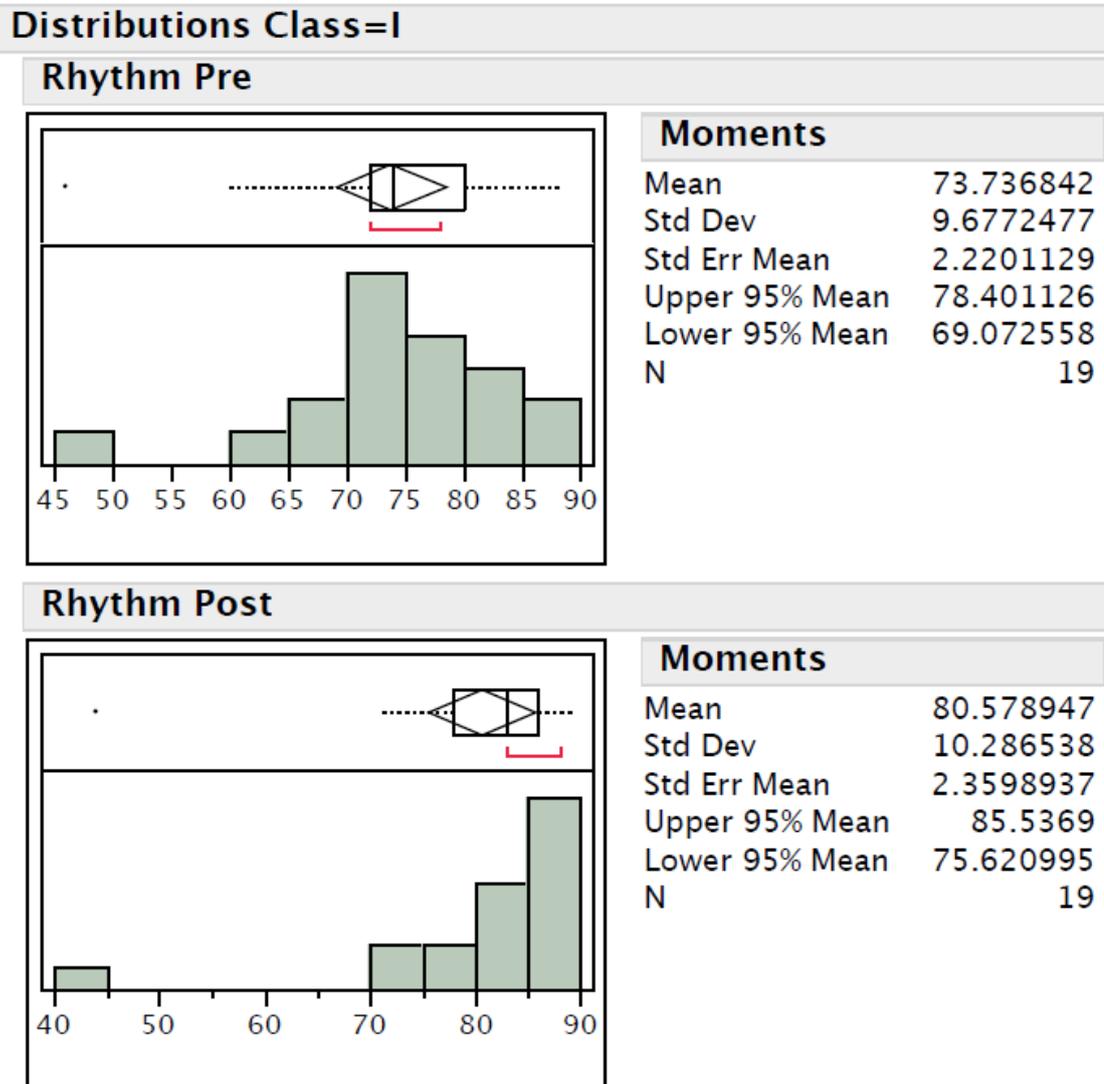


Figure 49. Rhythm performance pre- and post-test distributions for classroom H control.

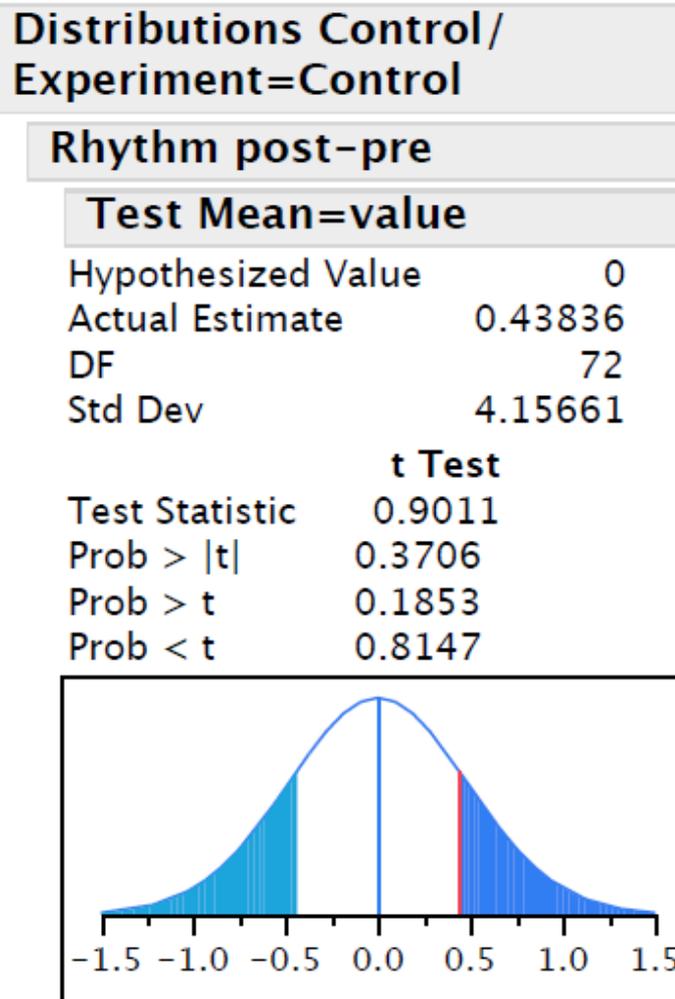


*Figure 50.* Rhythm performance pre- and post-test distributions for classroom I experimental.

### **Rhythm Pre- and Post-Test Differences**

Matched pairs t-tests were used to determine if there were statistically significant differences between pre- and post-test scores of rhythm performance for the control group (Figure 51). There were no significant differences. Matched pairs t-tests were used to determine if there were statistically significant differences between pre- and post-test scores of rhythm performance for the experimental group (Figure 52). The experimental and control groups differed significantly on tests for rhythm performance.

Matched pairs t-tests and analyses of variance were used to determine possible effects of the disproportionate numbers of nine year olds. Although the high numbers of control group nine year olds contribute disproportionately to the low rhythm performance gains in the control group, when nine year olds are removed from data analysis, there is no effect due to the numbers of nine year old participants on the significantly greater gains by the experimental group for rhythm performance. Analyses of variance are used to determine effects of age on variation in Rhythmic Performance. Age is a statistically significant effect; eight percent of the variation in rhythm performance gains can be explained by regression on age,  $r$ -squared = 8%.



*Figure 51.* Matched pairs rhythm performance pre-and post-test scores control group showing no significant difference between pre- and post-test scores.

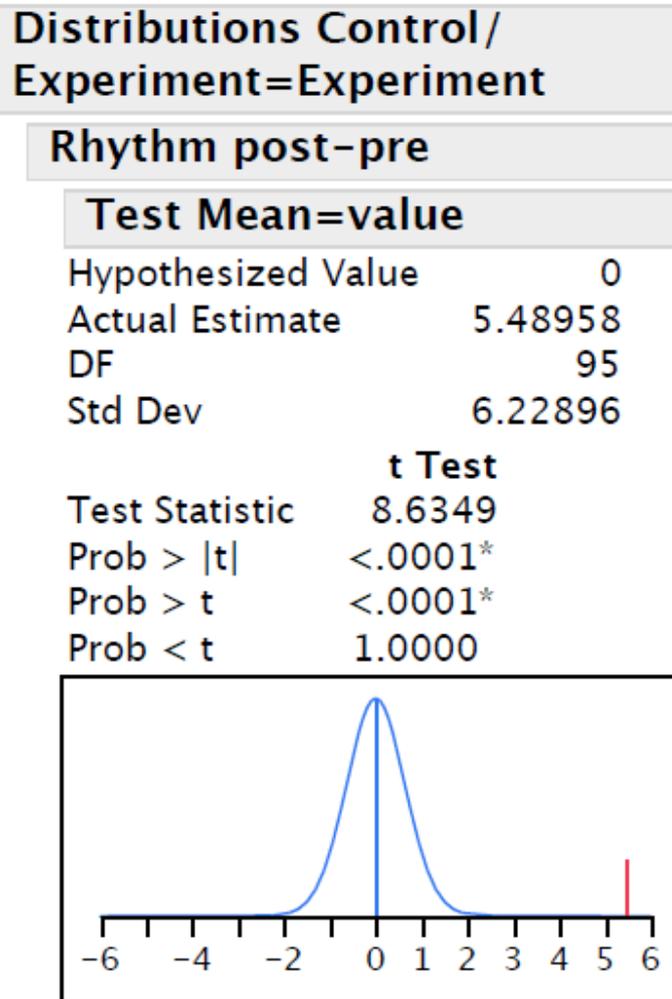


Figure 52. Matched pairs rhythm performance pre- and post-test scores experimental group showing significant difference between pre- and post-test scores.

### Rhythm Performance Effects for Age

Bivariate analysis shows significant effects for age for Rhythm Performance pre- and post-test scores. Rhythm performance pre-test scores increase with age ( $r = .45$ ) and rhythm performance post-test scores increase with age ( $r = .35$ ). Age statistically affects gains in Rhythm Performance; rhythm performance and age are positively correlated, ( $r = .28$ ).

### Mean Rhythm Performance Differences by Classrooms

Table 31 presents the means of rhythm performance differences by classroom for control and experimental classrooms.

Table 31. *Means of Rhythm Performance Differences by Classrooms*

Grade	Group	Number	Mean	Std. Error Mean
A	Control	22	-0.1818	0.4445
B	Experimental	23	3.0435	0.9503
C	Experimental	15	6.6667	1.8405
D	Control	16	-0.2500	1.0821
E	Control	17	0.3529	0.9113
F	Experimental	17	5.5882	1.1853
G	Experimental	22	6.0000	1.5090
H	Control	18	1.8889	1.3907
I	Experimental	19	6.8421	1.6082

Analysis of variance was used to determine if there was a significant difference between all classrooms with respect to mean rhythm improvement. Figure 53 shows that mean rhythm improvement significantly differs for classes but no particular class stands out.

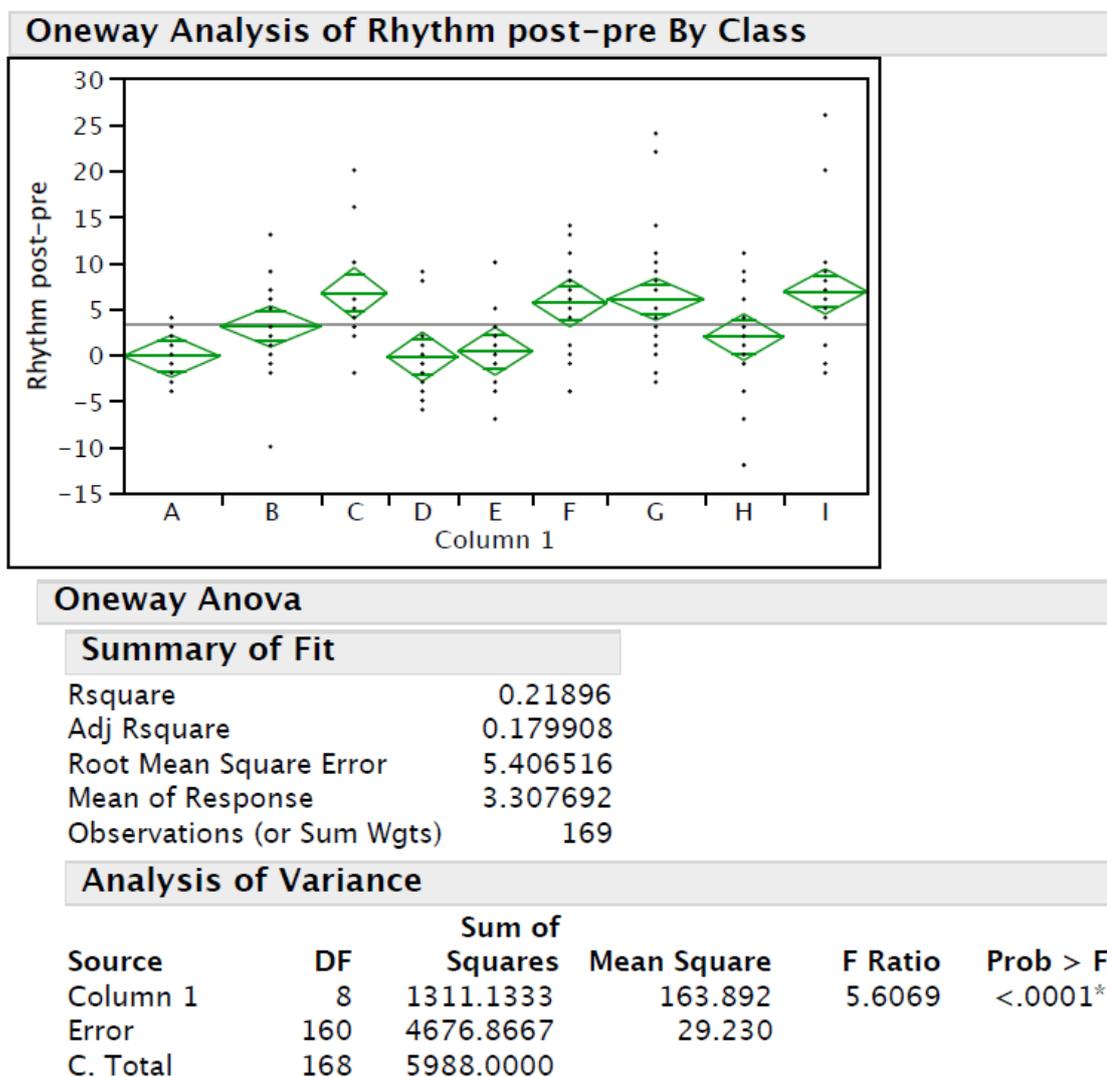


Figure 53. Analysis of Variance for rhythm performance test: Mean rhythm improvement differences by class.

### **ORF Pre- and Post-Test Scores**

Table 32 presents means for *Dibels™ Oral Reading Fluency* (ORF) pre- and post-tests by class for all experimental and control classrooms. Figures 54-62 show the distribution of pre and post ORF scores by classroom.

Table 32. *Means for Pre- and Post-Tests Dibels™ Oral Reading Fluency by Class*

Class	Group	Number	Pre-Test Mean	Post-Test Mean
A	Control	22	106.59	109.86
B	Experimental	23	78.48	91.43
C	Experimental	15	33.47	38.13
D	Control	16	11.5	13.44
E	Control	17	92.71	95.0
F	Experimental	17	46.53	49.65
G	Experimental	22	48.64	50.73
H	Control	18	40.23	42.44
I	Experimental	19	23.42	26.89

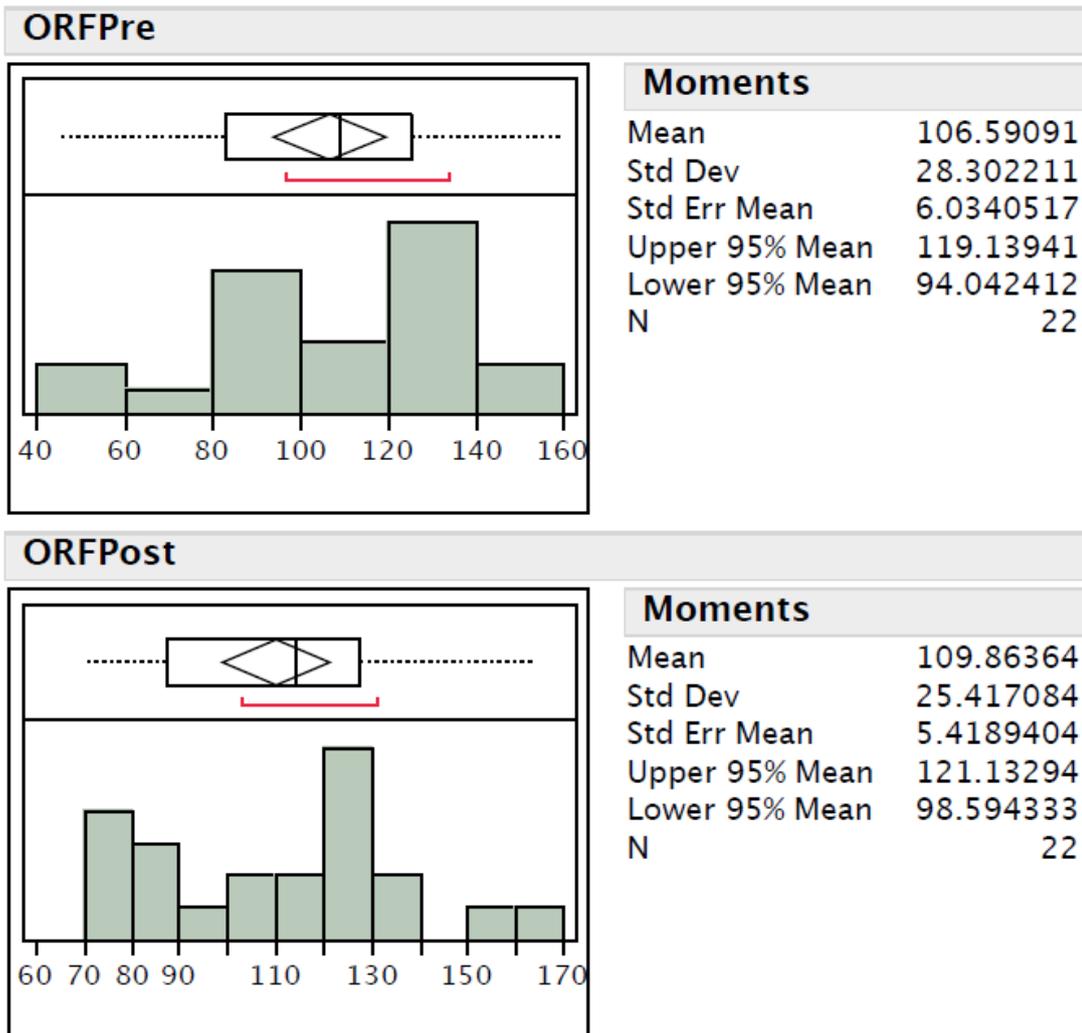


Figure 54. ORF pre- and post-test distributions for classroom A control group.

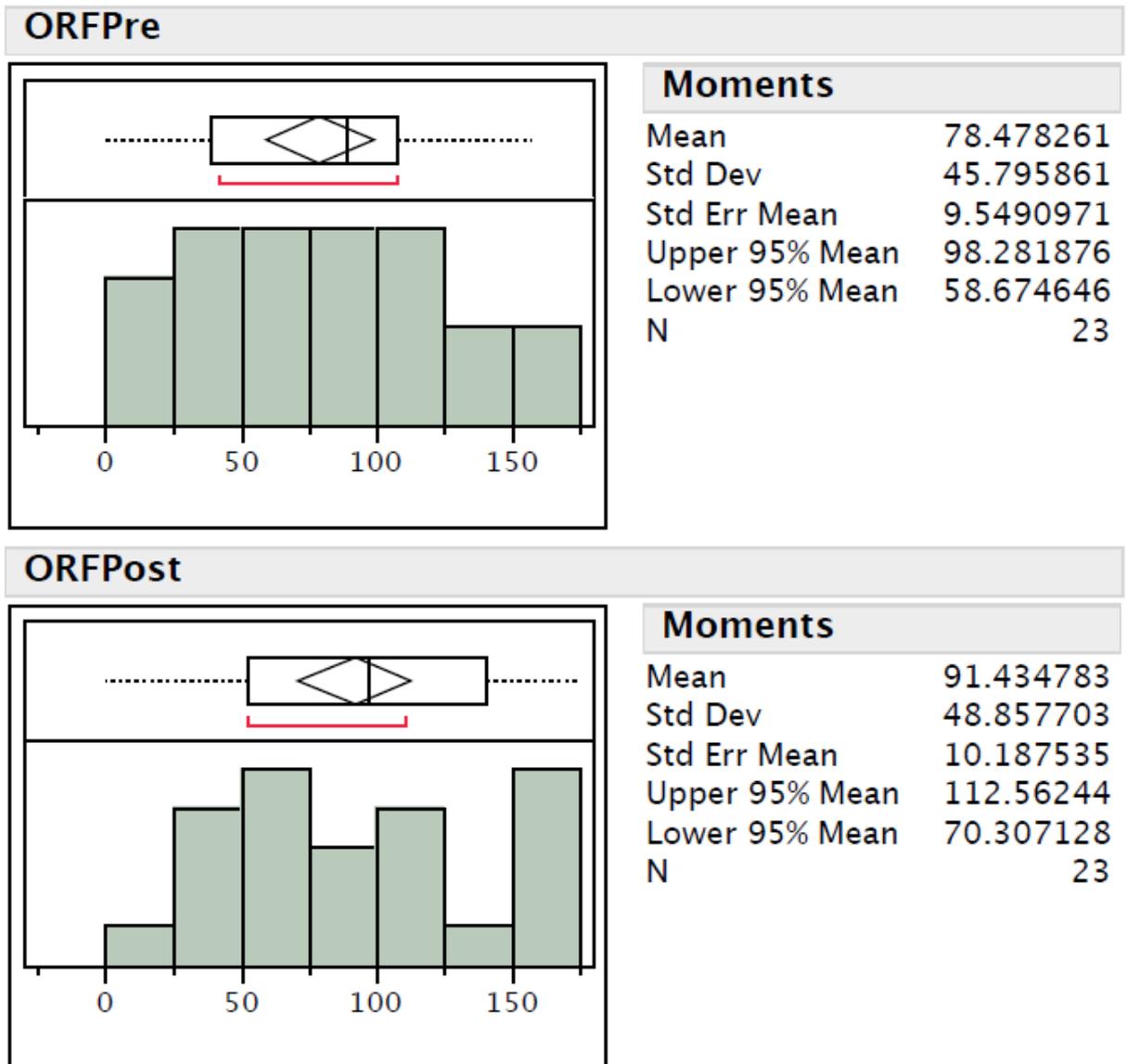


Figure 55. ORF pre- and post-test distributions for classroom B experimental group.

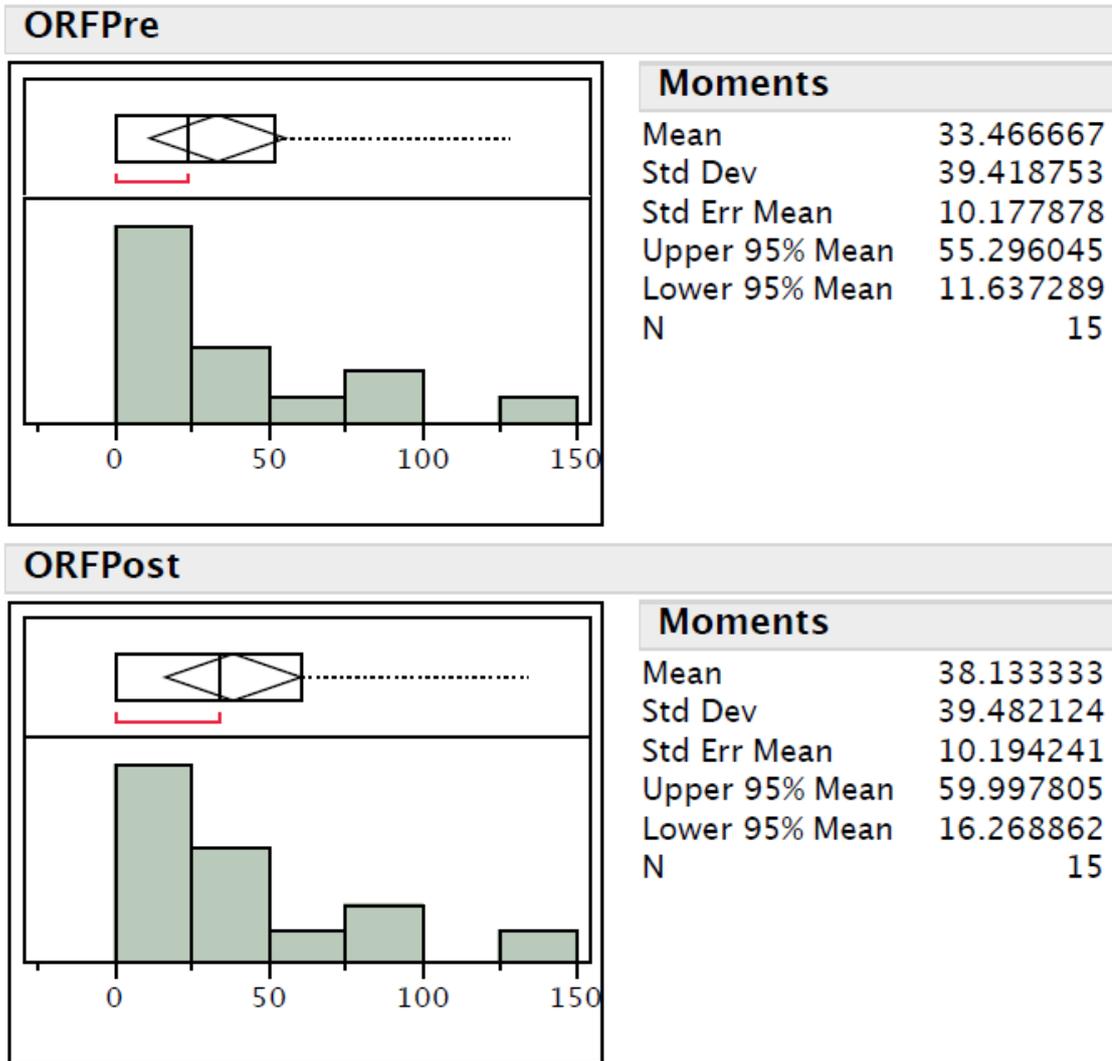


Figure 56. ORF pre-and post-test distributions for classroom C experimental group.

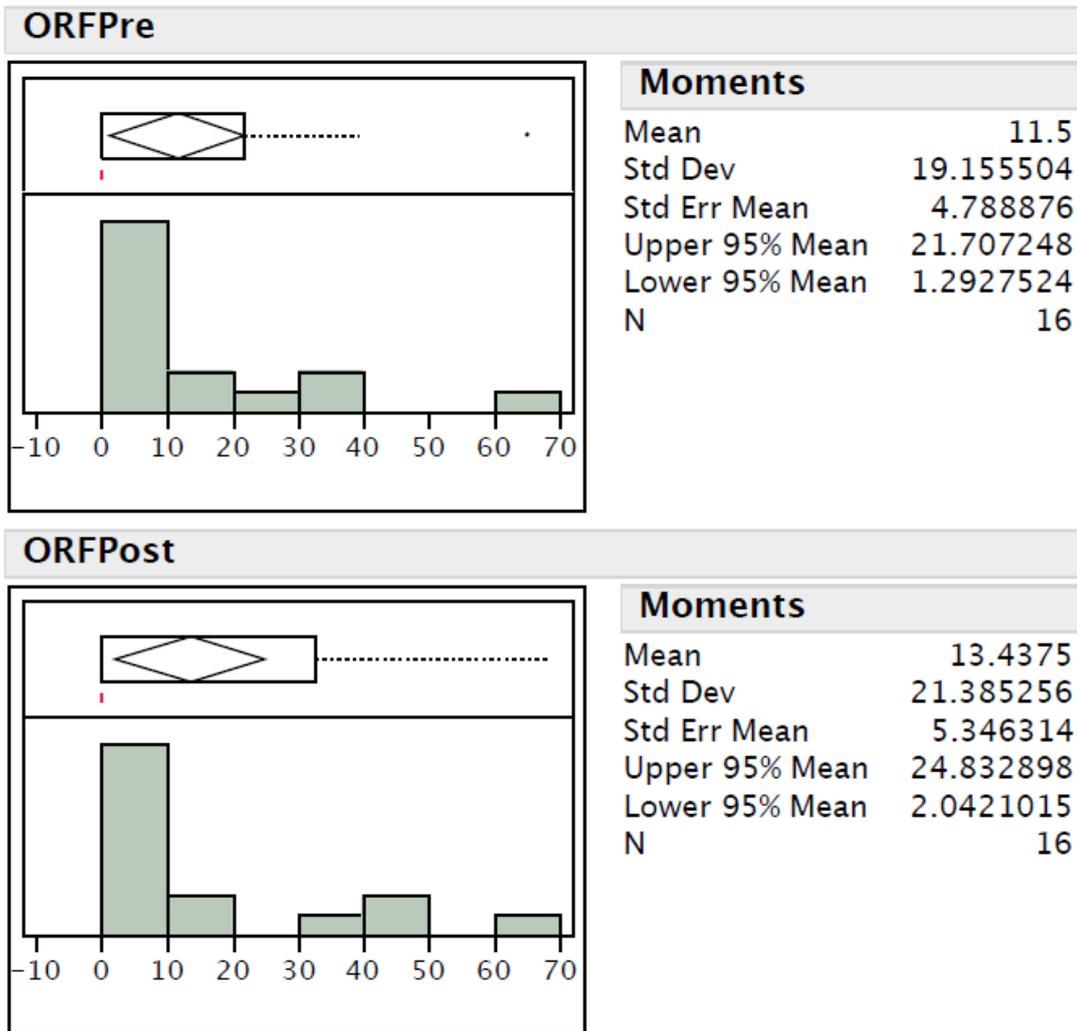


Figure 57. ORF pre- and post-test distributions for classroom D control group.

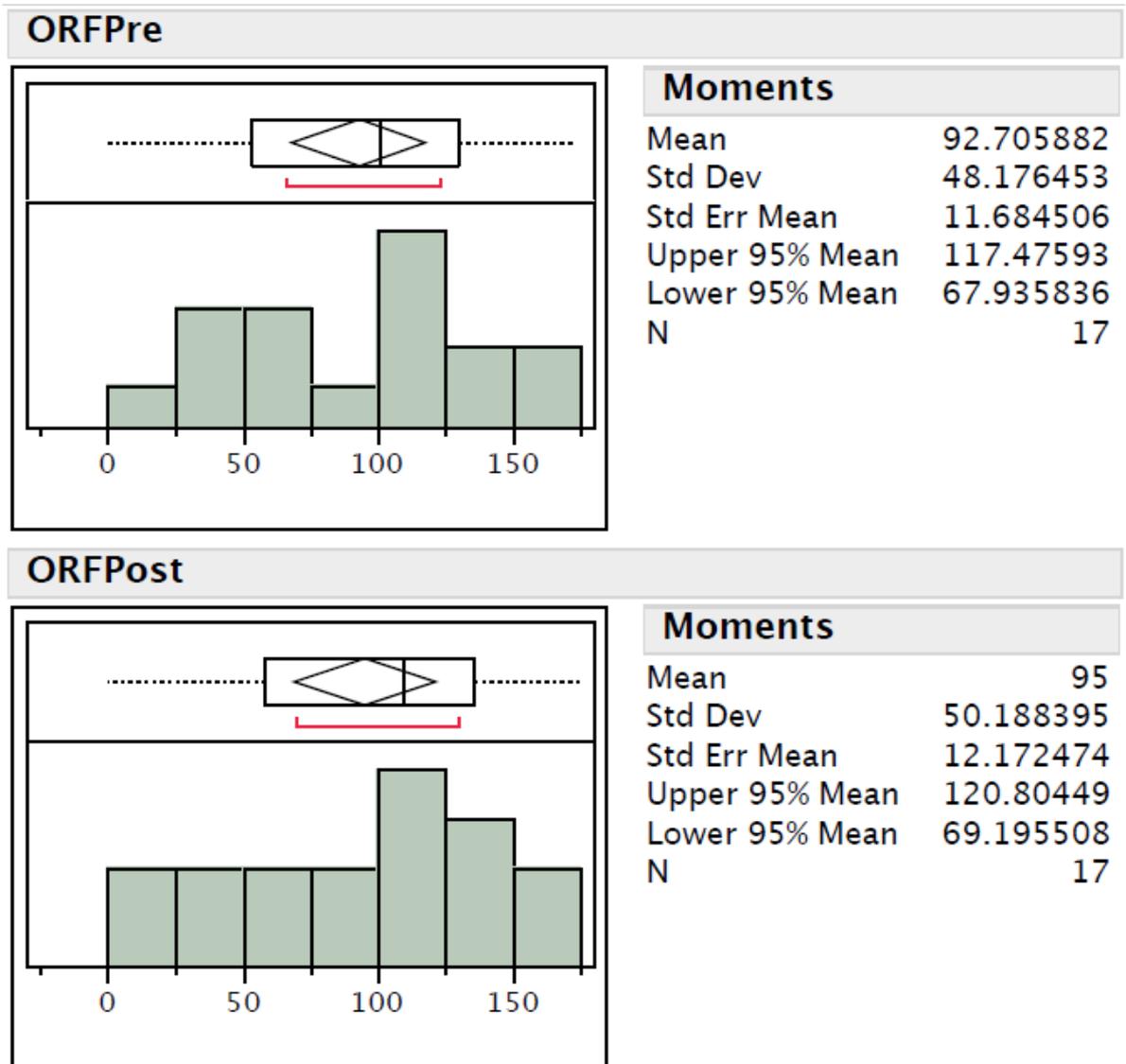


Figure 58. ORF pre- and post-test distributions for classroom E control group.

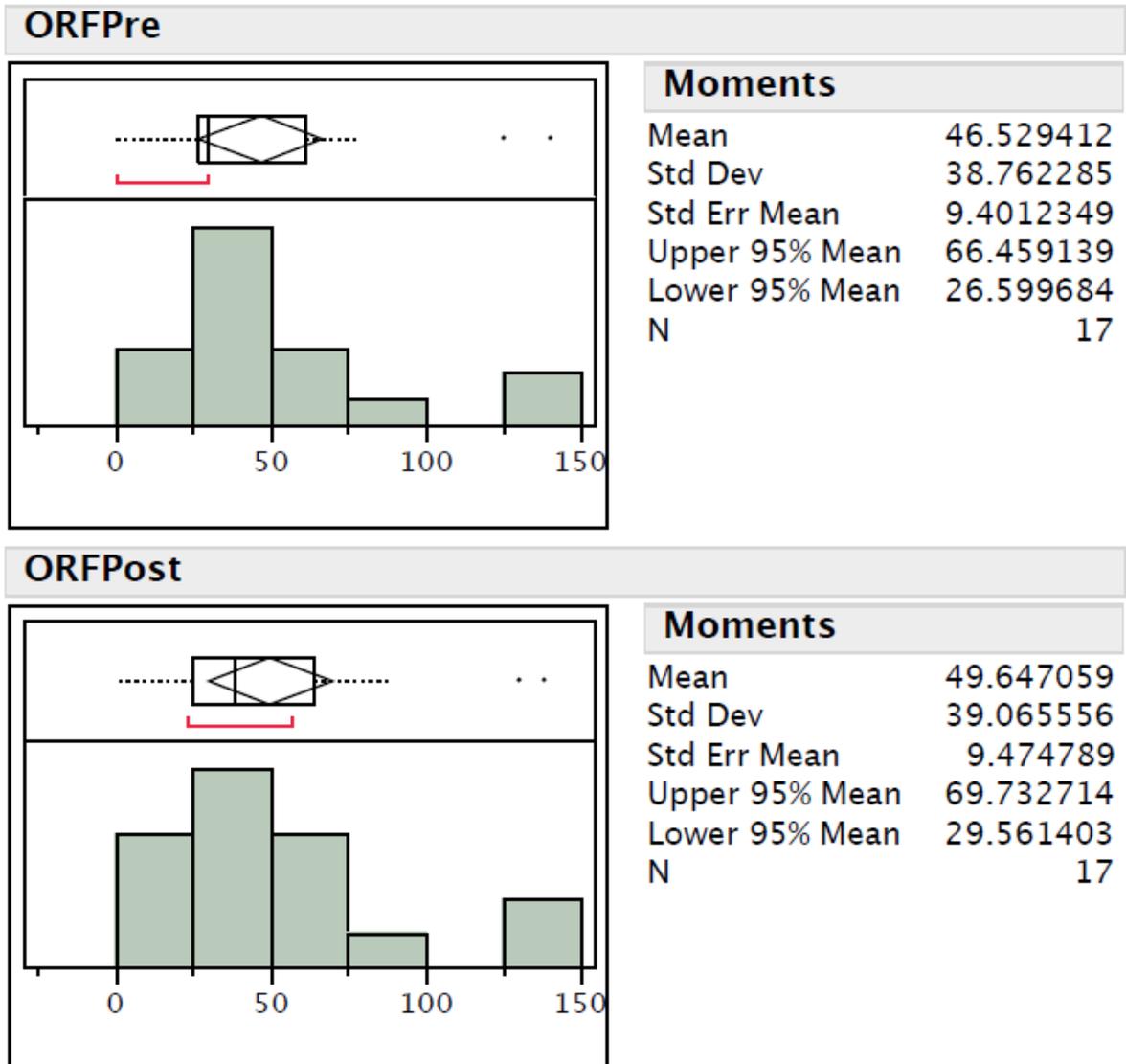


Figure 59. ORF pre- and post-test distributions for classroom F experimental group.

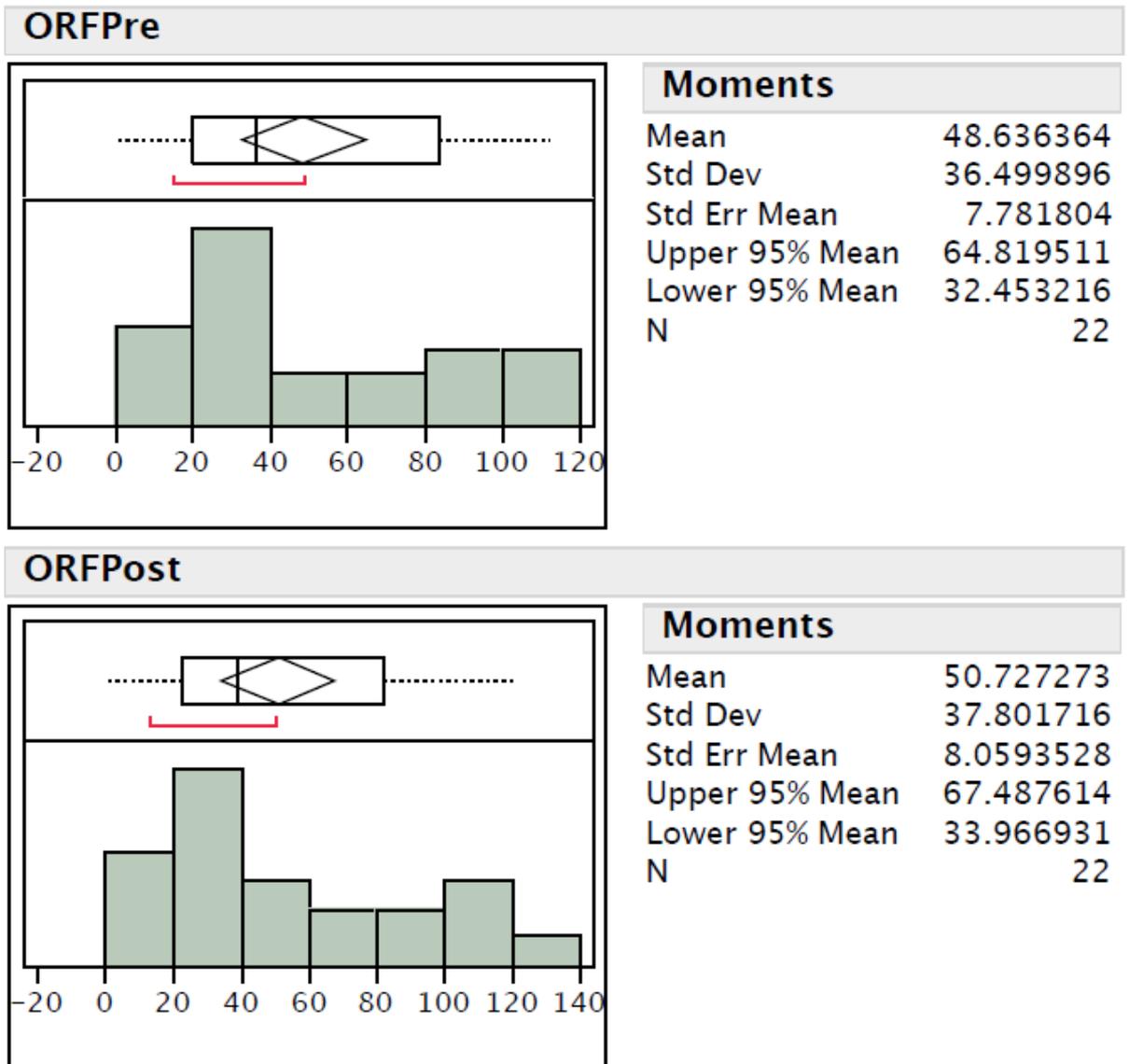
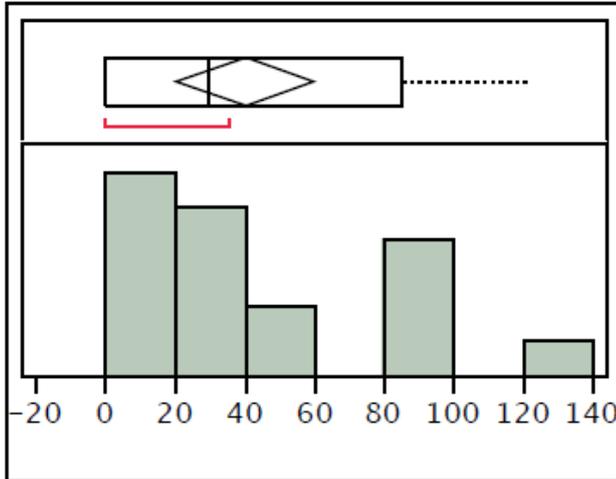


Figure 60. ORF pre- and post-test distributions for classroom G experimental group.

## Distributions Label=H

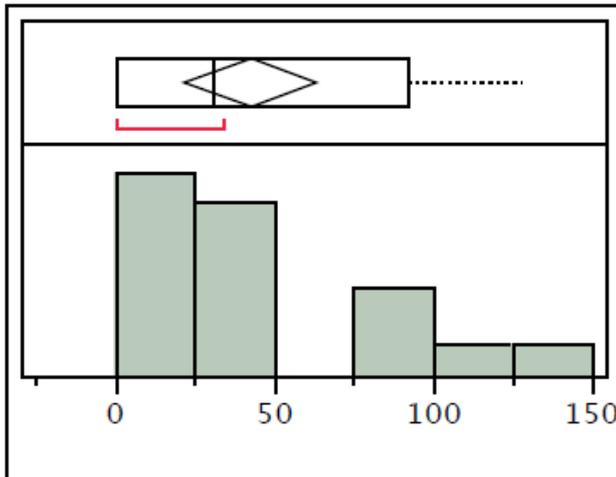
## ORFPre



## Moments

Mean	40.277778
Std Dev	39.64965
Std Err Mean	9.3455122
Upper 95% Mean	59.995085
Lower 95% Mean	20.560471
N	18

## ORFPost



## Moments

Mean	42.444444
Std Dev	41.81503
Std Err Mean	9.8558971
Upper 95% Mean	63.23857
Lower 95% Mean	21.650319
N	18

Figure 61. ORF pre- and post-test distributions for classroom H control group.

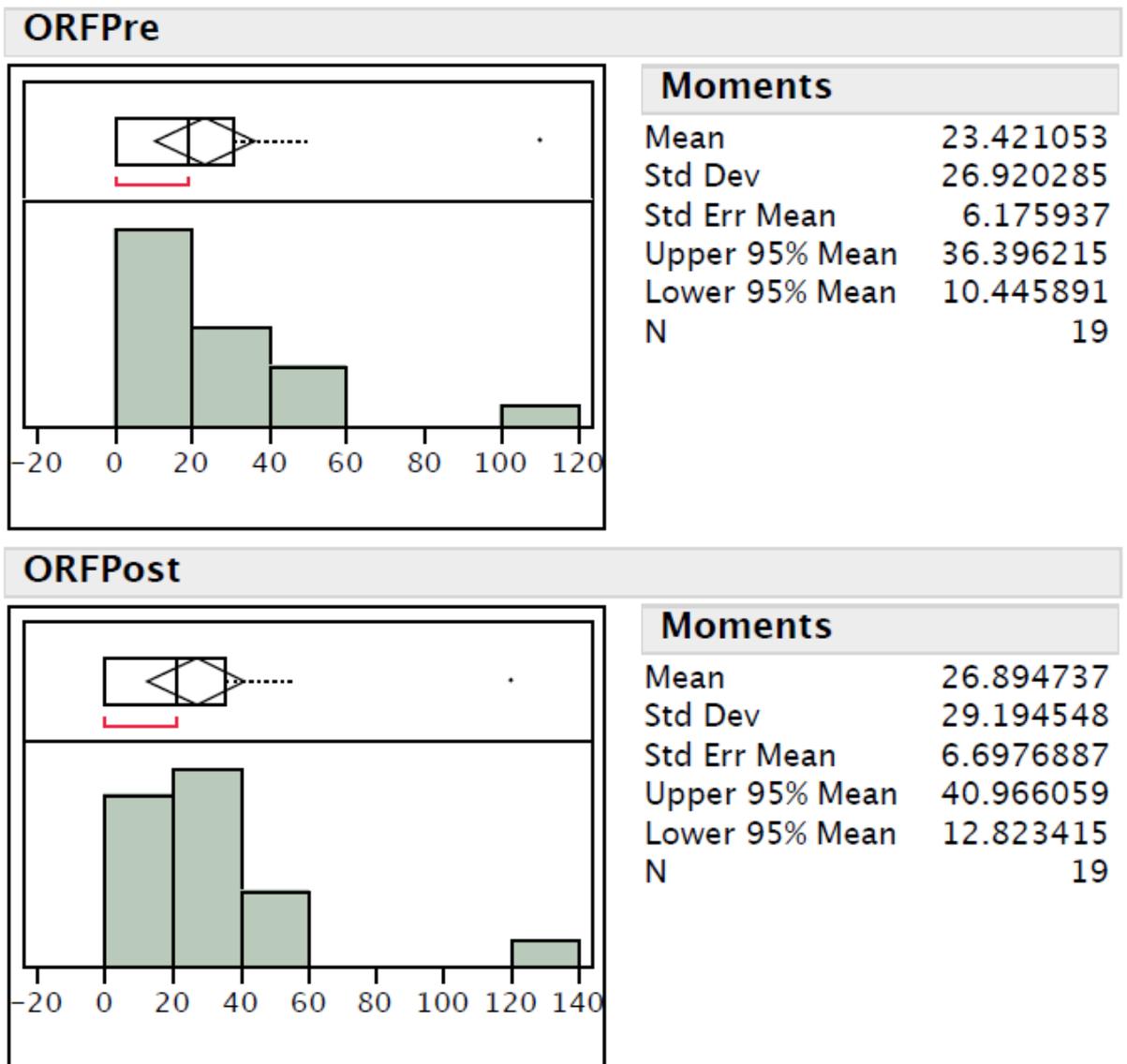


Figure 62. ORF pre- and post-test distributions for classroom I experimental group.

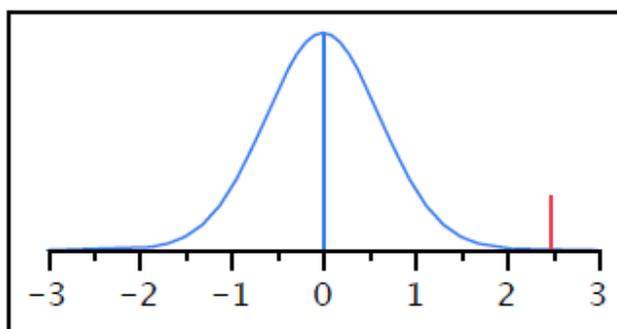
***ORF* Pre- and Post-Test Differences**

Matched pairs t-tests analysis was used to determine if there were significant differences between pre- and post-test scores for oral reading fluency for groups. There were statistically significant differences between pre- and post-test scores for oral reading fluency for control and experimental groups. There was a significant improvement in *ORF* scores for the control group (Figure 63) and for the experimental group (Figure 64). Both experimental and control groups achieved statistically significant gains in oral reading fluency scores. However, oral reading fluency scores for the experimental group increased significantly more than oral reading fluency scores for the control group.

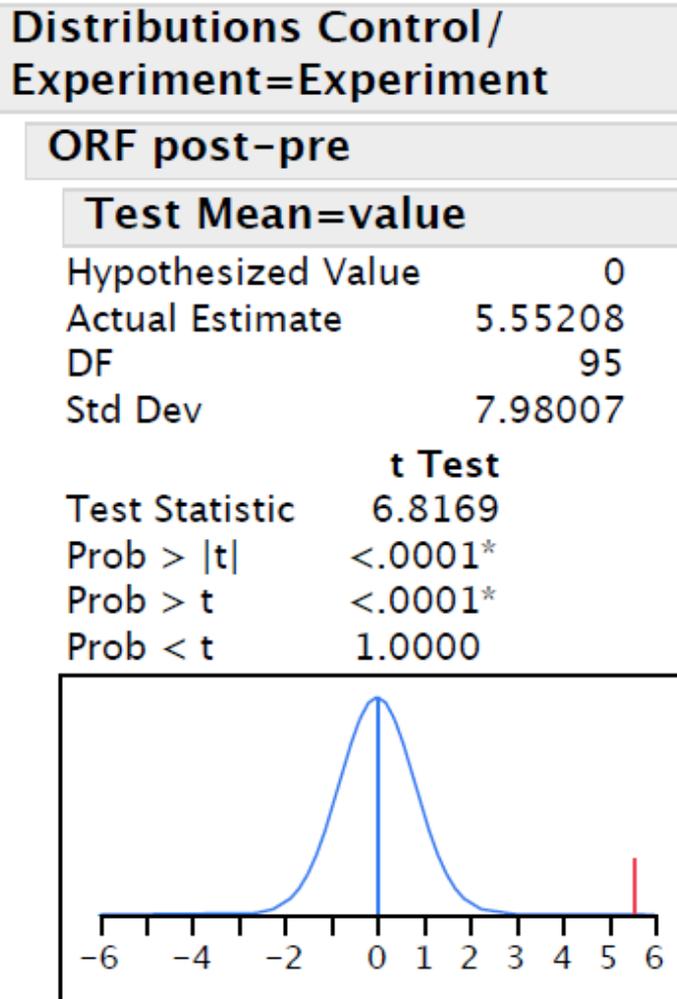
**Distributions Control/  
Experiment=Control****ORF post-pre****Test Mean=value**

Hypothesized Value	0
Actual Estimate	2.47945
DF	72
Std Dev	5.36995

	<b>t Test</b>
Test Statistic	3.9450
Prob >  t	0.0002*
Prob > t	<.0001*
Prob < t	0.9999



*Figure 63.* Matched pairs *ORF* control group pre- and post-test scores showing significant improvement.



*Figure 64.* Matched pairs *ORF* experimental group pre- and post-test scores showing significant improvement.

### **ORF Effects for Gender and Age**

Bivariate analysis shows there are no significant effects for gender on either oral reading pre- or post-tests. There are significant effects for age. Oral reading fluency scores improve with age,  $r = .64$  for pre-tests and  $r = .64$  for post-tests. However, age does not affect oral reading fluency gains although the effect of age on oral reading fluency approached significance ( $p < .06$ ).

### **Mean ORF Differences by Classroom**

Table 33 presents the means of oral reading fluency differences by classroom for control and experimental classrooms.

Table 33. *Means of Oral Reading Fluency Differences by Classrooms*

Grade	Group	Number	Mean	Std. Error Mean
A	Control	22	3.2727	1.6841
B	Experimental	23	12.9565	2.3138
C	Experimental	15	4.6667	1.5389
D	Control	16	1.9375	0.9894
E	Control	17	2.2941	1.1433
F	Experimental	17	3.1176	1.0392
G	Experimental	22	2.0909	0.9679
H	Control	18	2.1667	0.7106
I	Experimental	19	3.4737	1.0825

Analysis of variance was used to determine if there was a significant difference between classrooms with respect to mean oral reading fluency improvement. Figure 65 shows differences between mean oral reading fluency for all classrooms. Figure 66 shows that there were no significant differences between control classes for *ORF*. Figure 67 shows that there were significant differences between experimental classrooms for *ORF*.

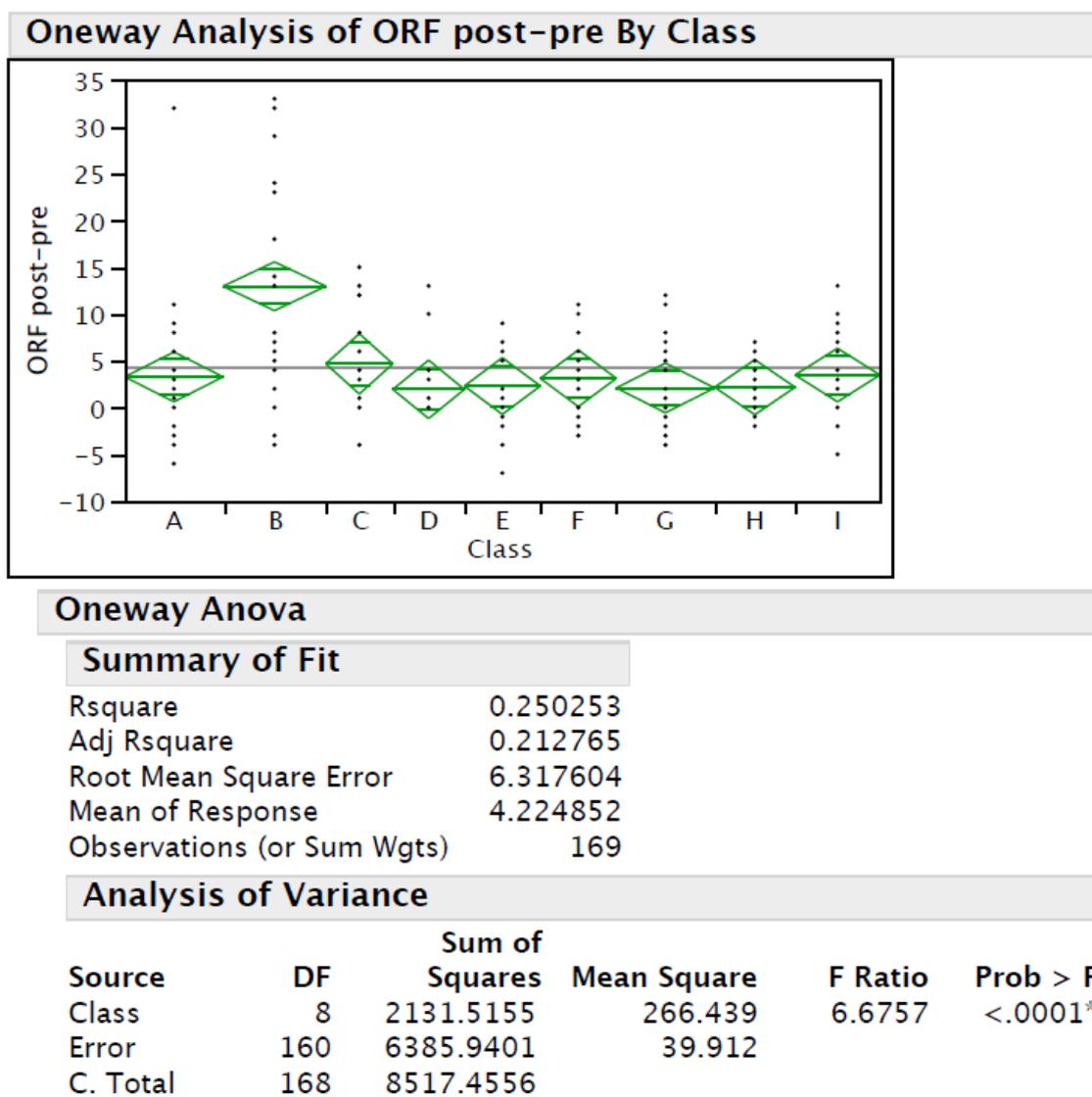
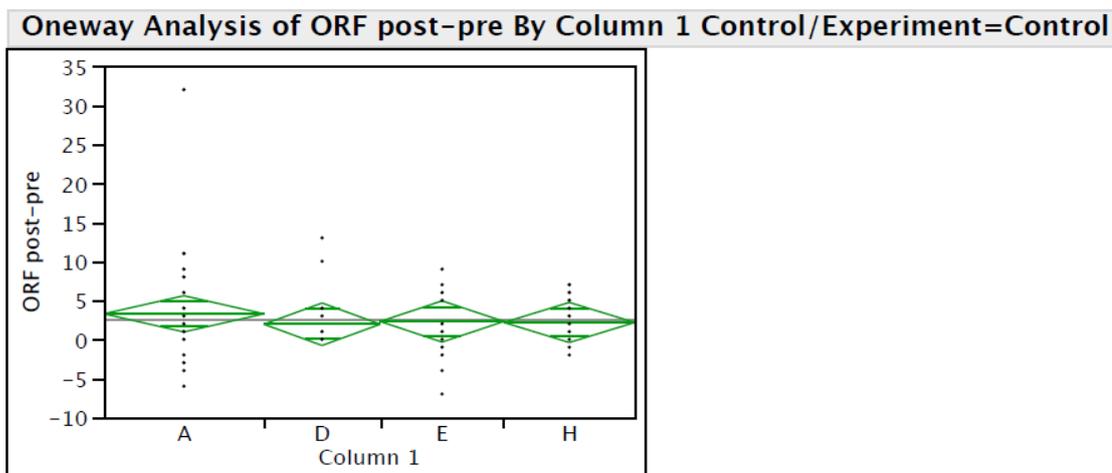


Figure 65. Analysis of Variance mean *ORF* improvement differences by all classes.



### Oneway Anova

#### Summary of Fit

Rsquare	0.010061
Adj Rsquare	-0.03298
Root Mean Square Error	5.457783
Mean of Response	2.479452
Observations (or Sum Wgts)	73

#### Analysis of Variance

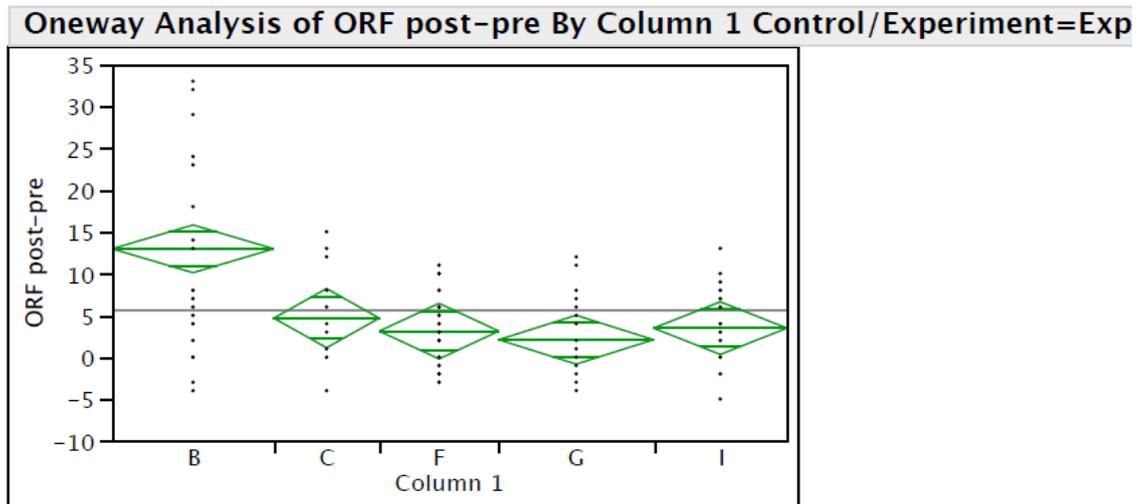
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Column 1	3	20.8886	6.9629	0.2338	0.8726
Error	69	2055.3305	29.7874		
C. Total	72	2076.2192			

#### Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
A	22	3.27273	1.1636	0.9514	5.5941
D	16	1.93750	1.3644	-0.7845	4.6595
E	17	2.29412	1.3237	-0.3466	4.9348
H	18	2.16667	1.2864	-0.3997	4.7330

Std Error uses a pooled estimate of error variance

Figure 66. Analysis of variance mean *ORF* improvement differences by control class showing no significant difference between control classes for *ORF*.



### Oneway Anova

#### Summary of Fit

Rsquare	0.284166
Adj Rsquare	0.252701
Root Mean Square Error	6.898487
Mean of Response	5.552083
Observations (or Sum Wgts)	96

#### Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Column 1	4	1719.1300	429.782	9.0311	<.0001*
Error	91	4330.6096	47.589		
C. Total	95	6049.7396			

#### Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
B	23	12.9565	1.4384	10.10	15.814
C	15	4.6667	1.7812	1.13	8.205
F	17	3.1176	1.6731	-0.21	6.441
G	22	2.0909	1.4708	-0.83	5.012
I	19	3.4737	1.5826	0.33	6.617

Std Error uses a pooled estimate of error variance

Figure 67. Analysis of Variance mean *ORF* improvement differences by experimental class showing significant differences between experimental classrooms for *ORF*.

***ORF Pre- and Post-Test Differences with and without Classroom B***

Analyses of variance were used to determine if there was a statistically significant difference between pre- and post-test scores for oral reading fluency for the experimental group. There was a statistically significant difference between pre- and post-test scores for oral reading fluency for the experimental group. However, Classroom B was the only classroom that significantly improved for post-tests of oral reading fluency. When Classroom B was eliminated from the analyses of variance, there was no difference between classrooms with respect to tests of oral reading fluency (Figure 68). When Classroom B is eliminated from analyses of variance testing, improvements in oral reading fluency for the experimental group were no longer significantly greater than those of the control group. Classroom B was the only experimental classroom that improved significantly more than control classrooms for measures of oral reading fluency.

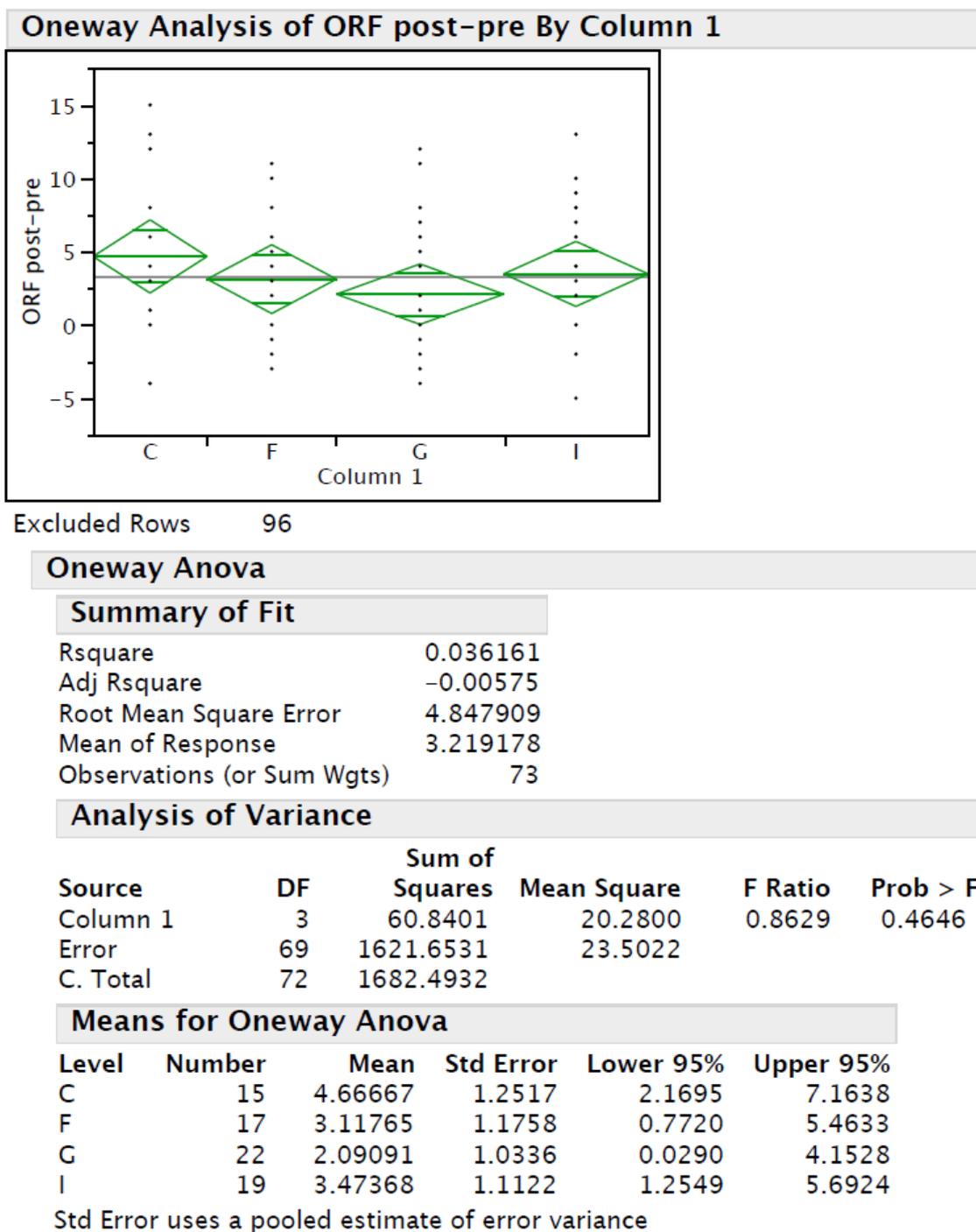


Figure 68. Analysis of variance pre- and post-tests of oral reading fluency experimental without Classroom B showing no significant different between scores.

### ORF Pre-Test Scores by School

Schools differ significantly with regard to Oral Reading Fluency pre-test scores (Table 34). John Dewey had the highest test scores and Emily Murphy had the lowest test scores. This may be partly attributed to the fact that John Dewey School includes older students from Grades One to Three and Emily Murphy is made up of only Grade One classrooms. Figures 69-72 show the distribution of oral reading fluency scores by school.

Table 34. *Oral Reading Fluency Pre-Test Scores by School*

School	Number	Mean	Std. Error mean
John Dewey	45	92.22	6.0238
Emily Murphy	31	21.13	5.7729
Jean Vanier	34	69.62	8.4070
Portia White	59	37.97	4.6618

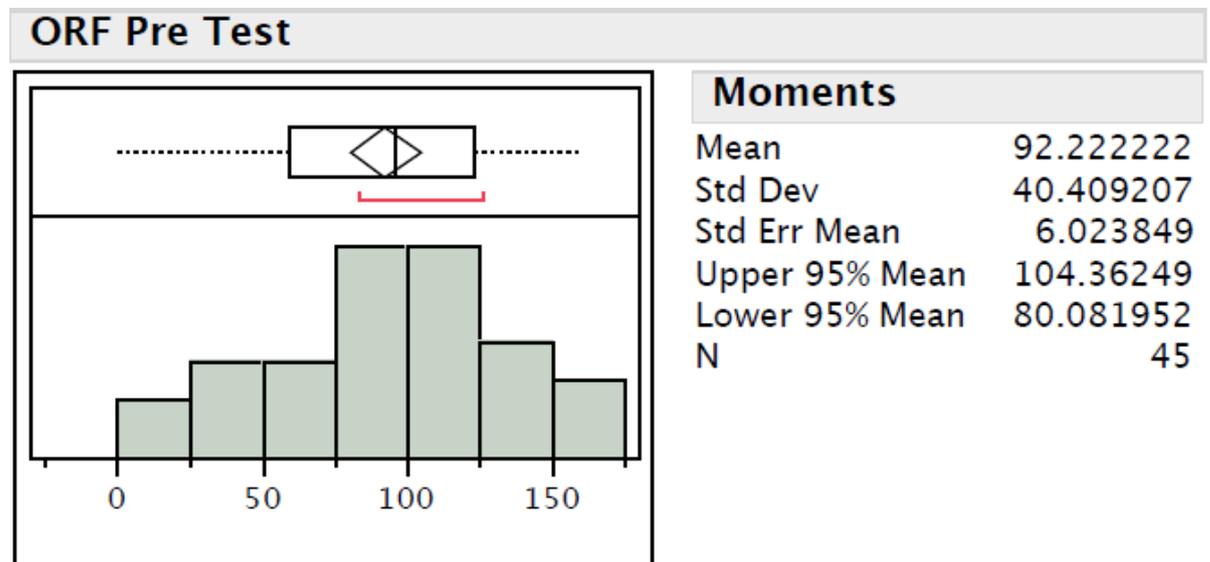


Figure 69. ORF pre-tests distributions for John Dewey School.

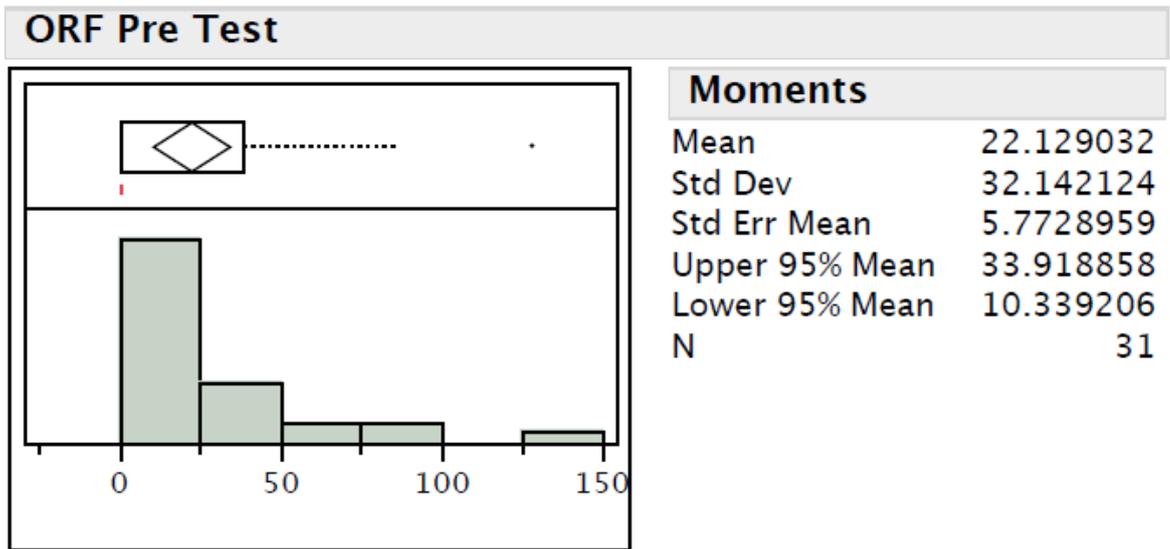


Figure 70. ORF pre-test distributions for Emily Murphy School.

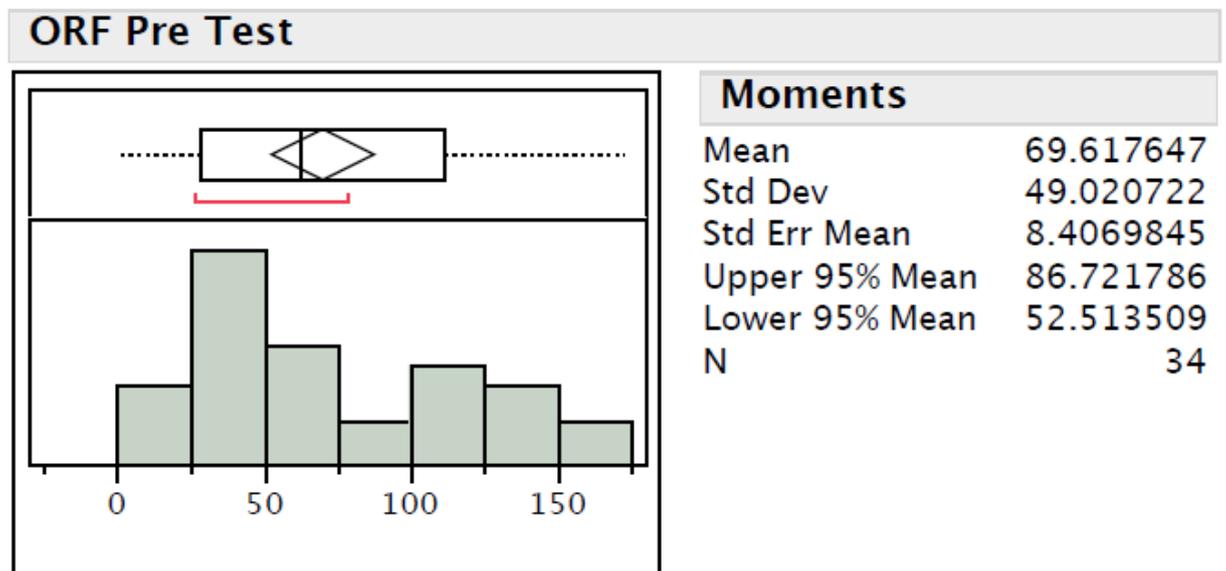


Figure 71. ORF pre-test distributions for Jean Vanier School.

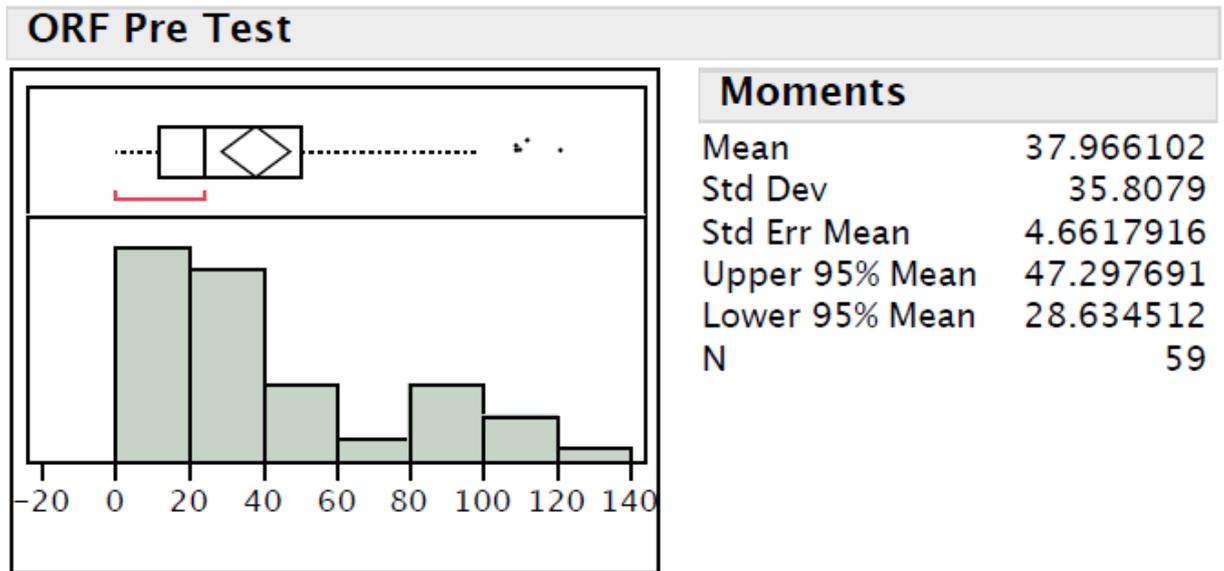


Figure 72. ORF pre-test distributions for Portia White School.

### **ORF Post-Test Scores by School**

Schools differ significantly with regard to Oral Reading Fluency post-test scores (Table 35). John Dewey had the highest test scores and Emily Murphy had the lowest test scores. This can partly be attributed to the fact that John Dewey School includes students from Grades One to Three and Emily Murphy is made up of only Grade One classrooms. Figures 73-76 show the distribution of post-test oral reading fluency scores by school.

Table 35. Oral Reading Fluency Post-Test Scores by School

School	Number	Mean	Std. Error Mean
John Dewey	45	100.44	5.9417
Emily Murphy	31	25.39	5.9933
Jean Vanier	34	72.32	8.5595
Portia White	59	40.53	4.8640

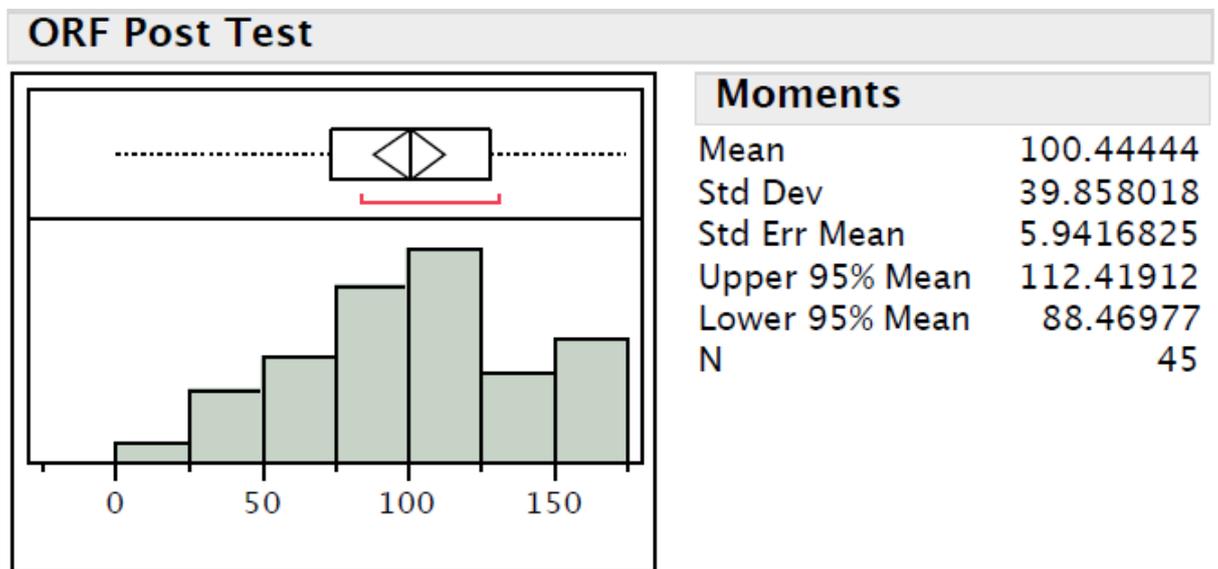


Figure 73. ORF post-test distributions for John Dewey School.

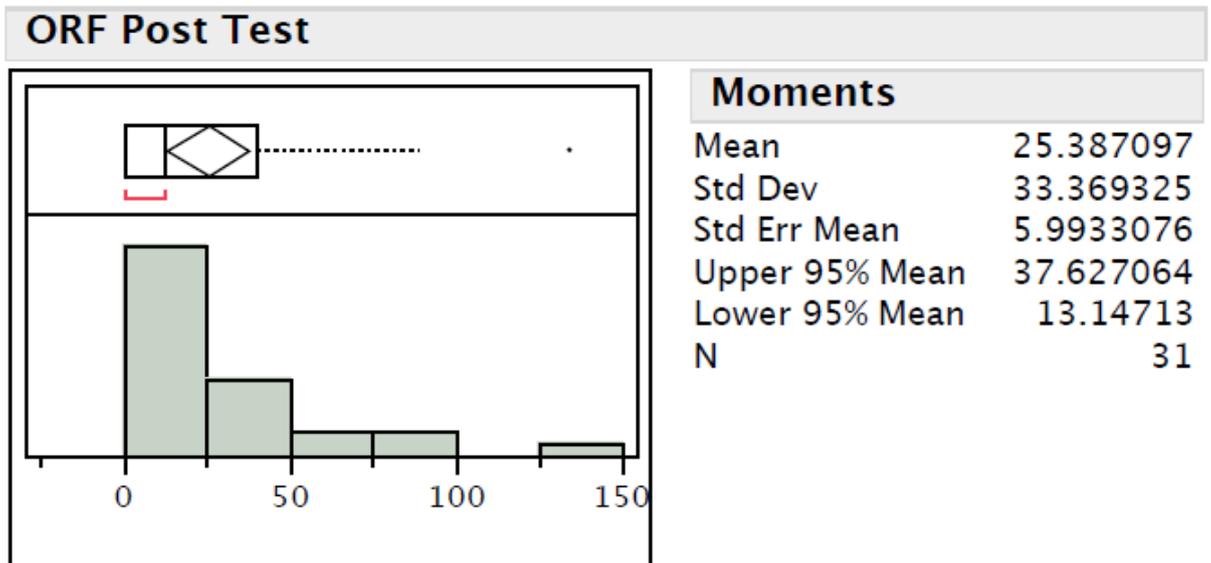


Figure 74. ORF post-test distributions for Emily Murphy School.

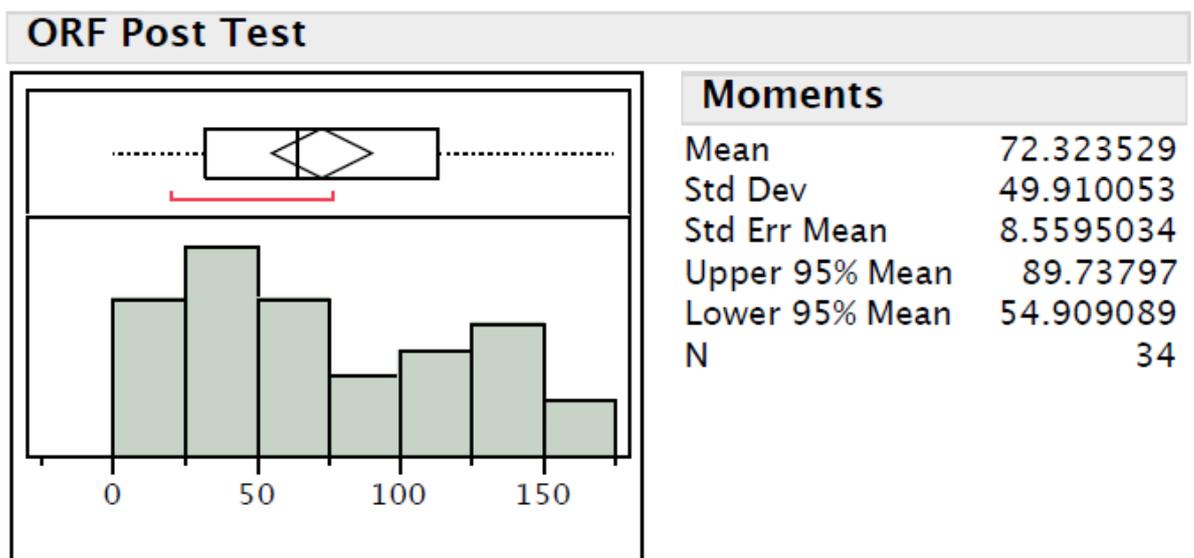


Figure 75. ORF post-test distributions for Jean Vanier School.

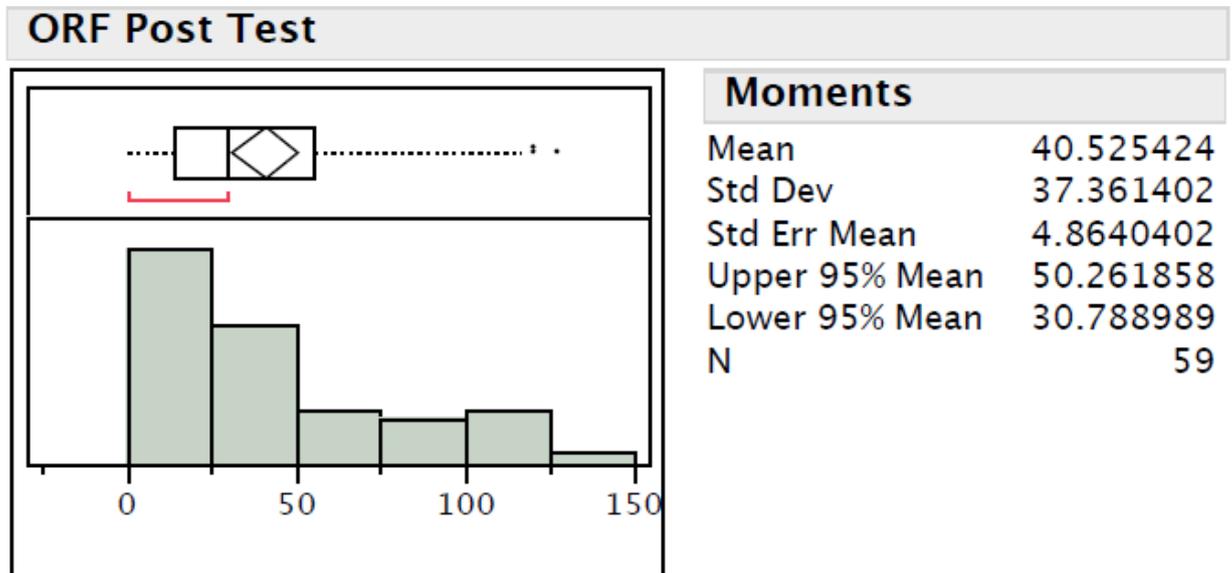


Figure 76. ORF post-test distributions for Portia White School.

### Rhythm Performance Pre-Tests by School

Schools differ significantly with regard to Rhythm Performance pre-test scores (Table 36). John Dewey had the highest test scores and Portia White had the lowest test scores. The high scores can partly be attributed to the fact that John Dewey School includes students from Grades One to Three. The low scores for Portia White cannot be attributed to age and grade as this school also includes older students from Grades One to Three. Figures 77-80 show the distribution of pre-test rhythm performance scores by school.

Table 36. Means of Rhythm Performance Pre-Test Scores by School

School	Number	Mean	Std. Error Mean
John Dewey	45	83.51	1.3056
Emily Murphy	31	76.81	2.2077
Jean Vanier	34	81.35	1.7817
Portia White	59	75.00	1.5311

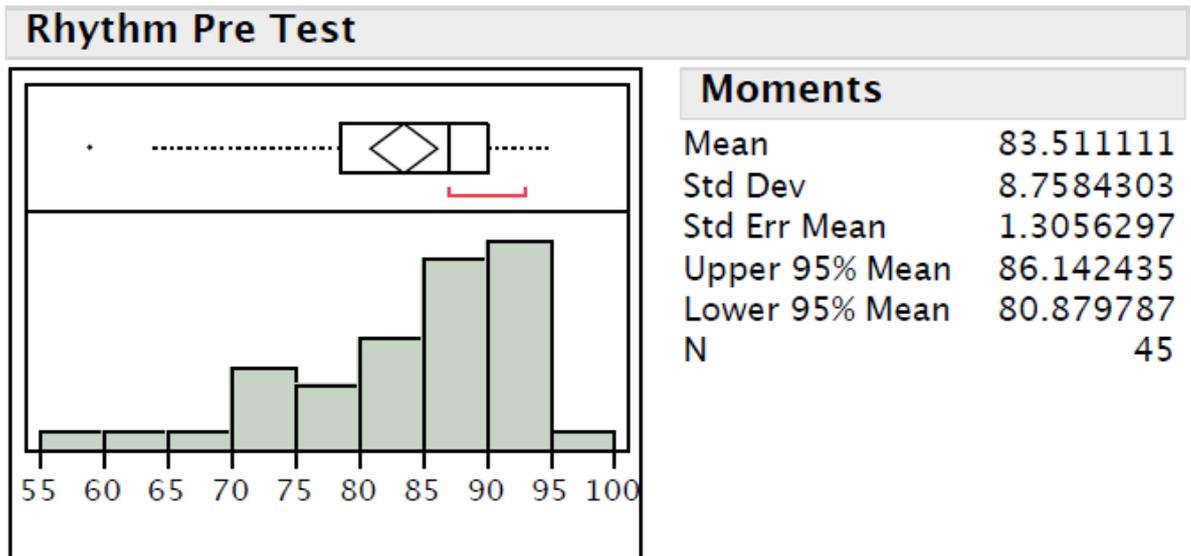


Figure 77. Rhythm performance pre-test distributions for John Dewey School.

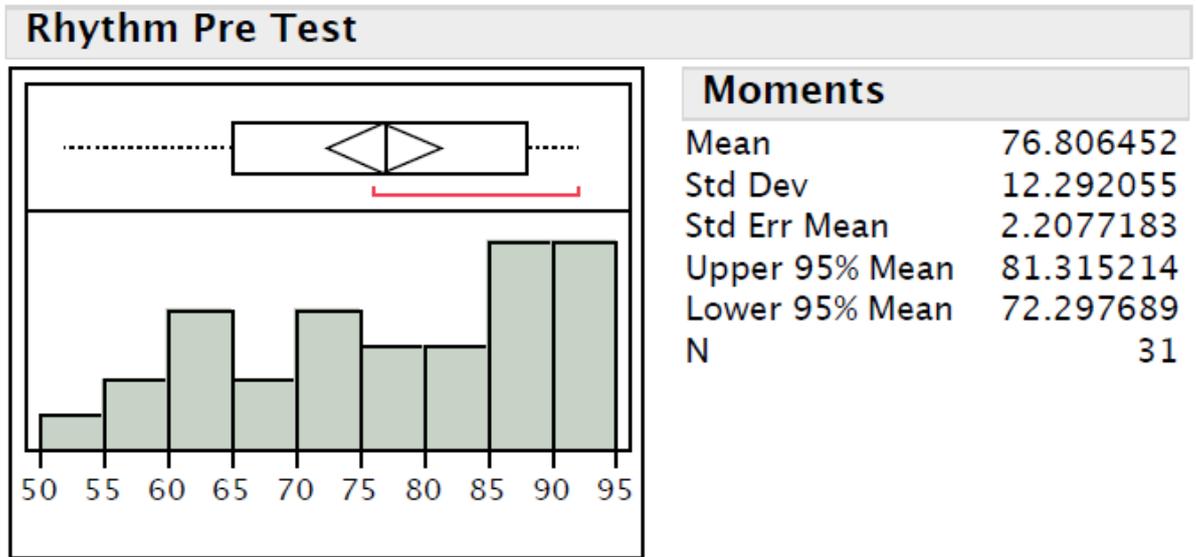


Figure 78. Rhythm performance pre-test distributions for Emily Murphy.

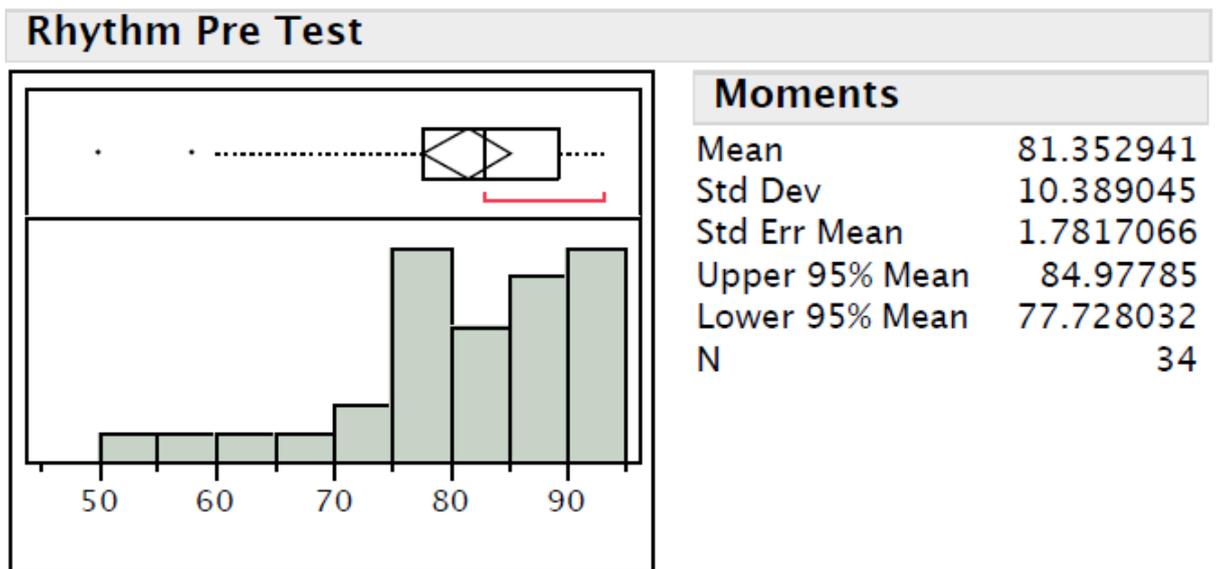


Figure 79. Rhythm performance pre-test distributions for Jean Vanier School.

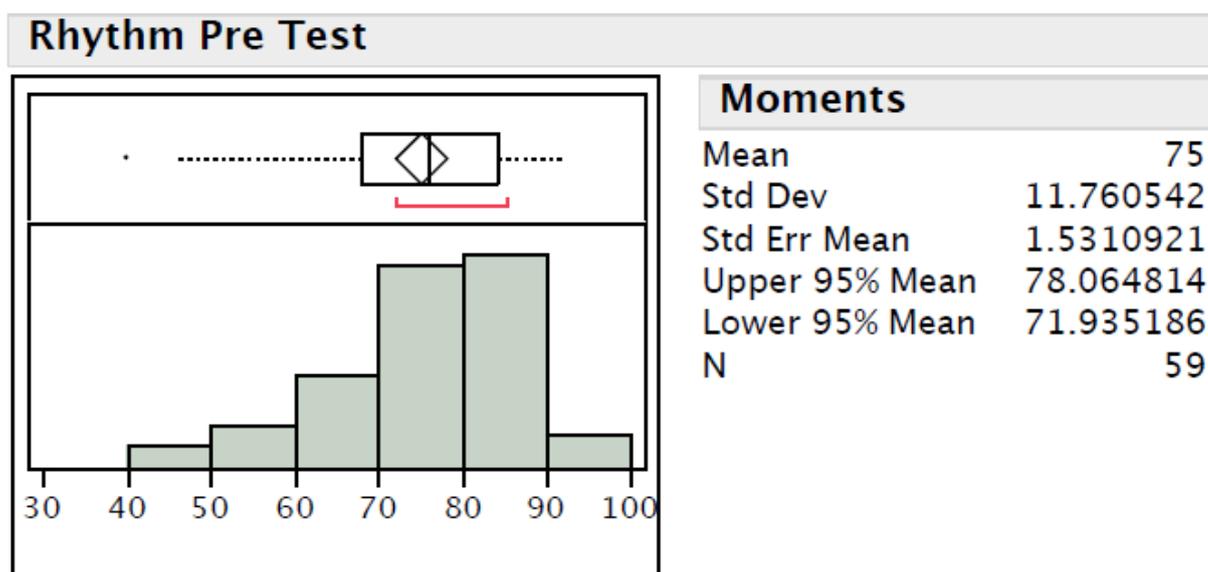


Figure 80. Rhythm performance pre-test distributions for Portia White School.

### Rhythm Performance Post-Tests by School

Schools differ significantly with regard to Rhythm Performance post-test scores (Table 37). John Dewey had the highest test scores and Emily Murphy had the lowest test scores. This can partly be attributed to the fact that John Dewey School includes older students from Grades One to Three and Emily Murphy is made up of only Grade One classrooms. John Dewey and Emily Murphy Schools also had the highest and lowest scores respectively for pre-and post-tests for Oral Reading Fluency. Figures 81-84 show the distribution of pre-test rhythm performance scores by school.

Table 37. Rhythm Performance Post-Test Scores by School

School	Number	Mean	Std. Error Mean
John Dewey	45	84.98	1.1103
Emily Murphy	31	79.90	1.9835
Jean Vanier	34	84.32	1.4253

table continues

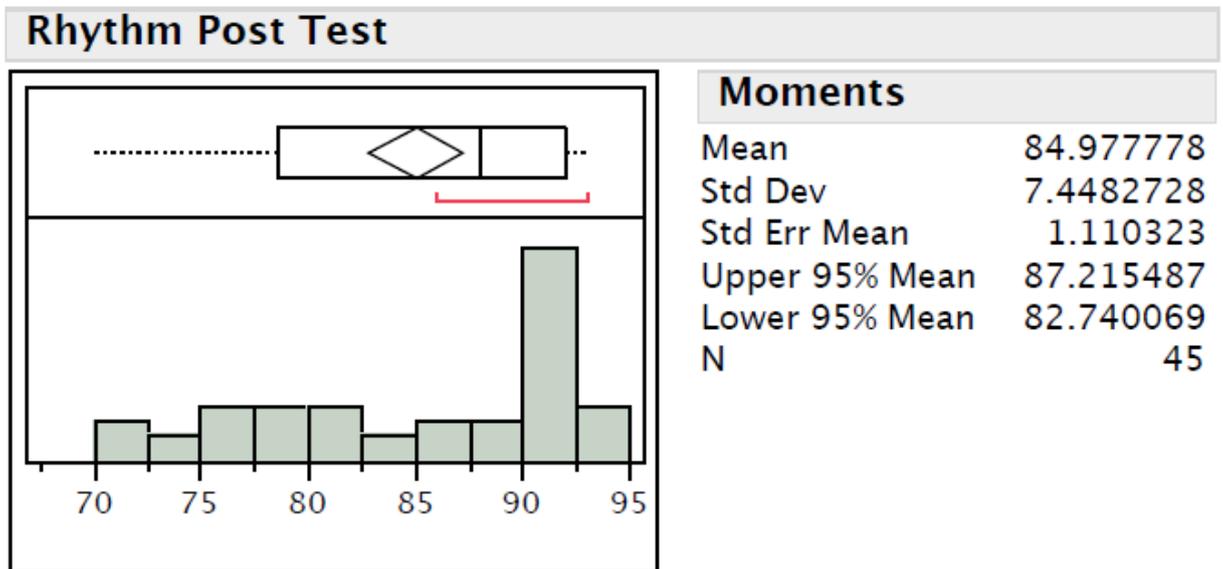


Figure 81. Rhythm performance post-test distributions for John Dewey School.

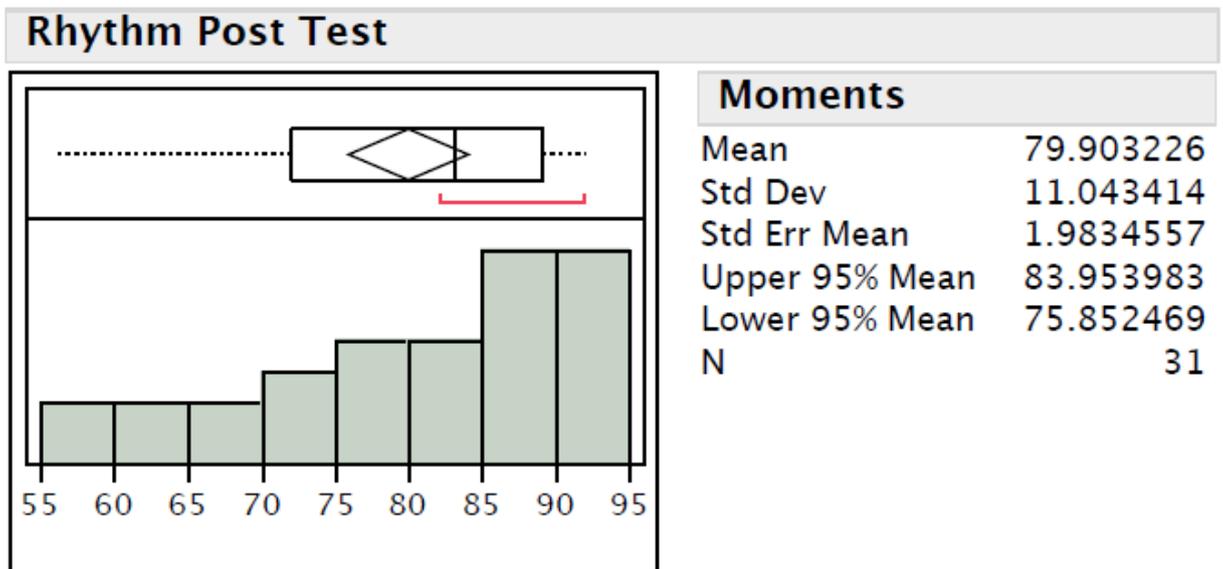


Figure 82. Rhythm performance post-test distributions for Emily Murphy School.

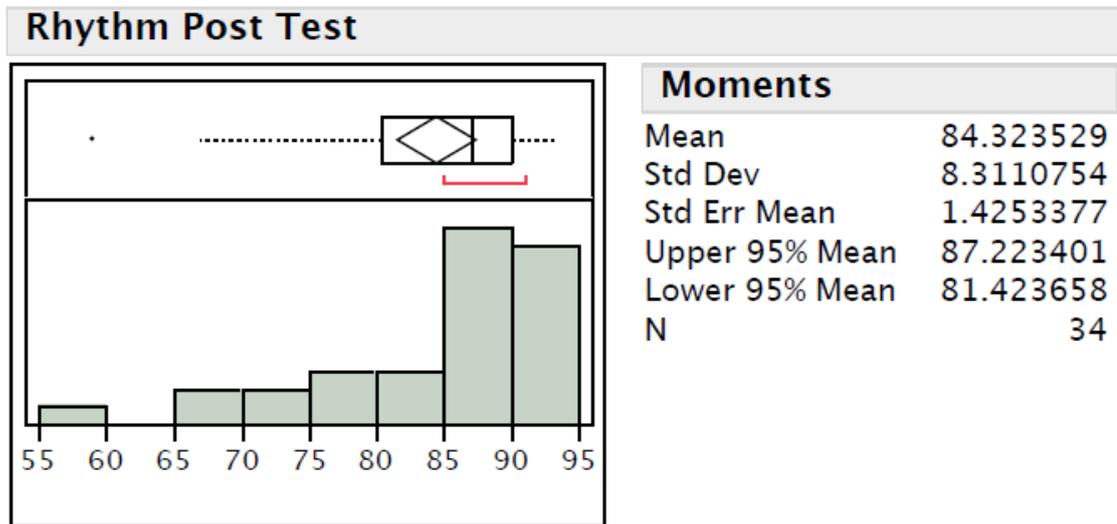


Figure 83. Rhythm performance post-test distributions for Jean Vanier School.

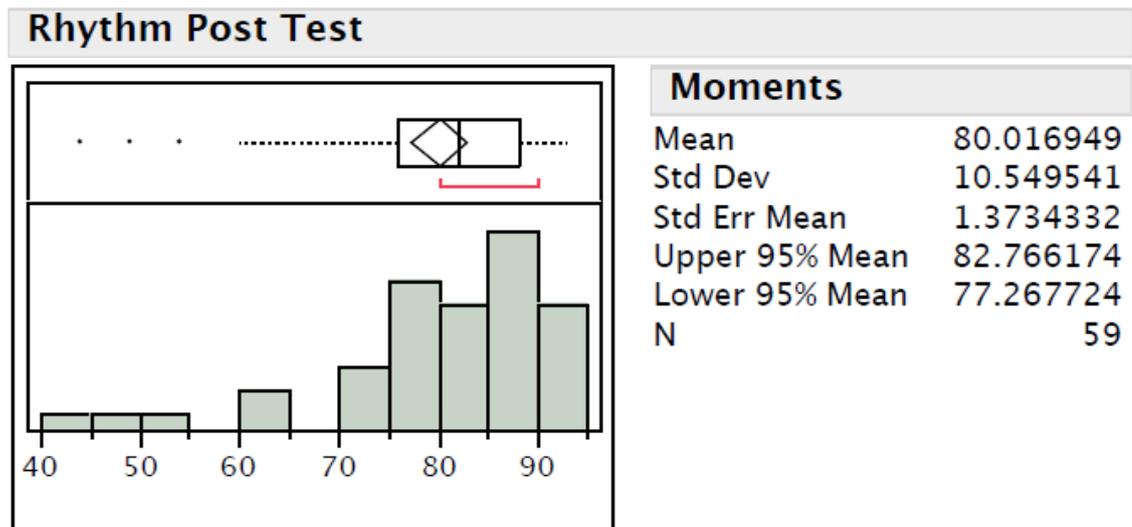


Figure 84. Rhythm performance post-test distributions for Portia White School.

### **ORF and Rhythm Performance Correlation**

Regression analysis was conducted to determine correlation between pre- and post-test scores for rhythmic performance and oral reading fluency for control and

experimental groups. A positive correlation is statistically significant for oral reading fluency and rhythm performance pre-tests. Rhythm performance and oral reading fluency are positively correlated in pre-tests ( $r=.7$ ). A positive correlation is also statistically significant for oral reading fluency and rhythm performance post-tests. Rhythmic competency and oral reading fluency are positively correlated in post-tests ( $r=.6$ ).

Analyses of variance were used to determine if the positive correlation between Oral Reading Fluency and Rhythm Performances scores was different by age.

Correlation increases with age for both pre-tests and post-tests as indicated by Table 38.

Table 38. *ORF Pre-Test Rhythm Pre-Test Correlation by Age*

Age	Pre-test <i>r-value</i>	Post-test <i>r-value</i>
6 years	.50	.48
7 years	.62	.60
8 years	.76	.65
9 years	.83	.80

### **Rhythm Performance Differences for Below Benchmark Scores**

Matched pairs analysis and analyses of variance were used to examine differences between control and experimental groups of struggling readers. Oral reading fluency test scores not meeting benchmarks set by the *DIBELS*™ tests for oral reading fluency were analyzed as a separate group for differences in Rhythm Performance. End of year benchmark goals are set at 40 words per minute for Grade One, 90 words per minute for Grade Two, and 110 words per minute for Grade Three by the test authors (Good & Kaminski, 2002a).

There is no significant difference in pre and post-test scores for Rhythm Performance in the below benchmark control group (Figure 85). There is statistically

significant difference in Rhythm Performance pre- and post-test scores for the experimental group. Post-test scores for Rhythm Performance significantly improved for experimental classrooms (Figure 86). When Classroom B was removed, there is still statistically significant improvement for rhythm performance for experimental classrooms.

### Distributions Control/Exp=Control

#### Post-Pre

#### Test Mean=value

Hypothesized Value	0
Actual Estimate	0.16854
DF	88
Std Dev	3.47143

t Test	
Test Statistic	0.4580
Prob >  t	0.6481
Prob > t	0.3240
Prob < t	0.6760

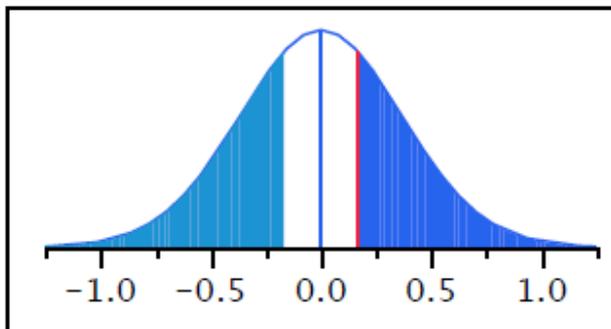
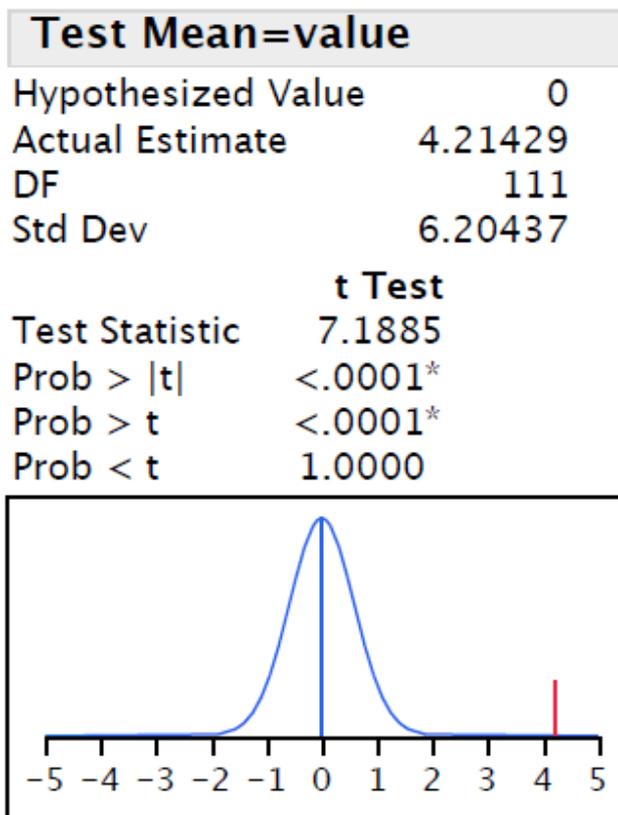


Figure 85. Matched pairs rhythm performance pre-and post-test scores below benchmark control group showing no significant difference between scores.



*Figure 86.* Matched pairs rhythm performance pre-and post-test scores for experimental below benchmark group showing significant difference between scores.

### **ORF Differences for Below Benchmark Scores**

Matched pair t-procedures indicate that for the group of scores not meeting benchmark goals, there is statistically significant improvement in oral reading fluency scores for both control (Figure 87) and experimental groups (Figure 88). The test scores for oral reading fluency increased significantly more for the experimental group than for the control group.

When Classroom B was removed, there is still statistically significant improvement for oral reading fluency for experimental classrooms (Figure 89). Analysis of variance indicates that for the below benchmark control and experimental groups,

mean scores for oral reading fluency were significantly higher for experimental groups than for control group scores with Classroom B removed.

### Distributions Control/Exp=Control

#### Difference

#### Test Mean=value

Hypothesized Value	0
Actual Estimate	1.11957
DF	91
Std Dev	4.37486

t Test	
Test Statistic	2.4546
Prob >  t	0.0160*
Prob > t	0.0080*
Prob < t	0.9920

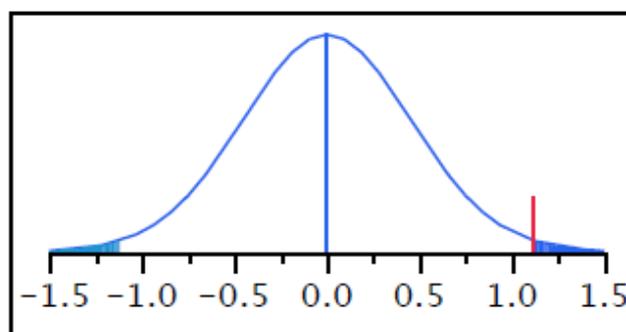
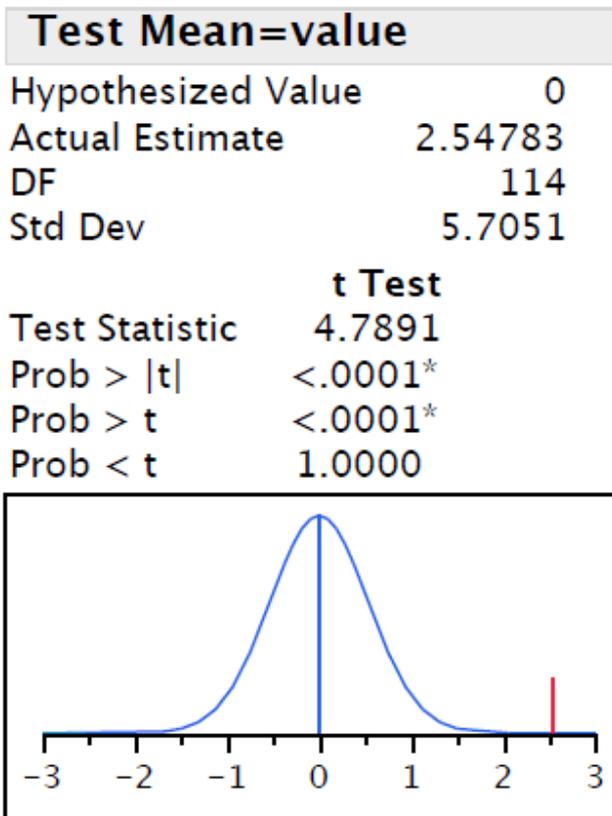
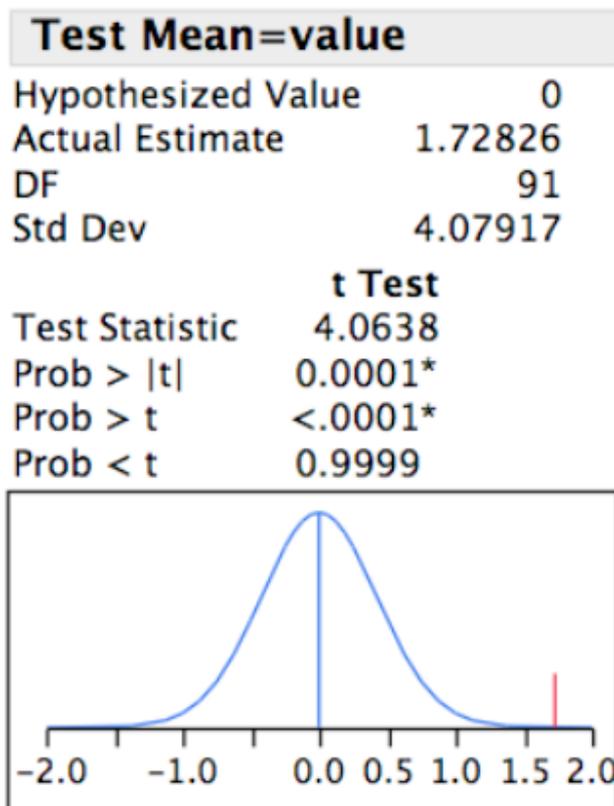


Figure 87. Matched pairs oral reading fluency pre-and post-test scores below benchmark control group showing no significant difference between scores.



*Figure 88.* Matched pairs oral reading fluency pre-and post-test scores below benchmark experimental group showing significant difference between scores.



*Figure 89.* Matched pairs oral reading fluency pre-and post-test scores for below benchmark experimental group without classroom B showing significant difference between scores.

### **Parent/Guardian Surveys**

This chapter also presents findings from the pre- and post-surveys administered to parent/guardians. Collaborating teachers were given pre- and post-surveys to send home to parent/guardians of all 169 students participating in the study. Response rates to pre-surveys were high as indicated in Table 39 below. Response rates were lower for post-surveys but still considered acceptable for educational questionnaires (Table 40) (Cox & Brayton Cox, 2008).

Table 39. *Pre-Surveys: Classroom Response Rates*

Classroom	Frequency	Percent of Classroom Population
A	20/22	90.9
B	23/23	100.0
C	13/15	86.7
D	14/16	87.5
E	15/17	88.2
F	14/17	82.4
G	15/22	68.2
H	12/18	66.7
I	12/19	63.2
Total	138/169	81.7

Table 40. *Post-Surveys: Classroom Response Rates*

Classroom	Frequency	Percent of Classroom Population
A	18/22	81.8
B	21/23	95.7
C	12/15	80.0
D	11/16	68.8
E	11/17	64.7
F	10/17	58.8
G	12/22	54.5
H	11/18	61.0

table continues

I	9/19	47.4
Total	115/169	68.0

**Parent/Guardian responses to pre-surveys.** Pre-Surveys consisted of five questions. The first question was:

1: Check **three** activities below that your child is most likely to do during spare time at home.

- play outside
- work on arts and crafts
- play video or computer games
- work on a hobby
- e-mail, MSN, or surf the internet
- play a musical instrument
- watch TV
- dramatic or pretend play
- play with toys
- talk on the telephone
- read a book or magazine
- listen to music
- other (please describe)

Table 41 shows that the top five activities many study participants were likely to engage in outside of school as part of leisure time were: playing outside; watching TV; watching/playing video/computer activities; playing with toys; and arts and crafts activities. Classrooms A and B were the only classes that listed reading as the leisure activity chosen by 30% or more of participants. Sports activities, music lessons, and other organized activities were not included as categories in an effort to avoid parent/guardians potentially including activities organized for children as their top choices. The “other” category was provided for activities such as organized sports if

these were considered activities of choice for students. The most frequently chosen “other” was sports activities.

Analysis of variance was used to examine the relationship between the key variable k) reading and Rhythm Performance Pre-test results. Analysis of variance indicates that children whose parents marked reading as one of their child’s three spare time activities of choice also had higher pre-test Rhythm performance scores.

Table 41. *Pre-Survey Question One: Percent Chosen as Three Spare Time Activities*

Classroom	A	B	C	D	E	F	G	H	I	Median
Question 1: Check three activities your child is most likely to do during spare time										
a) Play outside	52	70	40	81.3	59	47	57	47	28	53.5
b) Arts & Crafts	24	26	27	12.5	41	18	14	6	11	19.9
c) Video/computer	24	48	60	37.5	41	53	52	41	44	44.5
d) Hobby	0	13	0	0	59	0	0	0	0	8.0
e) Email/MSN/Internet	0	4	13	62.5	0	0	4.8	0	0	9.4
f) Musical Instrument	19	8.7	0	12.5	0	12	0	0	5.6	6.4
g) Watch TV	24	39	53	56.3	41	47	48	53	55.6	46.3
h) Dramatic/Pretend Play	29	13	6.7	0	17.6	0	0	0	0	7.4
i) Toys	29	30	40	31.3	29	29	19	13	33	28.1
j) Telephone	0	0	0	0	0	5.9	0	0	5.6	1.3
k) Reading	52	30	13	6.3	24	17.6	9.5	12	5.6	18.9
l) Listening to Music	19	4	0	12.5	5.9	17.6	4.8	2.4	11	8.6
m) Other	0	13	6.7	6.3	0	17.6	4.8	0	0	5.4

The second Pre-Survey question was:

2: Check the statement which best applies to your child.

\_\_\_\_\_ My child hardly ever reads anything for enjoyment.

\_\_\_\_\_ My child occasionally reads for enjoyment.

\_\_\_\_\_ My child reads regularly for enjoyment.

- \_\_\_\_\_ My child often reads for enjoyment.  
\_\_\_\_\_ My child reads for enjoyment every chance she/he gets.

Table 42 indicates a wide range of parent/guardian responses to Pre-Survey question two. The statement, “My child reads regularly for enjoyment” received the highest percentage of responses from Classroom B and C while no respondents from Classroom I chose this response. The statement, “My child occasionally reads” represented the highest median percentage but those results are affected by Classroom G’s very high response of 60. The statement “My child reads for enjoyment at every opportunity” represented the lowest median response (9.9); however, this statement represented the second highest percentage of responses for Classroom A.

Analysis of variance was used to determine a relationship between *ORF* Pre-Test scores and Pre-Survey Question 2 responses, controlling for school effect. The statements a) “My child hardly ever reads for enjoyment” and b) “My child occasionally reads for enjoyment were significantly related to lower scores for *ORF*. The statements c) “My child reads regularly for enjoyment,” d) “My child often reads for enjoyment,” and e) “My child reads for enjoyment every time she/he gets” were related to higher scores for *ORF* as compared to statements a) and b). Statement c) was not significantly different than statements d) and e) indicating that to achieve higher *ORF* test scores, it is no more important to read all the time than it is to simply read regularly.

Table 42. *Percent Response to Pre-Survey Question #2*

Classroom	A	B	C	D	E	F	G	H	I	Median
Check the statement which best applies to your child:										
a) Child hardly ever reads	5.3	17.4	16.7	21.4	14.3	0	13.3	33.3	25.0	16.3
b) Child occasionally reads	10.5	21.7	25.0	50.0	21.4	46.7	60.0	33.3	66.7	31.3
c) Child reads regularly for enjoyment	15.8	30.4	41.7	21.4	28.6	40.0	13.3	16.7	0	23.1
d) Child often reads for enjoyment	36.8	8.7	16.7	7.1	21.4	6.7	6.7	8.3	8.3	13.4
e) Child reads for enjoyment at every opportunity	31.6	21.7	0	0	14.3	6.7	6.7	8.3	0	9.9

The third parent/guardian Pre-Survey question was:

3: Circle a number for each statement below about your child (Very O=very often)

	Never	At times	Often	Very O
My child:				
Brings home a book from school to read for fun-----	1	2	3	4
Complains about having to read a book from school-----	1	2	3	4
Asks to go to the library to get a book-----	1	2	3	4
Says reading is boring-----	1	2	3	4
Says reading is too difficult-----	1	2	3	4
Reads to another child or adult-----	1	2	3	4
Says he/she doesn't like reading-----	1	2	3	4
Writes stories/cartoons for fun-----	1	2	3	4
Asks for books/magazines for gifts-----	1	2	3	4
Reads music to play an instrument-----	1	2	3	4

Pre-survey question three asks parents to rate ten statements on a four point scale: 1 = never; 2 = at times; 3 = often; and 4 = very often. The mean score for each of the ten statement responses is shown by classroom in Table 43. The overall mean score for all classrooms by statement is presented in the last column of Table 43.

As shown in Table 43, mean classroom responses for the statement one, “Brings home a book from school to read for fun” ranged from 1.8 to 3.1. A mean score of 3.1 indicates that Classroom A had the highest number of students who often brought home a book from school to read for fun. Classroom A was followed by Classrooms B and E, both with mean scores of 2.8. Classrooms G and I had the lowest number of students who brought home a book to read for fun, with a mean score at 1.8 (between “never” and “at times”).

The second statement for pre-survey question three asked parent/guardians to rate “Complains about having to read a book from school.” Mean responses ranged from 1.4 to 2.4. The classroom with the least number of students who complained about having to read a book from school was Classroom A (between “never” and “at times”). Classrooms G and I had the highest numbers of students who complained about having to read a book (between “at times” and “often”).

The third statement for pre-survey question three asked parent/guardians to rate the frequency with which their children asked to go to the library to get a book. Mean classroom responses ranged from 1.2 to 2.4. Classroom A had the highest number of students who asked to go to the library to get books (between “at times” and “often”). Classroom E had the second highest number of students who asked to go to the library to get books with a mean response of 2.1 and Classrooms G and I had the lowest number of

students who asked to go to the library to get books with a mean response of 1.2 (between “never” and “at times”).

Statement four asked parent/guardians to rate the frequency with which their children said “reading is boring.” Mean classroom responses ranged from 1.3 to 2.4. Classroom E had the lowest number of students who found reading boring (between “never” and “at times”) and Classrooms D and G had the highest number of students who said reading is boring (between “at times” and “often”).

Statement five asked parent/guardians to rate the frequency with which their children say “reading is too difficult.” Mean classroom responses ranged from 1.2 to 2.3. Classroom E had the lowest number of students who said that reading is too difficult (between “never” and “at times”) and Classrooms D and I had the highest number of students who said that reading is too difficult (between “at times” and “often”).

Statement six asked how often the child “reads to another child or adult.” Mean classroom responses ranged from 1.6 to 2.7. Classroom E had the highest number of students who read to another child or adult (between “at times” to “often”) and Classroom D had the lowest number of students who read to another child or adult (between “never” and “at times”).

Statement seven asked parent/guardians to rate how often their child said they did not like reading. The mean classroom responses ranged from 1.5 to 2.5. Classroom A had the lowest number of students who said they did not like reading (between “never” and “at times”) and Classroom D had the highest number of students who said they did not like reading (between “at times” and “often”).

Statement eight asked how often students wrote stories or cartoons for fun. This did not seem to be a popular activity for any classroom as the mean classroom response was between 1.1 and 2.0. Classroom A had the highest mean response for “at times” and all other classrooms ranged between “never” and “at times.” Classroom D had the lowest mean classroom response for “never.”

Statement nine asked how often students asked for books/magazines as gifts. Books and magazines did not appear to be popular gifts requests as mean classroom responses ranged from 1.0 to 2.3. Only Classrooms A, B, and E mean responses indicated students requested books/magazines as gifts “at times; all other classrooms requested books/magazines between “never” and “at times.” Classroom D requested books/magazines as gifts the least often with a mean response of “never.”

Few students in any classroom read music to play an instrument as asked in statement ten. The mean classroom response for students who read music to play an instrument was between 1.0 and 1.5. Six classroom mean responses indicated mean responses of “never” or just above “never” in answer to statement ten. Classroom A had the highest number of students who read music to play an instrument with mean responses between “never” and “at times.”

Table 43. *Pre-Survey Question 3: Mean Class Response*

Pre-Survey Question 3: Mean Class Response										
Question Three: Statement	A	B	C	D	E	F	G	H	I	Overall Mean Score
1.	3.1	2.8	2.2	2.0	2.8	2.2	1.8	2.2	1.8	2.3
2.	1.4	1.5	1.8	2.1	1.5	1.6	2.4	1.7	2.4	1.8
3.	2.4	1.9	1.7	1.5	2.1	1.7	1.2	1.7	1.2	1.7
4.	1.5	1.4	1.5	2.4	1.3	1.7	2.4	1.7	2.0	1.8
5.	1.4	1.7	1.7	2.3	1.2	1.7	2.2	2.0	2.3	1.8
6.	1.6	2.0	2.2	2.7	1.5	2.2	2.6	2.0	2.4	2.1
7.	1.5	1.8	1.5	2.5	1.6	2.3	2.2	2.0	2.1	1.9
8.	2.0	1.6	1.5	1.0	1.9	1.3	1.4	1.4	1.2	1.5
9.	2.3	2.1	1.4	1.1	2.1	1.9	1.3	1.2	1.0	1.6
10.	1.5	1.2	1.1	1.0	1.2	1.1	1.0	1.0	1.0	1.1

The fourth parent guardian Pre-Survey question was:

Does your child have a library card?    \_\_\_yes            \_\_\_no

Parent/guardian responses to pre-Survey question four indicate a very wide range of students who did or did not own a library card. The highest percentage of students owning a library card were found in Classroom A (68.4%) and the lowest percentage of students reported as owning a library card were in Classroom I (0%) (Table 44). Jean Dewey and Jean Vanier had the highest number of positive respondents, followed by Portia White. Emily Murphy parent/guardians reported the least number of students owning a library card (Table 45).

Table 44. *Percent Response to Pre-Survey Question #4 by Class*

Classroom	A	B	C	D	E	F	G	H	I
Percent of participants who own a library card	68.4	45.5	7.7	28.6	42.9	53.3	2.0	27.3	0.0

Table 45. *Percent Response to Pre-Survey Question #4 by School*

School	John Dewey	Emily Murphy	Jean Vanier	Portia White
Percent of participants who own library card	56.0	16.2	47.8	14.6

Analysis of variance was used to determine a relationship between owning a library card and scores on *ORF* tests. Controlling for school interaction, students whose parent/guardians reported their children did not own a library card had significantly lower scores for Oral Reading Fluency Pre-tests.

The fifth parent/guardian pre-survey question was:

5. Circle a number for the questions below.

	Not Important	Somewhat Important	Important	Very Important
a) How important are reading skills for your child's education?	1	2	3	4
b) How important is music as part of your child's education?	1	2	3	4

Table 46 presents the parent/guardian percent response to pre-survey Question #5a below. Parent/guardians from all schools clearly believed that reading skills were very important to their child's education. Music was not regarded as important as reading although over fifty percent of parent/guardians in six of the nine classrooms regarded music as important or very important to their child's education. Over fifty percent of the parent/guardians in three schools ranked music as important or very important to their child's education (Table 47).

Chi-square tests were used to determine a relationship between parent/guardian perception of the importance of reading compared to *ORF* Pre-tests (Pre-Survey Question 5a). There were no significant effects for parent/guardian perception of the importance of reading on *ORF* Pre-test scores.

Chi-Square tests were used to determine a relationship between parent/guardian perception of the importance of music compared to Rhythm Performance Pre-test scores (Pre-Survey Question 5b). There were no significant effects for parent/guardian perception of the importance of music on Rhythm Performance Pre-test scores.

Table 46. *Percent Response to Pre-Survey Question #5a: Importance of Reading*

Rank in Importance from 1-4	A	B	C	D	E	F	G	H	I
1	0	0	0	0	0	0	0	9.1	0
2	0	0	0	0	0	0	0	0	0
3	5.3	4.3	7.7	14.3	0	6.7	20.0	18.2	16.7
4	94.7	95.7	92.3	85.7	100	93.3	80	72.7	83.3

Table 47. *Percent Response to Pre-Survey Question #5b: Importance of Music*

Rank in Importance from 1-4	A	B	C	D	E	F	G	H	I
1	0	0	7.7	7.1	7.1	6.7	26.7	9.1	25
2	5.3	21.7	38.5	21.4	14.3	33.3	33.3	45.5	41.4
3	31.6	21.7	53.8	57.1	50.0	60.0	33.3	36.3	33.3
4	63.1	56.6	0	14.3	28.6	0	6.7	9.1	0

**Parent/Guardian responses to post-surveys.** The parent/guardian post-survey consisted of three questions and was distributed to the parent/guardians of students in experimental classrooms. One question was fixed and two questions were open-ended.

The first post-survey question was:

1. During the past few weeks has your child's interest in reading changed? (Check one)
- Yes, reads a little more than before
  - Yes, reads a lot more than before
  - No, reads about the same as before
  - Yes, reads a little less than before
  - Yes, reads a lot less than before
  - Other (Please explain)

The responses to the first post-survey question are found in Table 48. "My child's interest in reading has changed a little more than before" was the highest rated response, followed by "My child reads about the same." The third highest response was "My child reads a lot more."

Table 48. *Parent/Guardian Response to Post-Survey Question #1*

Survey Question	Number	Percent of Respondents
a) reads a little more	52	46
b) reads a lot more	19	17
c) reads about the same	37	32
d) reads a little less than before	1	1
e) reads a lot less than before	0	0
f) Other	5	4

The second post-survey question was:

2. During the past few weeks, has your child's interest in music changed? If so, in what ways?

Responses were coded from qualitative data into the categories of a) yes, more interest; b) yes, lots more interest; c) yes, linked to reading; d) yes, linked to self-initiated work; e) no, but always loved music and; f) no/not much. The number of responses totals more than the 114 parent/guardian post-survey responses as multiple responses were allowed for this survey question (Table 49).

Table 49. *Parent/Guardian Response to Post-Survey Question #2: Interest in Music*

Survey Question	Number	Percent of Respondents
a) Yes, more interest	50	44
b) Yes, lots more interest	40	35
c) Yes, linked to reading	67	59
d) Yes, linked to self-initiated activities	30	26
e) No, but always liked/loved music	14	12
f) No/Not much	10	9

The third parent/guardian post-survey question was:

3. What have you noticed or heard from your child about our music activities "playing with words and rhythm?" (Could you briefly comment?)

Qualitative responses were coded: a) noticed enjoyment; b) memorable activities; c) activities motivating and transformative; d) greater self-belief in reading skills; e) greater self belief in rhythmic/musical skills; f) not much/neutral.

"Noticed enjoyment" was the highest scored response, followed by "activities memorable," and then "activities motivating and transformative" (Table 50).

Table 50. *Parent/Guardian Response to Post-Survey Question #3*

Survey Question	Number	Percent of Respondents
a) Noticed enjoyment	104	91
b) Activities memorable	90	79
c) Activities motivating and transformative	72	63
d) Self-belief in reading skills	24	21
e) Self-belief in rhythmic/music skills	10	9
f) Not much/Neutral	10	9

A contingency analysis chi-square test was used to compare responses to Post-Survey Question 1 and coded responses to Question 3. Responses to Post-Survey Question 1 a) “reads a little more” and b) “reads a lot more” were grouped together into yes, reads more, and not yes categories (Response 3 c, d, and e) . The yes and not yes categories were then compared to coded responses to Post-Survey Question 3. There is a significant difference between groups for response 3a, “noticed enjoyment,” response 3b, “activities memorable,” and 3c “activities motivating and transformative.” Of the respondents to Post-Survey Question 1 who answered yes, reads more, 97.18% also reported that they noticed enjoyment of music and reading activities. This is a significantly greater number than the 79.95% of those who responded not yes and also noticed enjoyment. Interest in reading seems linked in some way to enjoyment of the music and reading activities.

Of the respondents to Post-Survey Question 1 who answered yes, reads more, 88.73% of these respondents compared to 57.89% of not yes respondents, also reported that they noticed activities were memorable. Of the respondents to Post-Survey Question

1 who answered yes, reads more, 71.83% also reported that activities were motivating and transformative, while only 44.74% of not yes respondents also reported motivating and transformative experiences. Of the respondents to Post-Survey Question 1 who answered yes, reads more, 28.17% also reported a greater self-belief in reading skills. This analysis suggests that a potential link seems to exist between music and reading activities described as memorable and reported as motivating and transformative. A link appears to exist between greater self-belief in reading skills with reading more for students in the experimental group of this study.

Post-Survey Question 1 “yes, reads more” and “not yes” respondents were also compared to Post-Survey Question 3d, “self-belief in reading competency” and Post-Survey Question 3e, “self-belief in rhythmic skills,” but results were not significant. Post-Survey Question 1 yes and not yes respondents were compared to Post-Survey Question 3f, “not much/neutral.” Differences between these groups were statistically different. Only 2.82% of those respondents who reported yes, reads more, also reported “not much/neutral” regarding feedback from their children about learning design experiences. The parents/guardians who reported not yes to more student reading were the ones who were more likely to report “not much/neutral” regarding feedback from their children about the learning design experiences for Post-Survey Question 3f.

Relationships between responses and survey questions were further probed by contingency analysis and chi-square tests. Post-Survey response 3d, “Greater self-belief in reading skills” was compared to Post-Survey Question 1 by “yes, reads a little more,” “yes, reads a lot more,” and “not yes” groups. There is a significant difference between groups,  $p\text{-value} < .05$ . In comparing Post-Survey response 1a and Post-Survey response

3d, 63% who reported, “reads lots more” also reported increased self-belief in reading, compared to 9% of “not yes” who reported increased self-belief in reading. Of the respondents who reported “reads a little more”, only 15.38% also reported increase in self-belief in reading resulting from music and reading activities.

The contingency analysis and chi-square tests described above were also used to compare Post Survey Response 3e “Self-belief in rhythmic/musical skills” to Post-Survey 1a, “yes, reads a little more” and 1b, yes reads a lot more” but chi-square results were suspect due to small sample size.

Responses to Post-Survey Question 1 grouped as yes and not yes responses were compared to responses to Post-Survey Question 2a, “yes, more interest in music.” There were no statistical differences between these groups. However, when responses to Post-Question 1 grouped as yes and not yes responses were compared to Post-Survey Question 2b “yes, lots more interest in music” there were statistical differences between groups, *p-value* < .05. Greater interest in music seems related to greater interest in reading. Of the respondents who reported “yes, more reading, 49% of these also reported yes, lots more interest in music, compared to 7.89% of those who reported not yes to more reading and also reported lots more interest in music.

Relationships between responses to Post-Survey Question 2b “lots more interest” in music compared to Post-Survey Question 1 “yes, more reading” were further probed by contingency analysis and chi-square tests. When “lots more interest in music” was compared to Post-Survey response 1a “reads a little more,” 1b “reads a lot more,” and not yes to reading more, 89.47% of respondents reporting “reads a lot more” also reported

“yes, lots more interest in music”  $p$ -value  $< .05$ . This compares to 34.62% of respondents reporting “reads a little more” and 11.63% of respondents reporting “not yes.”

There are statistically significant differences between Post-Survey Question 1 yes and not yes responses and Post-Survey Question 2c “interest in music related to reading”  $p$ -value  $< .05$ . Of the Post-Survey Question “yes” group, 76% of respondents also reported interest in music related to reading compared to 26.32% of not yes who reported interest in music related to reading. This relationship was further probed by comparing Post-Survey Question 1a “reads a little more,” 1b “reads a lot more,” and not yes to reading more to Post-Survey Response 2c “interest in music related to reading.” Fully 100% of respondents who reported “yes, lots more reading” also linked music to reading activities.

There are statistical differences between Post-Survey Question 1 yes and not yes responses and Post-Survey Question 2d “interest in music related to self-initiated music activities,”  $p$ -value  $< .05$ . Of those who responded yes to Post-Survey Question 1, 36.62% also reported links to self-initiated music activities compared to 2.63% of not yes who reported self-initiated activities in music related to yes, more reading. This relationship was further probed by comparing Post-Survey Question 1a “reads a little more,” 1b “reads a lot more,” and not yes to reading more to Post-Survey Response 2d “interest in music related to self-initiated music activities.” Interest in music seems related to self-initiated music activities as 84.21% of respondents who reported “yes, lots more reading,” also reported links to self-initiated music activities,  $p$ -value  $< .05$ .

Statistical differences were found between Post-Survey Question 1 yes and not yes responses and Post-Survey Question 2e “no change in music interest but always

liked/loved music”  $p\text{-value} < .05$ . If respondents reported not yes to changes in reading, they were more likely to also report that students always like/loved music. Of the respondents who reported not yes, 23.68% also reported students always liked/loved music, compared to 4.23% of Post-Survey Question 1 yes responses who also reported no change in music interest but students always liked/loved music. This relationship was further probed by comparing Post-Survey Question 1a “reads a little more,” 1b “reads a lot more,” and not yes to reading more to Post-Survey Response 23 “no change in music interest but always liked/loved music,”  $p\text{-value} < .05$ . Of respondents who reported no change in music interest but always liked/loved music, 25.58% also reported not yes to more reading, Post-Survey Question 1.

Statistical differences were also found between Post-Survey Question 1 yes and not yes responses and Post-Survey Question 2f “no, not much” interest in music changed  $p\text{-value} < .05$ . Only 1.41% of Survey Question 1 respondents who reported more reading also reported no, not much interest in music changed. In other words, those students reported as showing an interest in reading more were less likely to report no, not much interest in music changed. The relationship between these survey questions was further probed by comparing Post-Survey Question 1a reads a little more, 1b reads a lot more, and not yes to reading more with Post-Survey Question 2f. However, chi-square was suspect as sample size was low.

The relationship between Oral Reading Fluency Post-test scores were compared to Post-Survey Question 1 “yes reads more,” controlling for ORF Pre-tests, age, gender, and school. Post-test scores were significantly related to Pre-test scores,  $p\text{-value} < .05$  but age and gender were not significant. There were no significant school interactions and the

Post-Survey Question 1 responses for “yes, reads a little more” combined with “yes, reads a lot more” do relate to Post-test ORF scores,  $p\text{-value} < .05$ . The analysis does not explain this relationship or how the Survey responses and Post-test ORF scores are correlated.

\* \* \*

### **Reckless Blues**

“Reckless Blues” (1925/2009) by Bessie Smith and Louis Armstrong, may seem an odd choice of title to transmediate understandings of quantitative methods. However, the reckless in the title refers to the song’s lyrics and not to the very straight and logical treatment of the blues in this arrangement. Giddins and DeVaux (2009a) describe the reed organ chordal accompaniment as “unswinging a setting as one could imagine” (p. 56). The piece is a masterful example of a blues call and response and Bessie Smith’s typical use of the major third recalls Peirce’s teirce to my mind. She approaches the third from below, creating a blues effect that Armstrong perfectly captures in his response. The resonance between Armstrong and the Smith is extraordinary and the close relationship and agreement between the trumpet and vocals part mediates the close relationship between beat competency and oral reading rate indicated by the quantitative data results.

## Chapter Ten: Free Jazz

*...Say, what he call this*

*Composition?* Tiny fingers divining  
an architectonic flow, forearms jacking

cracks in the keyboard as wire  
and wood cry out in agony:

duo follow, ringing changes.  
Liberate the dissonance without killing

the blues. Unit structure: cut it.  
*They don't teach this joint in the Conservatory.*

Varèse via Jelly Roll, serial Waller,  
harmony ribbons in a Möbius strip. Recut it.  
(Keene, 2006, p. 205)

### Introduction to the Discussion

Free jazz is a term applied to a jazz idiom that emerged in the late 1950s and early 1960s and reflected “the ideological rejection of former jazz conventions” (Berliner, 1994, p. 122). I do not choose the title “Free Jazz” as a rejection of former research conventions. The title is chosen because the spirit of free jazz imbues the last stages of my research which departed for awhile from the original research conventions of the study to embrace new thinking. Zwicky (1992) points out that “to be resonant a structure must be flexible” (p. 428). In that spirit, complexity thinking was used to weave all the methods and results together for discussion in this chapter. The chapter begins with the point of departure, the return, and the final and resulting data analysis framework that was used to synthesize the findings of this research.

### **Point of Departure**

In May 2008, I presented preliminary findings in a report for my annual PhD committee meeting and received encouragement and direction from my committee to continue the analysis, write the findings, and complete my dissertation. Qualitative and quantitative methods results allowed me to answer the guiding research questions with depth and detailed evidence:

1. What is the potential for the semiotic resource of rhythm and pattern for early years children's engagement and meaning-making from print and non-print literacies?
2. What factors facilitate or inhibit the effectiveness of the semiotic resource of rhythm and pattern for supporting early years children's engagement and meaning-making from print and non-print literacies?
3. Is there a relationship between measures of early years reading competencies and rhythmic competencies?

Qualitative and quantitative results indicated a promising potential for rhythm and pattern to engage early years children in meaning-making and communicating meaning in both print and non-print multimodal literacies in the inclusive general early years classroom. The study indicated that rhythm and reading afforded alternate and equitable ways of knowing for all participants including those early years children who struggled with reading in this study. Facilitating and inhibiting factors, limitations, implications and suggestions for future practice were identified and concluded. In answer to the final research question, I determined a statistically significant, positive correlation between test measures of oral reading rate and beat competency.

Throughout the year of analysis, I also shared preliminary findings in a variety of public forums, symposiums, and conferences. There, too, I received positive feedback, questions for reflection, and encouragement to continue my data analysis path and share the final results. I drew upon the multiperspectival methodologies and methods used in this research to disseminate findings within the context of current research, theory, and practice. I shared results from the constructivist grounded theory analysis, semiotic analysis, multimodal semiotic analysis, analysis of the action research informed design research, and the quantitative results. However, the more I reviewed and shared my findings, the more dissatisfied I became with the way in which I had captured the data.

Comparative and integrated data analysis revealed common patterns, processes and themes indicating that experiences in rhythm were a valuable potential for engaging early years students in print and non-print multimodal meaning-making. However, the differences in data perturbed me. The mixed methods did not adequately explain data variations within and across classrooms, particularly for Classroom B. Qualitative results indicated that Classroom B experienced notably greater sustained involvement and engagement in the research design than other experimental classrooms. Quantitative results also showed that Classroom B was significantly different to other experimental classrooms. Classroom B was the only whole classroom group to show significant gains between pre- and post-tests of oral reading fluency, although the below *ORF* benchmark experimental groups did show statistically significant improvement for all experimental classrooms.

To try to understand Classroom B variations, I reviewed common processes and patterns generated by qualitative results and I consulted the literature. I experienced

resonance with Haggis (2008) when I read that comparative analysis can cause what is different between data sets to become invisible, “in the sense that what is similar becomes a category or theme” (p. 154). Haggis (2008) also suggests that a focus on key aspects of phenomena can mean that other aspects of data are disregarded. I wondered what important data were hidden or disregarded in my analysis. I continued to read an extensive body of related literature to interrogate and illuminate the research findings, and I experienced “interpreting geometries of epistemology” (Davis, 2005, p. 119) that interrupted and troubled the knowledge structures used in this research. I discovered a way of thinking described variously as a science, a theory, a paradigm, and a metaphor. I collided with ideas from complexity thinking and read:

Complexity is not just another category of phenomena, but an acknowledgement that some phenomena are not deterministic and cannot be understood strictly through means of analysis (i.e., literally, by taking apart or cutting up). A different attitude is required for their study, one that makes it possible to attend to their ever-shifting characters and that enables researchers to regard such systems, all at once, as coherent unities, as collections of coherent unities, and (likely) as agents within grander unities. (Davis & Simmt, 2003, p. 140)

I was excited to consider the possibility that a different attitude might be used to divulge previously hidden insights and understandings and I examined primary (Capra, 1982; Proggine & Stengers, 1984) and secondary (Byrne, 1998; Cilliers, 1998; Waldrop, 1992) sources on complexity. A growing awareness and understanding of the possibilities of complexity thinking for interpreting and understanding educational research (Davis & Sumara, 2006; Doll, Fleener, Trueit, & St. Julien, 2005; Fleener, 2002; Mason, 2008) and a deeper reading of bricolage in educational research as conceptualized by Kincheloe and Berry (2004) created a phenomenon that Davis (2005) describes as “interrupting frameworks” (p. 119). The act of engaging with complexity thinking was catalytic and

enabled critical and reflective analysis of the research processes (Kuhn, 2008) that transformed my thinking.

During the subsequent year I explored the “synergy of multiple perspectives” (Kincheloe, 2004, p. 76) and turned to post-structural frameworks “to examine and construct a research text with bricolage” (Berry, 2004, p. 107). As Berry (2004) warns, “the bricoleur diverges from the highway of efficiency and procedures of traditional monological research to engage different perspectives, readings, structures, processes, discourses, theories, methods, genres, and so forth” (p. 107). I adapted a framework proposed by Kincheloe & Berry (2004) grounded in principles of complexity thinking and used my original research questions as the point of entry text (POET) for application of the bricolage (Kincheloe & Berry, 2004).

I recut the findings of this research using the tools and language of free jazz, bricolage, and complexity thinking. I pursued a new architectonic flow, playing cracks in the keyboard in an attempt to liberate the dissonance of my research composition without killing the original song. The process of transmediating data analysis through the structures of bricolage, complexity thinking, music, art, poetry, and free jazz led to concurrent, autoethnographic research where “the researcher becomes the research subject” (Denzin & Lincoln, 2008, p. 50). The autoethnographic dissertation has been presented elsewhere and will be published in a different forum.

In this final chapter, I depart slightly from the usual ways to summarize findings and relate findings to the literature. Results from previous chapters are revisited by threading together the methodological bricolage of this dissertation using a bricolage map of conceptual domains (Berry, 2004). The bricolage map is both a means of threading the

methodological bricolage back to the initial research questions and a means of way-finding through the various methods and theory used in this study. Each threaded return “acts as a feedback loop to the initial text and changes, expands, clarifies, modifies, and challenges the existing knowledge” (Berry, 2004, p. 110).

The bricolage map serves as a way of mixing methods to connect and relate all data sets. From a conventional mixed methods perspective, a rigorous and strong mixed methods design must explicitly mix data from qualitative and quantitative data sets using purposeful and strategic approaches to mixing data (Creswell & Plano Clark, 2007). Without meaningful approaches to mixing data sets, the research is simply a related collection of mixed methods (Creswell & Plano Clark, 2007) that runs the risk of seemingly jumping down every rabbit hole encountered in the methodological journey.

The bricolage is not limited to the multiple methods used in research. It is also threaded with “diverse theoretical and philosophical notions of the various elements encountered in the research act” (Kincheloe, 2004, p. 51-52). Berry (2004) and Kincheloe (2008) suggest a broad range of conceptual areas as starting points for exploring the POET to challenge and problematize knowledge production and to cultivate difference and disequilibrium. Following Berry (2004), the research POET was subjected to multiple readings, conflicting discourses of social theory, different research genres and methodologies, perspectives from diverse cultural and social positionalities, different disciplinary and interdisciplinary ways of knowing, various philosophical domains, modes of power, and multiple and previously unconsidered knowledge sources (Berry, 2004; Kincheloe, 2008) that included art, poetry, and music.

As the POET is scrutinized through the domains chosen by the researcher, the process takes on the form of feedback loops that are repeatedly threaded and rethreaded through the POET and different domains. Such a process creates the necessary conditions for complexity principles to open up new insights, and expose “multiple possibilities, connections, depth, and complexity of the original POET” (Berry, 2004, p. 109). The initial research questions stated at the outset of the chapter serve as the point of entry text (POET) for the threading process. The point of entry text was set into a map of the bricolage used to investigate the research questions (see Figure 90).

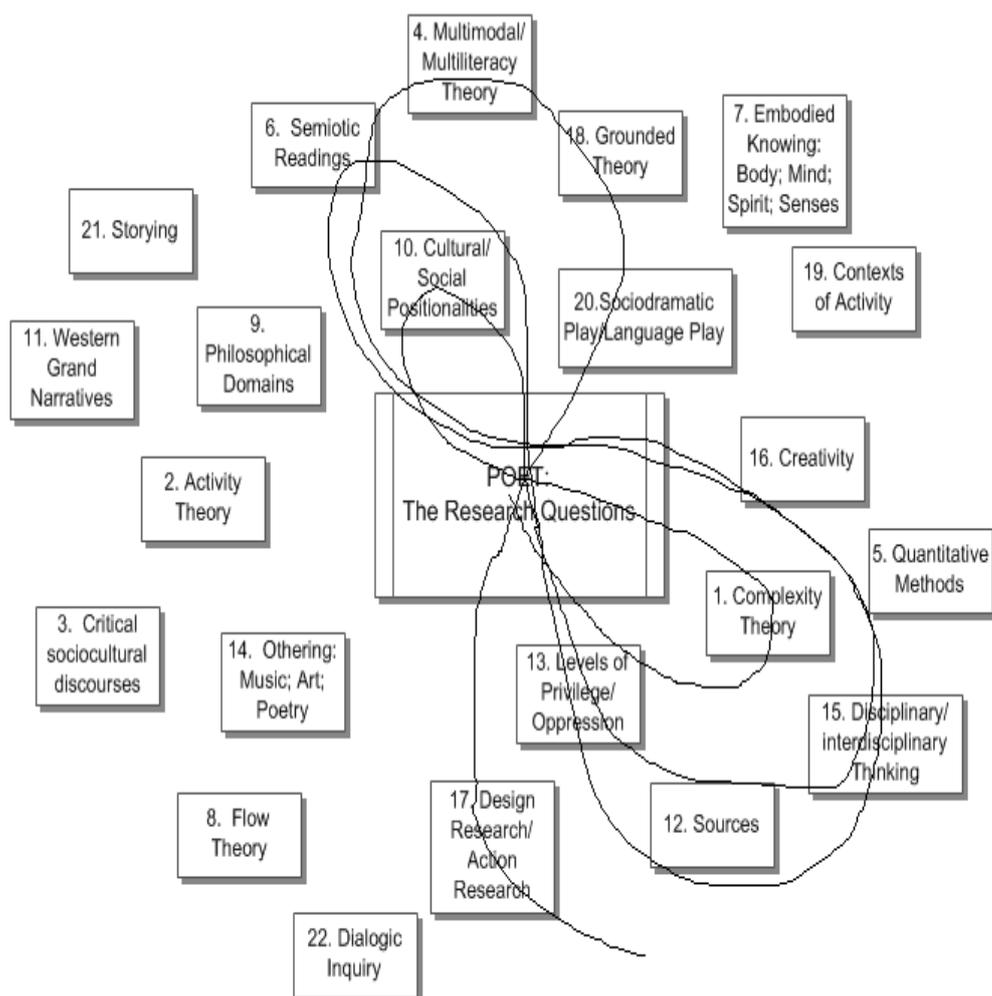


Figure 90. The bricolage map (adapted from Berry, 2004, p. 112).

### Complexity Thinking

Bricolage is both informed by complexity thinking and enacted according to the principles of complexity (Kincheloe & Berry, 2004). To problematize the POET, Berry (2004) suggests threading the text through multiple discourses, using feedback loops and other complexity principles to analyze the POET. Complexity thinking is not employed as a meta-discourse, nor does it explain, encompass, or supplant any other discourse (Davis & Sumara, 2006). Instead, complexity thinking is threaded through all the domains of the

bricolage to orient attention toward “dynamic, co-implicated, and integrated levels” (p. 26), and illuminate new perspectives and insights. Complexity thinking provides tools to think with (Manson, 2001) and a means of finding “deep complementarities of varied theoretical frames” (Davis & Sumara, 2006, p. 107) that are used to open up research analysis.

The principles and characteristics of complexity thinking are described in Chapter One. Conditions are synthesized from classic and current writings on complexity thinking (Davis & Sumara, 2006; Sumara & Davis, 2006) to identify systems that are complex, potent, and generative learning phenomena in contrast to systems that are merely series of complicated activities. Sumara and Davis (2006) suggest that conditions for complexity are always present in education; all complex systems are learning systems. However, they argue that complex conditions do not always operate through the teaching pedagogies we use to engage students with subject matter (Sumara & Davis, 2006). Planning interesting lessons, differentiating teaching and learning, organizing hands-on and child-centered activities, and using problem-solving approaches, are not sufficient to create complex learning ecologies that generate deep, powerful, and transformative learning.

Complexity thinking helps determine if the potential of the research design is to engage early years students in a series of complicated activities in rhythm and reading, or if the research processes have the potential to support complex, transformative, and emergent learning in both print and non-print literacies. The research bricolage is threaded with perspectives from complexity thinking in order to interpret and make sense of the research phenomenon and to formulate a meaningful response to the initial research questions.

Davis and Sumara (2006) insist it is necessary to “simultaneously examine the phenomenon in its own right (for its particular coherence and its specific rules of behaviour) and pay attention to the conditions of its emergence (e.g., the agents that come together, the contexts of their co-activity, etc.)” (p. xi). The focus on a collective of learners rather than a collection of learners is significant for this research where the classroom, rather than individual learners, is the unit of analysis. Examining the data from a complexity perspective allowed me to view the classroom as the learner and to analyze classroom interactions as the learning. As part of the classroom collective, the researcher-teacher is considered a co-learner. The role, contributions, and influences of the researcher in shaping the phenomena must be considered then, as part of the learning system, and so I begin by reviewing what I bring to the learning.

### **Researcher Influences**

Although complexity thinking is drawn from and informs a wide range of disciplines and branches of philosophy, limitations regarding complexity theories and issues of ethics and value are noted in the literature (Cilliers, 2010; Mason, 2008). In order to address those limitations, I thread my POET through the domains of complexity thinking in combination with activity theory and critical socio-cultural research on identity, agency, and power (Lewis, Enciso, & Moje, 2007b) to examine how I shaped the research phenomenon. I consider what ways I am socially and culturally positioned “in the interpretation of text through particular socializing processes, discourses and artefacts” (Berry, 2004, p. 116). I consider my position regarding power and privilege of agency and whether or not I contribute to invisible veins of oppressive power (Berry, 2004).

Although I designed the research process to be a collaborative one, activity theory and grounded theory analysis indicate that the study began with the researcher in possession of power and privilege of agency. There are a number of possibilities that might explain why power and privilege were likely accorded: I was a PhD candidate and instructor at a well-respected Faculty of Education and University; I was supported by the school division administration and school principals; I was lead researcher; and I brought an Ethics certificate and letters from the University of Manitoba that stated I was authorized to conduct research in the classrooms and schools. I also likely acquired privilege of agency as a result of credentials accumulated over many years as an educator and music specialist and as a result of the seemingly unique and specialized music and research knowledge I was perceived to have.

Davis and Sumara (2006) emphasize that “with specific regard to educational research, complexity thinking does not permit a simplistic separation of *established knowledge* and *how knowledge is established*” (p. 29). Applying complexity thinking, activity theory, and critical socio-cultural theory to an examination of the nested systems into which the research and researcher were placed, I realized I brought a particular and specific body of established knowledge and a cultural set of socializing texts and processes to each classroom.

I implemented a bounded research design from the perspectives and social positionalities of a classically and formally trained musician, an early years educator with a strong belief in constructivist learning theory, a passionate arts advocate, long-time Orff specialist, life-long learner and PhD candidate in Inclusive Special Education, and a middle class wife and parent of four teenagers. These experiences and established

knowledge intersected with the deep body of knowledge and experiences that collaborating teachers brought to the research. Some of that teacher knowledge, experience, and background surfaced during teacher interviews, throughout the research as analyzed through grounded theory methods, and in consultation with collaborating teachers to design and revise the ongoing research.

However, through the process of bricolage, it became clear that the depth and breadth of collaborating teacher knowledge and background were not sufficiently acknowledged or accessed. In the activity theory analysis, I declare the “individual perspectives, traditions, interests, positions, and aspects of individual and classroom historicity that affect meaning-making but are unknown to me” (Chapter Eight, p. 465). Additionally, although all collaborating teachers were instrumental in contributing to and shaping the learning design, and all teachers actively participated, opportunities for deep dialogue and exchange of ideas were constrained by time, school scheduling, and perhaps, by issues of power. The collaborative knowledge and experiences of researcher and teachers shaped and reshaped the research learning design but this process was primarily driven by researcher analysis, decisions and planning.

As the learning design was shaped and reshaped, the traditional role and power of researcher-teacher-director gave way, at times, to teacher-facilitator and teacher-as-learner; relations of power and privilege of agency were then more evenly distributed among participants. Students adapted design research strategies and processes for their own uses and added their repertoire to my socializing texts. Teachers shared feedback, insights, curricular connections, resources, and in some cases explored design research strategies. However, as indicated in data analysis results, the voice of the researcher was

most prominently privileged throughout the entire research although effort was made to meet the needs, interests, and goals of all study participants.

### **Nested Structures**

The research design that I brought to classrooms was part of a nested system of many components (Figure 91). I adapt a model used by Davis and Sumara (2006, p. 91) as a basis for integration, analysis, and discussion of the components of the nested system of this research and to illustrate the nested qualities and the ways in which the nested components influenced and shaped the research.

The model is formed by data from the classroom activity system models (Chapter Eight) and nests the individual meaning-makers (student learners, teacher/adult learners, and the researcher-teacher learner), within the classroom communities of co-learners (students, teachers/adults, teacher-researcher), the research design, the school communities, curriculum structures, the communities of theory and practice, the social and cultural communities, and the historical and current disciplinary knowledge. Complexity thinking points to the role of classroom knowledge and the ways that all nested levels shape each other and frame teaching and learning (Davis & Sumara, 2006).

Although the Davis and Sumara (2006) model is on a continuum moving from categories of *knowing* (inside layer of dynamic individual and group knowing) to categories of *knowledge* (relatively stable disciplinary and group knowledge), I assume all ways of knowing and knowledge represented in the nested model are dynamically interrelated rather than part of a dynamic to stable continuum. Beginning with the outer layer, supporting literature and disciplinary knowledge (Chapters One and Two) are regarded as dynamic. In particular, the supporting neuroscientific literature has changed

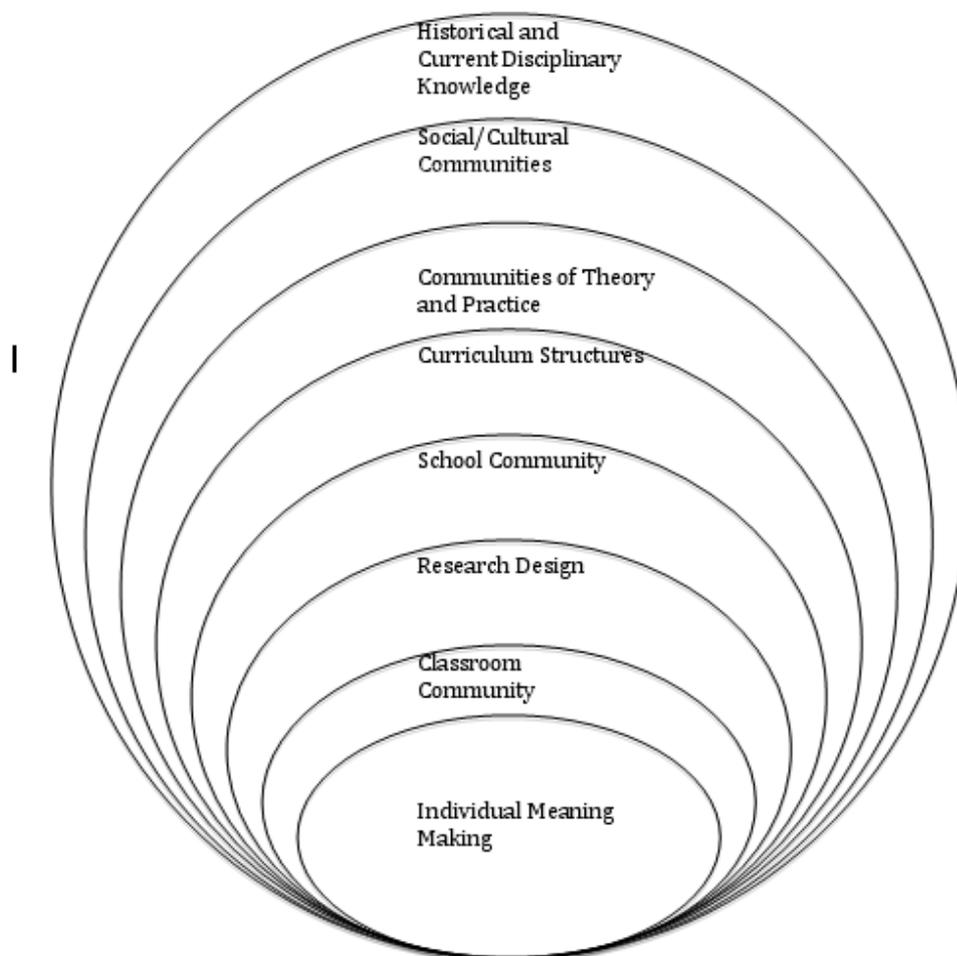
rapidly just within the period of time that I have prepared, carried out, and analyzed this research. Social and cultural communities in the next layer are also changing and dynamic. I have seen a social collective evolve so rapidly that questions on my original parent/guardian survey are now outdated. Just three years ago, tweeting, facebooking, skypeing, i-phones, i-pads, 3-D TV, classroom whiteboards, and other new and emerging technologies were not in the current, widespread use of today's students and classrooms.

Communities of theory and practice, nested within social and cultural communities, evolve in response to new developments in educational and scientific research and to changes in social and cultural communities. Curriculum structures located in the next layer are also dynamic when viewed as living documents. During research analysis, I have been a part of innovative arts education curriculum design and development that has influenced my views of teaching and learning music and the arts. All these systems shape and affect the further nested school communities, research design, classroom communities and individual meaning-making.

Disciplinary knowledge shapes communities of theory and practice, which in turn affect curriculum structures, school philosophy and practice, teaching practices in the classroom communities, and individual understandings. The nested quality of these dynamic domains is fractal, or self-similar. The nested subsystems of the learning system resemble the whole as the same level of detail is observed in each nested level. Davis and Sumara (2006) explain:

Phenomena such as personal cognition, collective action, educational structures, and cultural knowledge are dynamically similar. *All* are learning systems, where learning is understood as a process through which a unity becomes capable of more flexible, more creative activity that enables the unity to maintain its fit to its ever evolving context. (p. 92)

The consequences of this thinking include the realization that any analysis, understanding, and discussion of a complex learning system can only be partial as all sub-systems will affect the one system under scrutiny. Although sub-systems affect one another and are inextricably intertwined, they are not identical and cannot be equated. They must be studied at the level of their emergence (Davis & Sumara, 2006).



*Figure 91.* Nested subsystems for the rhythm and reading research design.

### **Critical Sociocultural Perspectives**

The POET is examined from within each of the multiple layers and subsystems of the nested system and threaded through the bricolage beginning with perspectives from

critical sociocultural discourses and research. Berry (2004) asks, “As you, the bricoleur, thread through the POET, what social injustices, inequities, and exclusions are revealed?” (p. 137). Considerations of equity and inclusion are at the heart of this research. As a PhD candidate in Inclusive Special Education, notions of democracy and social justice are foregrounded in my thinking and the study was intentionally designed for inclusive classrooms of diverse learners to avoid marginalization and disenfranchisement.

The disciplinary knowledge that informed the research design was examined from democratic stances (Fecho & Allen, 2003; Woodford, 2005) within frameworks of multiliteracy/multimodal understanding where no mode is privileged and all modes are available resources for meaning-making and communicating meaning (Jewitt, 2006; Kress & van Leeuwen, 2001; New London Group, 1996). Results from multimodal data analysis indicated equitable and democratic interpersonal meaning potentials as expressed through tenor. Power was equally distributed among students and all students were able to participate equitably through available, accessible, useable, and multiple modes that provided a variety of ways for students to make and communicate meanings. Research practices supported new literacy pedagogy that encourages a range of discourses and modes of communication to “deal with local diversity and demands of local culture” (Johnson & Kress, 2003, p. 9).

However, upon closer scrutiny, I realized that the disciplinary knowledge I investigated to foreground the modes of reading and music, was from the dominant culture of music and reading. I examined African sources and rhythm (Chernoff, 1979; Morin, 2003) and indigenous sources (Kurath, 1968; Whidden, 1993; Wuttunee, 2005) in preparation for diverse classroom communities, but I chose print and non-print sources

from within the English language Euro-canon (Kincheloe, 2008) as that was my area of expertise and experience. I also brought a specific cultural lens to bear on all music processes and pedagogy following a tradition that Berry (2004) might describe as part of the “Western grand narratives” (p. 117). Certain texts were chosen from my existing teaching repertoire using temporal structures of duple time signature despite the fact that many classrooms were made up of students from indigenous cultures with unique, personal texts and associated temporal structures.

Arvaniti (2009) suggests that “percepts of rhythm are not objective but language-dependent” (p. 61), indicating that a Western-based approach to language and rhythm may be problematic and an inhibiting factor for some students who are second language learners. There is no research data to indicate that the euro-centric approach to music and language used in this study was an inhibiting factor for any student, but inclusion of culturally diverse music and reading texts as appropriate to classroom contexts is certainly a recommendation for future research, teaching, and learning.

As the POET was further threaded through critical sociocultural perspectives, I used the bricolage to determine if and how all students from the diverse classrooms were given membership in the learning community of the research design. I examined concerns of marginalization, inequity, exclusion, and disenfranchisement to question if these issues were allowed to act as inhibiting factors for this study and I interrogated the research design for democratic agency. I realized that despite best intentions, I had unwittingly contributed to marginalization and exclusion through pre- and post-testing.

In their examination of the role of critical sociocultural literacy research, Moje and Lewis (2007) believe that perspectives from critical sociocultural theory matter more

than ever before in the current climate of proliferating standardized assessments. They urge that greater attention be given to the ways that “learning is shaped by identity, power, and agency” (p. 24) and ask educators to consider how students’ experiences and subjectivities are “incorporated into or shut out of the learning activity” (p. 24).

As I considered these perspectives and looped back to my POET, I realized that my use of standardized assessments as pre- and post-tests to answer initial research questions, contributed to inequities and a privileging and imbalance of power. The use of pre- and post-tests shut students’ experiences and subjectivities out of this part of the learning experience. In asking students to participate in the *DIBELS*<sup>TM</sup> (Good & Kaminski, 2002a) oral reading fluency tests and tests for rhythm performance, I contributed to practices that focus on “well-intentioned, yet deficit-oriented, research agendas” (Lewis, Enciso, & Moje, 2007a, p. 3). The *DIBELS*<sup>TM</sup> tests in particular, are criticized from a variety of platforms, including their support for policies of social injustices (Goodman, 2006). The *DIBELS*<sup>TM</sup> tests have been censured for privileging “some aspects of literate performance over others” and valuing “students’ performance over their vitality and identity” (Pearson, 2006, p. x).

Further examination of issues of identity, agency, and power (Lewis, Enciso, & Moje, 2007b) raised additional areas of concern. Although focus group data indicated that students enjoyed the learning experiences, learning events did not always invite and incorporate students’ experiences and subjectivities into the learning activity. Experiences such as “Person of the Week” (Classroom I, Learning Design, Chapter Five), the raps based on student stories (Classroom G, Learning Design, Chapter Five), and the student created chants, songs, and games in all classrooms were an attempt to create space for

student voice and subjectivity, however, time and the specific goals of the learning design and researcher often constrained student ownership of the learning experiences.

Students were given limited opportunities to question, dialogue, and reflect on the learning until the final focus group interviews. Their opinions and concerns were consulted for various elements of the activities, but usually as brief exchanges and as time permitted. Inevitably, just as conversations got going, our classroom time would end. Occasionally, when students began asking questions or sharing ideas, teachers would remind them that our time was limited and not to “waste” Mrs. Peters’ time with their questions or concerns.

Despite constraints to student identity and agency, data results do point to instances where identity and agency were facilitated. When student experiences and subjectivities took over my planned activities for Classroom F in “Semiotic Chaining” (Chapter Seven), I felt I had lost control of the study goals and worried that one of my precious research classes was wasted on a non-relevant story about a princess. I came to see this learning event and other similar experiences quite differently over time and through engagement with the bricolage and complexity thinking.

In “Semiotic Chaining” every student had an opportunity to contribute their own ideas to the conversation and enact identity as part of the collective experience. I considered how students’ different identities were “recognized by other participants in the activity” (Moje & Lewis, 2007, p. 24). We did not examine complex issues of culture, race, or gender during our discussions of the princess and the tick tock block. However, identity shaping was observed at work, as each student participant recognized the other as an equal, contributing and important voice and member of the larger classroom unit.

According to other teachers in the school, this was a rare experience for this classroom group.

I discovered that in the area of identity and agency, the research design was successful in creating spaces that allowed for new ways of being and new identities (Lewis, Enciso, & Moje, 2007a) in many unexpected and unplanned-for instances. Data from all qualitative results and parent/guardian post-surveys indicate a positive making and remaking of selves, identities, and relationships. Students viewed themselves as equal participating members in the classroom construction of speech-pieces, songs, and games. Students came to view themselves in transformative ways as authentic readers, musicians, story-tellers, and choreographers, changing their interpersonal relationships with classmates in the process. Identities were seemingly reshaped throughout various learning experiences in all classrooms in ways that are described as acts of agency (Moje & Lewis, 2007).

Agency is defined as “the strategic making and remaking of selves, identities, activities, relationships, cultural tools and resources, and histories, as embedded within relations of power” (Moje & Lewis, 2007, p. 18). When students called out “Sam can read!” as recorded in grounded theory results (Chapter Six), the classroom unit indicated that they recognized Sam in a new identity as a member in their community of readers. Sam, too, experienced a positive identity transformation in viewing himself as a reader for the first time. As documented in Chapter Six results, by the end of the study, no student felt it was important or necessary to draw my attention to his or her identity as a non- or struggling reader. Instead, many children were eager to show me their stories, their art inspired by our activities, and the songs, chants, and games they created.

Moje and Lewis (2007) depict conceptualizations of learning that Lave (1996) and Gee (2001) describe as shifts in identity. These identity shifts coincide with new forms of knowledge made possible through deep participatory learning (Moje & Lewis, 2007). When Sheldon said, “I came out different” (Chapter Six) he demonstrated the possibility of such an identity shift. Such learning involves not only the disciplinary content, but, in the case of this study, thinking and acting as readers and musicians. All qualitative and quantitative data results point to meaningful participatory learning that transformed interpersonal meaning potentials and created new forms of knowledge for teachers and students in both disciplines of music and reading. By the end of the study, all experimental classrooms identified themselves as communities of readers and musicians as demonstrated “through the enactment of particular identities” that were recognized as valuable in the spaces and relationships of this study (Moje & Lewis, 2007, p. 19).

### **Valuing in the Nested Model**

Threading the POET through further sociocultural discourse illuminated the importance of positive valuing for the research design. Orellana (2007) discusses ways that “practices, values, beliefs and norms of different activity settings’ in school, home, and community “overlap, align, complement, or collide with each other” (p. 134) and with what effects for diverse students, families, teachers, and the researchers and participants who move between these activity settings. Orellana (2007) describes how the experiences of schools shape and effect home and families, and conversely, how “[h]ome enters school in at least some of the same ways that school goes into homes—on the backs, in the bodies, and in the feelings and orientations that children bring with them” (p. 127-128).

Home entered the schooling of this research design in multiple ways. In threading the POET through quantitative data from parent/guardian pre-surveys, results point to parent/guardian values as one of the home variables that affected and likely served as a facilitating factor for the effectiveness of the research design to engage students in print and non-print meaning-making. Data results indicate that the majority of parent/guardians valued music as important to their child's education. Although parent/guardians did not value music to be as important as reading to their child's education, over fifty percent of parent/guardians in three schools ranked music as important or very important to their child's education.

In particular, Classroom A and B parent/guardians ranked music as highly important to their child's education; in control Classroom A, 63% of parent/guardians chose the highest ranking of "very important," as did 57% of Classroom B parent/guardians. In other classrooms, the responses ranged from 0% to 28.6% of parent/guardians who assigned music the highest ranking of "very important."

Students did not seem to value music and the arts as highly as did their parent/guardians and teachers. Playing outside, watching TV, and video and computer games ranked as the top three activities parent/guardians overall chose as their children's favourite spare time activities. Classroom A had the highest classroom response for playing a musical instrument and listening to music; nineteen percent of parents chose these activities as one of their children's top three favourites. The data from control Classroom A suggest shared values, or at least values that were perceived by parent/guardians to be shared values. Parent/guardians in Classroom A valued music more highly than other classroom parent/guardians and more students in this classroom

compared to other classrooms regarded playing or listening to music as a favourite activity (according to their parents).

Parent/guardians in all classrooms valued reading as important or very important to their child's education, however a wide range of responses was noted in the pre-survey question to determine the frequency of student reading for enjoyment. "My child reads regularly for enjoyment received the highest response from Classrooms B and C. Library card ownership was high in Classrooms A, B, and F, but only Classroom A parent/guardians ranked reading as one of their children's top three favourite spare time activities.

In looping back to the grounded theory results, it is apparent that despite findings from parent/guardian pre-study surveys, home influences did not always support reading, as noted by collaborating teachers. It is possible that parent/guardians did value reading but perhaps did not have the capacity to support their values, with the result that negative home influences affected reading for certain students in the study. The grounded theory data collected during the quantitative pre-tests for oral reading fluency also indicate a very wide range of attitudes and valuing of reading by students in the study.

The values of collaborating teachers regarding music and reading likely affected study results in positive ways. All teachers indicated that print literacy was a focus of their planning and infused throughout their teaching. The arts and music were also important to collaborating teachers and they described ways that music affected their personal lives and their professional teaching practices in very positive ways. They clearly articulated beliefs in the potential for the arts and music to engage early years

students in print and non-print meaning-making and they shared positive exemplars from practice.

Collaborating teachers were supported in their beliefs by the larger school system and by principals who also valued the importance of the arts, music and reading, as evidenced by requests for their schools to be research sites for this study. Although data results indicate that students entered the study with a wide range of values and attitudes towards reading and music, results from all qualitative methods indicate that by the end of the research, the study learning experiences were highly valued by the majority of students in all experimental classrooms. Looping back into the research questions, in particular question two, the positive and high values that researcher, school administrations, collaborating teachers, students, and parent/guardians assigned to music and reading likely acted as factors that facilitated the effectiveness of the learning design for supporting early years students' engagement in print and non-print meaning-making.

The high valuing of the research components by all control and experimental classrooms and by all levels of the nested domains likely contributed to student persistence and the sustained efforts and engagement indicated in qualitative data results. In particular, comparative data from pre- and post-surveys for parent/guardians, teacher interviews, and grounded theory results, indicate that valuing the experiences of the research design was exceptionally high for all Classroom B participants.

### **Complex Learning Systems**

Complex and transformative learning systems are characterized by qualities highlighted in Chapter One. Two key qualities identify complex learning systems; complex phenomena are adaptive and they are emergent (Davis & Simmt, 2003).

Complex phenomena are adaptive in that the complex system can change its own structure in response to interaction within the system (Davis & Simmt, 2003). Rasmussen (2010) believes this is the very quality that defines learning: “The definition of learning is changing a structure” through use and operations (p. 22). Complex phenomena are emergent in that they evolve from the co-implicated interactions and activities of the individual participants (Davis & Simmt, 2003). The interactions of the complex system give rise to a synergy that is something more than the sum of its parts (Davis & Simmt, 2003). In adaptive, emergent, and complex learning systems, learning is understood to be “ongoing, recursively elaborative adaptations through which systems maintain their coherence within their dynamic circumstances” (Davis & Simmt, p. 138).

Emergence is the most important and commonly cited quality of complex systems and is associated with several key conditions that may potentially be occasioned or prompted by educators and researchers (Davis & Sumara, 2006). Stacy (1996) identifies three parameters that drive complex adaptive systems: “the rate of information flow through the system, the richness of connectivity between agents in the system, and the level of diversity within and between the schemas of the agents” (p. 99). These three parameters can be located within six conditions that Davis and Sumara (2006) insist must be present for complex emergence to occur.

A classroom group of individual learners may form an intelligent, learning collective with synergistic properties that present “occasions for all participants to be smarter—that is, to be capable of actions, interpretations, and conclusions that none would achieve on her or his own” (Davis & Sumara, 2006, p. 136) if certain conditions are prompted. Complex emergence has the potential to occur if the learning system

includes the tension of both internal diversity and redundancy, if neighbor interactions are enabled through decentralized control, and if randomness is balanced with coherence (Davis & Sumara, 2006; Sumara & Davis, 2006).

### **Internal Diversity**

According to Stacy (1996), degree of diversity is one of the key control parameters of complex adaptive systems. The learning system must have sufficient diversity to generate learning but not so much as to fall into chaos and disorder (Stacy, 1996). Sufficient internal diversity is typically present in any classroom context and certainly was found in all nine control and experimental classrooms in this research design. As presented in grounded theory results, collaborating teachers indicated a wide range of abilities, interests, personalities, backgrounds, needs, cultures, and socioeconomic differences among the students in their classrooms.

Parent/guardian pre-surveys and grounded theory and semiotic data analysis results point to diverse family and student understandings about, and attitudes towards both musical experiences and reading. Quantitative descriptive statistics also indicate diversity within and across classrooms by gender and age although oral reading fluency pre- or post-tests show no statistical differences for gender. Quantitative results for pre- and post-tests for performance of steady beat and oral reading fluency indicate diverse learners in all classrooms. My entry into the classrooms as teacher-researcher introduced yet another source of diversity to support complex learning potentials.

Sumara and Davis (2006) argue that diversity is one of the most important features of a group's intellectual intelligence or collective intelligence. From a complexity perspective, intelligence is defined as "the ability to make innovative responses to

emergent circumstances” (Sumara & Davis, 2006, p. 45). The diversity within classrooms nurtured a rich source and bank of individual ideas from which classroom communities could draw in order to generate collective, innovative responses. There was never a shortage of varied and novel suggestions when we created our rhythm and reading pieces together. The ever-evolving stories, chants, songs, and games of Herbie, Henry, and their families and friends are the most prominent examples of innovative response to emergent circumstance common to all classrooms. In classroom B, such responses came to be the norm, although innovative response is documented in every classroom as presented in semiotic, multimodal and grounded theory results and in results from the action research/design research in Chapter Five.

Because of the multimodal nature of the research and the recursive, iterative learning design, there were numerous opportunities and ways for students to share and represent diversity throughout the study. Some students preferred to offer suggestions for nonpitched percussion use and others were quick to suggest ways we could combine vocabulary in our speech-pieces. Other students enjoyed offering ideas for movement and still others loved to think of new story possibilities for the puppet artifacts. It was never possible to predict how a similar learning experience might unfold from one classroom to another or to replicate experiences from one classroom context to another.

The possibilities for creating meaning-making opportunities through classroom collaboration were grounded in diverse ways of knowing and multiple tools with which to mediate understandings. Multimodal semiotic data results outline mediating tools that included: percussion instruments; classroom resources; reflection tools; artifacts; media such as timbre, dynamics, and sound; and multimodal ways of knowing such as space;

place; elements of music, particularly rhythm; timbre; dramatic, imaginative play; movement; gesture and gaze; voice quality; oral language; visual systems; and print text.

Although the conditions necessary for diversity to generate collective intelligence were in place in all classrooms, these conditions were not always used to occasion emergence. At times, I requested specific teacher-directed responses, as for example, directions to perform beat or the rhythm of the words a certain way to a speech-piece of my choosing. At other times, diversity was recognized, welcomed, and encouraged as when classrooms were experimenting and creating rhythm and reading experiences together.

### **Redundancy/Commonalities**

Internal redundancy, the complement of internal diversity (Davis & Sumara, 2006) is just as important as diversity to complex systems and crucial for emergence (Goldstein, 1994; Stacy, 1996). Redundancy does not refer to superfluous or unnecessary elements but instead, refers to deep commonalities among agents (Davis & Sumara, 2006). Deep commonalities enable meaningful interactions among participants through shared vocabularies and understandings, learning strategies and procedures, experiences, engagement, interest, and common goals. Similarity or sameness is an essential factor necessary to move from a collection of individuals to a collective learner with synergistic potential (Sumara & Davis, 2006). In this research design, sufficient commonalities existed within each classroom to allow transition from a collection to a collective by the end of the study.

Classroom communities shared many inherent redundancies and common understandings that provided a basis for classroom interactions. A high valuing of the

philosophy underlying the research and belief in the importance of the research goals and activities produced deep commonalities within and between classrooms and across the nested subsystems as previously described. The school divisions, principals, teachers, and teacher-researcher valued the research and all classrooms and many parents and students appeared to value the research activities and goals by the study's end.

Common values extended to philosophies and beliefs about teaching and learning. As described in grounded theory results, all students were early years children learning in nurturing classrooms where teachers planned based on constructivist theories of learning. All teachers placed high value and importance on differentiated teaching and learning; they believed that motivated and engaged learning and multimodal learning was important; they believed that teaching and learning were imaginative, creative processes, and that their classrooms were made up of diverse learners. I shared the same beliefs in constructivist learning theories and the same values as the teachers; the researcher commonalities with the existing approaches to teaching also produced a common ground of enabling redundancies.

Because the study began in the spring, classrooms had established norms and a shared history of several months. In the multi-age classrooms, the previous history for some classroom members extended over a period of one to two and a half years. I began the study in an attempt to discover and build upon existing classroom norms and commonalities. I explored participant understandings and attitudes towards music and reading to determine what common tools and language for rhythm and oral reading experiences were needed in order for classrooms to fully participate in the study's rhythm and reading activities.

Qualitative data results indicate that over the course of the study, a common set of modes, processes, procedures, strategies, games, artifacts, various semiotic language and tools, and vocabulary to explore music, movement and oral reading were developed in all experimental classrooms. Chapter Five details the Phase One acquisition of rhythm and movement tools, language, and strategies, and the ways in which common speech-piece repertoire was developed and used to support music and reading experiences throughout the study.

Common understandings about music and movement included beat awareness and competency, understanding and application of simple rhythmic patterns, understanding and use of simple ostinato patterns, and understanding and application of body percussion, nonpitched percussion, and movement as related to beat, rhythm, and oral reading experiences. By the conclusion of the study, beat had become an available and generalized semiotic resource and symbol (Chapter Seven) that mediated a variety of understandings about music and reading. Quantitative results indicate that experimental classrooms achieved common improvements in beat competency as indicated by post-tests for beat performance.

Common understandings about print text included a body of English sight words developed from Fry's list of high frequency words (Rasinski, 2003) and the Dolch basic sight words (Williams, 2005), understandings about local class texts common to individual classrooms, understandings about print text organization, structure, and rhythmic and beat properties. Quantitative results indicate that without Classroom B, no significant results were observed for tests of oral reading fluency. However, when matched pairs analysis was used to examine differences between control and

experimental groups limited to struggling readers as determined by *DIBELS*<sup>TM</sup> benchmark tests, there was statistically significant improvement for tests of oral reading fluency even when Classroom B was removed from the data. Limitations regarding standardized test results have been noted in the Methods chapter and previously in this Discussion.

The learning design began as my vision of a potentially useful approach to teaching and learning for music and reading and I assumed responsibility for implementing the study. In each classroom, at different points throughout Phase Two or Three, the vision and responsibilities became common and shared with many teachers and students, likely due to mutual engagement, enjoyment, and interest in the activities and the learning challenges. Learning challenges seemed to be generally viewed as achievable invitations to learning rather than as impossibly demanding tasks. As the study progressed, students assumed greater and greater responsibility for creating possibilities for beat, rhythm, and oral reading experiences, and frequently requested new challenges. It seemed a point of pride with all classrooms that the collective could finish reading print or non-print text exactly together, or that they could read our print text no matter how challenging the presentation.

During experiences with beat, rhythm, and oral reading, students assumed individual and collective responsibility for ensuring all our activities, games, and strategies met with success. They were quick to remind classroom members of appropriate behaviours if inappropriate ones were observed, and were conscientious about sharing instruments, taking turns, and following rules for respectful and collaborative learning. They were also enthusiastic and willing to offer ideas for creating innovative rhythm and reading activities. Classroom members shared roles and responsibilities in

modeling beat and rhythm strategies and processes for other students. Many students seemed to enjoy demonstrating appropriate use of body percussion, nonpitched instruments, and movement and willingly volunteered to demonstrate a process or idea when the class was invited to do so.

Data results point to a variety of possible factors leading to shared understandings and collective purpose. Although qualitative data suggest that teacher-researcher, students and teachers enjoyed all learning experiences, certain activities and objects acted as notable catalysts to engage participants in common interests, enjoyment and shared vision. Grounded theory focus group data indicate that most students took pleasure in the engaging and humorous print texts; students enjoyed games, language play, movement opportunities, and artifacts including nonpitched instruments, teaching aids and puppets. The effect of the cone puppets to create shared understandings, goals, and vision was prominent in data results for every classroom. The puppets brought students in every classroom together in shared experiences that they were always eager to develop through stories, games, chants, and songs.

The common vocabulary and experiences using beat and rhythm acquired a particular significance in the learning. Students were united in their physical and emotional responses to beat experiences (Firstness), in the interactions using rhythm and beat (Secondness), and in their eventual, generalized understandings about the properties and representations of rhythm and beat (Thirdness). Beat competency became a powerful community interpretant as described in semiotic data analysis. In the classroom F example “May the Force Be With You” (Semiotic Data Results Chapter Seven), the iconic beat became something akin to the Star Wars “force” that bonded students in

common, direct, embodied, and emotional ways and indexed a powerful sense of community. Beat experiences allied members of the classroom collectives and served as a unifying thread wound through all learning experiences in the study.

The synchronous effect of the beat seemed to exude a magnetic power of its own to draw students into the learning and was a powerful example of a common experience that transformed all classrooms “from a collection of *me*'s to a collective of *us*” (Davis & Simmt, 2003, p. 150). Qualitative data as for example, the semiotic results for “Old Pirate Dan” report that the wealth of powerful community indexical effects for Classroom B were unique to this classroom, although results show positive indexical relationships for community as a result of beat experiences in all classrooms.

Affective knowing and communication was highlighted throughout study results in various ways in addition to the beat experiences. Shared understandings and a common bond of emotional experience across nested levels was created through individual and collective, embodied, affective modes of thought (Martinello & Cook, 2000) and communication. All qualitative data results indicate that researcher, teachers, adults in the classroom, many students, and some parents consistently expressed deep, emotional enjoyment in all aspects of the learning experiences for the duration of the study. In all nested systems (teacher-researcher, teachers and other adults, collective, and individual students), affective dimensions of profoundly felt satisfaction, keen interest, curiosity, and delight in the activities, artifacts, modes, and resources used in this study contributed to motivated learning engagement as defined by criteria for learning engagement presented in Methods. Collective positive emotional effect created motivation and learning

engagement that sustained learning efforts and persistence as new music and reading challenges were drawn together and woven into the spirals of learning experiences.

### **Neighbor Interactions**

Neighbor interactions are a key feature of complexity (Davis & Sumara, 2006). Sumara and Davis (2006) believe that “knowledge emerges not simply amid the juxtaposition of bodies, but amid the juxtaposition of interpretive possibilities. In other words, the neighbors in a knowledge-generating collective must be *ideas*” (p. 50). Ideas are included with other manners of representation such as hunches or queries (Sumara & Davis, 2006) and are continuously revised “as the knowing agent integrates/embodyes new experiences” (Davis & Sumara, 2006, p. 142).

It is not possible to predict or determine what neighbors will interact together in a complex system because they are multiple, multiply connected, and affected by time and prior conditions and interactions (Haggis, 2008). Radford (2008) describes the interactions between representations as a creative process in that the interacting system variables produce changing or newly emerging and often unpredictable conceptualizations. I extend the notion of representation to include affective knowing, physical, embodied knowing, artifacts, and multimodal representations along with ideas, queries, and hunches. As Davis and Sumara (2006) acknowledge, ideas (or representations such as artifacts) cannot physically interact with each other or other representations; however, they can be considered potentials to be activated (Davis & Sumara, 2006) to generate new ways of knowing.

In this study, as previously described, the multiple and rich activating potentials included a range of diverse modes, the many artifacts used in the study, the various print

and non-print texts including beat diagrams, the teaching strategies and games, classroom resources, instruments, embodied, affective communication, dramatic, imaginative play, discussions, and ideas shared by all participants. These semiotic mediating tools and resources all functioned as activating potentials to instantiate neighbor interactions and mediate understandings about rhythm and reading.

Discussions and conversations that served as generative resources occurred between teacher-researcher and students, teacher-researcher and collaborating teachers and other adults in the classrooms and schools, teacher-researcher and parent/guardians, students and students, students and collaborating teachers and other adults, and students and parent/guardians. Neighboring interactions across levels were occasioned by means of the initial letters sent to students' homes informing of the research and asking for consents, by the parent/guardian surveys, the booklets the students took home, and the experiences in the classroom that were also taken out onto the playground and into homes.

A body of rich representations is not sufficient to occasion complex emergence. The ideas (and feelings, physical embodiment etc.) must be represented in ways that cause them to interact and bump against each other (Davis & Sumara, 2006). Through interaction and interpretation, "the juxtaposition of varied representations might then trigger other representations, which when represented might trigger still others" (Davis & Sumara, 2006, p. 143). Because this trigger effect compared to semiosis from a Peircean perspective (Short, 2007), I threaded the POET through semiotic theory and data results and re-read the data considering neighbor interactions.

Semiotic data analysis was used in this study to examine how sign-vehicles functioned to create meaning or not within the context of the classroom learning events. By examining sign, object, and effect, it was possible to identify not just the sign-vehicles important to this study, but to analyze the elements, relationships, and processes used in meaning-making. Results indicated the importance of Peirce's universal categories (Firstness, Secondness, and Thirdness) to this research. The use of Peirce's three trichotomies as a data analysis tool created awareness and understanding of the complex signs and diverse semiotic processes and student perceptions that were generated by study experiences. Semiotic data analysis pointed to the need for affordances of multiple and varied sign systems in this and future learning designs.

Juxtaposition of varied representations to trigger other representations was evident in processes of semiotic chaining described in Chapter Seven. The interpretant of one sign served as the representamen of a new sign which in turn generated yet another sign through the process of prompting and inviting neighbor interactions. Chapter Seven describes a particular kind of semiosis that occurs between sign systems. When knowledge in one system mediates knowledge in another, transmediation is said to occur (Siegel, 1995; Suhor, 1984).

Rowe (2007) describes the role of transmediation in opening up new meaning potentials: "[T]he expression of meanings in new sign systems creates anomalies that motivate a shift of stance from understanding to reflecting on and reorganizing knowledge through the lens of the new sign system" (p. 55). The many examples of transmediation in this study emphasize the importance of multiple semiotic systems and their interrelationships in a complex learning system. The information and knowledge

potentials within a system are affected as much by the relationships between variables as the variables themselves (Radford, 2008). It is the relationships between interactions that primarily distinguish complex systems thinking from systems thinking.

The importance and potential of relationships between interactions to transmediate understandings from one system to another is exemplified by the “Bounce High Bounce Low” learning event in Chapter Seven (Semiotic Data Analysis Results). Neighbor interactions in this example led to growing understandings about beat, rhythm, and language for participating students. Throughout the study, all students constructed meanings about language by means of chants such as “Bounce High Bounce Low.” These understandings were then expressed through interactions with new sign systems such as music and movement as students performed the underlying beat and sounds of the words using a variety of body percussion and instruments. Yet more interactions were generated when artifacts such as the ball were associated with the sign systems of music and movement. Visual literacy systems such as beat diagrams used together with print transmediated further understandings about language and print text for many children.

The use of multiple modes such as movement and music invited embodied learning and communicating opportunities. The importance of embodied learning was highlighted throughout all results. The illuminating thought, “thinking bodies” described in Chapter Five launched an exploration of the literature on embodied cognition that influenced development of the learning design to broaden experiences and include greater opportunities for embodied knowing and communicating. I began the study considering movement to be a means of engagement and a means to an end. Movement was planned as a mediating tool to “understand and perform something else” (Goodkin, 2004, p. 61)

and to explore and reinforce understandings about rhythm and language. Growing understandings about the role of movement led me to conclude that movement was in fact, a primary way of knowing for children.

Learning was a deeply embodied interacting experience for most participants; findings support the importance of embodied grounded approaches to learning (Bowman & Powell, 2007; Bresler, 2004; Semin & Smith, 2008). I repeatedly came upon evidence to indicate that learning involved all levels of Peirce's universal phenomenology. Results confirmed belief in Peirce's ontology that categories of Firstness, Secondness, and Thirdness are interdependent and always present together in symbolic understanding and representation. Immediate qualities of presentness such as direct, sensorial and emotional response (Firstness) to beat experiences and artifacts, dynamic interaction (Secondness) with beat and language experiences, and generalized meaning and representation (Thirdness) of beat and language, cannot be separated from each other in the meaning-making process.

Movement was not the only means of embodied knowing and communicating. Interactions were perceived, internalized, and represented through mind, body, spirit, and senses. Feelings and intuitions interacted and were mediated and transmediated through deep, lasting emotional responses, particularly to the puppets Herbie, Henry, and their family. Movement experiences and language play often elicited strong, emotional responses. Affective knowing was an important meaning-making mode and interactive potential in this study in both planned and unplanned ways.

I considered imaginative teaching approaches, as I did movement, to be a means of engagement and a means to an end. As described in qualitative results, speech-pieces

were often chanted with various emotions as a way to engage students and create interest and variety in repetitions of the same speech-piece. We often changed the character and intent of the speech-piece by choosing collaboratively whether we would use happy, sad, scared, mean, or angry etc., voices. We communicated affectively through voice qualities, movement, body percussion, instruments, voice, timbre, dynamics, tempo, dramatization, and gaze.

By examining the social processes developed through grounded theory in conjunction with the bricolage map, I became aware of just how important embodied knowing and communicating was for students in this study. Comments such as “Mrs. Peters, I *dreamed* about Herbie and Henry last night” (Chapter Six) convinced me of the emotional and imaginative impact of the artifacts and experiences used in the learning design. All collaborating teachers emphasized the importance of affective dimensions of feeling and emotion and convincingly expressed their certainty that imaginative play captured the hearts and minds of their students. The effects of imagination and affect were not limited to motivating and engaging students in the learning. Some students seemed to learn *through* their emotional engagement with Herbie and his family. These findings appear to support current notions of embodiment as inseparable cognition, emotion, body, and situation (Barrett & Lindquist, 2008).

As I threaded through the semiotic and multimodal data results, I realized that the wide variety and use of available modes, artifacts, and resources for making and communicating meaning contributed to the diversity, quality and richness of the neighbor interactions and facilitated and mediated dense neighbor interactions and juxtapositions of rich and varied interpretive possibilities. Student ideas interacted and were mediated and

transmediated through discussion, gesture, gaze, movement, body percussion, use of instruments and artifacts and various modes and embodied ways of knowing.

As I considered kinds of neighbor interactions and their generative potentials and processes, I examined the contexts in which these shared processes created and symbolized ideas (Sumara & Davis, 2006) across classrooms to see if I could make recommendations for occasioning neighbor interactions with rhythm and reading in other contexts. I compared my findings with the literature and encountered a moment of epiphany. Leading up to this research, I was guided by constructivist learning theories that suggest student-to-student dialogue and small group discourse and interactions are critical factors in learning and necessary in classrooms and schools that embrace constructivist learning theory (Brooks & Brooks, 1993).

During initial creation of the research design, I was concerned that the twenty minute timeslot for each class would act as a constraint to exclude small group and peer-to-peer exploration and discussions. An illuminating experience occurred when I encountered the complexity perspective that small-group discussions and face-to-face student interactions are not necessarily any more effective than classrooms set up in straight rows of desks with textbooks on every surface. From a complexity viewpoint, it is not the physical organization of the social community that is important but the sufficient density of neighboring and interacting ideas that is important to occasion rich, interpretive learning (Davis & Sumara, 2006). In this study and for any learning event then, deep learning is possible despite constraints to time and teaching, as long as opportunities are constructed to allow the multiple, dynamic, and varied activating potentials to create neighbor interactions with sufficient density.

However, constraints to meaning-making potentials may still exist even in a system that generates multiple, dynamic, and varied activating potentials. If teaching pedagogy does not make use of appropriate and quality knowledge and understandings offered at appropriate and meaningful times in the learning, then confusion, frustration, and disengagement may result. An illustrating example is presented below.

### **Quality Neighbor Interactions**

As many of the researchers/educators involved in complexity thinking have noted, complexity and emergence cannot be “caused” by certain kinds of teaching approaches or pedagogies but may only be occasioned (Davis & Sumara, 2006). However, emergence cannot guarantee that teaching pedagogies, disciplinary knowledge, and processes used as part of the complex learning system will produce meaningful, useful, and appropriate learning as evidenced by an example from Classroom F.

Rosemary, one of the substitutes for Classroom F, was excited to try out strategies and processes used in our research design. She had a music interest, but not a music background. Because she was employed partway through the study, she missed the first stage of the research where students and teachers acquired common vocabulary, tools, and language of the print and non-print literacies. Unknown to me, Rosemary created a speech-piece with the class as a tribute and good-bye to the school principal who was leaving the school at the end of the school year. Classroom F presented their speech-piece as part of a school assembly and Rosemary shared that the experience had not gone as she imagined it would. Rosemary said:

*It was so interesting to me. They could read all the parts that they could keep a beat to—that had an underlying beat or kept a pattern. But there were parts of that speech for Mr. Warren, for the farewell assembly, that didn't seem to have a pattern or lost the beat—they didn't seem to go to the beat very well—the beat*

*was lost, and they had a really hard time, they couldn't read those parts where the beat was lost." (Classroom F)*

When I asked Rosemary to share the speech-piece with me I discovered that the chant did not use the established common tools and language of the classroom for beat and rhythm. Words chosen for the speech-piece contained unfamiliar rhythmic patterns and most importantly, the temporal organization of the speech-piece changed from line to line, creating a structure that was impossible for students to read and speak while maintaining a steady beat. The natural accents of the words did not match with the natural accents of the beat groupings for each line and I could certainly see why students had struggled.

In addition, the sound before symbol process followed throughout the study was not a part of the process used by the class to perform their speech-piece for the principal. Rosemary had not been present in our early weeks building a repertoire of speech-pieces learned through aural and oral means. When Rosemary arrived to the classroom she observed the class successfully reading print texts from the board but had not been a part of the process leading up to that point. Students brainstormed words about their principal that they used to create their speech-pieces, much as we did in our research design, but in the next stage of the process, the teacher printed out the words on chart-paper for the students to read in the assembly after just one classroom rehearsal. The beat and rhythm strategies we used in the study to facilitate successful oral reading were not a part of the process in learning Mr. Warren's farewell speech-piece.

Interestingly, Rosemary pointed out that where the speech-piece did have a clear, underlying beat, the students experienced no difficulty reading the poem which underscored the importance of the steady beat to her and to me, and also underscored the importance of appropriate pedagogy, teaching strategies, and quality resources for student

success. Qualitative data indicate that useful and appropriate pedagogy and teaching strategies were used in this study for successful transmediation of disciplinary knowledge and processes of the research design. However, just as understandings of complexity theory cannot “cause” emergence, the approaches used in this research, no matter how successful, cannot “cause” effective teaching to facilitate engaged student learning in print and non-print literacies, if the conditions for and understanding of effective, quality pedagogy and teaching are not in place.

### **Decentralized Control**

When a system brings itself into being with a minimum of external centralized control, direction, or assistance, it is known as self-organizing (Stanley, 2005). During initial forays into complexity science, theory, and complexity thinking literature, I had difficulties picturing what classrooms might look like as self-organizing collectives. I believed it was important to have a planned and well-organized learning design with centralized teacher-researcher control. Decentralized control, however, does not refer to an absence of professional responsibility or planning. From a complexity perspective, decentralized control refers to the distribution of authority across “individuals, ideas, and resources” (Sumara & Davis, 2006, p. 48). Rather than focus on either the teacher as in teacher-centered approaches, or on the learner as in learner-centered approaches, the focus of learning is “the experience of insight around a matter of shared interest” (Sumara & Davis, 2006, p. 48).

From this perspective, learning then occurs across and between nested levels that include the individual learner, the collective learner, the teacher-researcher, and the collaborating teacher as they jointly create shared understandings. The notion of shared is

synonymous with the term decentralized; authority, learning, and authorship are distributed across a knowledge-producing system that facilitates shared participation in learning intention, interpretation, and appropriateness or correctness of action (Davis & Sumara, 2006). In this study, the control and locus of knowledge, or authority, were not found in just one teacher, authoritative text, or privileged mode, but were distributed at times, across levels, modes and texts. Knowledge was authored through multiple interactions across levels that included ideas, feelings, kinesthetic experiences, artifacts, and ways of knowing in various semiotic systems and processes.

Data results present many examples of decentralized control resulting in distributed, shared knowing and ways of knowing, particularly for Classroom B. For example, in Classroom B, our compositions were the infusion of so many different students' ideas and experiments that it would have been impossible to detangle whose ideas belonged to which student by the time we reached the final form for our pieces. One idea led to another in a process of semiosis that I thought of as a synergy space. Our whole became something greater than the individual parts, a condition for synergy and also for decentralization (Davis and Sumara, 2006). Classroom community members in all classrooms, and particularly Classroom B generally played active and important roles to contribute in diverse ways to collective knowing so that our creations became something greater than any one individual might construct. At the same time, the collective learning supported individual learning within the classroom community, as evidenced by data presented in Chapters Five to Eight.

Individual learning was uniquely supported for specific students. For some students individual learning within the collective experience meant that access to reading

was created. For others, it meant that attitudes about reading and/or music changed, opening up new pathways for learning in one or both areas. Other students discovered that additional and necessary learning challenges were created. Social needs for inclusion and acceptance, for equitable distribution of power, identity and agency were addressed. Needed opportunities for playful, enjoyable social interactions were created. It did seem possible, as Davis and Sumara (2006) insist, “to foster individual agency and possibility at the same time as addressing collective potential” (p. 142).

With new understandings and awareness of decentralized control, I compared classrooms to examine whether this condition was present and to what degree in all experimental classrooms. Chapter Five describes a learning experience creating “How-to” raps in Classroom G that was not always fully engaging for all students. Student focus, attention, and enthusiasm occasionally flagged and I concluded at the time that activities were not relevant for all students and were more about my creations rather than those of the children.

By contrast, an experience similar to the “How-To” raps of Classroom G was explored in Classroom B with very different outcomes. The chants that were developed in Classroom B based on the classroom theme of pirates and the water cycle featured dynamic interactions that gave rise to student-created chants and games at recess and as part of other curricular learning throughout the classroom day. The water cycle chant expanded to become part of a larger learning event that was shared with parent/guardians at student-led conferencing and transferred to homes.

I examined Classroom B and Classroom G learning events for qualities of decentralized control and first identified similarities in the knowledge producing systems.

Shared/decentralized control means that structures are in place so that students participate in the decision-making (Davis & Sumara, 2006). In both classrooms, I invited students to decide what words would be used to make up the chants or raps and how they would be used. Students contributed to decision-making regarding use of artifacts, games, strategies, and processes. In Chapter Five I accredited instances of disengagement in Classroom G to the fact that the students had no voice in the choosing of the sources for our chants despite the fact that the words for the raps came directly from the students' work. However, in Classroom B, the words and chants came from curriculum sources and were also sourced by me in collaboration with the classroom teacher but the results were very different.

The resources used for Classroom B generated vocabulary that was developed collaboratively and creatively into speech pieces; in Classroom G, the resources were children's stories that we tried to re-shape and manipulate into speech-pieces. Some of Classroom G stories were challenging rhythmic structures to use as sources for speech-pieces and so I took some stories home to create a starting framework to expedite and facilitate creation of the speech-pieces.

I examined these findings using the thinking and terminology of complexity. When I considered issues of decentralized control I examined notions of distributed authorship (Sumara & Davis, 2006). Decentralized control in complex learning systems means that "an idea, a shared commitment, a common purpose, a collective orientation, an emergent possibility" (Sumara & Davis, 2006, p. 146) become the focus of the complex social grouping. In Classroom B, the resources were drawn from the curriculum

but were developed through a meaningful and appropriate activity with common purpose, shared commitment and with a collective orientation that led to emergence.

In Classroom G, I was the one producing knowledge that I then shared with students when I returned to their class. The common purpose of the classroom was to wait patiently for their turn to have their “How-to” story developed into a rap; there was no collective orientation or commitment to the process to create the individual raps. When I asked students for their input and feedback, the resulting speech-piece was often a matter of confirming my choices, rather than a flexible, creative, and emergent process. I considered creating the rap to be a collaborative learning experience, but as Innes and Booher (2010) contend, many processes that are considered collaborative are actually not self-organizing or generative. I wondered how many other collaborative learning experiences in this study might be similarly described.

I was forced to realize that many of the learning experiences in Classroom G and indeed, at times in all the classrooms, were collaborative but not self-organizing or generative. In Classroom G, the focus for the “How-to” raps was not on collective knowing but on developing a collection of individual or personal knowledge. We created a collection of raps from the individual stories of students in the classroom organized into a framework that I created. I confirmed previous thinking that although I believed I used relevant, personally meaningful, and authentic materials in Classroom G, in fact, I used materials that were only relevant or meaningful to the one person in the classroom that created and wrote them down. The experience of reading and performing the chant using body percussion and nonpitched instruments did seem enjoyable to students but it did not

occasion the kinds of deep learning or dynamic interactions generated by the collective ways of knowing and distributed authorship occasioned in Classroom B.

With these understandings, I returned to the research questions and findings to examine the contexts in the learning design that seemed to best support learning of rhythm and oral reading fluency through common purpose, collective orientation and with shared commitment. I discovered that many of the learning events that featured decentralized control and dynamic neighbor interactions were ones that involved storying. Some of our richest and most imaginative and creative ideas were generated, developed and communicated through learning experiences that featured the stories that students constructed together about and through our songs, speech-pieces, and artifacts. Examples include Classroom C's Flower song/story, Classroom B's pirate theme storied through chant, song, and game, and any of the stories associated with the puppets Wrinkles, Wormie, Friendly Bear, the local classroom puppets, puppets that students brought from home, and of course, Herbie, Henry, and baby Herbie and Henry.

Students were caught "in the creation of the narrative spell" (Whitehead, 2010, p. 106) through the storying process. Whitehead (2010) describes storying as a community and individual "need to make meaningful patterns and interpret experiences" (p. 106). Whitehead (2010) warns that our curricular structures that exclusively organize learning around books and literacy cause children to "miss out on the patterns and strengths of oral literacy language" (p. 115). Whitehead suggests that storying is a magical experience and that linguistic devices such as rhyme, refrain, repetition, and metaphor impart a mesmerizing quality. Whitehead echoes epistemological beliefs expressed by Egan (2005) who includes story, play, rhythm and rhyme in his essential tool kit for learning.

Certainly, in this study, results describe numerous magical moments and mesmerizing qualities arising out of creative and imaginative storying play with language and rhythm.

The qualities of play, highlighted in research results, are further examples of decentralized control. During iterations of the design research, I explored qualities and criteria of play (Chapter Five) and purposefully included elements of play in the final phase of the design. I continued to explore the literature on play and examined the literature on sociodramatic play. Hall (2007) describes sociodramatic play as often enjoyable, challenging, and “living rather than learning” (p. 182). Results indicate that children seemed to live the experiences of “The Force” and the Herbie stories they co-created in this study.

Sociodramatic play gives meaning to literacy learning (Hall, 2007) and also to music learning. In analyzing the relationship between literacy and play, Hall (2007) exemplifies qualities and conditions of complex learning systems related to sociodramatic play that are also apparent in this study. Hall acknowledges that sociodramatic play can be both individual and social. It has coherence in that it is often structured in events and within this structure, initiations are generated and interacted with as co-players respond to other players’ initiations (Hall, 2007). Sociodramatic play, playful experiences, and characteristics of play are important to this study. Play has the potential to give meaning and relevancy to learning and to contribute to conditions for complex emergence.

Sociodramatic play generated emotional involvement and enjoyment for students, teachers, and teacher/researcher. When learners are emotionally involved, they are more likely to be purposefully engaged in the learning. Enjoyment provides the impetus to persevere and maintain focus and intensity when learning becomes challenging (Hall,

2007). Cook (2000) makes similar observations about the phenomenon of language play. Cook affirms the importance of language play for all human life and particularly for children. In this study, rhythm and repetition seemed attractive, enjoyable, and often fascinating to children. As part of language play, rhythm and pattern provided a valuable source of language knowledge, use, and activity (Cook, 2000). Rhythmic language play supported print literacy meaning-making through a variety of processes discovered in grounded theory analysis: repeated readings; appropriate, engaging texts; temporal organization; easily modeled experiences, and associated strategies that enabled success.

Language play when viewed through the lens of complexity thinking takes on new dimensions. Cook (2000) enumerates a variety of advantages to language play for language teaching and learners that has meaning for complexity thinking. Language play broadens the range and variation of interactions through adaptive use by classroom communities and well as by smaller groups or in one-to-one settings. The range of interactions afforded by language play generates the necessary density of neighbor interaction that provides a source for decentralized, egalitarian, and emergent learning. These advantages are meaningful and important for all learners who struggle with reading; at the same time, they meet conditions for emergence in complex learning systems.

### **Enabling Constraints**

Cook (2000) describes language play as a phenomenon that balances freedom and tradition. The terms random and coherence (Davis & Sumara, 2006) could be successfully substituted for the conditions of freedom and tradition that Cook (2000) elaborates. Language play is argued to be “simultaneously one of the most constraining and one of

the most liberating of activities” (Cook, 2000, p. 201). Language play has boundaries constrained by constitutive and regulative rules but at the same time has the potential to “create a sense of creativity and infinite possibility. Each playing of a game is at the same time a repetition and unique” (Cook, 2000, p. 201). Random permutations of form realized through speech-piece language play, songs, games, and dramatic play as described in results, “yield new iconoclastic ideas” (Cook, 2000, p. 201).

We began with the basic Dolch (Williams, 2005) and Fry (Raskinski, 2003) sight words and used those as our initial basis for language play. Every playing of the language games was new and unique as we generated endless variations and innovations for each piece through our rhythm experiences and associated artifacts. We added repertoire based on local classroom context and inspired by the artifacts to generate more language play. The forms and processes provided coherence while the sources for language together with collaborative idea generation provided the necessary random elements that resulted in conditions of enabling constraints.

Enabling constraints are the appropriate balance of randomness and coherence that enables emergent complexity. Coherence comes in the form of rules that “determine only the *boundaries of activity*, not the *limits of possibility*” (Sumara & Davis, 2006, p. 48). Sources of coherence in a complex system include low-level rules or proscriptive rules that are necessary for the healthy, safe, and viable life of the classroom communities (Davis & Sumara, 2006). The sources of coherence that allowed the classroom communities in this study to maintain a purposeful focus and establish identity were analyzed through activity theory models and described in semiotic multimodal and other data results.

Sources of coherence included the rules of the divisions, schools, and classrooms, for respectful, safe, democratic, and nurturing learning environments. Redundancies in the learning system, previously described, are important for coherence (Sumara & Davis, 2006). Coherence was achieved through defined boundaries that included the place and times we met in the classroom, consistent routines and organizational structures, and the spiral, iterative, and recursive framework. Teaching process was bounded by specific procedures, strategies, resources, repertoire, teaching aids, artifacts, learning sequences, and sound before symbol approaches (Montgomery, 2002).

Within the boundaries of the study, a world of rich, imaginative, and creative possibilities was sometimes occasioned. Previous experiences, consistent processes, and common goals seemed to provide the necessary coherence “to orient agents’ actions” (Davis & Sumara, 2006, p. 148) while internal diversity, new and varied challenges and engaging resources seemed to offer sufficient random interactions to generate divergent, flexible, and creative responses. The classroom collective of students and teachers in this study constantly adapted to the new ideas, resources, and evolving new texts and processes. Coherence balanced with sufficient randomness for flexible, divergent, and creative response that opened up synergy spaces for emergent complexity and deep learning. These synergy spaces were present at various times in all classrooms and most frequently in Classroom B.

Enabling constraints were present in many of the semiotic systems available to students in this study. For example, classrooms developed common language and coherent frameworks for music using rhythm and beat, instruments, and body percussion, for oral language and print text, and for movement. Flexible and varied student responses

were generated within the coherence of those systems as exemplified in multimodal results: “As the children moved through the room and around the tables and chairs, the beat could be seen to move in different directions, at varying levels, and with different motions resulting in a different version of the speech-piece every time we enacted it” (Chapter Eight).

The artifacts were also an important element in generating varied and diverse responses. Herbie and Henry the cone puppets, are featured in learning examples that balance the randomness of ideas generated by the puppets with the coherence of the speech-pieces, songs, and games that we used to create with. The discovery of Herbie was an entirely random event. The students in Classroom B reacted to Herbie and organized and adapted the cone puppet into their existing structure of speech-piece exploration using chant, song, body percussion, instruments, games and reading. The random artifact-mediated interactions generated from the finding of Herbie led to a wide range of creative and innovative responses that lasted throughout the study.

The phenomenon by which diverse, inconsistent or random events produce a wider range of responses than those produced by non-random events is well noted in the literature on creativity research (Walker, 2001). The conditions that occasion emergence also prompt divergent thinking and creativity. This awareness suggests that rather than attempting to learn creative teaching strategies or how to teach imaginatively, we need to think more about creating the conditions that result in creative processes and divergent thinking. Starko (2010) develops similar notions. An activity might be considered creative teaching because the teacher uses considerable creativity in developing and teaching it. However, the teacher being creative is not the same thing as the student

developing creativity (Starko, 2010). I did not design the study to explore creative or imaginative teaching or to teach creative, imaginative thinking skills. However, the acquisition and use of unique language and tools used to communicate arts-based semiotic systems, often introduces diverse, unusual, or unfamiliar elements that when juxtaposed with other familiar elements, create new perspectives and different ways of knowing or thinking about the world.

Unique semiotic arts-based tools and languages only have potential to open up creative, innovative spaces if they are offered in ways that make them accessible and useable. Davis and Sumara (2006) explain that coherence means that participants need to perceive the activity as meaningful, appropriate, relevant and do-able. Coherence needs to be balanced with contexts that allow participants and the ideas to interact in ways that are manageable but not trivial (Davis & Sumara, 2006). Many of the classroom learning experiences, when scrutinized for conditions of enabling constraints, seemed to have achieved some degree of balance between coherence and randomness, creating the potential, at least, for complex emergence. When conditions of enabling constraints were in place, divergent, creative, and innovative thinking were consistent outcomes. As the creativity research indicates, thinking innovatively and creatively is more successfully generated in the presence of resistance, divergence, and disparate elements (Walker, 2001).

### **Emergent Complexity and Classroom B**

Throughout data analysis I wrestled with the way in which the same or similar print and non-print resources and common artifacts, processes, and procedures could produce such variation across classrooms. My years of experience in the classroom taught

me that the same resources, theory, and practice will always unfold differently from classroom to classroom, so I expected variations due to student diversity and differing contexts. However, I also expected that comparative grounded theory methods might point to social processes that would further understanding of some of the variation across classrooms. Grounded theory data results did indicate some “actions, experiences, events, or issues” (Charmaz, 2006, p. 109) that helped me understand how and when categories varied. Engeström’s (2001) notions of contradictions also helped explore variations between classrooms, and all qualitative and quantitative results provided different and converging perspectives on the variations between Classroom B and the other experimental classrooms.

Identifying the actions, experiences, and events associated with data variation still did not satisfactorily help me understand the differences between Classroom B and other classrooms. However, when I interpreted classroom learning experiences through the lens of complexity thinking, I was able to distinguish differences that were not previously apparent to me and I was able to see that phenomena previously characterized as differences, were in fact due to deep commonalities between complex classroom learning systems. The commonalities in conditions for complexity created diverse responses typical of complex learning environments as they adapt, improvise, and change in response to participant interaction.

Other variations, such as Classroom B’s notably greater and sustained involvement and engagement in the research design could be attributed to the phenomenon of complex emergence that was occasioned to a more noticeable degree in Classroom B than in other classrooms. Deep, powerful meaning-making was generated

from self-organizing, adaptive learning that resulted from a balance of diversity and redundancy, rich neighbor interactions generated by conceptual resources with disciplinary depth and breadth, decentralized control, and enabling constraints. There are several possible factors that may have affected the potential to prompt conditions for complexity in Classroom B on a more consistent basis.

The source for neighbor interactions affected conditions for complexity and varied from class to class. In some classrooms, the neighbor interactions were limited to the interpretive possibilities arising from interaction of ideas prompted by the Dolch (Williams, 2005) and Fry (Rasinski, 2003) basic sight words. In Classroom B, the conceptual theme of the water cycle, pirates, and the deep involvement with imaginative, embodied, sociodramatic play, may have provided a deeper pool and wider range of neighbor interactions and semiotic affordances than in other classrooms. The conceptual diversity, quality and richness of the sources for neighbor interactions in Classroom B perhaps led to a greater density of interactions and interpretations to trigger effects, or semiotic chaining that extended beyond the classroom walls and limits of the research design.

Threading the Classroom B results through the domain of complexity thinking I considered another source of rich neighbor interactions for this classroom. Classroom B was given greater opportunities to engage in dialogic exchange and inquiry. Dialogic inquiry refers to teaching and learning where understanding is socially constructed through multiple positions of authority and identity, dialogue, and joint exploration and negotiation of meaning (Kumpulainen & Lipponen, 2010). Learning contexts support students as they build openly and freely on each other's knowledge and experiences to

extend their individual and collective thinking. Student engagement is characterized as active and genuine and classroom interactions are productive and multidimensional (Kumpulainen & Lipponen, 2010).

Readers make meaning through dialogic relationships with text (Davis & Sumara, 2006) in ways that can be described as “minds-on” (Scott, 2010, p. 19). Scott uses the term minds-on to refer to musical learning where students are actively involved in questioning, problem-solving, and reflection. Research data are rich with examples from Classroom B where students actively and productively questioned, interacted, and solved rhythm and reading problems as they created their speech-pieces and games. Even as a game was in progress it would be re-shaped as new suggestions were offered freely and openly by students involved in playing the game. Ideas would be jointly explored and negotiated until a collective process evolved to be used for that particular day and class.

As I examined conditions for dialogic inquiry related to complex emergence in Classroom B, I considered the notion that neighboring interactions could be students’ or teachers’ own ideas interacting in metacognitive through self-questioning or reflection. I examined the data for evidence of student self-questioning. I looked for instances when students asked themselves what made sense, what didn’t, and why, regarding their experiences with rhythm and reading. I discovered data examples in grounded theory results where students examined their own learning and shared what they knew about rhythm and reading and identified purposes for certain learning strategies. Data evidence indicates that students identified strategies for helping them learn reading and rhythm skills and particularly in Classroom B, set goals for themselves outside of the classroom and study experiences.

I realized that dialogue and questioning used to understand and promote productive interaction (Littleton & Howe, 2010) played a significant role in creating a greater density and richness of neighbor interactions in Classroom B. Questioning was a general strategy and approach to teaching in this study when classrooms constructed speech-pieces and games together but used in various ways and to different degrees of effectiveness throughout the study. I examined a typology of student exchanges for ten and twelve year olds that seemed applicable for exchanges in early years classrooms. The typology developed by Daniel et al. (2005) includes anecdotal, monological, non-critical dialogical, semi-critical dialogical, and critical dialogical categories (p. 338-340):

- Anecdotal: Exchanges with student and teacher regarding just the student's point of view, usually referencing "I" and without justifying viewpoints.
- Monological: Brief and simple answers to teacher questions without justifying point of view.
- Non-critical Dialogical: Students listen to each other's divergent perspectives and respectfully integrate them without critical evaluation to enrich their viewpoints
- Semi-critical Dialogical: Exchanges that include questioning, doubts, and oppositions, but does not successfully influence other students.
- Critical Dialogical: Involves negotiation of viewpoints, transactions between students in an open process where conclusions are temporary and open and serve as a hypothesis for future reflection. "[T]he initial idea that prevails at the beginning of a discussion is modified or nuanced at the end" (p. 340).

At the level of critical dialogical exchange, students are flexibly adapting and modifying their ideas and views based on the different perspectives of neighbor

interactions bumping together, in other words, a complex, emergent process. Critical dialogical exchange was apparent at various times in all classrooms as we created speech-pieces, songs, and games together. We frequently began with an initial idea for a speech-piece or game that became something quite different by the end of the class. However, many of the classroom exchanges must be considered monological and non-critical. In fact, monological exchange was often encouraged during the study as students were guided to take turns, listen carefully to the teacher-researcher, be respectful, and not oppositional. The greatest opportunities for critical dialogical exchange seem to occur outside the classroom walls.

Classroom B engaged most frequently in critical dialogical exchange in and outside of the classroom, inspired by the experiences of the research design. As students created their own speech-pieces, games, stories, storying journals, and Herbie-related art during classroom independent choice time, on the playground and in their homes, they freely questioned and challenged themselves and their peers. They negotiated viewpoints and processes in an open process that increased the density, frequency, range, and diversity of neighbor interactions to which students could respond, interact, adapt and modify. In Classroom B, as the collective worked together to adapt, improvise, and change in response to neighbor interactions, the rhythm and reading experiences generated powerful community effects and meaning-making opportunities that radically changed the learning structures of the classroom.

Critical dialogical exchange in all classrooms and especially in Classroom B was fostered by positive feedback mechanisms that nurtured local interactions between students and promoted deeper, distributed learning. As teacher-researcher I encouraged

the exchange of ideas and negotiation of viewpoints when we created together. At those times, interactions were enabled to create exciting synergy spaces. As Davis and Sumara (2006) explain, “If agents are able to affect and be affected by their nearest neighbors...then the grander unity has complex, transcendent possibilities. If however, information is controlled through a central hub...then emergent possibility is unlikely. Such a system...is oriented to a replication of existing possibility, rather than an expansion of the space of the possible” (p. 105).

### **Summary**

In this study, participants came together to form rhythm and reading learning communities that expanded possible spaces and generated new, dynamic, innovative and creative synergy spaces at various times and places in all experimental classrooms. Possibilities existed for both individual and community learners to generate and voice diverse responses and ideas that created synergistic opportunities for the classroom unit to explore reading and rhythm together in ways that were unforeseen, unexpected, highly enjoyable, and engaging for the majority of participants in the study.

Conditions for complex learning were present and sometimes occasioned to generate emergent, adaptive, and self-organized learning systems, most particularly in Classroom B. Classroom communities appeared to adapt and respond with flexibility, imagination, creativity, and innovation to the introduction of new artifacts, a broadened range of available meaning potentials or modes, speech-pieces, songs, games, and strategies for learning. The learning design was realized in very different ways that were unique to each classroom; even the common chants, songs, and games founded on the basic sight words took on distinctive forms in each classroom. By examining the

conditions that prompted complex, emergent learning, I was able to understand how transformative learning in rhythm and reading might be occasioned in other settings.

The conditions for complex emergence included internal diversity inherent to each classroom, a common set of tools for rhythm and reading, shared understandings for how to use those tools, a common set of strategies and processes for using those tools, a range of available artifacts and modes, and a common desire and motivation to use the tools and language of rhythm and reading for some shared, collective purpose. Rich neighbor interactions including complex multimodal semiotic signs and systems generated a deep and wide repertoire of possibilities and potentials for learning that were enacted and embodied within a coherent bounded framework of enabling constraints.

Qualitative results provide convincing evidence for the importance of rhythm for print and non-print meaning-making. When semiosis was triggered and complex learning was prompted, deep, affective engagement and new understandings about rhythm and reading resulted for many children in this study. Beat provided a guiding and organizing temporal framework for aural and written speech-pieces and songs and transmediated understandings about print text. In addition, a positive indexical relationship between rhythm experiences and reading resulted in a sense of self-efficacy for many students. Findings also indicate that some students experienced greater confidence, risk-taking, trust, persistence, effort, and a decrease in their usual stress and anxiety as a result of rhythm and reading experiences. New identities as contributing classroom members and as readers were acquired. Experiences equalized power structures, created democratic learning ecologies, and offered agency to all learners. Individual needs were met through the collective experiences in a variety of social, cognitive, and embodied ways.

A final threading into the bricolage map before returning to the research questions connects Csikszentmihalyi's (1979) theories about play, creativity and flow for teaching and learning. Csikszentmihalyi's conditions for flow, previously presented, make new sense in light of complexity thinking. Flow conditions are another way of describing emergence. The phenomenological conditions for flow described by Csikszentmihalyi (1990b) are embedded in conditions outlined for complexity. Coherence must be balanced with randomness so that challenges are not greater than skills and skills are not greater than the challenge. Spontaneity, flexibility, and student decision-making are central. Goals become intrinsic to the learning and immediate and meaningful feedback maintains student involvement. Sawyer's (2003) application of flow theory to collective learning makes a final connection to complexity thinking and is relevant to the findings of this study: "...group flow is an emergent property of the entire group as a collective unit" (p. 167).

### **Research Question One**

Threading back to the POET one final time, it is now possible to answer the research questions with greater depth and understanding. Focused experiences integrating rhythm and language using an Orff-based approach have convincing potential for early years children's engagement and meaning-making from print and non-print literacies as indicated by qualitative and quantitative results. Qualitative results present a variety of ways that rhythm supports oral reading fluency and specific strategies for promoting oral reading fluency were identified.

In this study, the majority of students and teachers appeared to sustain highly motivated and engaged learning throughout the research as defined by motivation and

engagement criteria set out in Chapter Six Grounded Theory Results and Chapter Five Design Research/Action Research. Learning was perceived to be relevant, meaningful, and highly enjoyable in all classrooms. Many students that previously struggled with reading were observed to take great pleasure in the reading and rhythm experiences and all teachers noted student improvement in oral reading fluency for certain students in their classrooms.

Rhythm and reading experiences and approaches to teaching and learning prompted curiosity, creative, imaginative, and divergent thinking and processes. Learning was perceived at times to be personal, relevant, and transformative according to criteria established in Chapter Six Grounded Theory results in a number of positive ways for both teachers and many students and parents. Parent/guardian post-survey results also indicate transformative effects; greater interest in reading was linked in some way to enjoyment of the music and reading activities. A potential link appears to exist between music and reading activities described as memorable, motivating, transformative, and promoting self-efficacy and with reading more for students in experimental classrooms. Sixty-three percent of parent/guardians who reported that their children read “lots more” after the study also reported that their children experienced increase self-belief in reading.

Greater interest in music seems related to greater interest in reading as indicated by parent/guardian post-survey results. Ninety percent of parent/guardians who reported their children read a lot more following the study experiences also reported that their children had lots more interest in music and fully one hundred percent of respondents who reported their students engaged in lots more reading also linked music to reading activities. Conversely, only 1.41% of respondents who reported their children engaged in

more reading reported that their children's interest in music had not changed. Interest in music was also linked in some way to self-initiated music activities as eighty-four percent of respondents who reported their students read lots more also reported links to self-initiated music activities.

### **Research Question Two**

Research question two asks what factors facilitate or inhibit the semiotic resource of rhythm for supporting early years children's engagement and meaning-making from print and non-print literacies. Conditions that generate complex, emergent learning as described throughout Discussions facilitate deep and transformative learning and help make sense of the variations in Classroom B. Factors that inhibit success of the design research are lack of decentralized control, insufficient density, quality, and variety of neighbor interactions, and a lack of enabling constraints. A lack of opportunities for dialogic exchange across and within nested subsystems of individual, classroom collective, teacher, and teacher-researcher was also a significant constraint and inhibits the success of this research. Dialogic exchange and richer, more meaningful neighbor interactions would have been more likely occasioned if a greater depth and breadth of historicity of classroom collectives and collaborating teachers had been explored and this knowledge integrated into the research design. Issues of identity, agency, and power represent a significant limitation that is addressed in the final concluding model of this research.

### **Research Question Three**

Research question three asks if there is a relationship between measures of early years reading competencies and rhythmic competencies. Quantitative results indicate that

oral reading rate is significantly correlated with beat competency. There is a positive correlation between oral reading fluency and beat performance for both pre- and post-tests and correlation increases with age. Quantitative results also indicate a variety of relationships regarding oral reading fluency and rhythm performance. Rhythm performance and age were positively correlated: rhythm performance pre-test and post-test scores increase with age and gain is affected by age. Oral reading rate scores also improve with age for both pre- and post-test scores; however, age does not affect oral reading fluency gains, although statistics approach significance.

The experimental and control groups differed significantly on tests for pre- and post-test rhythm performance as the experimental group achieved greater gains for scores of rhythm performance on post-tests than did the control group. These data confirm the qualitative results that suggest the experiences of the research design supported successful acquisition of beat competency. Classroom B was the only experimental classroom that improved significantly more than control classrooms for measures of oral reading rate as determined by post-tests. These findings confirm qualitative results that indicate exceptional differences in oral reading experiences for Classroom B. However, validity concerns and limitations regarding standardized test results are noted in Methods.

Matched pairs analysis and analyses of variance were used to examine differences between control and experimental groups of struggling readers, as defined by benchmark *DIBELS*<sup>TM</sup> oral reading fluency benchmark test scores. For these students, there is statistical improvement in oral reading fluency pre- and post-test scores for both control and experimental groups. Oral reading rate scores were significantly higher for experimental groups as compared to control groups and when Classroom B was removed

from data analysis, there was still statistically significant improvement for oral reading rate for experimental classrooms.

Statistical improvement in oral reading rate for both experimental and control classrooms confirms qualitative results that suggest control classrooms also experienced positive affects from reading song storybooks in the control classroom experiences. There is no significant difference in pre- and post-test scores for rhythm performance for the below benchmark control group, however there is a statistical difference in pre- and post-test scores for rhythm performance for the experimental group, which again echoes findings in qualitative results that experimental classrooms made significant gains in rhythmic performance.

Coltrane, an innovative jazz legend, is famously quoted as saying, “Music shouldn’t be easy to understand” (Kahn, 2002, p. xvii). Coltrane’s free jazz accompanied me as I followed the changes in an attempt to understand the complexities in teaching and learning about music and reading. Dissonance was liberated though there is always more dissonance to hear on any repeated listening. Through the synthesis of bricolage, I took inspiration from Coltrane’s sublime *A Love Supreme* (Coltrane, 1965/2003). The four-part free jazz suite, is a “cohesive balance of composition and improvisation, of form and energy, like no other title in Coltrane’s collected works” (Kahn, 2002, p. xvii).

Hearing a complex system in its glorious emergence helped transmediate understandings about complexity viewed through my research. As Coltrane constructed, broke down, and re-erected the blues structures (Kahn, 2002) I was inspired to make similar, though far less sublime, attempts. As I wrote of embodied ways of knowing, I heard their sounds. As I examined flow, creative abundance, and the meaning of agency,

identity, and power, I heard all these elements in exquisite agony and ecstasy in this music.

Research, like music is not easy to understand; the understanding is never complete. However, this listening is played; it is time for new music. The threads of the bricolage map can now be drawn together. The shape of the bricolage in Figure 92 below is transmuted into one final form, understanding, and music in the following Conclusions.

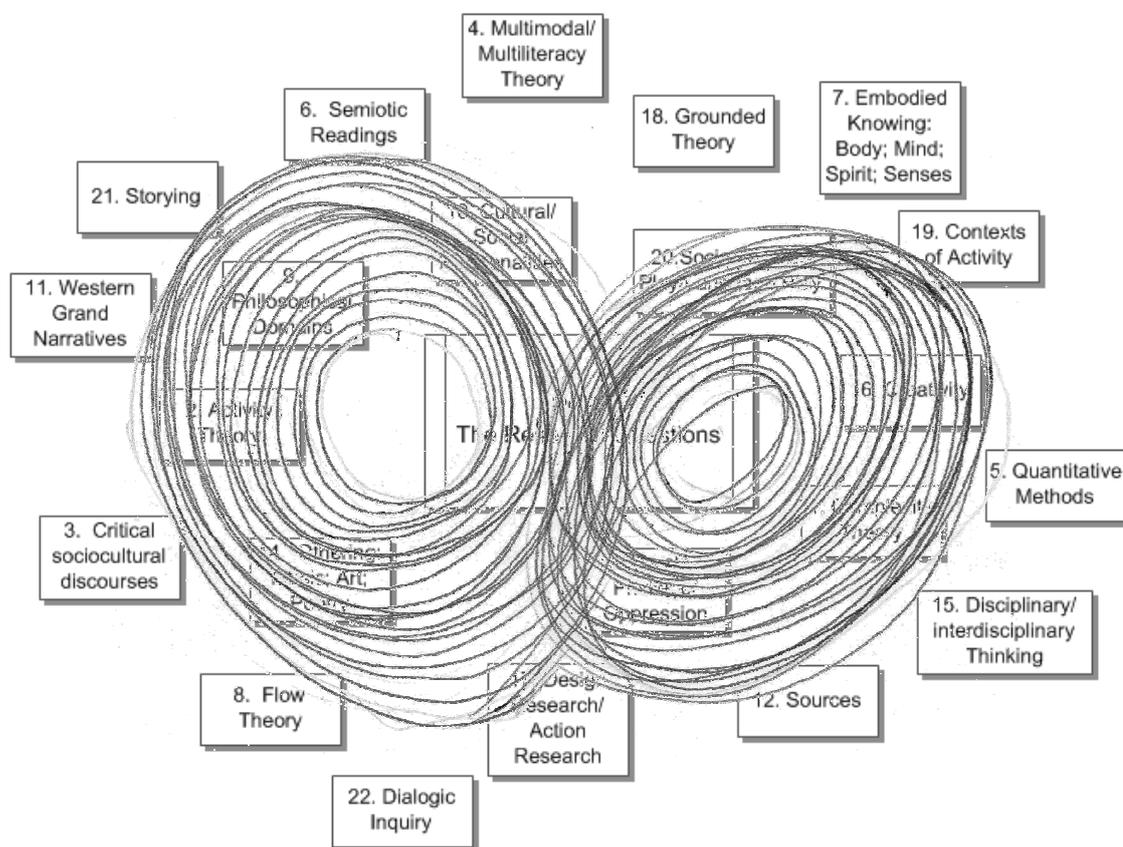


Figure 92. Threaded bricolage map of study methods and perspectives.

The iconic image of the Lorenz butterfly attractor as superimposed on the bricolage map (adapted from Berry, 2004, p. 113) is often used to illustrate the butterfly

effect and chaos theory. The butterfly shape is the representation of a “mathematical weather convection model known as a strange attractor that was found to represent a butterfly” (Lorenz, 1993, p. 15).

In mathematical terms, strange attractors are sets of values that a system tends towards without ever quite reaching (Castree, Demeritt, Liverman, & Rhoads, 2009). Attractors or basins of attraction are regions of space “to which all evolutionary trajectories are drawn” (Phillips, 2003, p. 3). The strange attractor makes a useful metaphor for this study. The butterfly attractor is “sensitively dependent on initial conditions” (Lorenz, 1993, p. 8) Like strange attractors, the study was altered and affected by initial conditions and outside disturbances or effects (Stacy, 1996). The experiences of rhythm and reading acted as strange attractors for many children who were drawn into the learning activities and experienced and embodied the compelling force of the beat. The rhythm attractor transmediated and transformed understandings about music and reading for many students in this study.

Strange attractors are examples of chaotic systems that have certain regularities and boundaries. The illustration of the Lorenz strange attractor shows that the tracing of the lines never follow the same path but at the same time, they never leave the orbit of the attractor. Like the strange attractor, the classrooms in this study followed their own unique paths within the regularities of the research design. Unlike the strange attractor phenomenon, complexity and emergent, adaptive learning, rather than chaos, was the outcome in many instances of this research phenomenon.

\* \* \*

### **A Love Supreme**

John Coltrane's "A Love Supreme" (1965/2003) was introduced as a source of inspiration, emotional and spiritual sustenance, hope, and transmediation throughout the final stages of this research. Kahn (2003, p. xvii) describes the album as:

The propulsive, elevating effect of African polyrhythms. The lugubrious tempos of modal jazz. The wistful keening of Far Eastern folk music. The urgency of free jazz. The agitation of bebop. The familiar feel of the blues. The orgasmic release of gospel.

I heard all these elements in the music of research. The music of "Love Supreme," like my research, challenged my listening and understanding. The experience and impact of both is life-changing and far-reaching and led at last to the conclusions presented in the next and final chapter.

### Chapter Eleven: Butterfly Wings

...And ourselves, fluttering toward and away

In an pattern that, given enough

Dimensions and point-of-view,

Anyone living there could plainly see—

Dance and story, advance, retreat,

A human chaos that some slight

Early difference altered irretrievably?

Chapman, 2005, p. 107

### Introduction to the Conclusions

The poststructural bricolage of plurality, complexity and rigour includes narratological strategies to perturb and amplify complexity “with personal and literary style, voice and conventions” (Berry, 2004, p. 117). These strategies include traditional and contemporary sources of knowledge and artifacts such as art, daily life, popular culture, books, film, and poetry (Berry, 2004). My knowledge sources include Baroque and classical music, twentieth century jazz, and music of twenty-first century composers. Poetry has also been a prominent and important source of knowledge. During the challenges of transmediating and connecting synaptic firing of fractal thought fragments, I reached for poetry as a sense-maker. When searching for some elusive word or phrase to capture meaning, poetry was my thesaurus. Poetry did not give me words; it gave me clarifying sense and lyric thought. I am not a poet and so I do not have the skill to share that lyric process, but Zwicky has the gift. Lyric thought is “an attempt to arrive at an integrated perception, a picture or understanding of how something might affect us as

beings with bodies and emotions as well as the ability to think logically” (Zwicky, 1992, p. 68).

The final conclusions are my attempt to arrive at integrated perception, to use words to create image, to use image to transmediate meaning, and to use meaning to contribute to practice and theory. I synthesize and summarize my learnings into four encompassing bodies of thought represented by a model that has been a constant companion for some years. To introduce the first essential learning, I call upon lyric thought “to give voice to an ecology of experience” (Zwicky, 1992, p. 68). Zwicky (1992) assures me that “It is not impossible to contain logical argument and be lyric in form” (p. 174). Here is my attempt at both.

### **Essential Learnings**

The words that tell the research story lie flat and lifeless, black marks on a page. But the letters once shimmered and danced. They shouted, whispered, and colored the patterns and dimensions of the research. I read words and heard musics and rhythm. I hear with my eyes, feel with my ears; understanding is seeing, being. My particular way of perceiving and knowing the world is not yours. And I cannot know what songs or not, impoverished technology transmediates to those who read this score. What keys will sound? Is F minor blue or red?

Perhaps to some the music’s grounded themes will clearly speak: intriguing melodies; shaping; reshaping; intertwining. The mood is warm, playful, joyous. A glorious range of expressive qualities inherent in the music may communicate embodied delight, possibility, hopeful future-- the feeling/being/thinking of C. Peirce. Or does the form appeal? The ternary ABA is one I would rewrite. The A is too deliberately

contrived—contrapuntal mechanics—no breath of Bach. Please observe the full rest in bar 9. Parallel octaves and fifths will be 5 marks deduction each. You may begin....

But oh, the B section! The large, joyous, modal color organ of spiraling, leaping, recursive, exuberant, Mrs. Peters, we can't live without you music of the middle section! The intensity/density/energy layers of polyrhythms, cross-rhythms and mixed meters may convey the dynamic organic, dynamic organic complex, dynamic organic complex chaos crazy of 4 schools, 9 classrooms, 10 and more teachers, 169 early years children--all chanting and singing and moving, creating—advance, retreat and...what was that slight early difference—the irretrievable alteration? Bifurcation. Fractalization. Ideation. Theorization. Anotheration, and the music turns, again.

I begin at the close with summary reflection through my ways of knowing. If they are not your ways of knowing, then I apologize. But then, you would be fortunate, for you would understand what I have learned. They do not hear what I presume they hear, no matter how loudly, or slowly, or carefully, or how practised I play the song. We cannot know what meaning is made when the music sounds. One hears melody, another rhythm. Someone sees colors, and yet another hears the same music and tastes cheese. I know through music, art, movement, drama, language, science, different modes, unique meanings. I consider my knowing sources rich and varied. But there are more ways of knowing than I conceived of.

A hundred languages and more, says Malaguzzi (cited in Edwards, Gandini, & Forman, 1998). A metaphor, I thought. They said it was a metaphor—authoritative sources can't be wrong. A hundred languages is: "A metaphorical expression of the number of ways that children can find to express themselves" (Fraser & Gestwicki, 2002,

p. 249). Out of all the ways to perceive, make and communicate meaning—how do we know for another human being which mode will impart a certain kind of meaning more easily and more naturally than another (Hull & Nelson, 2005)? Feelings sound rhythm to me, and yet I did not consider colored smell—or that white paint could smell blue (Cytowic & Eagleman, 2009). In my little knowing, I calculated those ways of making meaning. In the name of research I searched and underlined and *numbered* the ways of knowing of those children. And then I counted them.

Ten. Ten ways of knowing.

And then I measured them—just two. Two ways of knowing. Just the way the large company in Oregon, USA told me how to do in their online, downloadable manual. And the way the CD that came with the “Rhythm Performance Test-Revised” (Flohr, 2004) directed me to do when the voice from the computer speakers said, “Use your mouse to click on the ear so you can hear the directions.”

The child has a hundred languages but the school and culture steal ninety-nine, says Malaguzzi (cited in Edwards, Gandini, & Forman, 1998). Did I steal from those children? If so, I tried to give back. And they forgave me, those beautiful students and teachers who so generously invited me into their classrooms and schools. The students forgave me and replied with gifts. Each time I entered the classroom and sat down in my chair, the children smiled up at me, started patting their knees and called out, “We’ve got the beat, Mrs. Peters. Let’s play!”

And play we did, with joy and laughter at every meeting. And in that rich and wonderful play and in those imagined worlds of Herbie and Henry, synergy spaces of transformative learning opened in every class, much like the opening of synergy spaces in

my research analysis one year later. The children are still speaking to me through the data and I am still learning from them using different tools to excavate the data. Just as Herbie and Henry served to prompt learning for children in the study, so Davis and Sumara (2006) and a host of others happened to perturb mine. Through complexity thinking I came to believe that it was possible to orchestrate rich, complex learning for both choir and solo voices with a song for every member to sing--or play, or chant, or move, or read, or feel.

But wasn't this supposed to be about reading and rhythm?

Reading is the global gold standard of currency. Without an ability to read, our children are marginalized and denied entry into social, professional, and academic arenas. Beat provides entry into another world. It is the basic element of any music, and an essential skill and understanding for any music-making. Reading is basic to the subject area of English Language Arts as rhythm is foundational to the discipline of music. But Jardine, Clifford, & Friesen (2003) argue with me. What is basic, they say, to any living discipline, "is precisely its excessiveness" (p. 208). They propose a "curriculum in abundance" (Jardine, Friesen, Clifford, 2006, p.6) that centers on issues of ontology rather than epistemology, a "thinking and experiencing that is substantive, material, bodily, earthly, located, specific" (Jardine, 2006, xxiv).

Classroom inquiries based on notions of abundance are grounded in beliefs "about how the world fits together in its deepest and most vigorous intellectual and spiritual possibilities" (Jardine, 2006, p. 100). Surely, the music of the world is also harmonized with physical and imaginative possibilities? Pinar (2006), in the foreword to the book, depicts "dwelling within curriculum in abundance" as an experience that supports "the

modes of being in the world that enable us to experience the world... These modes of being do not just happen; they are not learning styles or pedagogy tools” (p. xiv). Pinar draws on characterizations of abundance (Jardine, Friesen, & Clifford, 2006) to describe experiences to be cultivated and worth the long, hard, and sometimes dangerous process. Pinar suggests that such experiences offer passionate and profound engagement, a world alive and purposeful.

### **First Essential Learning: Ontology of Abundance**

Yes, this research is about reading and rhythm. But it has also been about much more. The research story told of what has been and what could be, through the living of an ontology of abundance, my first essential learning. Not just beat exercises and rhythm patterns checked off the list for the day. Not reading skills alone, fragmented, and ill-fitting. Instead, rhythm and processes of reading became the “catalytic moments of experience... saying what was silent, gathering what was dispersed, drawing us into the way of a world of relations” (Jardine, Friesen, & Clifford, 2006, p. 91). In the imagined, open, synergy spaces of our research, the reading and rhythm lived experiences drew previously silent children into a world of interacting, resonating, vibrating, intensely personal, and collectively embracing relations.

Yes, there were two ways of knowing—within ten ways of knowing—within 100 languages for knowing, “and a hundred hundred hundred more” (Malaguzzi, cited in Edwards, Gandini, & Forman, 1998, p. 3). Pinar (2006) describes this space as one where people, ideas, and images speak, provoke awe and wonder, and pull the learner in. “We may take epistemological paths to reach this place, but where we arrive is a living breathing place of being” (p. xii).

### **Second Essential Learning: Critical Complex Epistemology**

The journey down epistemological paths has been the focus of this research and forms the second body of essential learning in this research. The epistemology of complexity examined in the previous discussions is broadened to notions of “critical complex epistemology” (Kincheloe, 2008, p. 41). Using this lens, as “teachers and researchers come to recognize the complexity of the lived world with its maze of uncontrollable variables, irrationality, non-linearity, and unpredictable interaction of wholes and parts, they begin to also see the interpretive dimension of reality” (Kincheloe, 2008, p. 41). The multiple methods used for interrogating and understanding the research are necessary from a critical complex epistemological standpoint. In the classroom, in practice, they are no less necessary. Each research method provides a different perspective on the events, experiences, and relationships of the study in the same way that the multiple modes, artifacts, and teaching strategies provided unique and diverse ways of knowing and communicating for students participating in this research.

Findings highlight the many rich ways that diverse student communities and individuals constructed the teirce of Peirce’s ontology. Each student and classroom arrived at a different interpretant for similar experiences in reading and rhythm. The teirce rotated time and again in endless semiosis; one teirce became the object of another as transmediation was inspired by the catalytic, synergistic learning sources and spaces of the study. Transmediation and interpretant were affected by diverse values, past experiences, interests, attitude, emotional and spiritual affinity throughout the study in ways I could observe and in ways I could not. The prior knowledge probed and gathered up at the outset of the research was incomplete and insufficient. I realized that prior

knowledge and experience affects not only the starting point of the research and teaching, but also needs to be considered as part of interactions throughout the learning.

Through critical complex epistemological approaches to the research, difference and diversity were extended to questions of identity, agency, and power. At the outset to this research, critical theory (understanding there is no such singular thing) was not a theoretical pillar underpinning this study. I examined the work of critical theorists (Kincheloe, 2005; Kincheloe & McLaren, 2005) but mistakenly considered my research to be free of issues of gender, race, power, sexuality, politics, ideologies, or democracy. My goal was to foster equitable power, agency and identity, and not to privilege.

The findings point to both success and failure in this regard, but along the way, I realized that all research, all teaching, and all curricula, are always embedded in issues of critical ontology and epistemology. As a researcher and teacher it is essential for me to analyze and understand the nature of my sociocultural context and my overt and occluded relationship with others (Kincheloe, 2008). “Without such understandings of their own contextual embeddedness, individuals are not capable of understanding from where the prejudices and predispositions they bring to the act of meaning making originate” (Kincheloe, 2008, p. 42).

My prejudices and predispositions at once constrain and enable me. Because music and the arts are my way of being in this world, I could not imagine that any child could remain untouched by the joy and enticement of music. Certainly, motivation, engagement and enjoyment were important social processes resulting from the processes of this research. However, attribution is misplaced if I say these processes are the result of music and rhythm effects. The findings pointed to underlying valuing, imaginative

dramatic play, multiple semiotic systems, artifacts, instruments, diverse sources of knowing, humour and language play, as some of the ways of affective knowing and communication. Teacher-researcher engagement and passion and students' emotional engagement were mutually influential.

### **Third Essential Learning: Embodied Knowing and Communicating**

Affective and embodied knowing, motivation, and learning engagement were at once both products and processes in this critical, complex epistemology. They resulted from and drove the interactions that generated complex, emergent learning. These qualities were part of a process of diversity and redundancy, decentralized control and neighbor interactions, and enabling constraints that amplified, transmediated, and transformed learning for individual and collective learners in this study. Zwicky describes this kind of complexity as polydimensionality (1992), “another metaphor for depth. When a polydimensional thought is resonant, the effect is like being able to see a tremendous distance through clear air or water. The impulse to leap is overwhelming, a deep-bodied joy” (p. 336).

Deep-bodied joy perfectly captures a theme and thread that unites all classrooms, experimental and control. The experiences of the study, whether in the context of rhythm and reading experiences for experimental classrooms, or in the context of shared song-stories for control classrooms, discharged a deeply felt joy and un-nameable Firstness in every classroom. The importance of embodied knowing and communicating: mind, body, spirit, senses becomes the third essential learning area of this study.

Embodied knowing is bound up in ontological abundance and critical complex epistemologies, but must be foregrounded for this research and, this research would

suggest, for any teaching and learning. Such a presencing of embodied ways of knowing is especially important in light of global trends to quantify learning and focus on reductionist, fragmented learning processes, strategies, and evaluative methods. The explosion of popular, academic, and scientific interest in brain-related phenomena has done much to constrain notions of meaning-making as processes only of the intellect.

Current accounts of cognitive science, “the scientific study of mind and cognition” (Bermúdez, 2010, p. i) typically limit learning processes to functional neural network modeling. The “turn to the brain” (p. 59) focuses attention on the anatomy of the brain and away from the lyric, resonant ways of knowing through body, soul, and spirit. The qualitative findings radiate the importance of embodied ways of knowing and cause me to question what invisible ways of knowing were left unrecognized. Particularly for the classrooms in which I worked, I questioned what indigenous ways of knowing I should have explored.

#### **Fourth Essential Learning: Rhythm Meaning-Maker and Communicator**

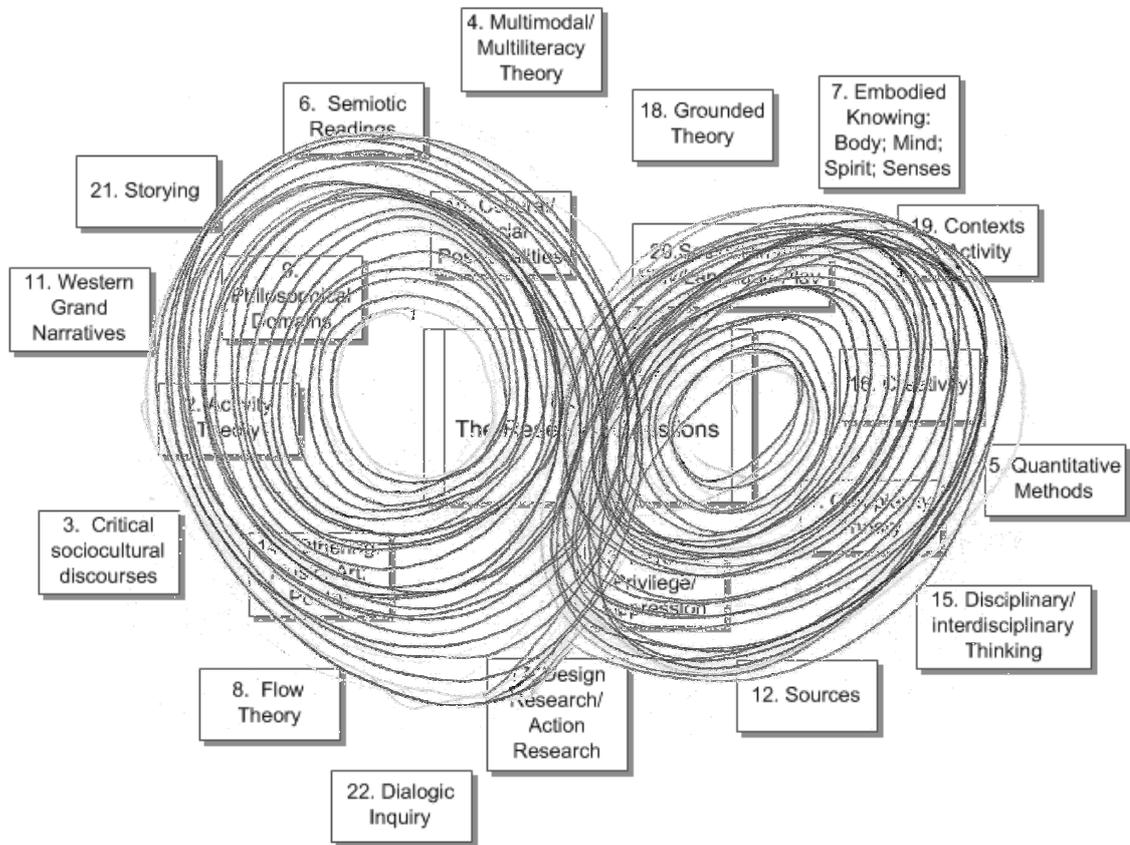
Evidence from neuroscience supports this research. The cognitive neuroscience of music (Peretz & Zatorre, 2003) provides fascinating insights into the function of rhythm in the neural workings of the brain and body. This body of research informed the design of the study, shaped iterations, and continues to provide new perspectives and insights. The body of neuroscientific research connecting subcortico and cortical rhythmic processing to all aspects of human perception, including music, speech and language, expands with every foray into library databases (Escoffier, Sheng, & Schirmer, 2010; Goswami, 2010; Kotz, & Schwartze, 2010). Evidence for impaired rhythmic entrainment, or beat competency linked to issues of struggling readers (Goswami, 2010)

continues to accumulate and this research joins those ranks. Despite my grave concern regarding ethics of standardized testing, the findings of this study indicate a strong, positive correlation between measures of beat competency and measure of oral reading fluency by the dimensions of speed and accuracy.

The synchronous potential of beat is a growing research interest (Keller & Riefer, 2009; Merker, Madison, & Eckerdal, 2009; Overy & Turner, 2009). In qualitative findings, beat is described as a powerful, magnetic force in the classrooms. Like the Lorenz strange attractor that draws the system variables toward it, beat can be viewed as a strange attractor for this research. There were multiple attractors in the study's complex learning system as described in findings. Of the multiple attractors, the beat strange attractor was highlighted in all the findings and common to all experimental classrooms. Students were drawn emotionally, physically, in sensory ways, and cognitively to experiences with the beat. The beat attractor exerted a compelling pull on the individual and collective learners. Once again, like the Lorenz attractor, the orbit of children around the beat attractor never followed the same path twice as it varied through the multiple recursions of every speech-piece and chant. Rhythm as a meaning-maker and communicator thus becomes the fourth essential learning area in this research.

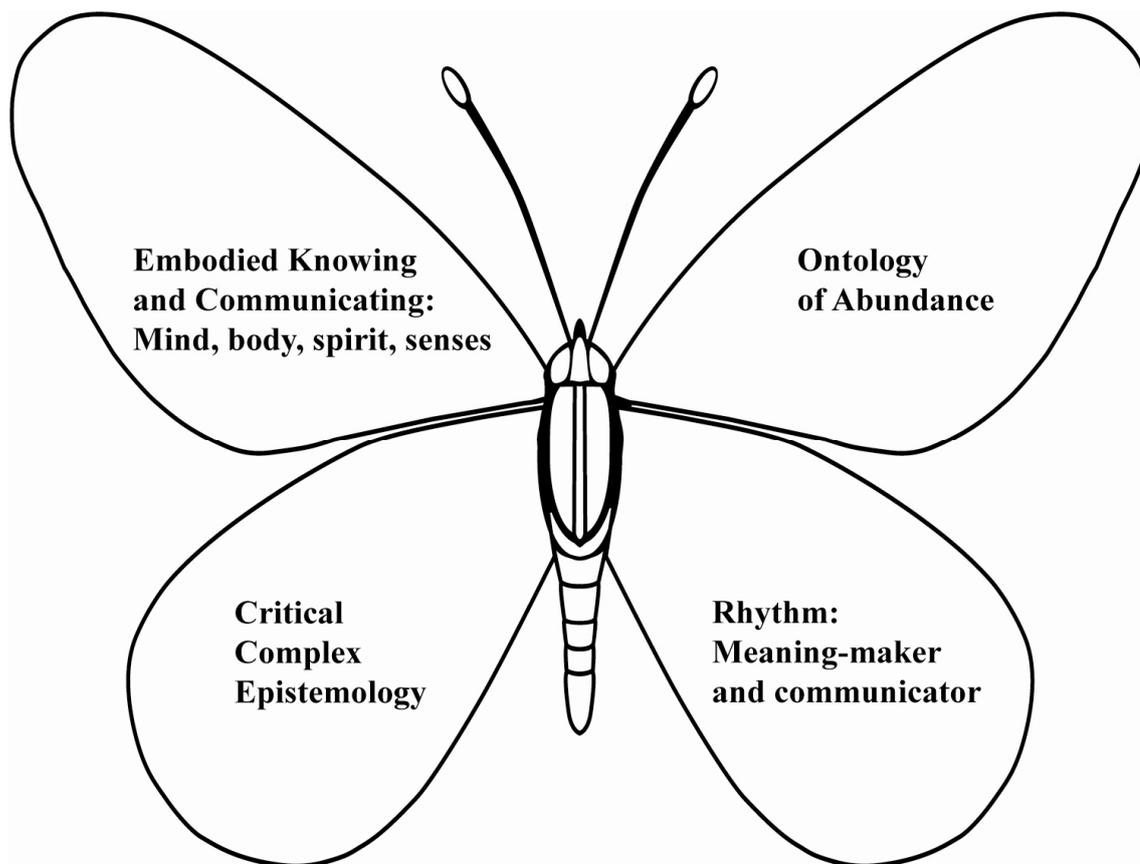
The findings detail ways that rhythm facilitated reading and music in the experimental classrooms. Experiences in rhythm and language fostered successful oral and print reading through repeated and echo readings, use of appropriate text, as temporal and visual organizers for sound and print, by creating awareness and understanding of phonological structures, and by transmediating understandings about and in text.

The bricolage map, newly threaded with lyric and scientific thought, is pictured once again (Figure 93):



*Figure 93.* Threaded bricolage map of study methods and perspectives.

And now becomes:



*Figure 94.* Final model of the research findings.

### **The Research Model**

The model of this research design is finally complete (Figure 94). The four essential learning areas of this research are:

1. Ontology of abundance
2. Critical complex epistemology
3. Embodied knowing and communicating: Mind, body, spirit, senses
4. Rhythm: Meaning maker and communicator

I have been working with the image of a butterfly for some years now as an Arts education curriculum writer and consultant. The butterfly representation is used as a

model and metaphor for provincial curriculum frameworks in Dance, Drama, Music, and Visual Arts and is intended to show how the four essential learning areas developed for arts education work together in interrelated, interdependent ways. The same thinking infuses this research.

In an ontology of abundance, using critical complex epistemologies and embodied ways of knowing and communicating, rhythm and beat have the potential to act as meaning-makers and communicators to engage early years children in meaning-making of print and non-print literacies, including reading and music. The four essential learning areas must work synchronously together in order to create imaginative, engaging synergy spaces for reading and rhythm. Through the interactions and interdependence of the wings, distinctions between issues of ontology and epistemology blur. Kincheloe (2005) suggests such blurring is advantageous and observes: “We are to some degree what we know” (p. 82). If such interacting ontological, epistemological, and embodied ways of knowing are part of experiences in rhythm and beat, then spaces are created between and among the folds of the butterfly wings for creative, imaginative, innovative, and divergent thinking. A resonance-body is formed:

In a polydimensional structure, integrated components may transmit motion to one another. Under certain conditions of attunement, a resonance-body is formed.

Such a structure then is capable of complex resonance. (Zwicky, 1992, p. 8)

Importantly for this model, “resonance is a function of the integration of various components in a whole” (Zwicky, 1992, p. 64). When the whole dances and stories, “resonance occurs in the spaces between” (Zwicky, 1992, p. 64).

Resonant form generates energies of joy, engagement, delight, identity, agency, and power that lift the butterfly and carry it on ever-changing and colliding currents of lyric thought, bounded by the ecology within which it takes flight and soars. This research cannot be used to predict that ecology. And so we come to both the limitations of the research and its significance—the essential distinctive or “original contribution to theory or practice” (Roberts, 2004, p. 15). The lyric possibilities of this research are limited to just those schools and classrooms within which I learned. Experiences in rhythm and language occasioned complex learning but the trajectory of emergence was affected by different variables and interactions in each class. The classroom learning systems and collectives were “sensitively dependent on initial conditions” (Lorenz, p. 8) as explored in the Discussions. Emergence and “sensitive dependence” returns us to the illuminating terminologies of complexity thinking and with new thoughts, comes new music.

### **Butterfly Wings and Tropical Storms**

The music of *Butterfly Wings and Tropical Storms* has sifted my thinking for the past year. A chance conversation at a concert, a bifurcation in time, and I was gifted my concluding transmediating knowledge source. Randolph Peters (2002) wrote *Butterfly Wings and Tropical Storms* to demonstrate that “Music, like weather, has patterns and it also has unpredictability. Both often contain a fine inner ordering that masquerade on the surface as randomness” (Introduction). The work is titled Butterfly Wings in reference to “the idea that infinitesimal disturbances caused by the flight of a butterfly could be multiplied over months and years and eventually result in a tropical storm” (Introduction).

The butterfly effect is associated with chaos science, and seminal theoretician, Edward Lorenz. Lorenz is famously known for his discovery that weather systems as

modeled by computer, are shown to be complex, nonlinear, and extremely sensitive to initial conditions (Lorenz, 1993). When Lorenz presented a 1972 paper on his findings entitled, “Does the flap of a butterfly’s wings in Brazil set off a tornado in Texas” (Lorenz, 1993, p. 181) he initiated thinking that has been retold in playful and eccentric ways for the last thirty years (Smith & Jenks, 2006).

The classic butterfly effect story is more an example of linearity than nonlinearity; what is often left out of the telling is that the butterfly’s wings are actually a miniscule variable which may or may not contribute to something larger depending on a vast number of “active variables, interactions and possibilities that cause non-predictability” (Smith & Jenks, 2006, p. 5). Despite the stretching of the tale in popular consciousness, the analogy provides a striking metaphor for chaos (Gribbin, 2004), a theory intertwined and allied with complexity theory (Doll, 2008) as outlined in Chapter Two. The Lorenz butterfly effect is an example of a dynamical bifurcation (Byrne, 1998) where system variables suddenly jump from one attractor to another (Manson, 2001), changing the dynamics of the system as the result of small perturbations or variations.

Prigogine and Stengers (1984) theorize complex learning systems as examples of “order through fluctuation” (p. 206). At crucial bifurcation points, the complex interplay and interaction of individuals and collectives can change and transform the system, for better or worse. The variables that create and control bifurcation points include any of the six conditions that may occasion emergence explored in the Discussions. In this research, crucial bifurcation points were reached in all experimental classrooms at different times and in different ways that changed the trajectory of the learning in those classrooms.

A key bifurcation point for this study was the day I arrived to Classroom C with Herbie the cone puppet in my bag. When the children begged to see Herbie, my choice to introduce Herbie into our classroom ecology changed the trajectory of the research and opened up spaces for rich, imaginative, and creative interactions. There is no learning intervention, curriculum, reading program, or music education approach that can anticipate or predict such transformative outcomes in a complex learning system. Any claims to do so would point to the likelihood of a replicated, complicated learning system, but not a recursive, complex learning system where bifurcation points are fostered. I cannot guarantee results; however, this study has generated design principles that may extend beyond the control and experimental classrooms to guide future educational design for other contexts.

Both complex and complicated learning were present in this study. Grounded theory results indicate that all control and experimental classrooms were highly motivated and engaged in the music and reading learning experiences. Findings suggest that all classrooms enjoyed the experiences, often in deep, affective ways, and that experiences motivated interest in both reading and music. Activities in the control classrooms were largely predictable, replicable, and followed the lesson plans that I created for them. We read and sang the song-stories together following the same routine in every class. The only opportunity I created for neighbor interactions were those instances where I asked students to choose their favourite song-story or add special vocal effects for story characterization. We participated in interesting and, I believe, valuable learning. However, we did not occasion emergence or opportunities for deep synergistic learning

where individuals and collective created, imagined, and transformed learning to create lyric resonance beyond or different to what was possible for individuals alone.

Bifurcation points are traceable in all experimental classrooms by looking back through the data. But if conditions for emergence are in place, even in hindsight, it is not possible to determine the patterns and processes for reading and rhythm experiences that could be reproduced again, even with the exact same students and collaborating teacher. Stacy (2010) confirms that “there is unpredictability at each bifurcation point in the sense that no subsequent state is simply deducible from the previous one” (p. 62).

### **Contributions, Limitations, and Implications**

Where then, does that place this research? What is the distinctive or unique contribution to theory and practice of education? I believe that the findings of this research point to rhythm, in particular beat, as an essential mediator for learning in both semiotic systems of both music and reading. Imaginative synergy spaces in early years classrooms that generate transformative, conceptual, creative, and innovative learning in music and reading, can be occasioned (though not caused) through embodied learning, an ontology of richness, and complex epistemologies if system beliefs and values are shared by administrators, educators and families. Issues of agency, identity, and power were a concern for this research as discussed; a critical complex epistemology is essential in any learning ecology to create equitable learning that honours, values and makes available all ways of knowing and knowing sources.

Such a learning ecology presents many challenges for teachers and administrators; not least of these concerns is the growing pressure on educators for measurable teaching and student success. The strong message that comes from initiatives to standardize

teaching approaches, learning, resources, and assessment and evaluation within and across nested systems seems to indicate that conformity and sameness are the desirable qualities in teaching and learning. Normal equals the same. Findings from this research support an ontology of abundance and critical complex epistemology that argue the opposite is true. Normal, in a complex learning system, equals diverse. However, complex learning or emergence, as this research has demonstrated, is not easily measured using traditional evaluative means and alternate approaches to assessment and evaluation of learning may need to be explored.

Time was a notable constraint and limitation in this study. All collaborating teachers and teacher-researcher identified issues of time and scheduling as constraints to this research. Crowded school schedules and lack of teaching time challenge efforts for any innovative practice. I propose rhythm and reading learning as part of daily classroom experiences but infused throughout curricular experiences rather than in a twenty minute period every second day as implemented in this study. Infusing experiences in rhythm is both a more efficient use of teaching time and more appropriate for complex learning systems. Learning is viewed as inquiry in a complex ontology of abundance (Jardine, Clifford, & Friesen, 2006); invitations to learning are made where appropriate and meaningful to the context of the learning ecology.

The quality of individual and collective interactions is constrained by the quality of the invitations and the knowing sources. Current educational thinking supports the importance of the arts as essential sources to stimulate imaginative and creative interactions (Sheridan-Rabideau, 2010). Teachers need a certain expertise and understanding in both music and reading to implement the experiences presented in this

study, and this expertise can be occasioned in Faculties of Education that prepare teachers for the profession of education. A depth of disciplinary and pedagogical understanding is important to support educators in making effective choices when they reach crucial points of bifurcation. The expertise of both teacher and student is honoured as co-learners negotiate shared meaning (Edwards, Gandini, & Forman, 1998).

Expertise extends to ways of inviting neighbor interactions and dialogic exchange. Rich knowing sources, support through valuing, sufficient time, and enabling constraints are not sufficient to generate deep, powerful learning. The quality of neighbor interactions depends on ways that interactions are prompted and mediated. As this research indicates, important opportunities for dialogue and reflection were sometimes missed and even discouraged in this study. Fleener (2002) observes that without reflection, the power of recursion is reduced to the complexity of repetition.

The spiral approach used in this research is not effective if old ideas are simply revisited in new ways so that each layer of the spiral is a discrete, accumulation of information and content (Fleener, 2002). Experiences in control classrooms were examples of such an approach. The learning represented a spiral curriculum of repetition without reflection. Some experiences in experimental classrooms, however, demonstrated the power and potential for generative, reflective, recursive processes that explored interactions and patterns arising from the creative processes.

Tension, diversity, and randomness are sometimes viewed as problematic and constraints to teaching and learning. However, “the view from complexity acknowledges that some form of performative tension is inevitable” (Cilliers, 2005, p. 261). Rather than seek to eliminate all tension, diversity, and randomness, these qualities can instead be

considered beneficial and welcomed and encouraged in our classrooms. Change, flexibility, spontaneity, and adaptation are indicators of robust system diversity and learning.

In jazz, the head returns at the conclusion of the piece. The opening quote is sounded again: “Resonance here is a root metaphor. To sound an utterance in a resonant thought-structure is, among other things, to produce sympathetic vibrations of varying intensities throughout—to cause other utterances to sound, some less faintly, some more” (Zwicky, 1992, p. 62). In this research, beat was the utterance sounded in resonant structures of mind, body, spirit, and senses to create sympathetic vibrations for language and music learning. The sympathetic vibrations did not end with the research. The music still plays, the utterances still sound, some less faintly, some more.

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## Appendix A: Permission Letter and Consent Form to Principals

April, 2007

(Principal of School)  
(School Address)

Dear:

I am a teacher and graduate student working on my Ph.D. in Inclusive Special Education in the Faculty of Education at the University of Manitoba. For my dissertation research I am following up on a pilot study I conducted in a Winnipeg school division to investigate the effects of rhythm and pattern on reading for elementary students. My preliminary research along with existing empirical research suggests potential links between rhythmic music skills and reading skills for early years children. This research is supported by current theories of education advocating a multiliteracy approach to teaching and learning. I am interested in the ways that integrated experiences using rhythm and pattern might facilitate both print and non-print literacies for early years children Grades 1-3, including children who struggle with traditional ways of learning to read. I am writing to ask your consent for participation in a study of rhythmic music experiences and reading for early years students beginning April 2007 and ending May-June 2007.

Research suggests that the kinds of music experiences included in my study for both experimental and control classrooms are beneficial for all early years students. Eric Jensen, author of "Arts with the Brain in Mind," states that "compelling evidence supports the hypothesis that musical arts may provide a positive, significant, and lasting benefit to learners" (p. 13, 2001). Anvari and colleagues (2002) suggest that music skills might enhance reading acquisition, and Goswami and colleagues (2002) believe that it is rhythmic elements of music that help children process speech and reading patterns. Kieran Egan, a respected Canadian scholar and educator writes: "Rhyme, rhythm, and pattern are potent tools for giving meaningful, memorable, and attractive shape to any content. Their roles in learning are numerous, and their power to engage the imagination in learning the rhythms and patterns of language—and the underlying emotions that they reflect—is enormous" (Egan, 2005, p. 3).

My study involves early years classroom teachers, their students, and parents and/or guardians. Members of experimental classrooms receive an Orff-based 10-week intervention using rhythmic music activities integrated with regular classroom activities for approximately 20 minutes 3-5 times weekly in a regular classroom setting. Orff-based music approaches are used in many schools in Manitoba and feature speech-play, body percussion, percussion instruments, barred instruments, singing, movement, listening, and improvisation. Members of a control classroom(s) will participate in singing song storybooks for the same period of time in a classroom setting. I will instruct both experimental and control groups. All experiences in rhythm, pattern, and song storybooks

will be constructed by me to purposefully connect to Manitoba curricula, to be enjoyable, and to support and be integrated with classroom curricula and programming in collaboration with classroom teachers and their planning for curricular outcomes. To exemplify, if students were studying the water cycle as part of Grade 2 Science, and the classroom teacher was constructing activities to facilitate the Specific Learning Outcome 2-4-01 “Use appropriate vocabulary related to their investigations of air and water,” the investigator might design a rhythmic chant and beat and pattern activity to integrate with and enhance the science learning using words that the children need to read for that Science learning outcome. A chant might include such words as “precipitation, condensation, and evaporation” and the rhythmic elements of those words might then be transferred to body percussion, movement, and instruments to illustrate both the meaning and the sounds of the words involved. In control classrooms, the investigator will provide song storybooks to integrate with specific learning outcomes identified by the classroom teacher.

As music experiences are designed to be integrated with classroom curricular study, students in experimental and control groups will not lose any regular class time or programming with the exception of less than 30 minutes in total for measures of rhythmic competency and oral reading fluency administered individually before and after the 10 week intervention, and approximately 20 minutes as part of a focus group to discuss and reflect on music experiences towards the end of the intervention. Elements in both rhythmic and reading fluency measures are developmentally appropriate for early years students, are stated general and specific learning outcomes in the Manitoba music and language arts curriculum documents, and support curricular learning in music and language arts.

Rhythmic assessment will take 5-10 minutes and is a computer-based “Contemporary Rhythm Skills Assessment” instrument designed to assess performance of steady beat and rhythm patterns by children ages 4-12. Children match grade-appropriate beat and rhythms produced by a computer program by tapping computer keys. In addition to assessment, these measures are recommended for use “as a research tool for assessing pre-post intervention changes in rhythm performance.” A description of this assessment can be found at <http://www.ecsmedia.com/indivprods/musRPTR.shtml>.

Oral reading fluency measures are taken from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS™) 6<sup>th</sup> edition, and include the DIBELS™ Oral Reading Fluency and Retell Fluency, and the Word Use Fluency measures. These indicators take approximately three minutes and involve reading a short grade-appropriate passage for 1 minute, possibly re-telling it for a second minute, and then using a series of common words such as “green” in a sentence for a 1 minute activity. A complete description of these activities can be found on the DIBELS™ website at <http://dibels.uoregon.edu/>.

I will administer the rhythmic and reading measures individually to all students. I will not divulge individual scores or results. All rhythmic and reading responses are assigned a numerical coding and pseudonym so that student identification and results remain anonymous and confidential.

The only other tasks and time commitment for students will be an invitation to all children to participate in a 20 minute focus group session held towards the end of the ten week intervention, consisting of approximately 4-6 children a group along with the investigator, to share reflections and analysis of the music experiences. Informal comments and suggestions from students will be welcomed and noted during the rhythmic music experiences to help evaluate student interest and engagement. A short survey of 5-10 questions (not more than 10 minutes to complete) will be given to parents and guardians before and after the intervention for their perspectives on music and reading in relation to their children's experiences.

Tasks and time required by teacher participants include communication prior to the intervention to identify curricular connections for the music experiences and to schedule times for the intervention, an interview with the classroom teacher and me for 30-60 minutes before and again after the intervention on teachers' perspectives of music and reading at a time and place convenient for the teacher, as well as informal feedback throughout the study in whatever format is most comfortable for the teacher. This feedback is important as any suggestions, concerns or observations noted by classroom teachers will help inform and revise the ongoing rhythmic music experiences. Feedback could take the form of verbal observations and commentaries, e-mails, phone calls, written notes or journals depending on teacher preference, and might take 5-10 minutes on the day of the music activities and at the teachers' convenience. Teachers will be present in the classroom during music experiences and will be invited to participate if they wish.

Benefits to participation in this study include possible improvement for engagement or skills for reading and music through both control and experimental groups, as well as benefits to the educational community by creating a better understanding of the relationship, if any, between rhythmic music experiences and reading and contributing to effective, multiliterate strategies and approaches for teaching reading. There are no known or anticipated risks to subjects or third parties to participate. There are no potential risks that could result in a breach of confidentiality or a loss of anonymity of personal information or identification. No information will be disclosed that could identify participants, schools, or school divisions, and all information collected from participants in this study will be aggregated so no individual names of students, teachers, schools, or school divisions will appear in any published reports or presentations. All participants' anonymity and confidentiality will be preserved by pseudonyms and secure, locked transportation and storage of data in a locked area of my home for which I will have sole access and viewing before, during, and after the research activities. I will not use any real names in field notes or data collection for students, parents/guardians, teachers, schools or divisions participating in this study. All data records kept on my computer will be password protected and accessed only by me. Pseudonyms will be used in all records and in communication with classroom teachers regarding the research activities.

If you approve, audiotape will be used to record focus groups and teacher interviews, and audio and videotape will be used to record my instruction, the music teaching processes,

and student responses. All audio and videotape will be for my exclusive viewing and analysis; no one else will see or hear any tapes, and videotapes will be erased daily. All data, audiotapes, and videotapes will be shredded or erased on completion of the study and after data analysis. Recording devices will be positioned so that students who do not have permission to be taped will not appear on any video taping.

Participation in this study is entirely voluntary and students, parent/guardians, and teacher participants are informed they are free to request information and withdraw at any time or from any activity, interview, focus group or survey by informing me of their decision. Participants will be informed that their participation or non-participation, or their decision to withdraw from the study will be without consequence of any sort, and will have no effect on outcomes, grades, or their relationship with the researcher or professional setting.

If you are interested in having any of your school's early years teachers and students participate in this study, please sign the accompanying form and return it to me at your earliest convenience. To expedite this process, you may fax it to xxx-xxxx but please also include a hard copy in the mail. When I receive your consent, I will provide you with letters of recruitment to be distributed by you to potential classroom teacher participants so that interested classroom teachers can contact me or my supervisor directly to obtain more information and declare their willingness to participate if they decide to do so.

I will follow up participants' willingness to participate with a letter of detailed information and a request for signed and informed consent. Once the classroom teacher has signed a letter of informed consent, the teacher will be asked to distribute a recruitment letter to potential students and parents/guardians (all members of the class) on my behalf so that interested parents or guardians may contact me or my supervisor directly to obtain more information. They may declare their interest in participation by returning the recruitment letter to the classroom teacher in a sealed envelope provided by me. Willingness to participate will be followed up with a detailed letter of information and a letter requesting informed, signed consent. All letters and surveys sent to parents/guardians will be distributed through the classroom teacher with envelopes provided by the researcher so that anonymity on behalf of students, parents and guardians will be protected.

There is no remuneration provided for participants in this study. Student and teacher participants will receive a certificate or letter thanking them for their participation and teachers may receive a small gift (under \$25.00) to thank them for their time and efforts.

This research has been approved by the Education and Nursing Research and Ethics Board (ENREB). If you have comments or concerns resulting from participation in this study, please contact the Human Ethics Secretariat at 474-7122. If you require further information about this study, please contact me at the addresses below, or my supervisor, Dr. Kelvin Seifert at the Faculty of Education, University of Manitoba at 474-9004 or

xxxxxxx@cc.umanitoba.ca. You will be provided with a written report and summary of the study upon completion. I thank you in advance for your interest in this research.

Yours sincerely,

Beryl Peters  
University of Manitoba  
Faculty of Education  
474-9004  
petersb@cc.umanitoba.ca

## Consent Form

**Research Project Title:** A Formative Study of Rhythm and Pattern: Semiotic Potential of Multimodal Experiences for Early Years Readers

**Researcher:** Beryl Peters

### **The University of Manitoba, Faculty of Education**

This consent form, including letter of intent, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and the scope of teacher and student participation. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Your signature on this form indicates that you have understood to your satisfaction the information regarding teacher, student and parent/guardian participation in the research project, and that you agree to allow students and teachers in your school to participate as subjects. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. Students and teachers are free to withdraw from the study at any time, and/or refrain from answering any questions they prefer to omit, without prejudice or consequence. You should feel free to ask for clarification or new information throughout the study. You may contact Beryl Peters at 474-9004 or [petersb@cc.umanitoba.ca](mailto:petersb@cc.umanitoba.ca) or her supervisor, Dr. Kelvin Seifert at xxx-xxxx or [xxxxxxx@cc.umanitoba.ca](mailto:xxxxxxx@cc.umanitoba.ca).

This research has been approved by the Education Nursing Research and Ethics Board (ENREB). If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 474-7122.

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Principal's Signature

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Researcher's Signature

Date

Please fax this form to xxx-xxxx.

## Appendix B: Permission Letter and Consent Form to Teachers

April, 2007

(Teacher's Name)  
(Teacher's School Address)

Dear:

I am a teacher and graduate student working on my Ph.D. in Inclusive Special Education in the Faculty of Education at the University of Manitoba. For my dissertation research I am following up on a pilot study I conducted in a Winnipeg school division to investigate the effects of rhythm and pattern on reading for elementary students. My preliminary research along with existing empirical research suggests potential links between rhythmic music skills and reading skills for early years children. This research is supported by current theories of education advocating a multiliteracy approach to teaching and learning. I am interested in the ways that integrated experiences using rhythm and pattern might facilitate both print and non-print literacies for early years children Grades 1-3, including children who struggle with traditional ways of learning to read. I am writing to ask your consent to participate in a study of rhythmic music experiences and reading for early years students beginning April 2007 and ending May-June 2007.

Research suggests that the kinds of music experiences included in my study for both experimental and control classrooms are beneficial for all early years students. Eric Jensen, author of "Arts with the Brain in Mind," states that "compelling evidence supports the hypothesis that musical arts may provide a positive, significant, and lasting benefit to learners" (p. 13, 2001). Anvari and colleagues (2002) suggest that music skills might enhance reading acquisition, and Goswami and colleagues (2002) believe that it is rhythmic elements of music that help children process speech and reading patterns. Kieran Egan, a respected Canadian scholar and educator writes: "Rhyme, rhythm, and pattern are potent tools for giving meaningful, memorable, and attractive shape to any content. Their roles in learning are numerous, and their power to engage the imagination in learning the rhythms and patterns of language—and the underlying emotions that they reflect—is enormous" (Egan, 2005, p. 3).

My study involves early years classroom teachers, their students, and parents and/or guardians. Members of experimental classrooms receive an Orff-based 10-week intervention using rhythmic music activities integrated with regular classroom activities for approximately 20 minutes 3-5 times weekly in a regular classroom setting. Orff-based music approaches are used in many schools in Manitoba and feature speech-play, body percussion, percussion instruments, barred instruments, singing, movement, listening, and improvisation. Members of a control classroom(s) will participate in singing song storybooks for the same period of time in a classroom setting. I will instruct both experimental and control groups. All experiences in rhythm, pattern, and song storybooks will be constructed by me to purposefully connect to Manitoba curricula, to be enjoyable, and to support and be integrated with classroom curricula and programming in

collaboration with classroom teachers and their planning for curricular outcomes. To exemplify, if students were studying the water cycle as part of Grade 2 Science, and the classroom teacher was constructing activities to facilitate the Specific Learning Outcome 2-4-01 “Use appropriate vocabulary related to their investigations of air and water,” the investigator might design a rhythmic chant and beat and pattern activity to integrate with and enhance the science learning using words that the children need to read for that Science learning outcome. A chant might include such words as “precipitation, condensation, and evaporation” and the rhythmic elements of those words might then be transferred to body percussion, movement, and instruments to illustrate both the meaning and the sounds of the words involved. In control classrooms, the investigator will provide song storybooks to integrate with specific learning outcomes identified by the classroom teacher.

As music experiences are designed to be integrated with classroom curricular study, students in experimental and control groups will not lose any regular class time or programming with the exception of less than 30 minutes in total for measures of rhythmic competency and oral reading fluency administered individually before and after the 10 week intervention, and approximately 20 minutes as part of a focus group to discuss and reflect on music experiences towards the end of the intervention. Elements in both rhythmic and reading fluency measures are developmentally appropriate for early years students, are stated general and specific learning outcomes in the Manitoba music and language arts curriculum documents, and support curricular learning in music and language arts.

Rhythmic assessment will take 5-10 minutes and is a computer-based “Contemporary Rhythm Skills Assessment” instrument designed to assess performance of steady beat and rhythm patterns by children ages 4-12. Children match grade-appropriate beat and rhythms produced by a computer program by tapping computer keys. In addition to assessment, these measures are recommended for use “as a research tool for assessing pre-post intervention changes in rhythm performance.” A description of this assessment can be found at <http://www.ecsmedia.com/indivprods/musRPTR.shtml>.

Oral reading fluency measures are taken from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS™) 6<sup>th</sup> edition, and include the DIBELS™ Oral Reading Fluency and Retell Fluency, and the Word Use Fluency measures. These indicators take approximately three minutes and involve reading a short grade-appropriate passage for 1 minute, possibly re-telling it for a second minute, and then using a series of common words such as “green” in a sentence for a 1 minute activity. A complete description of these activities can be found on the DIBELS™ website at <http://dibels.uoregon.edu/>.

I will administer the rhythmic and reading measures individually to all students. I will not divulge individual scores or results. All rhythmic and reading responses are assigned a numerical coding and pseudonym so that student identification and results remain anonymous and confidential.

The only other tasks and time commitment for students will be an invitation to all children to participate in a 20 minute focus group session held towards the end of the 10

week intervention, consisting of approximately 4-6 children a group along with the investigator, to share reflections and analysis of the music experiences. Informal comments and suggestions from students will be welcomed and noted during the rhythmic music experiences to help evaluate student interest and engagement but not required. A short survey of 5-10 questions (not more than 10 minutes to complete) will be given to parents and guardians before and after the intervention for their perspectives on music and reading in relation to their children's experiences.

If you decide to participate in this study you will be asked to communicate with me prior to the intervention to identify curricular connections for the music experiences and to schedule times for the intervention, to participate in an interview with me for 30-60 minutes before and again after the intervention for your perspectives of music and reading at a time and place convenient for you. You may decline to answer any of the interview questions you do not wish to answer and may terminate the interview at any time. Questions are meant to be discussion points as for example, "What are your students' reactions to music experiences in the classroom?" All interview questions will be relevant to the research and rhythmic music intervention. You will also be asked to provide informal feedback throughout the study in whatever format is most comfortable for you. This feedback is important as any suggestions, concerns or observations noted by you will help inform and revise the ongoing rhythmic music experiences. Feedback could take the form of verbal observations and commentaries, e-mails, phone calls, written notes or journals depending on teacher preference, and might take 5-10 minutes on the day of the music activities and at the teachers' convenience. Teachers will be present in the classroom during music experiences and you are invited to participate in the music activities at any time if you wish.

Benefits to participation in this study include possible benefits to all students through engagement in reading and possible improved reading and/or music skills for both control and experimental groups, as well as benefits to the educational community by creating a better understanding of the relationship, if any, between rhythmic music experiences and reading and contributing to effective, multiliterate strategies and approaches for teaching reading. There are no known or anticipated risks to subjects or third parties to participate. There are no potential risks that could result in a breach of confidentiality or a loss of anonymity of personal information or identification. No information will be disclosed that could identify participants, schools, or school divisions, and all information collected from participants in this study will be aggregated so no individual names of students, teachers, schools, or school divisions will appear in any published reports or presentations. All participants' anonymity and confidentiality will be preserved by pseudonyms and secure, locked transportation and storage of data in a locked area of my home for which I will have sole access and viewing before, during, and after the research activities. I will not use any real names in field notes or data collection for students, parents/guardians, teachers, schools or divisions participating in this study. All data records kept on my computer will be password protected and accessed only by me. Pseudonyms will be used in all records and in communication with classroom teachers regarding the research activities.

If you approve, audiotape will be used to record focus groups and teacher interviews, and audio and videotape will be used to record my instruction, the music teaching processes, and student responses. All audio and videotape will be for my exclusive viewing and analysis; no one else will see or hear any tapes, and videotapes will be erased daily. All data, audiotapes, and videotapes will be shredded or erased on completion of the study and after data analysis. Recording devices will be positioned so that students who do not have permission to be taped will not appear on any video taping.

Participation in this study is entirely voluntary and students, parent/guardians, and teacher participants are informed they are free to request information and withdraw at any time or from any activity, interview, focus group or survey by informing me of their decision. Participants are informed that their participation or non-participation, or their decision to withdraw from the study will be without consequence of any sort, and will have no effect on outcomes, grades, or their relationship with the researcher or professional setting.

If you are interested in participating in this study, please sign the consent letter below and return it to me at your earliest convenience. You may fax it to me at 885-3930, but please also include a hard copy in the mail. When I receive your letter of consent, I will follow up with letters of recruitment to be distributed by you to student and parent/guardian participants so that interested participants can contact me or my supervisor directly to obtain more information and declare their willingness to participate if they decide to do so.

Parents/guardians and students may declare their interest in participation by returning the recruitment letter to you in a sealed envelope provided by me. Willingness to participate will be followed up with a detailed letter of information and a letter requesting informed, signed consent from parents/guardians and students. There is no remuneration provided for participants in this study. Student and teacher participants will receive a certificate or letter thanking them for their participation.

This research has been approved by the Education and Nursing Research and Ethics Board (ENREB). If you have comments or concerns resulting from participation in this study, please contact the Human Ethics Secretariat at 474-7122. If you require further information about this study, please contact me at the addresses below, or my supervisor, Dr. Kelvin Seifert at the Faculty of Education, University of Manitoba at 474-9004 or xxxxxxxx@cc.umanitoba.ca. You will be provided with a written report and summary of the study upon completion. I thank you in advance for your interest in this research.

Yours sincerely,

Beryl Peters  
University of Manitoba  
Faculty of Education

474-9004 petersb@cc.umanitoba.ca

## Consent Form

**Research Project Title:** A Formative Study of Rhythm and Pattern: Semiotic Potential of Multimodal Experiences for Early Years Readers

**Researcher:** Beryl Peters

### **The University of Manitoba, Faculty of Education**

This consent form, including letter of intent, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and the scope of teacher and student participation. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Your signature on this form indicates that you have understood to your satisfaction the information regarding teacher, student, and parent/guardian participation in the research project, and that you agree to participate in this study and allow students in your classroom to participate as subjects. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions, without prejudice or consequence, even if you have signed this letter of consent. You should feel free to ask for clarification or new information throughout and at any stage of this study. You may contact my supervisor, Dr. Kelvin Seifert at the Faculty of Education, University of Manitoba at xxx-xxxx or xxxxxxxx@cc.umanitoba.ca. or you may contact Beryl Peters at 474-9004 or petersb@cc.umanitoba.ca.

This research has been approved by the Education Nursing Research and Ethics Board (ENREB). If you have any concerns or complaints about this project, you may contact the Human Ethics Secretariat at 474-7122.

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Teacher's Signature

Date

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Researcher's Signature

Date

Report to be sent to this address:

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### Appendix C: Permission Letter and Consent Form to Parent/Guardians

April, 2007

(Name of school)  
(Address of school)

Dear Parent(s) or Guardian(s):

I am a teacher and graduate student working on my Ph.D. in Inclusive Special Education in the Faculty of Education at the University of Manitoba. For my dissertation research I am studying the possible link between rhythmic music experiences and reading that is suggested by existing research and supported by current theories of education advocating a multiliteracy approach to teaching and learning. I am interested in the ways that experiences using rhythm and pattern might help reading for early years children in Grades 1-3. I am writing to ask your permission for you and your child to participate in a University of Manitoba research project on the possible links between rhythmic music skills and reading skills in early years children. This project has the support of the principal and the classroom teacher at your child's school and will be conducted in your child's classroom at (name of school) over the next several weeks.

My study involves early years classroom teachers, their students, and parents/guardians. It is expected to be an enjoyable one and will be conducted as part of regular classroom instruction. Children would participate in whole classroom Orff-based music activities such as speech-play, singing, activities using percussion instruments, barred instruments, movement, listening, and improvisation or as members of a control classroom participating in singing song-storybooks for approximately 20 minutes 3-5 times weekly in a regular classroom setting. Empirical research suggests that all these music experiences would be beneficial for all early years students.

I will instruct both experimental and control groups but your classroom teacher will remain in the class at all times. All experiences in rhythm, pattern, and song storybooks will be constructed to purposefully connect to Manitoba curricula and to support and be integrated with classroom curricula and programming in collaboration with classroom teachers and their planning for curricular outcomes so no regular classroom curricular study will be missed as a result of this study.

This project will require less than 30 minutes of total time out-of-class for assessments of rhythmic competency and oral reading fluency I would conduct individually with all students before and after the 10 week music activities in the classroom. Elements in both rhythmic and reading fluency measures are developmentally appropriate for early years students, are stated general and specific learning outcomes in the Manitoba music and language arts curriculum documents, and support curricular learning in music and language arts.

Rhythmic measures will take 5-10 minutes and involves students matching grade-appropriate beat and rhythms produced by a computer program by tapping computer keys. Oral reading fluency indicators take approximately three minutes and involve reading a short grade-appropriate passage for 1 minute, possibly re-telling it for a second minute, and then using a series of common words such as “green” in a sentence for a 1 minute activity.

I will administer the rhythmic and reading assessments individually to all students. I will not divulge individual scores or results. All rhythmic and reading responses are assigned a numerical coding and pseudonym so that student identification and results remain anonymous and confidential. The only other tasks and time commitment for students will be an invitation to all children to participate in a 20 minute focus group session held towards the end of the fifteen week intervention, consisting of approximately 4-6 children a group along with the investigator, to share reflections and analysis of the music experiences. Informal comments and suggestions from students will be welcomed and noted during the rhythmic music experiences to help evaluate student interest and engagement, but not required. A short survey of 10 questions (around 10 minutes to complete) will be given to parents and guardians before and after the intervention for their perspectives on music and reading in relation to their children’s experiences. You may decline to answer any survey questions you do not wish to answer and all response will be coded numerically and remain anonymous and confidential.

There are no known or anticipated risks to subjects or third parties to participate. There are no potential risks that could result in a breach of confidentiality or a loss of anonymity of personal information or identification. All children, and parent/guardian individual information, participation, and results are considered confidential and will not be shared with anyone else, including school staff. All information and results will be coded numerically and included anonymously in any reporting. I would like to include examples of students’ responses and comments that I collect when observing and interacting with children during the study but no information will be disclosed that could identify participants, schools, or school divisions, and all assessment results collected from participants in this study will be aggregated so no individual names of students, teachers, schools, or school divisions will appear in any published reports or presentations. All participants’ anonymity and confidentiality will be preserved by pseudonyms and secure, locked transportation and storage of data in a locked area of my home for which I will have sole access and viewing before, during, and after the research activities. I will not use any real names in field notes or data collection for students, parents/guardians, teachers, schools or divisions participating in this study. All data records kept on my computer will be password protected and accessed only by me. Pseudonyms will be used in all records and in communication with classroom teachers regarding the research activities. The music activities are part of classroom instruction during regular school hours and focuses on learning outcomes prescribed by the provincial curriculum. A potential benefit for your child is that use of the music activities may improve engagement or skills for reading or music. This study may also benefit other educators by providing information and possible strategies for teaching reading and rhythm.

If you approve, audiotape will be used to record focus groups and audio and videotape will be used to record my instruction, the music teaching processes, and student responses. All audio and videotape will be for my exclusive viewing and analysis; no one else will see or hear any tapes, and videotapes will be erased daily. All data, audiotapes, and videotapes will be shredded or erased on completion of the study and after data analysis. Recording devices will be positioned so that students who do not have permission to be taped will not appear on any video taping or be heard on audio recording.

Only children who have parental/guardian permission, and who themselves agree to participate, will be involved in this study. Participation in this study is entirely voluntary and students and parent/guardians are free to request information and withdraw at any time or from any activity, focus group or survey by informing me of their decision. Participants will be informed that their participation or non-participation, or their decision to withdraw from the study will be without consequence of any sort, and will have no effect on outcomes, grades, or their relationship with the researcher or professional setting.

If you and your child are interested in participating in this study, please return the tear-off below in the sealed envelope provided to your classroom teacher by (insert date) and I will provide you with a letter of detailed information and a request for signed, informed consent from you and your child. There is no remuneration provided for participants in this study. Student participants will receive a certificate or letter thanking them for their participation.

I would like to assure you that this study has been reviewed and approved by the Education and Nursing Research and Ethics Board (ENREB) at the University of Manitoba. In addition, it has also been approved by the (name of the school division) and has the support of the principal and classroom teacher at your child's school. However, the final decision about participation is entirely yours. If you and your child decide to participate you and your child may still withdraw from the study at any time without penalty by informing me.

If you have comments or concerns resulting from participation in this study, please contact the Human Ethics Secretariat at 474-7122. If you require further information about this study to help you in reaching a decision, please feel free to contact me at the addresses below, or my supervisor, Dr. Kelvin Seifert at the Faculty of Education, University of Manitoba at xxx-xxxx or xxxxxxxx@cc.umanitoba.ca.

A copy of the final written research report will be left in the school and the principal will be informed when it is available to be viewed by interested parties. Thank you in advance for your consideration of consent and your interest in contributing to furthering knowledge of children's rhythmic and reading skills. Please complete one copy of the attached consent form, whether or not you give signed permission for you and your child to participate, and return and seal the form in the attached envelope provided, to your

classroom teacher by (insert date). Please keep the other copy of the consent form for your records. Thank you again for your time and consideration.

Yours sincerely,

Beryl Peters  
University of Manitoba  
Faculty of Education  
petersb@cc.umanitoba.ca

### **Consent Form**

**Research Project Title:** A Formative Study of Rhythm and Pattern: Semiotic Potential of Multimodal Experiences for Early Years Readers

**Researcher:** Beryl Peters

#### **The University of Manitoba, Faculty of Education**

This consent form, including letter of intent, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and the scope of teacher and student participation. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Your signature on this form indicates that you have understood to your satisfaction the information regarding teacher, student, and parent/guardian participation in the research project, and that you agree to participate in this study and allow your child to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. Students and parents or guardians are free to withdraw from the study at any time, and/or refrain from answering any questions they prefer to omit, without prejudice or consequence. You should feel free to ask for clarification or new information throughout the study. You may contact my supervisor, Dr. Kelvin Seifert at the Faculty of Education, University of Manitoba at xxx-xxxx or xxxxxxxx@cc.umanitoba.ca. or Beryl Peters at 474-9004 or petersb@cc.umanitoba.ca.

This research has been approved by the Education Nursing Research and Ethics Board (ENREB). If you have any concerns or complaints about this project, you may contact the Human Ethics Secretariat at 474-7122.

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Signature of Parent or Guardian

Date

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First and last name of child (please print)

Room Number

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Signature of Researcher

Date

\_\_\_ Yes, I give permission for my child to be audiotaped for the purposes of this study and I understand that only the investigator will hear the tapes and that all audiotapes will be erased upon completion of the study and data analysis. Participants' identities will be protected in data analysis through the use of pseudonyms. Tapes will be transported and stored in a locked, secure briefcase or filing cabinet to which only the investigator has access to prevent accidental access by any other parties.

\_\_\_ No, I do not give permission for my child to be audio taped for the purposes of this study and I understand that any audio recording devices used in this study will be positioned so that my child will not be recorded.

\_\_\_ Yes, I give permission for my child to be videotaped for the purposes of this study and understand that all videotapes will be erased daily after viewing and analysis by the investigator only. Participants' identities will be protected in data analysis through the use of pseudonyms. Tapes will be transported and stored in a locked, secure briefcase or filing cabinet to which only the investigator has access to prevent accidental viewing by any other parties.

\_\_\_ No, I do not give permission for my child to be videotaped for the purposes of this study and understand that any video recording devices used in this study will be positioned so that my child will not be recorded.

### **Appendix D: Permission Letter and Consent Form to Students**

April, 2007

Dear Student:

My name is Beryl Peters and I am a teacher and a student at the University of Manitoba at the Faculty of Education studying about ways to help children learn to read by doing music activities. I am writing this letter to ask your permission to take part in a project that involves children like yourself and to see if you want to be in this project, too. I have designed a study I think will be enjoyable that uses different music activities and games in your classroom along with your usual classroom activities.

If you decide to take part in my project, I would get together with your teacher and your whole class two or three times a week for about 20 minutes each time for about 10 weeks. Your whole class might sing song storybooks with me, or you might chant rhymes together, tap the beat with your hands, with instruments, move to the beat, or use instruments and body percussion to play the way the words go. You don't have to be able to sing or play any instrument to join in our activities.

If you wanted to tell me about some activities that you really liked, or ones that you didn't especially like, I would be happy to hear your comments but you don't have to tell me anything if you don't want to. Towards the end of our time together, I would invite a few students at a time to get together in your class to talk with me for about 20 minutes about reading and music and some of the things we were doing with our music games. Before we start our music activities with the class, you would try some reading and rhythm activities by yourself with me at your school. We would use my computer to match some rhythms it makes by tapping on the computer keys for about 5 minutes, and I would ask you to read some words and sentences out loud for about 3 minutes. At the end of our time together with your class, I would ask you to do the same kinds of reading and rhythm activities by yourself with me at your school. I would write about what I learn from our music activities but I would not use your name or your school's name in what I write about.

You do not have to help me with the activities or games. It is entirely your choice and if you decide to be in my study and then later change your mind, you can tell me you do not want to be in my study anymore. If I ask you questions that you do not want to answer then tell me you do not want to answer any questions. If I asked you to do some activities you do not want to do then just tell me that you do not want to do them and that will be okay. The things that you say and do, and any information I write about will not have your name with it; so no one will know they are your answers or anything about the activities you do. I will not let anyone besides me see your answers or any other information about you. Nobody at your school see the answers or information you give about our music and reading activities.

If you are willing to participate in my music activities and games, then please write your name on the line below. If you write your name, it means you agree to participate, but if you change your mind, it will be okay to stop at any time. You do not have to be in my study. No one will be upset with you if you decide not to be in the study or if you decide to be in this study and then later change your mind. You can ask questions at any time. You can ask me questions now or you can ask me later. I will include a phone number and my e-mail so that you can talk to me or someone else at any time during the study. Thank you very much for your help.

Sincerely,

Beryl Peters  
University of Manitoba  
Faculty of Education

## **Consent Form**

**Research Project Title:** A Formative Study of Rhythm and Pattern:  
Semiotic Potential of Multimodal Experiences for Early Years Readers

**Researcher:** Beryl Peters

**The University of Manitoba, Faculty of Education**

I agree to participate in this research. I will participate with my whole class doing music activities and games two or three times a week, for about 20 minutes at a time for about 10 weeks. I understand that my teacher will be there and that other children in my class will participate with me. I will participate in a discussion about our activities, and I will participate in reading and rhythm activities by myself with Beryl Peters for about 10 minutes before our 10 week class activities and about 10 minutes after our 10 week activities. I understand that the information that is learned about rhythm and reading with my class will be written up in a report. I understand that my name will not be used and that I get to see a report. I understand that I can stop participating at any time and that I do not have to participate in any activities or answer any questions that I do not want to. I can ask questions about what I am doing at any time and can phone or e-mail Beryl Peters at 474-9004 or [petersb@cc.umanitoba.ca](mailto:petersb@cc.umanitoba.ca) or her teacher, Dr. Kelvin Seifert at the Faculty of Education, University of Manitoba at xxx-xxxx or [xxxxxxx@cc.umanitoba.ca](mailto:xxxxxxx@cc.umanitoba.ca). if my parents or I want more information.

This research has been approved by the Education Nursing Research and Ethics Board (ENREB). If you have any concerns or complaints about this project, you can contact them at 474-7122.

**If you want to be in the study, sign your name on the line below:**

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Child's name, printed

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Signature of Investigator

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Date

**Appendix E: Song Storybooks Used in Study**

- Adams, P. (Ill.). (1973). *There was an old lady who swallowed a fly*. Wiltshire, England: Child's Play.
- Allender, D.(Ill.). (1990). *Shake my sillies out: Raffi's songs to read*. New York: Crown Publishers.
- Archambault, J., & Martin Jr, B. (1989). *Chicka chicka boom boom*. New York: Aladdin Paperbacks.
- Arnold, T. (1997). *Parts*. New York: Scholastic.
- Aylesworth, J. (1992). *Old black fly*. New York: Scholastic.
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**Appendix F: Student Song and Chant Booklet (without illustrations)**

## Listen to the Words We Sing!

(based on Fry's 300 instant sight words)

Thank you to all the wonderful children and their teachers who sang,  
chanted, and played these rhymes, songs, and games with me. You were all  
fantastic!

Beryl Peters

Listen! Listen!

Listen! Listen!

Listen to the sounds of the words we sing.

Listen! Listen!

Listen to the sounds of the words we sing.

Hello Everybody!

Hello everybody yes indeed

Yes indeed, yes indeed

Hello everybody yes indeed

Yes indeed my neighbor.

Feel it in your hands

Feel it in your feet.

Feel it in your body

You've got the beat!

### One for Ice Cream

One for ice cream  
Two for soda  
Three to walk to  
Manitoba!

### Jelly in the bowl

Jelly in the bowl  
Wiggle waggle wiggle waggle  
Jelly in the bowl.

### In and Out

In and out  
In and out  
O—U—T and that spells out!

### See Saw

See saw  
Up and down  
In the air and  
On the ground.

### Bounce High

Bounce high  
Bounce low  
Bounce the ball to Shiloh.

### Rain Rain

Rain rain  
Go away  
Come again  
Another day  
All the children want to play.

### I Can Hop Like a Frog

I can hop like a frog.  
I can swim like a fish.  
I can look at a star.  
I can make a wish.

### Star Light

Star light Star bright  
First star I see tonight  
Wish I may wish I might  
Have the wish I wish tonight.

### One Two Tap Your Shoe

One two tap your shoe  
Three four tap the floor  
Five Six tap the sticks  
Seven eight lay them straight  
Nine ten do it again!

How many different kinds of voices can you use? (Happy, sad, fast, slow, loud, quiet, sharp, smooth, etc.)

### Snail Snail

Snail snail  
Snail snail  
Go around and  
Round and round.

### Herbie and Henry

I see a cat  
I see a bee  
I see Herbie  
Looking at me.

I see a cat  
I see a bee  
I see Henry  
Looking at me.

### Baby Herbie's Song

Where oh where is  
Baby Herbie?  
Where oh where is  
Baby Herbie?  
Where oh where is  
Baby Herbie?  
Way down under in his  
Little house.

### The Pie Game

I like candy  
I like cake  
Piled to the sky.  
I don't like an  
Empty plate  
Fill it with blueberry pie.

### The Flower Game

The buds come out  
The leaves come out  
The flowers come out, too.  
The birds come out  
The children come out  
Its spring for me and you!

### The Bone Game

Wrinkles wrinkles  
Where is your bone?  
Someone took it  
From your home!  
Who took your bone?  
I took your bone!

Look at that  
Look at this  
Look at that  
Which is which?



**Appendix G: Student Certificate of Appreciation**

**(Certificate was printed on 8 1/2 x 11 poster paper).**

**Appendix H: Qualitative Data Collection Plan (Lankshear and Knobel, 2004 p. 189)**

Research question #1: What is the potential for the semiotic resource of rhythm and pattern for early years children's engagement and meaning-making from print and non-print literacies?		
Data to be collected	Data collection methods	Relationship between data to be collected and research questions
Students: data on attitudes and beliefs towards reading and music, intervention activities, and student reflections/response on intervention activities meaning-making and engagement from their perspective	Parent/guardian survey results  Student focus groups (audiotapes)	Survey of parents and focus group interviews provides insights into different perspectives of student interest, engagement, and meaning-making in print and non-print literacies and provides contextual data.
Student quantitative data on measures of oral reading fluency and rhythmic competencies	Pre-and post-tests: DIBELS ORF and Rhythm Performance Test	Complementary evidence for semiotic potential of rhythm and pattern
Parents/Guardians: data on attitudes and beliefs towards reading, music, and the arts	Parent/Guardian survey pre- and post-intervention	Parent perspectives on attitudes and beliefs towards print and non-print literacies and any changes in those attitudes or beliefs.
Teachers: data on attitudes and beliefs towards reading, music, and the arts; data on teaching philosophy and practice regarding print and non-print literacies; data on reflection and response to intervention activities	Interviews before and after intervention (audiotapes)  Ongoing reflection and response to intervention activities: researcher teaching strategies; researcher design, and observation of student participation and engagement (various communication media and conversations with researcher during intervention)	Teacher perspectives on attitudes and beliefs towards print and non-print literacies which may influence semiotic potential and provide contextual data.  Teacher perspectives on implications for practice to connect theory and practice of semiotic potential  Teacher perspectives on what works and what doesn't to inform research question and revisions to increase potential of semiotic resource.
Research question #1: What is the potential for the semiotic		

resource of rhythm and pattern for early years children's engagement and meaning-making from print and non-print literacies?		
Data to be collected	Data collection methods	Relationship between data to be collected and research questions
Intervention and Researcher teaching strategies	Researcher observations of researcher teaching strategies and intervention implementation and design (videotapes, field notes, daily written and/or audio taped log "recording main events observed or heard that day, reflections on what was seen or heard, connections drawn between previous days' data collection" (Lankshear and Knobel, 2004, p. 190), hunches, tentative interpretations, emotional responses)	<p>Researcher perspectives of researcher strategies and intervention design used to generate ideas and revise intervention design for iterative cycle.</p> <p>Perspectives of practice to connect to theory</p> <p>Perspectives of practice to build theory</p>
Student participation in intervention activities	Observation of student participation, involvement, engagement in intervention activities (videotapes, field notes(videotapes, field notes, daily written and/or audio taped log "recording main events observed or heard that day, reflections on what was seen or heard, connections drawn between previous days' data collection" (Lankshear and Knobel, 2004, p. 190), hunches, tentative interpretations, emotional responses.)	<p>Provides complementary evidence to quantitative data to answer question of semiotic potential</p> <p>Enables identification of possible connections to print and non-print literacies, what works, what doesn't for students, why, and data to inform revisions for iterative cycle.</p>
Data in the form of student artifacts: performances or compositions produced by students, school policy documents, class print texts.	Artifact collection in journal and folder	Contextual information and evidence of intervention to inform revisions, build, and connect to theory.

### **Appendix I: Teacher Interviews Guiding Questions**

1. What approaches/theories about learning inform your teaching? Could you describe your teaching practices and philosophies?
2. How is multiliteracy or multimodal learning important and useful to you in your classroom?
3. Do you enjoy music? How do you share music with your students? Do you feel that you could keep a beat to a poem or song?
4. What elements of music are you comfortable using as part of your classroom teaching strategies?
5. What are some of the reading difficulties for your students?
6. Could you describe characteristics of students in your classroom that do not seem to engage in reading print text or in traditional approaches to reading?
7. Do your students ask you read to them or ask to have time to read in class? How is that facilitated in your class?
8. Do you feel the majority of your students are able to keep a beat to a poem or song?  
What kinds of experiences do students have with beat and rhythm in class?
9. What are your students' reactions to music experiences in the classroom?
10. In your opinion, what potential is there for experiences in rhythm and pattern using poetry and music to provide alternate learning avenues for your students?
11. What is your background and type of experience in music and the arts?
12. Do you feel that the opportunity for students to engage in creative, imaginative approaches to literacy is important?

### **Appendix J: Student Focus Group Guiding Questions**

1. Is reading fun or is it boring at school? What makes it fun or boring?
2. Is reading fun or is it boring at home or outside of school? What makes it fun or boring?
3. What kinds of books do you like to read for fun? Do you wish you had more time to read?
4. Do you like people to read to you and what kinds of things do you like people to read?
5. What are your favorite things to read about?
6. When do you like to go to the library and how often do you go?
7. Is reading something easy to do or is it difficult? Why is it easy or difficult?
8. What is your favorite activity outside of school?
9. What music do you like? Do you like singing songs or playing instruments? Do you take any music lessons after school or on the weekend? Would you like to? Do you have enough time for music or would you like more time for music? What would you do with more time?
10. What nursery rhymes do you know or remember from when you were little?

### Appendix K: Pre-Study Parent/Guardian Survey

#### To Parent/Guardians:

Thank you very much for agreeing to participate in this University of Manitoba study investigating ways in which musical elements of rhythm and pattern help reading for young children. Could you take just a few minutes to respond to this short questionnaire to provide valuable information for this study? Your answers will be completely confidential. Please seal the completed survey in the envelope provided and return to your classroom teacher. Please do not put your name or your child's name on the outside of the envelope. Again, thank you very much.

1. Check **three** activities below that your child is most likely to do during spare time at home.

- play outside
- work on arts and crafts
- play video or computer games
- work on a hobby
- e-mail, MSN, or surf the internet
- play a musical instrument
- watch TV
- dramatic or pretend play
- play with toys
- talk on the telephone
- read a book or magazine
- listen to music
- other (please describe)

2. Check the statement which best applies to your child.

- My child hardly ever reads anything for enjoyment.
- My child occasionally reads for enjoyment.
- My child reads regularly for enjoyment.
- My child often reads for enjoyment.
- My child reads for enjoyment every chance she/he gets.

3. Circle a number for each statement below about your child.

often	My child:	Never	At times	Often	Very
	Brings home a book from school to read for fun-----	1	2	3	4
	Complains about having to read a book from school-----	1	2	3	4
	Asks to go to the library to get a book-----	1	2	3	4
	Says reading is boring-----	1	2	3	4
	Says reading is too difficult-----	1	2	3	4
	Reads to another child or adult-----	1	2	3	4
	Says he/she doesn't like reading-----	1	2	3	4
	Writes stories/cartoons for fun-----	1	2	3	4
	Asks for books/magazines for gifts-----	1	2	3	4
	Reads music to play an instrument-----	1	2	3	4

4. Does your child have a library card?    \_\_\_yes            \_\_\_no

5. Circle a number for the questions below.

	Not Important	Somewhat Important	Important	Very Important
How important are reading skills for your child's education?	1	2	3	4
How important is music as part of your child's education?	1	2	3	4

Thank you again for providing important information for this study.  
Beryl Peters  
University of Manitoba

## Appendix L: Post-Study Parent/Guardian Survey

### Dear Parent/Guardians:

Thank you so much for agreeing to participate with your child in this University of Manitoba study investigating ways in which musical elements of rhythm and pattern help reading for young children. The support from students, teachers, administration, and parents at John Dewey School has been tremendous and your participation has been most appreciated. We had a wonderful response to the parent/guardian survey; thank you for taking the time to add your very valuable data to this study.

The survey is enclosed again in case you wish to add any changes, or if you did not get a chance to respond the first time and wish to include your comments and observations. There are also just three new questions that would provide very important additional information and your kind response to these three questions would be most appreciated! It has been a great honor and privilege to have worked with the outstanding students and staff at John Dewey School. Thank you once again for allowing me this opportunity to add to the body of educational research in reading.

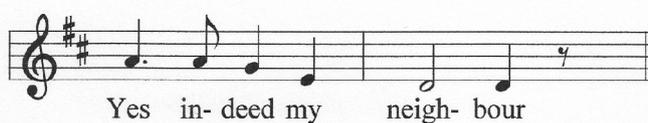
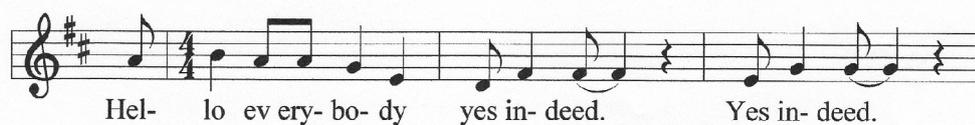
Your answers will be completely confidential. Please seal the parts of the survey you wish to respond to in the envelope provided and return to your classroom teacher. Please do not put your name or your child's name on the outside of the envelope. Again, thank you so much.

Additional questions to the first survey:

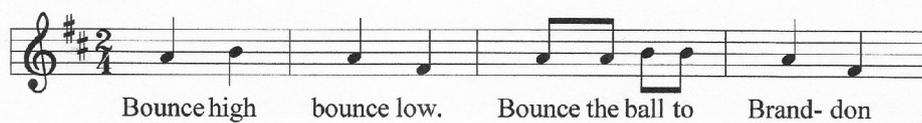
1. During the past few weeks has your child's interest in reading changed? (Check one)
  - Yes, reads a little more than before
  - Yes, reads a lot more than before
  - No, reads about the same as before
  - Yes, reads a little less than before
  - Yes, reads a lot less than before
  - Other (Please explain)
  
2. During the past few weeks, has your child's interest in music changed? If so, in what ways?
  
3. What have you noticed or heard from your child about our music activities "playing with words and rhythm?" (Could you briefly comment?)

## Appendix M: Study Songs

### Hello Everybody



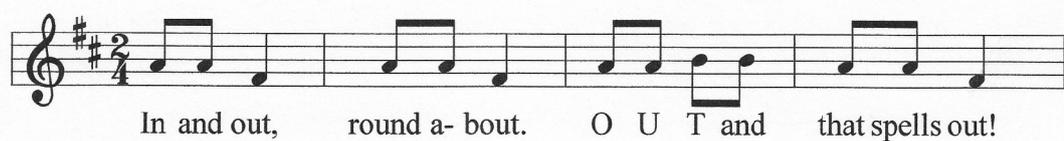
### Bounce High



### Hey Hey



### In and Out



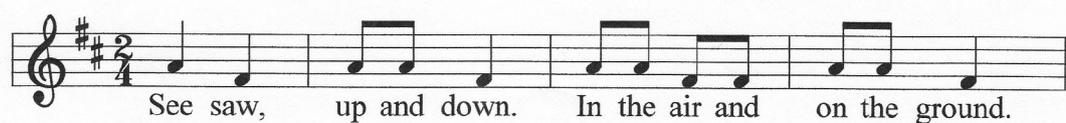
### Rain Rain



### Roll the Ball



### See Saw



## Snail Snail

Musical notation for the song "Snail Snail". It features a single staff in treble clef with a key signature of one sharp (F#) and a time signature of 2/4. The melody consists of eight measures. The lyrics are: "Snail snail snail snail. Go a- round and round and round." The notes are: G4 (quarter), A4 (quarter), B4 (quarter), C5 (quarter), B4-A4 (beamed eighth notes), G4 (quarter), F#4 (quarter), E4 (quarter).

Snail snail snail snail. Go a- round and round and round.

## Star Light, Star Bright

Musical notation for the first line of "Star Light, Star Bright". It features a single staff in treble clef with a key signature of one sharp (F#) and a time signature of 2/4. The melody consists of five measures. The lyrics are: "Star light, star bright, first star I see to- night. Wish I may,". The notes are: G4 (quarter), A4 (quarter), B4 (quarter), C5 (quarter), B4-A4 (beamed eighth notes), G4 (quarter), F#4 (quarter), E4 (quarter).

Star light, star bright, first star I see to- night. Wish I may,

Musical notation for the second line of "Star Light, Star Bright". It features a single staff in treble clef with a key signature of one sharp (F#) and a time signature of 2/4. The melody consists of three measures. The lyrics are: "wish I might, have the wish I wish to- night." The notes are: G4 (quarter), A4 (quarter), B4 (quarter), C5 (quarter), B4-A4 (beamed eighth notes), G4 (quarter), F#4 (quarter), E4 (quarter).

wish I might, have the wish I wish to- night.

**Appendix N: Beat-Movement Sequence (Adapted Montgomery 2002)**

Beat-Movement Sequence for the Development of Beat Awareness and Beat Competency during the “sound” stage of the Sound-before-Symbol Process (adapted from Montgomery, 2002)

1. Chant in own space keeping beat with arms with an end point for beat.
2. As above, alternating arms.
3. As above, no endpoint.
4. Chant playing percussion instrument on beat.
5. Chant moving arms to beat with partner.
6. Chant, listen to recorded music in own space while passing object on beat.
7. Chant traveling beat with arms.
8. Chant in own space while stepping beat.
9. As above traveling from space to space with stepping beat motions.
10. Child leads keeping beat (nonlocomotor or locomotor) using known repertoire.
11. Chant, or listen in own space keeping beat with arms as words continue in child’s inner hearing.
12. As above, with feet.
13. As above, traveling from space to space stepping the beat.



Journal



**Snail Snail**

--	--	--	--

Snail

snail

snail

snail



--	--	--	--

Go a- round and round and round.



**Bounce High Bounce Low**

--	--	--	--

Bounce

high

Bounce

low

--	--	--	--

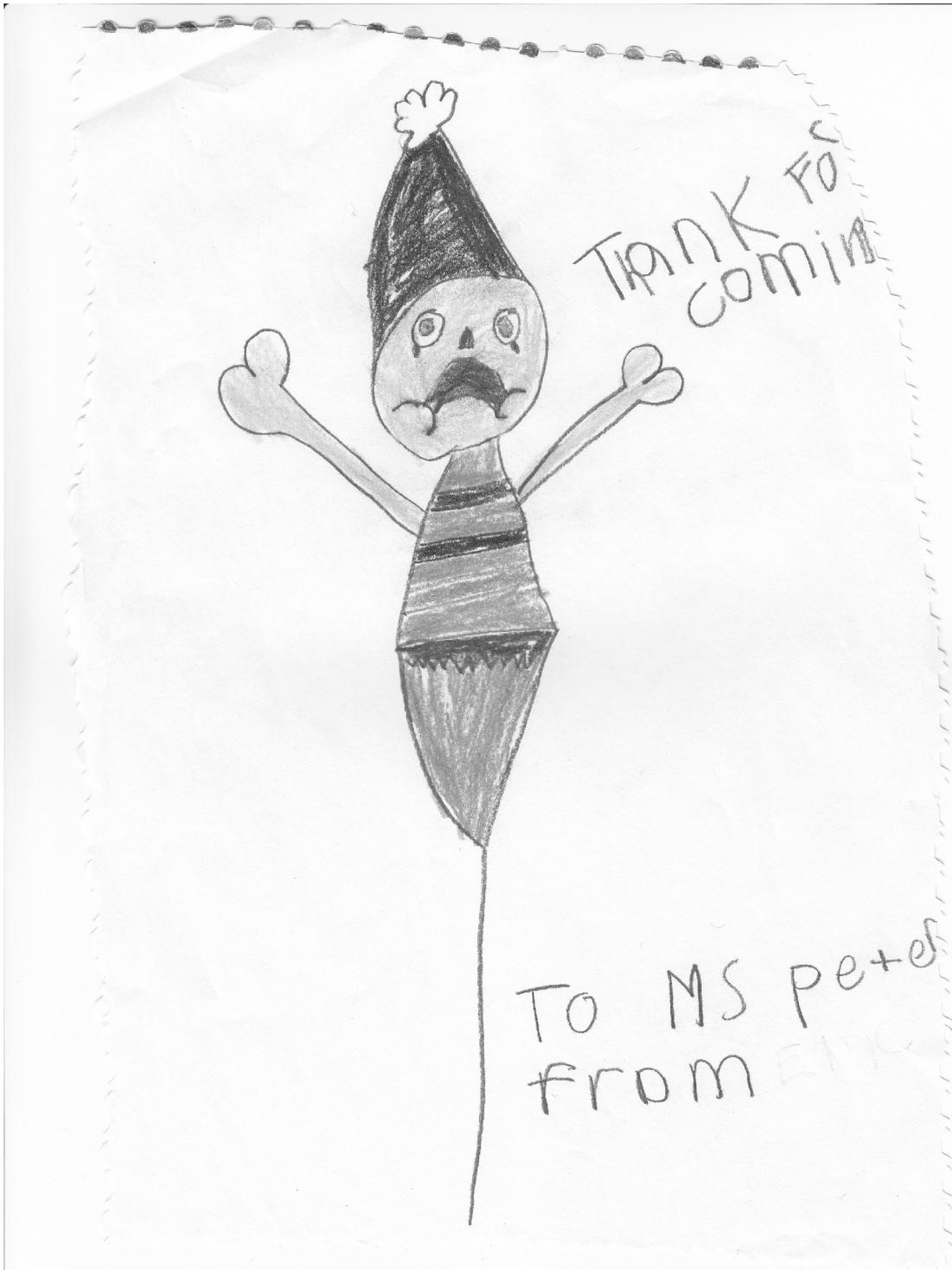
Bounce the ball to

Shi-

loh.

**Appendix P: Herbie and Family**





THANK FOR COMING

To MS peter  
from EIK



