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Teaching and Supporting Beginning Readers: A Comparison of Two Systematic Approaches to Phonics Instruction with First Grade Students

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Teaching and Supporting Beginning Readers: A Comparison of Two Systematic Approaches to Phonics Instruction with First Grade Students" submitted by Larissa J. Jackson in partial fulfilment of the requirements of the degree of Master of Science.

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Abstract

The aim of this exploratory study was to compare the effectiveness of two systematic phonics instruction approaches on grade 1 students over a school year. The comparison group received implicit phonics instruction, whereas the experimental group received explicit phonics instruction. A total of 114 grade 1 students (Experimental $n = 66$; Comparison $n = 48$) completed pre- and post-testing of word analysis tasks. A quantitative analysis revealed that the experimental group had significantly greater gains than the comparison group over time. Additionally, a microgenetic analysis was conducted focusing on two first grade students, one successful and one struggling learner. Results of this analysis revealed that their teacher effectively differentiated content, process, and product for each student based on his level of functioning. A comparison of scaffolding used with both students revealed that the successful student engaged in more self-directed activities, whereas the struggling learner received more structured support.

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CHAPTER ONE

INTRODUCTION

Beginning Reading Instruction

Learning to read is a major milestone for children living in a literate society. Although learning to speak one's native language is a natural process, not requiring explicit instruction, reading must be taught because our writing system relates to speech in an arbitrary yet conventional way (Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998). Specifically, children need to be taught the alphabetic principle, such that they understand the relationship between the sounds of speech and the alphabetic letters. Many children living in rich literate contexts develop a basic understanding of this principle through informal instruction at home and non-explicit activities at school. However, it has been estimated that more than one in three children experience significant difficulties in learning to read (Adams, 1990). Children experiencing difficulties learning to read are likely to stay behind their peers in literary achievement. Juel (1988) found that children reading below grade level at the end of first grade were more likely to be poor readers in later years.

Reading skills provide a critical part of the foundation for children's academic success and a failure to read has far-reaching negative consequences such as poor academic performance across the curriculum (Binder, 1996) and an overarching negative impact on an individual's social and economic life (National Institute for Literacy, 1998). Therefore, it is critical that young children are provided with reading instruction that effectively addresses the needs of all learners early on in their school careers.

Supporting student literacy development has long been an important focus of education. However, there has been considerable debate over how best to teach beginning reading. Some advocate the emphasis should be on reading comprehension with whole-language instruction, whereas others place a central focus on word recognition with phonics instruction. Adams (1990) proposed that both sides of this debate are critically intertwined because the central goal of all reading instruction is comprehension, which depends significantly on the ability to recognize letters, spelling patterns, and whole words effortlessly, automatically and visually. Adams' position was supported by a recent meta-analysis, which found that early phonics instruction seems to lead to better reading skills, including decoding and reading comprehension skills in children in Kindergarten and grade 1 (NRP, 2000). The National Reading Panel (2000) recommended explicit, systematic phonics instruction for beginning readers. Explicit, systematic phonics instruction is the planned, sequential introduction of phonetic elements and their consistent relationship between sounds and letters. Is explicit, systematic phonics instruction superior to another mode of instruction in phonics? The present study aimed to further investigate this issue by comparing two types of systematic approaches to phonics instruction, an explicit phonics method and an implicit phonics method, over the course of an academic year with first grade students.

Differentiated Instruction

When children begin school they vary in their interests, skills, and learning preferences. Thus, to maximize the impact of any instruction approach teachers must modify their instruction in ways that enable all students to be successful. This type of teaching is known as differentiated instruction and it has been found to be beneficial for

first graders who are learning to read (Juel & Minden-Cupp, 2000). In addition, many case studies and individual teacher testimonies have suggested that students learn more and feel better about themselves with this type of instruction (Tomlinson, 2000). Thus, a second component of the present study examined how differentiated instruction can be used within the context of explicit, systematic phonics instruction with grade 1 students who differ in their levels of academic functioning.

Cognitive Scaffolding

When differentiating instruction, teachers can provide cognitive scaffolding, that is, the teacher assumes some of the cognitive demands of tasks, thus lessoning the cognitive loads of her students and freeing up their working memories, which allows children to reach a greater understanding. This is especially important when a child is exposed to new experiences and knowledge, such as in the case of learning to read, because new cognitive connections are being formed that were previously unrelated in the child's mind (Case, 1985). Children form these connections through a variety of general cognitive processes that helps them regulate learning. These include problem solving, exploration, mutual regulation, and modeling (Case, 1985). Teachers can foster the cognitive development of their students by incorporating scaffolding activities into their classrooms. A final aim of the present study was to deduce how differentiated instruction may support the development of literacy schemata by engaging in cognitive scaffolding activities that over time lead to hierarchical integration in students.

CHAPTER TWO

REVIEW OF THE LITERATURE

This chapter will begin with an overview of the debate over how best to teach young children to read, specifically focusing on instruction in whole-word, whole-language and phonics. This will be followed by a review of the different approaches to phonics instruction. The importance of phonemic awareness within a phonics program will then be discussed. Components of differentiated instruction will be presented, with some attention given to how teachers can modify classroom elements, such as content, process, and product, within the context of phonics instruction. A theory of regulatory cognitive processing leading to hierarchical integration will also be discussed. Finally, the chapter will conclude with a discussion of microgenetic analysis and its relevance to this study.

The Great Debate over Reading Instruction

For over a century there has been considerable debate over how best to teach young children to read. Since the invention of the alphabet by the Phoenicians over 3,000 years, reading instruction began by teaching the letters and their names, followed by the letter-sound associations, then syllables, and then on to more complex words (Mathews, 1966; Smith, 1986). It was only in the mid-19th century that students were taught sight words before receiving instruction in the components of letters (Pressley, Allington, Wharton-McDonald, Collins Block & Mandel Morrow, 2001). The reasoning behind this shift in reading instruction was that many believed reading whole words was a more natural approach than learning the letters and blending them to make recognizable words.

In the beginning of the 20th century, the effectiveness of reading instruction began to be scientifically analyzed (Smith, 1986). These analyses revealed that teaching the letters and their corresponding sounds, sometimes referred to as the alphabetic principle, was more effective than whole-word instruction (Adams, 1990; 2002). Despite these findings, reading instruction in schools was dominated by whole-word approaches, like those using the Dick and Jane readers (Pressley, Allington, Wharton-McDonald, Collins Block & Mandel Morrow, 2001).

Over the last fifty years this debate between whole-word versus skill-based instruction has raged on. Several books have been published attacking the whole-word method, such as Rudolf Flesch's (1955), *Why Johnny Can't Read and What You Can Do about It* and Jeanne Chall's (1967), *Learning to Read: The Great Debate*. These books had a tremendous effect on the direction of reading instruction, so much so that the Dick and Jane readers were removed from the curriculum in the United States (Pressley, Allington, Wharton-McDonald, Collins Block & Mandel Morrow, 2001). Chall's book synthesized all of the reading research conducted throughout the 20th century and made a strong case for promoting skill-based or phonics instruction. The primary focus of phonics instruction is to help young children understand how letters are linked to sounds to form letter-sound correspondences and spelling patterns to help them learn how to apply this knowledge in their reading (NRP, 2000; Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan, 2001). It is a sophisticated version of the letter and sound-based method that has been around for centuries.

A series of large-scale comparisons aimed at understanding beginning reading methods in grade 1 were undertaken in the 1960's and were included in Chall's synthesis

(Bond & Dykstra, 1967). Unfortunately, the conclusions from these studies were unclear. While Chall interpreted them by emphasizing that phonics was a superior approach to the whole-language approach, the authors concluded that other aspects of educational settings, for instance the teacher, were more important than the method of reading instruction (Pressley, Allington, Wharton-McDonald, Collins Block & Mandel Morrow, 2001). As a result, reading instruction during the 1970's became eclectic, for example, the Dick and Jane readers were replaced with a new series that incorporated a small amount from phonics, but retained most of its whole-word features.

The debate was further sparked when, in 1971, Frank Smith weighed in by writing a book entitled, *Understanding Reading*. The focus of this book was on promoting reading instruction based on constructing an understanding of what was read and its advantages over whole-word or phonic instruction. Smith and his colleague, Goodman, argued that learning to read was primarily about learning to predict words based on the meaning cues in the text, as well as on the reader's prior knowledge (Goodman, 1986). This method became known as whole-language instruction and at the heart of it was reading children's literature in which the vocabulary was controlled or predictable for the children's level of reading skills. However, some criticized these books for not controlling the vocabulary enough to restrict the number of new sight words introduced and for not providing frequent repetitions of those words (Cunningham & Allington, 1998). Smith and Goodman were also criticized by Flesch (1981) in his second book, *Why Johnny Still Can't Read: A New Look at the Scandal of Our Schools*, because Flesch believed that the whole-language method was no different from whole-word instruction. Despite this attack on whole-language instruction, Flesch went on to

argue that no one method of teaching young children to read is best, not even phonics instruction; further complicating the debate.

Whole-language instruction received praise from some researchers, such as Stahl and Miller (1989) who compared whole-language to whole-word approaches using standardized measures of reading achievement and concluded that whole-language approaches were effective in promoting pre-reading competencies in kindergarten, but not in grade 1. This finding was supported by Sacks and Mergendoller (1997) in another study with only kindergarten students. Another study found that students instructed in whole-language were more likely to cope better when confronted with a difficult text than students instructed in phonics (Dahl & Freppon, 1995). Despite these favourable findings, criticisms continued to mount against whole-language instruction.

In her book, *Beginning to Read*, Marilyn Jager Adams (1990) synthesized the research supporting phonics instruction in beginning reading instruction, much like Chall did back in 1967. Analogous with Chall's findings, Adam's book not only made a strong case for phonics instruction leading to better reading skills, but also emphasized the importance of instructing pre-reading skills, such as the ability to distinguish differences among spoken sounds corresponding to letters in the alphabet (Adams, 1990; 1998; 2002). Since the publication of Adam's book, the whole-language approach has been further weakened by numerous studies that show that direct, intensive phonics instruction led to better reading skills (e.g., Alexander, Anderson, Heilman, Voeller & Torgesen, 1991; Foorman, Francis, Novy & Liberman, 1991; Manis, Custodio & Szeszulski, 1993; Olson, Wise, Johnson & Ring, 1997; Torgesen & Burgess, 1997).

Additional support for phonics instruction was found in a meta-analysis consisting of 52 different, peer-reviewed and soundly designed experimental studies conducted by the National Reading Panel made up of U.S.-government appointed reading experts (NRP; 2000). This meta-analysis revealed that systematic phonics instruction produced significant and lasting reading skills in kindergarten through grade 6 students, including normally developing readers, students at risk for future reading problems, students with learning disabilities, low-achieving students who are not disabled, and students across various SES levels. The panel noted that phonics instruction is a means to an end. The purpose of learning the letters and sounds are to apply these skills accurately and fluently in daily reading and writing activities. This panel advocated for a more balanced approach of reading instruction, and perhaps a solution to the "great debate" by having a solid foundation of phonics instruction with the addition of a comprehensive reading and writing components taken from whole-word and whole-language instruction.

Phonics Instruction

The goal of phonics instruction is to help beginning readers to understand how letters are linked to sounds to form letter-sound correspondences and spelling patterns and to apply this knowledge in their reading (NRP, 2000). Phonics instruction can be taught systematically or incidentally (Hempenstall, 2004; NRP, 2000). The systematic instructional process is usually teacher-directed. The teacher bases the sequence and content of her presentations on a logical analysis of students' reading skills. Students are given ample time to practice their new skills in decodable text formats characterized by a controlled vocabulary and ongoing corrective feedback on their errors. Teachers perform continual assessment of students' reading fluency (accuracy and speed) and

comprehension. In contrast, with incidental or embedded phonics instruction the teacher does not follow a planned sequence of phonics elements but highlights particular elements opportunistically as the student moves through the curriculum. This process is based on the assumption that each student learns to read in his or her own unique manner and the teacher facilitates this process with contextual and graphophonic cues. Within this type of instructional process, the phonics instruction is embedded in text reading.

Two main approaches to phonics instruction have been developed, which vary according to the unit of analysis or how letter-sound combinations are represented to the students namely, explicit and implicit phonics instruction (NRP, 2000). For example, synthetic or explicit phonics approaches begins by teaching the association between the alphabet letters and their sounds (Hempenstall, 2004). Students are taught to link an individual letter or letter combination with its appropriate sound and then blend the sounds to form recognizable words. Explicit phonics builds up from part (letters) to whole (words). This can be done in two ways. The teacher can show the letter that corresponds with a particular sound at the same time. For example, the teacher would say, "This letter here (pointing to the letter m) makes the sound */m/.*" Alternatively, synthetic or explicit phonics can be taught by the sounds of the letters first without presenting the corresponding letter. The letters are then introduced once the students have learned the sounds. For example the teacher would say, "We have all learned the sound */m/*, and now here is the letter used in writing that makes the sound */m/.*" It has been suggested that presenting a visual symbol for each sound may anchor the sounds perceptually in the students' minds rather than simply presenting the sound (Adams, 1990, Bus & van IJzendoorn, 1999). This approach to phonics instruction also teaches the

processes of blending and segmenting. Blending helps students decode unfamiliar words, whereas segmenting words into phonemes helps students in spelling unfamiliar words and retaining spellings in memory (Santi, Menchetti & Edwards, 2004). In blending, students are taught how to combine different sounds to make a word. For example, the teacher would ask, "What word is made by combining the sounds */c/ – /a/ – /t/*?" With segmenting, students are taught how to break down a word into its different sounds. For instance, the teacher would say, "Sound out the word *cat.*" Once the students have a firm understanding of the relationship between the letters and their sounds, they are taught phonograms (i.e., *th, ir, er, ur, or, sh, ee, ch*) and more complex words. A key element in the success of explicit phonics instruction is the provision of multiple opportunities to read decodable words in context (Adams, 1990; 2002, NRP, 2000) and ample modeling of the application of these skills to reading (Chall, 1996; NRP, 2000).

In analytic or implicit phonics instruction, students are taught whole word units followed by systematic instruction linking specific letters in the word with their corresponding sounds (Hempenstall, 2004). Implicit phonics breaks down whole words into parts. Also, sounds are never pronounced in isolation, like with explicit phonics. The student is required to absorb the required information on the words structure from the teacher's verbal or visual presentation of similar sounding words. For example, the teacher would present the sound */c/* by saying, "The first sound you are seeking is also found in the words, *cat, courage,* and *cold.*" Approximately 300 words a year are taught as whole words. The student must make her or his best guess as to what the word is by its shape, beginning and ending letters, and any context clues from the rest of the

sentence or any accompanying pictures. Blending or segmenting is not usually taught. Implicit phonics is the most widely used form of phonics taught in school (Hiskes, 1996).

Explicit/synthetic and systematic phonics instruction has been found to be more effective in improving reading skills in young children (Baker, Kame'enui, Simmons, & Stahl, 1994; Blachman, 1991; Felton & Pepper, 1995; Foorman, 1995; Foorman, Chen, Carlson, Moats, Francis & Fletcher, 2003; Moats, 1994; NRP, 2000; Santi, Menchetti & Edwards, 2004; Simmons, Gunn, Smith, & Kame'enui, 1995; Singh, Deitz, & Singh, 1992; Spector, 1995). If explicit phonics instruction is so much more effective, why is it not being taught in schools as much as implicit phonics? The reason is that explicit phonics instruction has not generally been included in teaching training curriculum for over 50 years and most of the classic old texts have long been out of print (Hiskes, 1996). Teachers simply cannot teach what they do not know. Accordingly to Hempenstall (2004), a major flaw that has contributed to the lack of support for implicit/analytic phonics is in that it assumes that students begin with enough of awareness of the letter-sound correspondence skills that they can decipher the common sound among the various words presented by the teacher.

Phonemic Awareness

Scientific research has brought to light the essential role of phonemic awareness as a precursor to learning phonics rules and subsequently, reading instruction (Adams, 1990; 1998; 2002; Goswami & Bryant, 1990; Nicholson, 2006; NRP, 2000). Whereas phonics instruction teaches the association between letters and sounds in reading and spelling, phonemic awareness instruction involves teaching how to analyze sounds within spoken words, not written ones (Nicholson, 2006). Phonemes are the smallest

meaningful units of sound in language (Richgels, 2001). In English, there are approximately 40 phonemes (Nicholson, 2006). Phonemic awareness is the abstract ability to think about the sounds of words separately from their spellings and separately from the slight phonetic variations that occur within the structures of phonemes (Adams, Foorman, Lundberg, & Beeler, 1998).

Although expert readers automatically process the sounds of phonemes as they produce and listen to speech so that they can attend to the meaning behind the speech, phonemic awareness does not seem to develop automatically with age. Research has shown that adult illiterates generally lack phonemic awareness (Morais, Cary, Alegria, & Bertelson, 1979). Phonemic awareness must then be taught, and ideally taught as early as in kindergarten and grade 1 (NRP, 2000). Four decades of research have shown that poorly developed phonemic awareness is the core deficit for many children who struggle to learn to read (Adams, 1990; Bond & Dykstra, 1967; Bradley & Bryant, 1983; Ehri, 1979; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Foorman, Francis, Novy, & Liberman, 1991; Hatcher, Hulme, & Snowling, 2004; Juel, 1991; Lundberg, Olofsson, & Wall, 1980; Nicholson, 2003; Schneider, Ennemoser, Roth, & Kuspert, 1999; Tunmer, Herriman, & Nesdale, 1988). The meta-analysis done by the National Reading Panel suggested that instruction in phonemic awareness should be structured so that it: (a) moves from simple to complex tasks, (b) explicitly and systematically teaches the manipulation of phonemes with letters, and (c) teaches one or two types of phoneme manipulation instead of multiple types (NRP, 2000). Phonics programs that systematically teach children phonemic awareness with letters were found by the NRP to be more effective in acquiring phonemic awareness than those programs that did not

include letters (NRP, 2000). The panel also found that the role of the teacher, her knowledge of phonics and the method of delivering phonics instruction were very important for reading instruction. These issues will be taken up within the context of differentiated instruction.

Differentiated Instruction

Differentiated instruction is a way of ensuring what a student learns, how he or she learns it, and how the student demonstrates what he or she has learned is a match for the student's interests, and current academic level of functioning (Tomlinson, 2003). Young children begin school at different reading levels, diverse interests and skills, and a wide range of learning preferences. In kindergarten, some students already have an understanding of the alphabet and numbers, while others have only a basic awareness. Some students thrive on the requirements of school and others have real problems adjusting to the structure. If these differences among students are ignored by teachers, there is a danger of "losing" students as early as during the elementary school years (Tomlinson & Cunningham Eidson, 2003). For this reason, teachers must find ways to ignite students' love of learning early in their schooling and encourage them to remain engaged in the learning process throughout the school years and beyond.

Such instruction is very different from the traditional teacher practice of one-size-fits-all instruction. As described by Tomlinson (2003), much of differentiated instruction is based on common sense. If a student is struggling for whatever reasons, the instruction should be modified to ensure that he or she masters the essential parts of the lesson. If a student learns at a faster pace than the rest of the class, the pace and breadth of instruction should be shaped to reflect that particular student's learning. Differentiated teaching

stems from a teachers' understanding and experience of what individual students need, be it more structure, more independence, greater challenge or more practice (Tomlinson, 2003). The teacher's goal is to teach responsively by maximizing the capacity of each student by differentiating instruction in ways to help all students bridge gaps in understanding and skill.

Three Key Principles of Differentiated Instruction

There are three key principles that guide differentiation (Tomlinson, 2003). Understanding and implementing these principles is crucial for facilitating the teacher's work and ensuring the success of the students. The first principle is that a teacher in a differentiated classroom uses time, space, and materials flexibly to meet the needs of the students and promote maximal success for the class. For example, the arrangement of the classroom may change to enable students to work in a variety of ways (e.g., independently or in groups) or different modes of teaching are used to teach the same material (e.g., visually or auditory).

The second principle is that there is a strong link between assessment and instruction. Student evaluations are used to guide instructional planning. Teachers in differentiated classrooms need to pre-assess their students at the beginning of the year to establish each student's knowledge, skill, and understanding; these assessments become individual baselines on which to build subsequent instruction and assessment. The teacher then develops her lesson plans based on this pre-assessment and her ongoing assessment of her students throughout the year. The teacher also assesses student interests in order to improve motivation and learning efficiency.

The final principle is that the teacher emphasizes individual growth as central to the success of the class. In a differentiated classroom, students compete with themselves and strive for their personal bests. Each student is responsible for working towards his or her goal and the teacher guides and supports their progress.

Student Variation

Research has revealed that students can vary in at least four ways that make differentiated instruction a beneficial teaching strategy for teachers (Tomlinson, 2003). Students differ in the academic level at which they are functioning. A student's academic level is comprised of a cognitive ability, prior learning and experiences, and attitudes towards school. Many of these components change over time and with intervention. To differentiate this level of functioning, a teacher develops learning choices in varying degrees of difficulty. When students are able to work at a level of difficulty that is both challenging and attainable, learning takes place (Jensen, 1998).

Student interest refers to those topics or pursuits that evoke curiosity and passion in a learner. To differentiate in response to student interest, a teacher matches student interests to aspects in the curriculum. Students are innately drawn to certain interests, but they can realize new interests with exposure in school. When student's interests are heightened and broadened in school, they are shown to be more engaged and persist in learning (Csikszentmihalyi, 1990).

Student learning profile refers how a student learns best. To differentiate in response to student learning profile, a teacher addresses student talents, culture, gender, or cognitive abilities in her instruction. This can be done by presenting information through verbal, spatial, and kinesthetic modes or allowing students to work alone or with

their classmates. Classrooms that support each student's individual learning profile are more likely to have students who learn more effectively and efficiently (Campbell & Campbell, 1999).

Finally, the teacher can differentiate in response to student affect, such as how a student feels about themselves, his or her learning, and attitudes toward school. It has been found that positive affect is related to better student learning than negative or neutral affect (Wolfe, 2001).

The aim of differentiated instruction is not for all students to reach "grade level" or a prescribed benchmark, but rather maximize individual success from whatever starting point. It is important that teachers recognize each student's needs in order to appropriately challenge and develop their growth and heighten his or her motivation to learn. This is not only true for reading instruction, but across the curriculum. However, research has found that teachers make few adaptations intended to address the needs of individual students, such as adapting materials, adjusting course content, or adapting scoring or grading criteria (Fuchs & Fuchs, 1998; McIntosh, Vaughn, Schumm, Haager & Lee, 1994).

Modifiable Classroom Elements

There are three classroom elements that teachers can modify in their classrooms to foster differentiated instruction in the context of reading instruction (Tomlinson, 2003). The first element is content and refers to what teachers teach. One of the goals of differentiation is to enable students to focus and build on the essential information, ideas, and skills of a lesson. This goal is reached when the teacher is able to teach the essential elements of a lesson and break them down into a learning sequence that is understood by

all her students. For example, the teacher could re-teach or pre-teach students that need additional instruction, or using computer programs or tape recorders as a way of conveying essential concepts, principles, and skills required for the mastery of reading.

Another classroom element that teachers can differentiate is process. This refers to how a student makes sense of the information, ideas, and skills that are essential to the lesson. A teacher can differentiate a process or activity by adding greater complexity or abstractness to tasks, or by increasing the variety of ways in which students are asked to learn (e.g., writing a letter, drawing a picture, or acting it out). What is essential is that students understands the core information and can demonstrate this in their own way.

Teachers can also differentiate products. This element provides evidence of what a student has come to know, understand, and be able to do over an extended period of learning. A good product allows for reflection and extension of understanding. This can be done by encouraging students to apply what they have learned in a variety of ways.

Differentiated instruction is a way of tailoring the content and process of a lesson and how the student then demonstrates his or her understanding to their own individual interests and current academic level of functioning. Differentiated instruction can be used to teach reading skills to promote individual success in this domain. Although Tomlinson (2003) treats these as three separate elements, they are interwoven together within the classroom as the teacher applies them to her instruction. Another pedagogical tool that can enhance reading instruction is support or scaffolding provided by the teacher. This topic will be discussed in the next section.

Regulatory Processes Leading to Hierarchical Integration

Case's (1985, 1992) neo-structural theory of cognitive development identified dual forces that foster children's development, contextual experience and physiological maturation processes. Changes in the children's executive control structures available to solve specific intellectual problems bring about cognitive development. These tripartite control structures involve: a) understandings of essential features of the problem, b) recognizing a related goal, and c) understanding something about the sequence of operations that are needed to bridge the two. Case proposed that children's experience with problems within a particular area of knowledge allows new cognitive connections to be formed. These would then allow for the integration of knowledge structures that were previously unrelated in the child's mind.

According to Case (1985), there are four regulatory processes that lead to hierarchical integration. The first of these processes is problem solving. When young children are confronted with a problem, they naturally seek out a solution. This situation provides children with the opportunity to develop strategies and may lead to hierarchical integration of schemata. Problem solving involves a problem situation, a goal situation, and possible strategies. These strategies may or may not be successful at leading to the goal situation, but all problem solving processes have clearly defined goals. For example, when young children begin to form their alphabet letters, their goal is for their letters to look like the sample letters given to them by their teacher.

A second regulatory process involved in hierarchical integration is exploration (Case, 1985). This process involves an initial situation, often never before experienced (e.g., figuring out how many rocks of different sizes fit into a container). The young

children then apply numerous executive structures one after the other in an attempt to find a solution. The sequential application of these executive structures may lead to the assembly of hierarchical integration. Unlike problem solving where there is a specific goal directing children's strategic attempts, exploration does not have clearly defined solutions, but instead focuses on the situations.

The third process that may lead to hierarchical integration is imitation. According to Case (1985) young children have a strong natural tendency to observe the actions of those around them and imitate them. When a young child is faced with a novel situation, often they will refer to the actions of an adult or an older child for orientation and guidance. Thus, the actions of adults and older children are modelled by young children and may lead to hierarchical integration of their existing schematic structures. However, children will only engage in imitation when the proper amount of novelty and utility are present in the situation. Imitation can be thought of as the social counterpart to problem solving and exploration processes.

The final regulatory process is mutual regulation (Case, 1985). This process involves, "the active adaptation of the child and some other human being to each other's feelings, cognitions, or behaviour" (p. 269, Case, 1985). This type of adaptation may be an end result, such as a loving interaction, or it may be a means to an end, as in a task involving mutual cooperation. A form of mutual integration that is particularly interesting to this study is instruction. In this social situation, just as in the previous process of imitation, the child is provided a model, although with mutual regulation it is not only the presence of the model that is important, but also the model's active efforts that may contribute to hierarchical integration.

Within each process there are four sequential steps involved in the hierarchical integration of schemata (Case, 1985). The first is schematic search. During this step the child searches for interesting operations to apply to the current situation, and then generates them, one after another. Within the problem solving process, the search must include a simultaneous matching of the current situation with the desired end state or goal. Once the search is complete the child should then notice the differences among each operational sequence. This step is called schematic evaluation. Children apply the relevant schemata and evaluate whether or not they have generated the desired outcome. The next step is schematic retagging. In this step, the child identifies or "tags" where the members of the operational sequence begin, end, and link together like forming a chain. Finally, schematic consolidation takes place in the fourth step. During this step, children test out their new schema and see if they have "tagged" it properly. This is done through experimenting with subtle changes and various applications. Children practice the new sequence until they have mastered it and the schematic structure is consolidated.

In summary, young children engage in four types of regulatory processes that may lead to hierarchical integrations. Teachers can foster the cognitive development of their students by incorporating problem solving, exploration, imitation, and mutual regulation activities into the classroom (Case, 1985), particularly in promoting reading instruction as it involves many cognitive processes, such as rapid decoding, large vocabularies, and a variety of strategies to aid comprehension and memory (Adams, 1990). Considering the complexity involved in instructing reading, a comprehensive method of scientific measurement is required to analyze cognitive development. This type of analysis will be discussed in the next section.

Microgenetic Analysis

Microgenetic analysis is an excellent method to investigate how young children develop reading skills. The microgenetic approach measures change in cognitive development, which has been described by Siegler and Crowley (1991) as the essence of development. Unlike some methods of studying change that capture only episodic snapshots, microgenetic analyses span development much like a movie camera. It catches the moments in between the still frames, and when studying development, these moments may contain precise and valuable information.

According to Siegler and colleagues, there are three main properties of this approach (Siegler, 2005; Siegler & Crowley, 1991). The first property is that observations should span the period from the beginning of the change to the time at which it reaches a fairly constant state. Depending on the phenomena, this period may vary considerably. The second property of the microgenetic approach is that within this observation period, the density of observations is greater than the rate of change. Children's learning is rarely a straight line between before and after a change occurs. Dense observations ensure that the developmental sequence, be it continuous or discontinuous, in children's learning is perceived. The final property is that observations are analyzed by a concentrated trial-by-trial analysis. The purpose of this property is to generate understanding of the processes that emerge from both quantitative and qualitative aspects of change.

There are many different types of experimental designs used in the microgenetic analysis approach. Some microgenetic studies involve a single subject design that may include a high number of instructional sessions (Robinson & Mervis, 1998) or a high

number of subjects for just a single session (Alibali, 1999). Other experimental designs are more naturalistic, where participants are observed over a varying period of time without any experimental intervention (Thelen & Ulrich, 1991).

The microgenetic approach has broad applicability in studying processes of change as it occurs. It has been used to study a wide range of cognitive changes in participants of all ages, ranging from infants to older adults (Adolph, 1997; Chen & Siegler, 2000; Kruse, Lindenberger, & Baltes, 1993; Metz, 1998; Miller & Aloise-Young, 1995; Schauble, 1996). Microgenetic analyses have also been use to study change across different domains such as spoken language (Robinson & Mervis, 1998), mathematical reasoning (Alibali, 1999), perception (Shimojo, Bauer, O'Connell, & Held, 1986), and storytelling (McKeough & Sanderson, 1996). Microgenetic methods have also be used in variety of settings for instance in the home (Thelen & Corbetta, 2002) and in the classroom (McKeough, Davis, Forgeron, Marini & Fung, 2005; Taylor & Cox, 1997). Diverse developmental theories such as neo-Piagetian (Fischer & Yan, 2002) and sociocultural (Duncan & Pratt, 1997) have also been investigated using this approach.

The findings from these studies indicate, despite the variability among age groups, domains, settings, and theoretical underpinnings, that there is a consistency in how children learn. One such finding suggests that children's learning is not a straight line from learning a new strategy and then applying it. Instead, children's thinking is more variable than previously thought. This finding has been termed by Kuhn and his colleagues (1995) as, intraindividual variability, and not only do different children use different strategies to solve the same problem, but the same child will employ different strategies to solve the same problem at two separate times (Siegler, 1996). Children will

also revert back to less sophisticated strategies even after they have been taught more advanced ones (Kuhn, Amsel, & O'Loughlin, 1988; Schauble, 1990). The finding of intraindividual variability is important for predicting, analysing, and understanding changes in cognitive development. Furthermore, a microgenetic analysis of phonics instruction could provide further information that may led to a better understanding of the development of children's reading skills.

The Current Study

The current study is an investigation of the effectiveness of phonics instruction in the development of reading skills. It draws upon similar instructional research (Baker, Kame'enui, Simmons, & Stahl, 1994; Blachman, 1991; Felton & Pepper, 1995; Foorman, 1995; Foorman, Chen, Carlson, Moats, Francis & Fletcher, 2003; Moats, 1994; NRP, 2000; Simmons, Gunn, Smith, & Kame'enui, 1995; Singh, Deitz, & Singh, 1992; Spector, 1995) that showed positive effects on children's reading skills following instruction in phonics. The research compared two phonics approaches for teaching reading to children in grade one: an explicit and an implicit approach. The experimental method also utilized differentiated instruction within the context of explicit phonics instruction to see whether it would enhance the students' reading skills. Additionally, the experiment method investigated the application of the regulatory cognitive processes theorized by Case (1985), to phonics instruction. This study attempted to gain insight into the relative merits of explicit and implicit phonics approaches, as well as analyzing the effects of differentiated instruction and scaffolding, in order to better understand and support the process of developing reading skills.

Hypotheses

Guided by the research on phonics instruction, this study sought to explore the effects of two different instruction methods for teaching grade 1 children to read, and to analyze how a teacher from the experimental group effectively differentiated and provided scaffolding to two of her students. It investigated the following questions:

1. Will students in the experimental group improve to a significantly greater degree in reading competency, relative to the comparison group?
2. Did a teacher in the experimental group effectively differentiate her explicit, systematic phonics instruction to support the ability levels of her two grade 1 students?
3. Did a teacher in the experimental group provide cognitive scaffolding through regulatory processes (problem solving, exploration, imitation, and mutual regulation) and did this practice lead to improved specific reading skills in her two grade 1 students, who differed in their level of academic functioning?

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Design

This exploratory study examined the effectiveness of two types of phonics instruction on literacy skills of grade one students. There were two phases to this study. The first phase was a pre-test-post-test comparison group design. Children took part in classroom-wide pre-testing sessions in September during which time they were assessed using the Word Analysis Subtest of the Canadian Test of Basic Skills (Hieronymus, Hoover, Lindquist, Scannell, & King Shaw, 1998). Children in the experimental group (n = 66) participated in ten months of language instruction based on the Open Court Reading Program (OCR, 2002). Children in the comparison group (n = 48) participated in ten months of regular grade 1 instruction based on the Alberta Learning curriculum guide for Language Arts (Alberta Learning, 2000). At the end of the academic year, children in both conditions were reassessed using the Word Analysis Subtest. In the second phase, the microgenetic method was employed to examine how the teacher differentiated her instruction based on differing ability levels and how these differentiated activities led to hierarchical integration of the students' cognitive schemata. This analysis focused on two first grade students from an experimental classroom; one successful learner and one struggling learner.

Phase One

Participants

A total of 114 first grade volunteer students from eight different classrooms participated in this phase of the study. There were 34 girls and 32 boys in the experimental group, whereas the comparison group had 28 girls and 20 boys. Participants included four grade 1 classes as the experimental group and another four grade 1 classes as the comparison group. Participants were selected from four public elementary schools situated in rural and town settings in Central Alberta. Three comparison classrooms were drawn from a school of 350 students in kindergarten through grade six. This school was in a town setting with farms, acreages, and a First Nations reserve nearby. Some students came from single-parent, low income homes, but the majority were from middle socio-economic status (SES) homes. There was variability in the student ability level, including some gifted and developmental delays. Support was given by parent volunteers, and behavioural support teams and First Nations services. The school also had a well-stocked library. The second school included two experimental and one comparison classrooms. This school was situated in a town with little racial, or ethnic variance and had an enrolment of 400 students in kindergarten through grade six. This school had a 12% First Nation student population. Students mostly came from two income families. There was variability in the student ability level, including some gifted and learning difficulties. The school also had a well stocked library and parent and community volunteers. The third school that participated in this study was also in a town setting. This school taught kindergarten through grade six and had a student population of 300. One experimental classroom came from this school. Students from this school were mostly from transient,

single parent families. There was variability in student ability level, including academic, behavioural and social/emotional domains. The school received support through social services and behavioural support programs. There were few parent volunteers at this school. The final site was in a rural setting close a First Nation Reserve. This was a high needs school that taught kindergarten through grade 12, and was made up of 250 students. One experimental classroom came from this school. Approximately fifty percent of the student population came from single parent homes. Many students came from low SES homes and First Nation families. There was variability in student ability level in academic, behavioural and social/emotional areas. This school had minimal library resources, few parent volunteers, and received support from social services, behavioural support services and First Nations services. There was one ESL student in the comparison group.

Table 3.1

Description of Experimental and Comparison Classrooms

	Number of		
Classrooms	Students	Males	Females
Experimental 1	20	12	8
Experimental 2	18	8	10
Experimental 3	14	8	7
Experimental 4	13	4	9
Comparison 1	10	3	7
Comparison 2	9	4	5
Comparison 3	19	9	10
Comparison 4	10	4	6
Total	114	52	62

Participant Measures

Canadian Test of Basic Skills – IV (CTBS-IV); Word Analysis Subtest

The Word Analysis Subtest from the Canadian Test of Basic Skills (CTBS; Hieronymus, Hoover, Lindquist, Scannell, & King Shaw, 1998) was administered classroom-wide by a research assistant to both the experimental and comparison study participants. The CTBS is a multiple-choice, norm-referenced, general achievement test for students in kindergarten through grade 12 (Anderson, 2004). In September all students wrote Form K Level 6 of the subtest, which is designed for students in Kindergarten to mid-grade 1. In June all of the students wrote Form K Level 7 of the subtest, which is designed for students in mid-grade 1 to mid-grade 2 to measure any change in their reading skills. The Word Analysis Subtest Form K Level 6 is intended to assess how well students can recognize letters and letter-sound relationships. The Word Analysis Subtest Form K Level 7 is slightly more advanced than Level 6. It measures the ability to recognize phonographs and manipulate letter substitutions in words. Three letters, pictures, or words are presented as response options for each of the thirty test questions on both levels of the subtest. The skills scores obtained from the Word Analysis Subtest are often helpful in diagnosing the difficulties of students who are slow in literacy development. The time required to administer this Subtest varies from about 25 to 35 minutes.

Scoring measures and criteria

Student responses on the Word Analysis Subtest were scored as stipulated in the CTBS manual. Possible standard scores ranged from 0 to 230. Fall norms were used with the pre-test and Spring norms for the post-test.

Procedure

Eight volunteer classes were chosen on the basis of teacher expertise and interest in participating in a study that investigated literacy development. The selection of expert teachers was essential to ensure that, within all of the classrooms, there was high quality teaching of children's literacy skills. Moreover, all teachers held similar views regarding individualized instruction, and what constitutes best practice in emergent literacy. Another consideration in selecting the classes was the matching of socio-economic levels of the two conditions. Pre- and post-testing were administered after obtaining parental permission. (see Appendixes B and C for consent forms)

All eight classrooms were taught by one classroom teacher, except for one experimental classroom which was co-taught by two teachers. Instruction occurred over the course of the school year, from September to June, during daily 90-minute language arts periods and incorporated both oral and written language.

Experimental instruction methodology

The four experimental grade one classrooms received language art instruction based on the Open Court Reading program (OCR, 2002). OCR is a systematic, explicit phonics-based literacy program developed for children in elementary school. The teachers were provided all of the materials for implementing the OCR program in their classrooms. This included workbooks for the children in phonics and spelling and vocabulary skills, decodable texts, teacher's manuals, and sound/spelling cards to display in their classrooms. The classroom teachers in the experimental condition received one-day formal training by a representative from OCR and the research team and observed a classroom which had been using this program for many years prior to the beginning of

the year. Teachers met with the research team every six weeks to discuss instruction aims, plans, strategies, challenges, and progress. In addition, a researcher assistant visited the classrooms on a monthly basis to provide instructional support, document students' progress, and gather data on teachers' differentiation strategies. The teachers were reimbursed for the after-school time they devoted to this study.

The emphasis of the OCR program is on a balance of phonemic awareness, phonics (with blending as the key strategy), and literature activities. Phonemic awareness activities dominated the first 30 lessons. Forty-two phonic rules were introduced using sound-spelling cards, alliterative stories, and controlled vocabulary text that practice the rule just taught. At the same time decodable texts were used, a parallel strand of Big Book readings occurred so that skills in oral language comprehension and a positive relationship towards stories could be developed. Spelling dictation exercises moved students from phonetic spellings towards conventional spelling based on phonics knowledge and spelling conventions. Writing workshops activities and anthologies of fiction, nonfiction, and poetry were also introduced.

Each OCR lesson began with whole-group, teacher-directed instruction and then the students were provided differentiated instruction to individuals or small groups. Differentiated instruction is an important element of this program. The OCR program enables teachers to differentiate between students who needed extra support specific skills and those working above grade level and beyond the capabilities of the average readers in the class with specific student workbooks, such as Reteach and Challenge workbooks.

Comparison instruction methodology

Children within the comparison condition received language arts instruction based on the Alberta Learning curriculum (Alberta Learning, 2000). This program used a systematic, implicit approach to teaching phonics. Children were taught to blend and segment sounds that are heard or spoken, not written. The emphasis of this program was on phonemic awareness and spelling patterns in predictable books. Whole-class activities such as shared writing, shared reading, choral or echo reading, and guided reading provided the context for this type of instruction. Children learned specific strategies to decode unfamiliar words by making predictions based on textual and context cues, playing rhyming games to develop phonological awareness, identifying high frequency words by sight, and identifying smaller words embedded in larger words (e.g., the word, *in*, within *grin*).

This language arts program has five general desired outcomes for students in the first grade: a) listen, speak, read, write, view, and represent to explore thoughts, ideas, feelings and experiences, b) listen, speak, read, write, view, and represent to comprehend and respond personally and critically to oral, print, and other media texts, c) listen, speak, read, write, view, and represent to manage ideas and information, d) listen, speak, read, write, view, and represent to enhance the clarity and artistry of communication, and e) listen, speak, write, view, and represent to respect, support, and collaborate with others (Alberta Learning, 2000). The second outcome contains specific outcomes related to literacy instruction. They include: use prior knowledge, use comprehension strategies, use textual cues, use phonics and structural analysis, use references, experience various

texts, construct meaning from texts, and appreciate the artistry of texts (Alberta Learning, 2000).

Some teachers in the comparison group differentiated aspects of their literacy instruction, but during the present study, differentiated instruction was not a specified element of the language arts grade 1 program (Alberta Learning, 2000).

Phase Two

Participants

A microgenetic analysis was conducted using two participants selected by the classroom teacher. One student was a successful learner and the other student was struggling. The successful student was six years and nine months at the beginning of the school year. He had been retained the previous year, in grade 1. He achieved a standard score of 159, which is at the 90th percentile for his grade level on the Word Analysis Subtest of the CTBS at the beginning of the school year. The struggling student was six years and eleven months at the start of the academic year. He had been retained in kindergarten. He had previously been designated with a mild cognitive disability as stipulated by Alberta Education guidelines. In September, he achieved a standard score of 139, which is at the 53rd percentile for his grade level on the Word Analysis Subtest of the CTBS.

Documentation

Teachers in the experimental group were asked to choose three students, one successful and two struggling, and document their literacy development throughout the academic year in weekly journal entries. Additionally, targeted differentiated lesson forms were filled out by the teachers twice monthly for each of the selected students (see

Appendix A). These forms included information about the focus of the teachers' lessons, such as how they differentiated their instruction for each selected student, how the students responded to the differentiation, concerns the teachers had, and how to proceed with the next lesson. Furthermore, twice a month the teachers provided work samples from the selected students and a comparison student to illustrate the difference between the targeted child and another more average functioning student. Teachers in the comparison group were not required to record any documentation specific to this study.

Plan of Analysis

To understand how children respond to differentiated instruction within the content of systematic, explicit phonics instruction, a microgenetic analysis was under taken. Microgenetic analysis has broad applicability in studying the process of cognitive change as it occurs (Siegler, 2005). This type of analysis requires that children's performances be observed and recorded over an extended instruction period, allowing an intensive session-by-session analysis of their learning. The microgenetic analysis undertook to examine two interacting aspects of the teacher's instruction: how the teacher differentiated her instruction based on the differing ability levels of the two targeted students, and how these differentiated activities led to hierarchical integration of the students' cognitive schemata. Using the teacher's documentation, the differentiated lessons were analyzed using Tomlinson's three differentiated classroom elements (Tomlinson, 2003). These elements are: content, process, and product. The teacher's differentiated activities were further analyzed using Case's theory of regulatory processes leading to hierarchical integration (Case, 1985). According to Case's theory, young children engage in four types of regulatory processes that may lead to hierarchical

integration of schemata: problem solving, exploration, imitation, and mutual regulation. The aim of this analysis was to deduce how differentiated instruction may develop literacy cognitive schemata by engaging in regulatory processes that over time lead to hierarchical integration in the targeted students.

Summary

The aim of this study was to measure and compare the effects of a developmentally-based literacy program in which differentiated instruction is embedded within systematic, explicit phonics instruction to comparison classrooms using a systematic, implicit phonics approach. All participants' language skills were measured by the Word Analysis Subtest of the Canadian Test of Basic Skills both before and following instruction. Furthermore, a microgenetic analysis undertook to examine how a teacher differentiated her instruction based on the differing ability levels of two targeted students, and how these differentiated activities led to hierarchical integration.

CHAPTER FOUR

RESULTS

This exploratory study examined the reading skills of grade one students receiving two different instructional methods in phonics instruction. Measures included the Word Analysis Subtest of the CTBS before and after approximately nine months of instruction. Differences were examined between instructional groups using statistical measures described below. Additionally, a microgenetic analysis was conducted to examine the process of instruction. This form of analysis commonly assesses how instruction accelerates cognitive gains so that children's developmental processes can be studied and qualitatively tracked over a specified amount of time.

Pre- Post-Instruction Analysis

The analysis of pre-and post-testing supported the prediction that the explicit phonics instruction used with the experimental group would more effectively advance the reading skills of grade 1 students than implicit phonics method used with the comparison group. Mean scores and standard deviations were computed on the pre- and post-testing of the Word Analysis Subtest of the CTBS (See Table 4.1). A repeated measures ANOVA was performed to determine if significant group differences emerged over the two measurement periods. When the experimental and comparison groups scores were averaged for the pre- and post- tests results indicated that there was a significant group effect [$F(1,112) = 6.72$, $p<.05$] and a significant time effect [$F(1, 112) = 50.28$, $p <.001$]. However, the effect of interest in the current study was the significant group by time interaction effect [$F(1,112) = 24.32$, $p<.001$]. Reference to Figure 4.1 reveals that the

experimental group had significantly greater gains than the comparison group over time. The effect sizes were .057, .310, and .178 for Group, Time, and Interaction, respectively.

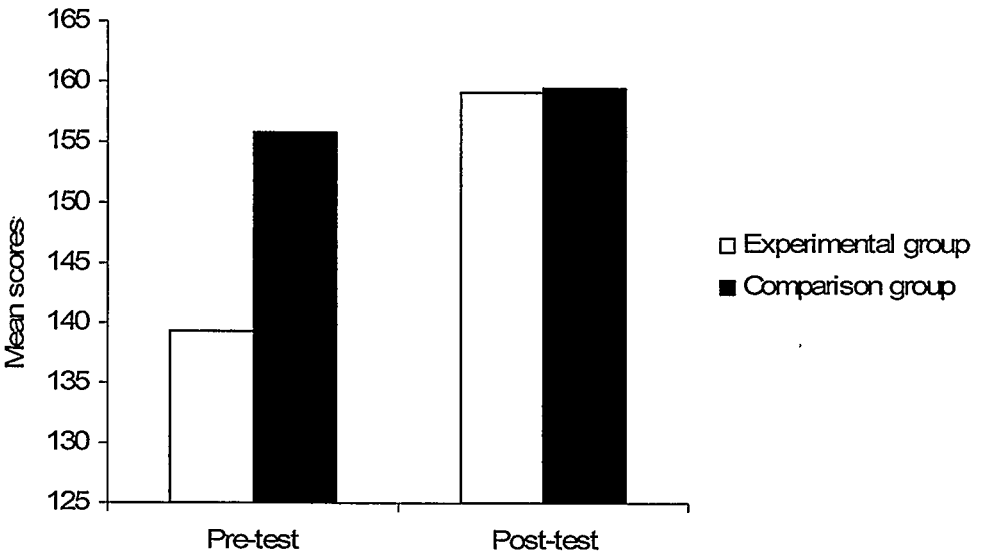
Table 4.1

Pre- and Post-Test Word Analysis Subtest Standard Scores for Experimental and Comparison Groups: Means and Standard Deviations

	Experimental		Comparison	
Word Analysis	Pre	Post	Pre	Post
Means	139.29	159.24	155.88	159.46
Standard deviations	13.86	21.49	22.62	18.45

Figure Caption

Figure 4.1 CTBS mean standard scores at pre-test and post-test for the experimental and comparison groups.



Microgenetic Analysis

Lesson content

A microgenetic analysis was conducted focusing on two first grade students, one successful and one struggling learner, who were enrolled in the same experimental classroom with one teacher. The names of the students and their teacher have been changed to protect their identity. They received differentiated instruction within the context of explicit, systematic phonics instruction. Eight phonics lessons, spanning from October to May were examined within this microgenetic analysis. Each of the eight lessons content and specific instruction focus is listed in Table 4.2.

Table 4.2

Phonics Lesson Content

Date	Phonics Lesson Content	Instruction Focus
October	Practice short /u/ printing	Phonemic awareness Memory Fine motor skills
November	Practice short vowel spelling: /s/ as a /z/ sound at the end of words (e.g., hills, trucks)	Memory Fine motor skills Phonemic awareness Word analysis
December	Practice letter formation, printing on lines, and reading and spelling /y/ words.	Memory Fine motor skills Phonemic awareness
January	Practice spelling words chosen from sound and spelling lessons and review sight words.	Memory Fine motor skills Word analysis Phonemic awareness Listening skills
February	Introduce long /i/ sound spelled as /y/ and /ie/	Phonemic awareness Memory

Date	Phonics Lesson Content	Instruction Focus
March	Review /ow/ and /aw/ sounds	Phonemic awareness
		Memory
April	Review long and short vowel	Phonemic awareness
	sounds, practice decoding skills	Memory
	and reading independently	Word analysis
May	Review phonics spelling while	Memory
	doing a crossword puzzle from	Fine motor skills
	the Challenge workbook.	Word analysis
	Students were partnered up.	Communication skills

Analysis of Student Performance

Struggling Student

According to the Ms. Smith's journal entries and lesson plans, Tom had difficulty reading at the beginning of the year. He had a previous diagnosis of a mild cognitive disability according to Albert Education criteria and he had been retained in Kindergarten. He was unable to decode or blend sounds to create words. He also lacked many reading strategies. At the beginning of the year his writing was scribed for him or he copied his work out of books. On a positive note, Ms. Smith indicated he had good fine motor skills. In addition to reading and writing skills, Tom also struggled with attention issues. He often had difficulty focusing on his work and Ms. Smith had to separate him from other students to help him stay on task. At times, he was observed by Ms. Smith becoming very frustrated by his limited skills and sometimes refused to do his work.

Over the course of the school year, Tom developed the strategy of copying other student's work in order to finish his own. Ms. Smith struggled with this behaviour. Although she was aware he lacked confidence in academic matters, she wanted him to develop more independence. At times, she rearranged the seating patterns to discourage him from copying.

Ms. Smith used a variety of strategies to help him develop his writing and reading skills. She used red light/green light stickers on his desk to teach him directionality of writing, sat beside him for extra support, used Reteach workbooks from OCR for repetition of core phonics concepts, and used a lot of encouragement and praise. By the end of the year, he was writing in sentences and proof-reading his own written work. In

September, Tom achieved a standard score of 139, which is at the 53rd percentile for his grade level on the Word Analysis Subtest Form K Level 6 of the CTBS. In June, he achieved a standard score of 153, which is at the 26th percentile the Word Analysis Subtest Form K Level 7. Tom's performance on the pre- and post-tests will be discussed in the next chapter.

Table 4.3 illustrates Tom's phonics output in grade 1. His phonics skills improved over the academic year. Throughout the first half of the year, he was still developing his phonics skills. He was not able to correctly match the sounds with the corresponding letters. Moreover, he was able to identify certain parts of words (e.g., missing the "m" in "jump"). However, by April and May, he started using more complex spelling patterns (e.g., "hight" for high and "wohsed" for washed) demonstrating his newly acquired phonics knowledge.

Table 4.3

Struggling student: Output Analysis

Date	Student Phonics Output Analysis
October	Wrote "Kut" instead of "cut"
November	Wrote "loc" instead of "look"
	Wrote "jup" instead of "jump"
December	Wrote "yrn" instead of "yarn"
	Wrote "hap" instead of "help"
	Too little spacing between words
January	Wrote "scat" instead of "skate"
	Wrote "soes" instead of "stones"
	Wrote "foru" instead of "four"
	Wrote "slis" instead of "slice"
	Wrote "seid" instead of "said"
	Wrote "cam" instead of "came"
	Wrote "cuot" instead of "cute"
	Wrote "qicke" instead of "quick"
	Spelled the following words correctly: good, fuse, gem, black, ate, cage, ape, brown, all, like, mice, did, he

Date	Student's Phonics Output Analysis
February	Introduce long /i/ sound spelled as /y/ and /ie/
	Wrote "loib" instead of "lady" (reversal of /d/ to /b/)
	Wrote "lad sye" instead of "ladies"
	Wrote "pate lus piys." Instead of "Patty likes pies."
March	Trouble copying the correct words
	Lost his place
April	Wrote "hight" instead of "high"
	Copied words with correct vowel sounds (long vs. short)
May	Wrote "a wau" instead of "away"
	Correctly spelled "hair"
	Wrote "wohsed" instead of "washed"
	Wrote "a cros" instead of "across"
	Wrote "rod" instead of "road"

Successful Student

At the beginning of the year, according to Ms. Smith, Chris seemed withdrawn. Chris had been retained the previous year in grade 1. He loved to read non-fiction books and acquire new knowledge from them. He was able to print well and was working to stay within the lines. Ms. Smith wanted Chris to take an intellectual leadership role with other students over the course of the academic year, but in the beginning he was only able to complete his own tasks. Over the course of the year she hoped to motivate him to become a teacher to his peers. Within weeks of the start of the year, his confidence improved and his was excited about helping others. Throughout the year Chris worked independently, and both inspired and helped his classmates. Ms. Smith described his appetite for learning as voracious. Throughout the year, his confidence grew. Ms. Smith encouraged him to work ahead in his Phonics and Challenge workbooks at his own pace. Occasionally, Chris read the directions wrong and needed to go over certain pages again to correct them, but otherwise he worked independently and was thrilled with this special privilege. In March, Chris spent 45 minutes writing at one time and he enjoyed the processes of illustrating, proof-reading, and revising his story. In April, he felt comfortable taking on a leadership role with his classmates, leading discussions on various topics. His writing continued to improve, and he wrote an 11 page story and transformed his rough draft into a good copy. He described writing as a journey to Ms. Smith. By the end of the year, Chris developed into a confident student who was enthusiastic about helping students who were struggling and was comfortable being a leader in his classroom. Chris achieved a standard score of 159, which is at the 90th percentile for his grade level on the Word Analysis Subtest of the CTBS at the beginning

of the school year. At the end of the year, he achieved a standard score of 223(98th percentile). Chris' performance on the pre-and the post-tests will be discussed in the following chapter.

The phonics output for Chris is shown in Table 4.4. Chris displayed very good phonics skills at the beginning of the year. He occasionally reversed some of his letters (e.g., "e" and "g"). He also displayed knowledge of more advance spelling patterns, although he sometimes applied these inaccurately (e.g., "pupes" instead of pups). In March, there was evidence of a sense of play in his output. Chris seems to be exploring other ways of completing his standard phonics assignments. It was difficult for Ms. Smith to ascertain whether many of his errors were due to lack of knowledge, boredom, curiosity, or carelessness.

Table 4.4

Successful Student

Date	Student Phonics Output Analysis
October	No errors in spelling from dictation
	No errors in punctuation or copying
November	Reversal of the letter /e/ and /g/ occasionally
	Wrote sentence fragments
December	Wrote "pupes" instead of pup
January	No errors on monthly spelling dictation
February	Very little self-correcting by rewriting over the incorrect letter
	Wrote "Frie" instead of "fry"
	Uses all capital letters for dictation words
	Wrote "Paty Likes pies." Instead of "Patty likes pies."
March	Linked all of the different words together with lines
	Appears like he wrote a backwards "1" before every different word
	Capitalized words that are not at the beginning of a sentence, but at the start of a new line
April	No errors
May	Wrote "chicken" instead of "chickens"
	Wrote "our" instead of "Our" at the beginning of a new sentence

Differentiated Instruction

The teacher's biweekly progress journal entries on the two chosen students and written descriptions of her differentiated lessons were analyzed using Tomlinson's (2003) differentiation activities. Differentiated instruction is a way of tailoring subject matter and how it is taught to each student to maximize learning (Tomlinson, 2003). This microgenetic analysis used Tomlinson's (2003) three classroom elements: content, process, and product. Content refers to what a student needs to learn or how students should access information. Process is how a student makes sense of the information, ideas, and skills that are essential to the lesson. For example, process is differentiated by adding greater complexity or abstractness to tasks, or by increasing the variety of ways in which students are asked to learn (e.g., writing a letter, drawing a picture, or acting it out). And, product refers to projects or activities that allow students to rehearse, apply and expand what they have learned. A good product allows for reflection and extension of understanding. Although these elements are treated as separate categories for the purpose of describing them, they are all related to one another and interwoven together within the activities of the classroom.

Ms. Smith modified the content of her lessons for both Tom and Chris. Tom was offered only key concepts of the lesson content. Ms. Smith chose to reduce the work load, for example, by limiting the number of new words per lesson to three rather than five. In contrast, Ms. Smith provided further elaboration on the core concepts for Chris by assigning extra work (e.g. working ahead in his Challenge workbook). Ms. Smith differentiated the content of the successful student's lessons more often than for the struggling student.

Ms. Smith differentiated the process of her instruction between the two targeted students. For Tom, she provided repetition, one-on-one instruction, and visual cues, such as a desk chart, pointing, and underlining to help him identify and make up for gaps in his learning so that he could move ahead. Ms. Smith also differentiated process with Tom by providing him with a scribe. The scribe, often Ms. Smith or another student, would write down Tom's ideas or answers for him. Occasionally, she would pair Tom with a successful student who would then help by reading for him so that he could finish the lesson. For Chris, Ms. Smith modified the pace at which he could move through the material of the lesson so that it was quicker. He was also paired with other students to offer help and guidance, thereby solidifying the concepts in his mind (Biemiller & Meichenbaum, 1998). Ms. Smith made great efforts in differentiating process so that both students came to understand the core information of the phonics lessons and could demonstrate their understanding in their own way.

Ms. Smith differentiated process and product for Tom with activities that were more structured and more concrete, with fewer steps, closer to his own experiences, and calling on simpler reading skills. In contrast, Chris was provided activities that were quite complex, open-ended, abstract, and multifaceted, drawing on more advanced reading materials. Both students were encouraged to extend their understanding through problem-based learning, which places students in the active role of solving problems. Tom was given clearly defined problems with few unknowns, such as filling in the missing letters from a word. Chris was given more complex problems with wider ranges of acceptable approaches, such as coming up with theories of how trains travel underground. Ms. Smith also had higher expectations for the Chris' work than for Tom's work, for example she

expected Chris to spell all of the dictation words correctly or write a four-page story, whereas Tom was expected to write a sentence unassisted. Ms. Smith effectively differentiated product by encouraging her two students to show what they had learned in a variety of ways.

This microgenetic analysis of how a first-grade teacher differentiated her instruction between a successful and a struggling student revealed that she effectively differentiated content, process, and product to support their differing ability levels.

Cognitive Scaffolding

A further microgenetic analysis was conducted on the amount and type of cognitive scaffolding provided by Ms. Smith to Tom and Chris she differentiated her instruction. A comparison of the type of processes used with the two students revealed that Tom received more structured support through instruction and modeling (see Table 4.5). In contrast, Chris was encouraged to engage in more self-directed activities (see Table 4.6). Tom engaged in more problem solving activities, such as daily phonics lessons which involved the students working through exercises in their workbooks. Each exercise had clearly defined goals and the students' work was corrected by the teacher and returned to the students as feedback. Tom also participated in imitation activities, such as observing those around him during a phonics lesson and imitating their actions or imitating how Ms. Smith stayed between the lines when she printed letters. Ms. Smith used imitation to supplement the problem solving activities and help him to understand the core concepts of the phonics lessons. Extra time was given to Tom for practicing this supporting schematic consolidation. In addition to structured cognitive scaffolding, mutual regulation, which is a more socially facilitated process, was used by his teacher in

providing instruction to Tom and having more experienced students in the classroom work with him. Ms. Smith also used mutual regulation as a way of providing emotional support for his learning, through praise and encouragement, as Tom was frequently frustrated and discouraged by his slow progress compared to his peers. Ms. Smith's positive affect bolstered Tom's self-esteem and was reciprocated to her and extended to his classmates.

Chris engaged in more self-directed, less structured regulatory processes than Tom. Chris frequently engaged in the process of exploration. As he was performing at the top of his class, he finished the lessons much more quickly than the other students and then engaged in exploration as a way of further applying and extending his newly developed schemata. For example, he would read independently on topics he was interested in and he would independently research questions he might have about a particular lesson using classroom and library books and the Internet. This independence allowed him to engage in more exploration activities than Tom, who was very dependent on the help of his teacher and peers to successfully complete the phonics lessons. Another regulatory process that Chris frequently engaged in was mutual regulation. Chris not only received instruction from Ms. Smith, but he also provided instruction to his peers. This transference of responsibility for task accomplishment is an outcome of effective scaffolding (Biemiller & Meichenbaum, 1998). Chris would often finish his work and then identify students sitting near to him who did not know how to complete the exercises in their phonics workbooks. He would then provide verbal or non-verbal instruction to help his peers understand the tasks. Chris would also supplement or modify his

instruction accordingly and not just give the "right" answers, as was observed by Ms. Smith. This teaching helped him further consolidate his schemata.

In summary, Ms. Smith provided cognitive scaffolding through regulatory processes (problem solving, exploration, imitation, and mutual regulation) to two students who differed in their level of academic functioning. Each child received scaffolding that was individualized in the combination of regulatory processes in order to accelerate their reading skills.

Table 4.5

Differentiated activities and regulatory processes for the struggling student

	Struggling Student	
Date	Differentiated Activities	Scaffolding
October	*Process:*	Problem Solving
	One-on-one assistance with teacher	Mutual Regulation
November	*Content:*	Problem Solving
	Eliminated words	Imitation
	Process:	Mutual Regulation
	Provided repetition	
	One-on-one assistance with teacher	
	Pointed to letter sounds on desk chart	
December	*Process:*	Imitation
	One-on-one assistance with teacher	Mutual Regulation
	Peers read out loud to model for him	
January	*Product:*	Problem Solving
	Practiced the beginning sounds	Mutual Regulation
	and simple sight words with his	
	mother before dictation	

Struggling Student

Date	Differentiated Activities	Scaffolding
February	*Process:*	Problem Solving
	One-on-one assistance with teacher	Mutual Regulation
	Teacher pointed to correct spelling	
March	*Process:*	Problem Solving
	One-on-one assistance with teacher	Mutual Regulation
	Teacher underlined specific words	
April	*Content:*	Problem Solving
	Extra work in his Reteach workbook	Mutual Regulation
	Process:	
	Peer-support provided help by	
	reading for him	
May	*Product:*	Problem Solving
	Partnered with a successful student	Mutual Regulation
	to work on a cross-word puzzle	

Table 4.6

Differentiated activities and regulatory processes for the successful student

	Successful Student	
Date	Differentiated Activities	Scaffolding
October	*Process:*	Exploration
	Worked ahead on his own	Mutual Regulation
	Helped other students	
November	*Content:*	Problem Solving
	Spelled other sight words	Exploration
	Process:	
	Worked ahead on his own	
	Checked his own work for letter reversal	
December	*Content and Process:*	Imitation
	Read independently at a faster pace	Mutual Regulation
	than the class	
January	*Product:*	Problem Solving
	Teacher had higher expectations for	
	him than for other students for the	
	dictation	

	Successful Student	
Date	Differentiated Activities	Scaffolding
February	*Content:* Extra work in his Challenge workbook *Process:* Helped other students	Exploration Mutual Regulation
March	*Content:* Extra work in his Challenge workbook *Process:* Worked independently at his own pace	Exploration
April	*Content:* Extra work in his Challenge workbook *Process:* Helped other students	Exploration Mutual Regulation
May	*Product:* Partnered with a struggling student to work on a cross-word puzzle	Problem Solving Mutual Regulation

Summary

The results of this study indicated that only the experimental group improved their standard score over time as measured by the Word Analysis Subtest of the CTBS. Thus, the students who received the explicit, systematic phonics instruction had significantly greater gains over time in reading skills than the students given the implicit phonics instruction. The results of the microgenetic analysis revealed that a teacher in the experimental group effectively provided cognitive scaffolding and differentiated her explicit phonics instruction to support the differing ability levels of two of her first grade students.

CHAPTER FIVE

DISCUSSION

The first specific question addressed in the present study was as follows: (a) Will students in the experimental group improve to a significantly greater degree in reading competency to the comparison group? Differences in learning that were demonstrated between the two groups will be discussed in detail in this chapter. In addition, a microgenetic analysis was conducted on two first-grade students from one of the experimental classrooms to answer the following specific questions: (a) Did a teacher in the experimental group effectively differentiate her explicit, systematic phonics instruction to support the differing ability levels of her two grade 1 students, and (b) Did a teacher in the experimental group provide cognitive scaffolding through regulatory processes (problem solving, exploration, imitation, and mutual regulation) and did this practice lead to improved specific reading skills in her two grade 1 students, who differed in their level of academic functioning. A discussion of how the findings of these analyses are relating to the literature is also presented in this chapter. The chapter will conclude with a discussion of limitations, implications, and directions for further research.

Overview of Results and Links to the Literature

The children in the experimental group made significantly greater gains over the year than the children in the comparison group ($p<.001$). The experimental group began the year at a much lower level of word analysis than the comparison group (See Table 4.1; Figure 4.1), yet at post-testing, the experimental group had gained nearly 20 standard points, whereas the comparison group gained just four standard score points. These

findings suggest that the children in the comparison group began the study with better reading skills than the children in the experimental group. These results also suggest that, compared to the comparison group who received implicit phonics instruction, the explicit phonics instruction offered to the experimental group was more successful in improving grade 1 students' word analysis skills, such as letter recognition, letter-sound correspondence, rhyming, and letter substitution. These findings are analogous with other studies that found explicit phonics instruction to be more effective in developing word analysis skills than implicit phonics instruction (Foorman, Fletcher, Francis, Schatschneider, & Mehta, 1998; NRP, 2000; Snow, Burns, & Griffin, 1998).

One explanation for these findings is that the explicit phonics instruction was more effective at teaching phonemic awareness than the implicit phonics instruction. Phonemic awareness is the abstract ability to process and manipulate phonemes in spoken syllables and words (NRP, 2000). Research has repeatedly found that phonemic awareness plays an essential role as a precursor to learning phonics rules and subsequently, reading instruction (Adams, 1990; 2002; Goswami & Bryant, 1990; Nicholson, 2006; NRP, 2000; Santi, Menchetti, & Edwards, 2004). In explicit phonics programs, children learn right from the start about the function of letter sounds in all positions in words, sounding and blending them for pronunciation. However, in implicit phonics programs, children initially learn letter sounds most often at the beginning of words (Johnston & Watson, 2004). Explicit phonics instruction provides children with a technique of knowing not only initial sounds, but also medial and ending sounds so that they can independently decode unfamiliar words.

Caution must be taken when interpreting these results however, as the effect sizes were small and other explanations are possible. The explicit phonics program may have been more efficient and led to more rapid initial rates of growth, but it is possible that the effects of the implicit phonics approach are cumulative so that longer term outcomes are not different, as proposed by Foorman and her colleagues (1998). If the present study followed these same children for another year, the rate of growth for the comparison group may have been similar to that of the experimental group.

Another explanation might be that the children in the experimental group, who were so much lower in their reading skills at pre-testing than the comparison group, simply caught up to the comparison group and these gains could have been achieved by an implicit phonics program. However, findings show that children experiencing difficulties learning to read are likely to stay behind their peers in literary achievement (Adams, 1990). For example, Juel (1988) found that children reading below grade level at the end of first grade were more likely to be poor readers in later years. The Matthew effect, whereby the rich get richer in reading and the poor get poorer in reading, may help explain certain aspects of reading failure (Stanovich, 1986). Children, who enter school with a good sense of phonemic awareness due in part by their literate-rich pre-school environments, are able to quickly and easily comprehend the alphabetic principle (Adams, 1990). On the other hand, children from environments that are devoid of books and oral stories sometimes enter school without a strong phonemic awareness, and without appropriate instruction in the beginning stages of reading these children are likely to commence the downward spiral of the Matthew effect. It is remarkable that the children in the experimental group made such impressive gains on the post-test given that

they were so low on the pre-test compared to the scores of the children in the comparison group, in light of the Matthew effect. The explicit, systematic phonics instruction may have contributed to their extraordinary success in grade 1.

A microgenetic analysis of two grade 1 students' of differing ability levels demonstrated substantial growth in their reading skills. Although there were individual differences in the rate and amount of growth, both children improved their phonemic awareness and phonics skills, spelling, vocabulary, and writing during instruction. Though, it may be possible that these changes occurred simply because the children grew older over the course of the academic year, it is likely due to the instructional context, intensive practice, and peer interaction. Looking at just the outcomes, the successful student, who was retained in grade 1, achieved a standard score of 159 (90^{th} percentile) on the Word Analysis Subtest of the CTBS at the beginning of the school year. At the end of the year, he attained a standard score of 223 (98^{th} percentile). The struggling student, who had a mild cognitive disability and was retained in Kindergarten, achieved a standard score of 139 (53^{rd} percentile) on the pre-test and a standard score of 153 (26^{th} percentile) on the post-test. The pre- and post-tests differ in the level of skills they assess. The pre-test, Word Analysis Subtest Form K Level 6, assesses letter identification and letter-sound correspondence. The post-test, Form K Level 7, assesses more advanced skills, such as the ability to recognize phonographs and manipulate letter substitutions in words. Although Form K Level 7 is designed for students in mid-grade 1 to mid-grade 2, the difference between the skills assessed by the pre- and the post-tests were not yet mastered by Tom.

The strength of the microgenetic method is that it looks beyond outcomes to examine the actual process of learning. Although, the CBTS demonstrated Chris improved his word analysis capabilities over the school year, by additionally examining his writing output in the microgenetic analysis, there is evidence that he may not have been stimulated adequately by the phonics lessons. Many of his lessons have doodles and markings that indicate some sort of mental games he may have played as a way of further keeping himself occupied. These findings indicate that Chris may have scored even higher at post-testing had he been given more challenging tasks.

Even though throughout most of the school year Tom was not able to correctly match the sounds with the corresponding letters, nor to identify certain letters of a word, improvements in his phonics skills were apparent towards the end of the year. He began using more difficult spelling patterns in his writing, and he expanded his written vocabulary and understanding of simple grammar and syntax rules. However, these gains in phonemic awareness and phonics, spelling, vocabulary, writing development did not translate into a large improvement on the post-test. An explanation for this finding is that as Tom was retained in Kindergarten, he had time to develop his phonemic awareness and other reading skills that are taught in Kindergarten over two years and thus, was able to achieve at the 53rd percentile on the pre-test (Level 6), which assesses entry-level grade 1 word analysis skills. But since the post-test measures more advanced skills than the pre-test (e.g., entry-level grade 2 word analysis skills) Tom only scored at the 26th percentile on the post-test (Level 7). Although he performed in the lower quarter of his class when assessed on the post-test, Tom gained 14 standard points over the year.

An explanation for this finding is that students with mild cognitive disabilities have more difficulty translating learned phonics skills into different contexts. Although this student displayed letter recognition and letter-sound correspondence in his daily phonics instruction, these skills did not generalize to other instructional tasks and situations. Perhaps Tom understood the phonics content, especially with cognitive scaffolding provided by Ms. Smith and his classmates, but he wasn't ready to extend his understanding independently in the post-testing context.

It is well known that children learn in different ways, and evidence suggests that differentiated instruction not only supports this view, but also creates optimal learning conditions for each child. The microgenetic analysis revealed that Ms. Smith effectively differentiated the content, process and product of her instruction between a successful and a struggling student. Each type of classroom element was differentiated to accommodate both children's level of academic functioning.

There is an ebb and flow to learning especially when task demands exceed processing capabilities or scaffolding is provided to children. Certain learning tasks promote schema construction through meaningful mental actions by reasoning about meaningful real-life experiences and by elaborating on current schemata with new information (Merrienboer & Paas, 2003). To optimize learning, information must be presented in a way that children's limited processing capacity or working memory is not overloaded. Scaffolding or cognitive support decreases cognitive load (Case, 1985; Merrienboer & Paas, 2003). The cognitive scaffolding provided by Ms. Smith reduced the two targeted children's cognitive loads and enabled Tom and Chris to engage in regulatory cognitive processes that lead to hierarchical integration of cognitive schemata.

The types of regulatory processes used by the students differed. Chris engaged in more exploration and mutual regulation processes, whereas the Tom engaged in more problem solving and imitation processes. This finding indicates that regulatory processes can be differentiated successfully to accommodate students of varying levels of academic functioning and led to improved reading skills.

The analysis also showed that these two students used some unanticipated (but intuitively reasonable) strategies that helped them develop reading competence in the classroom. For example, when task demands were increased, Tom repeatedly copied the answers from his peers or when Chris finished his work well before his classmates, he provided scaffolding as a peer tutor. Although Ms. Smith discouraged the copying by the struggling student, this type of imitation process worked for him for a time until independent work was possible. The mutual recognition process engaged in by the Chris in the role of the "teacher" not only led to schematic construction, but also an increase in confidence and interest in the subject matter.

Although, the microgenetic method is highly praised by some researchers, it has been criticised by others for being costly, time consuming, and not using control conditions or large enough sample sizes for generalization (Pressley, 1992). Sielger (1991; 2005) argued, however, that microgenetic analysis studies are well worth the time and money spent on conducting them because they yield precise observations and the density of information gained broaden our understanding of children's learning. The data reported in this study demonstrate that the microgenetic method offers insight into issues related to the ways in which reading knowledge builds and changes in individual children.

Limitations of the Current Study

There were differences between the comparison group and the experimental group, thus limiting the generalizabilty of the findings from this study. At pre-test, the children in the comparison group had greater reading skills than the children in the experimental group. Additionally, the participants in this study were not screened for disorders and disabilities which may contribute to poor reading skills and, consequentially, one group may have had disproportionately more poor readers than the other group.

A factor that was impossible to account for was the impact that different instructors may have had upon the study results. The teachers ranged in years of teaching experience, style, and effectiveness. It is difficult to say whether some of the differences in group results were derived from factors associated with the particular teacher(s) addressing each classroom. Levels of enthusiasm for phonics, general knowledge of phonics and particular teaching styles are only some of the ways in which the teachers may have varied. Therefore, a repeat of the current study would be helpful in order to better control for effects that may be attributable to teaching style or personality of the teacher.

Another limitation of this study was that differentiated instruction was not taught within the context of implicit, systematic phonics instruction in the comparison group as it was with the explicit, systematic instruction in the experimental group. Additionally, the measure that was chosen to assess the students reading competencies did not directly assess reading comprehension, which according to Adams (1990) is the main goal of

reading. However, reading comprehension depends heavily on word analysis skills. Thus the two are interrelated.

Implications

The current study has several implications for phonics instruction in grade 1 as follows. Positive results for the group receiving systematic, explicit phonics instruction support the use of this instructional approach for developing reading competence in first grade children. Curricular choice and incorporation of phonemic awareness into the grade 1 curriculum may be more effective with an explicit phonics approach. Although it has been suggested that systematic phonics programs (i.e., those having a standardized instructional sequence) may reduce teacher interest and motivation, employing pre-service training and ongoing in-service training, as was done in this study, may minimize this possibility (NRP, 2000).

Explicit phonics instruction can be differentiated for students of varying interests and level of academic functioning. Children who demonstrate low achievement in reading seem to benefit from explicit phonics instruction, although some may need additional support and practice. Children who demonstrate high achievement in reading also seem to benefit from explicit phonics instruction, although some may need supplementary content and the flexibility to work at a faster pace than the rest of the class.

Regulatory processes, such as problem solving, exploration, imitation, and mutual regulation, can also be differentiated within explicit phonics instruction. Differentiated regulatory processes not only lead to hierarchical integration of reading schemata, but also increase students' interests and confidence levels. Differentiated instruction and

regulatory processes have implications for creating a more powerful learning environment by optimizing learning information for each student.

A child with mild cognitive disabilities in this study was able to learn phonemic awareness and phonics, spelling, vocabulary, writing skills over the course of the academic year however he performed in the lower quarter of his class when assessed on entry-level grade 2 word analysis skills. These findings demonstrate the importance of assessing children's reading skills in a variety of ways to meet the needs of diverse learners and not just focusing on the outcomes of test scores.

Directions for Future Research

Issues raised by this study are in need of greater understanding through further investigation. Some teachers in the comparison group differentiated aspects of their literacy instruction, but during the present study, differentiated instruction was not a specified element of the language arts grade 1 program (Alberta Learning, 2000). It would be interesting to investigate whether combining implicit, systematic phonics instruction and differentiated instruction would yield similar improvement in reading skills in grade 1 children, as was the case with the experimental group. Additionally, a further exploration of the effects of explicit and implicit phonics instruction on reading development over a longer period of study would be useful in determining any difference in the rate of growth overtime. Further investigation of how to best to support the reading development of students with mild cognitive disabilities with explicit phonics instruction would also be worthwhile. For example, less advanced students are rarely given the responsibility for task construction or the opportunity to assist other students because they are struggling with their teachers to keep up with the grade-level curriculum

(Biemiller & Meichenbaum, 1998). This type of investigation could support the creation of appropriate instructional techniques so that less advanced students are provided with all constructive tasks at which they could succeed with scaffolding.

Conclusions

This exploratory study investigated the relative effects of two methods for teaching phonics to grade 1 students. The comparison group used systematic, implicit phonics instruction, whereas the experimental group used systematic, explicit phonics instruction. The experimental method also used differentiated instruction. In a statistical analysis of a pre- and a post-test measuring word analysis, significant differences were found between instructional groups. The experimental group had significantly greater gains than the comparison group over time. An explanation for these findings may be that explicit phonics instruction may be more effective at teaching phonemic awareness, than implicit phonics instruction. The results of a microgenetic analysis revealed that a teacher in the experimental group effectively provided cognitive scaffolding and differentiated her explicit phonics instruction to support the differing levels of academic functioning of two of her grade 1 students. Although there were individual differences in the rate and amount of growth, both targeted students improved their standard scores over the year. Despite the limitations of this study, the results provides further evidence for the importance of systematic, explicit phonics instruction in the early stage of learning to read and have important implications for curriculum choice and reading instruction in grade 1.

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APPENDIX A

Targeted Differentiated Lesson

Date _____ Student _____

The focus of my lesson: _____
Why I want to differentiate this lesson for this child:

_____
_____

How I am differentiating this lesson for this child:

_____
_____
_____

How this child performed/responded:

_____
_____
_____
_____

Concerns:

_____
_____
_____

Positives:

_____
_____
_____

Where do we go from here…

_____
_____
_____

Student work sample attached that illustrates this differentiation: YES ☐

Comparison student work sample attached that illustrates the difference between targeted child and another more average functioning student. YES ☐

APPENDIX B

Experimental Group Parent/Guardian Consent Form

Research Project Title: Customizing Literacy Development

Investigator: Dr. Anne McKeough

Sponsor: Networks of Centres of Excellence (CLLRNet)

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. 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.

We are inviting you to participate in a research study, entitled Customizing Literacy Development, being conducted by Dr. Anne McKeough of the University of Calgary. Our aim is to measure the effects of a developmentally-based literacy program involving children who attend Kindergarten through grade three. Our general methodology will involve, first, identifying where on the multiple pathways to literacy development individual children are located and, second, supporting them in their construction of literacy skills and practices by building bridges from their current level of functioning to subsequent levels on their developmental trajectory. This approach will allow instructors to deliver customized, developmentally appropriate experiences within the constraints of group-oriented classrooms. We will compare students' performance in the developmentally-based, customized program to the performance of students who are being offered their usual program. Regular classroom teachers will do all teaching. To evaluate the relative merits of the two programs, the usual assessments will be made by teachers. As well, students' response to the program will be documented through observation and anecdotal comments by the classroom teacher, in the usual manner.

All children in the class will participate in the instruction. However, only children whose parents sign this consent form will participate in the research study (i.e., have their work and the teacher's observations made available to the researchers). This research involves no risks beyond those normally experienced in daily life.

All participants in the study will remain anonymous through the replacement of personal names by ID numbers. The master ID list and data collected will be kept in a locked file cabinet in the researcher's office and will be destroyed five years after completion of the analysis of the data. The rest of the printed data cannot be linked to the participant without the consent form and will be stored separately from the consent forms. It will also be kept in a locked filing cabinet and destroyed five years after the completion of data analysis. All computer records will be erased five years after the completion of data

analysis. Finally, research data will be reported anonymously in academic presentations, publications and reports. When work samples are presented, all identifying material will be removed. These data will be available (with identifying information removed) to the project funder.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to have your child participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw your child from the study at any time with no penalty to you or your child. As well, if the teacher does not believe the instruction and research are in the best interests of her students she may withdraw from the study. In such circumstance, you will be informed by the researcher immediately. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your child's participation.

The investigator will, as appropriate, explain to your child the research and his or her involvement, and will seek his or her cooperation throughout the project. If you wish to have further information about this research study, please contact Dr. Anne McKeough at 220-5723.

If you have any questions or issues concerning this project that are not related to the specifics of the research, you may also contact the Research Services Office at 220-3782 and ask for Mrs. Patricia Evans.

If you are willing to allow your child to participate, please retain this informational letter for your records and reference and return the attached consent form to your child's teacher.

APPENDIX C

Comparison Site Parent/Guardian Consent Form

Research Project Title: Customizing Literacy Development

Investigator: Dr. Anne McKeough

Sponsor: Networks of Centres of Excellence (CLLRNet)

Dear Parent or Guardian:

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. 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.

We are asking you to allow your child to participate in a research study, entitled Customizing Literacy Development, being conducted by Dr. Anne McKeough of the University of Calgary. Over the past year, we have been conducting a research study entitled Customizing Literacy Development. Under the direction of Dr. Anne McKeough, of the University of Calgary, we have been using a developmentally-based literacy program in several other Kindergarten and Grade1 classrooms in the Golden Hills School Division. Now, we are ready to evaluate the effectiveness of the program. To do this, we need to compare the academic achievement of students receiving our experimental program with that of children receiving the typical instruction program. Because your child has been receiving the typical instruction program, we are asking permission to conduct an assessment of his/her language arts achievement, for comparative purposes. The assessment will be a pencil and paper task that measures students reading level. It will be administered by your child's regular classroom teacher in a large group and should tale no longer than one hour, in total. As is no doubt evident, this research involves no risks beyond those normally experienced in daily life.

All participants in the study will remain anonymous through the replacement of personal names by ID numbers. The master ID list and data collected will be kept in a locked file cabinet in the researcher's office and will be destroyed five years after completion of the analysis of the data. The rest of the printed data cannot be linked to the participant without the consent form and will be stored separately from the consent forms. It will also be kept in a locked filing cabinet and destroyed five years after the completion of data analysis. All computer records will be erased five years after the completion of data analysis. Finally, research data will be reported anonymously in academic presentations, publications and reports. These data will be available (with identifying information removed) to the project funder.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to have your child participate. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw your child from the study at any time with no penalty to you or your child. As well, if the teacher does not believe the research is in the best interests of her students, she may withdraw from the study. In such circumstance, you will be informed by the researcher immediately. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your child's participation.

The investigator will, as appropriate, explain to your child the research and his or her involvement, and will seek his or her cooperation throughout the project. If you wish to have further information about this research study, please contact Dr. Anne McKeough at 220-5723.

If you have any questions or issues concerning this project that are not related to the specifics of the research, you may also contact the Research Services Office at 220-3782 and ask for Mrs. Patricia Evans.

If you are willing to allow your child to participate, please retain this informational letter for your records and reference and return the attached consent form to your child's teacher.