

**ASSESSING THE EFFECTIVENESS OF
A CULTURAL CURRICULUM TO IMPROVE EARLY LITERACY OUTCOMES
FOR KINDERGARTENERS**

by

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Abstract

Low literacy is a challenge facing Aboriginal communities across Canada and is an identified barrier to school success. Early literacy intervention is an important target to reduce the discrepancies in literacy outcomes. Little has been studied in relation to Aboriginal culture coupled with early literacy and its effects on student development. The Moe the MouseTM Speech and Language Development Program (Gardner & Chesterman, 2006) is a cultural curriculum created to improve the early language skills of students aged three to five through the use of traditional images and stories. The Moe the MouseTM program was designed to be a cultural curriculum that provides opportunities for children to practice language skills, but its effectiveness in improving early literacy skills has yet to be assessed. An enhanced Moe the MouseTM program, created by the researcher, integrates explicit instruction in phonological awareness into the Moe the MouseTM program.

The purpose of this study was to evaluate the effectiveness of the Moe the MouseTM Speech and Language Development Program and an enhanced Moe the MouseTM program that was coupled with explicit early literacy instruction on student phonological awareness skills. One hundred Kindergarten students at six elementary schools participated in this study. Participants were assigned to one of three conditions: comparison (business as usual), Moe the MouseTM, or enhanced Moe the MouseTM. Before and after the intervention, phonological awareness skills of the Kindergarten students were assessed. Analysis of covariance (ANCOVA) indicated significant differences in advanced phonological awareness skills based on the classroom but not the condition. Upon post hoc analysis by condition, results indicated that there were significantly stronger effects on advanced phonological skills for the enhanced Moe the MouseTM condition

when compared to the Moe the MouseTM program or the district's early literacy instruction. Aboriginal and non-Aboriginal students responded similarly within the Moe the MouseTM and enhanced Moe the MouseTM conditions. After the intervention, a smaller proportion of students from the enhanced Moe the MouseTM program fell in the "At Risk" category for later reading difficulties. Additionally, the teachers rated both programs as socially valid and containing appropriate cultural content.

Preface

This thesis consists of original research conceived by the graduate student, with advisement from her research supervisor. The graduate student was primarily responsible for data collection, recruitment, analysis, and writing, and thus, this thesis represents her work as lead researcher and author. Ethics Approval was required by the UBC Behavioural Research Ethics Board (BREB) to conduct this research. The UBC BREB certificate number is H09-01360.

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Chapter 1: Introduction

A significant gap in school achievement exists between Aboriginal and non-Aboriginal students (Canadian Council on Learning, 2008; Cowley & Easton, 2006). Several general factors have been identified as barriers to learning for all struggling students, regardless of ancestry. These factors include a lack of school readiness, absenteeism, and mobility (Canadian Council on Learning, 2008). Additional barriers to educational success among Aboriginal populations in particular include the intergenerational effects of Indian Residential schools (J. Ball, 2008), discrimination and institutional insensitivity toward Aboriginal cultures, and a lack of awareness of Aboriginal approaches to learning (Strand & Peacock, 2002). Due in part to this socio-cultural marginalization, many Aboriginal students currently experience significant risk factors for challenges in the Canadian educational system (e.g., minority status, poverty, minority language, having a disability, or being raised by a parent with a disability). The relevance of school curricula to the worldviews and culture of Aboriginal students may also contribute to an achievement gap between Aboriginal and non-Aboriginal students (United Nations Educational Scientific and Cultural Organization, 2009).

Literacy

One particularly important area in this achievement gap is literacy. Most children who have problems learning to read come from low-income families (Ellis & Large, 1987). In 2005, in Canada, 21.7% the country's population identified as Aboriginal had incomes below Statistics Canada's low income cut-off after tax, compared to 11.1% for the non-Aboriginal identity population (Statistics Canada, 2006). Low literacy is one of many challenges facing Aboriginal communities across Canada, and among both Aboriginal and non-Aboriginal peoples, those with higher levels of education generally have stronger literacy skills (Canadian Council on Learning,

2008). Therefore, quality literacy instruction represents a critical means to reduce the achievement gap. It is obvious that positive learning experiences, especially in an individual's early years, are crucial to school success. As such, it is important to identify early literacy skills that can be changed to increase positive trajectories, because the earlier that support is provided, the more likely it is that reading outcomes can be improved (Vaughn & Fuchs, 2003; Vaughn, Linan-Thompson, & Hickman, 2003; Vaughn, Mathes, Linan-Thompson, & Francis, 2005).

Aboriginal students tend to experience reading failure more often when compared to their same-age peers in the general population. Moreover, Aboriginal students who have dropped out of school have reported that reading difficulties contributed to their decision to leave (Dehyle, 1992). Fortunately, these challenges can be addressed, therefore increasing Aboriginal student success. Achievement gaps in mainstream schools are neither necessary nor absolute. For example, Aboriginal children who read or were read to were less likely to repeat a grade (Statistics Canada, 2004). Of those children who did not read or were never read to, 26% repeated a grade. Reading just a few times a week decreased this risk by half.

Phillips and colleagues (2004) provide an example of a school-based intervention to reduce the literacy gap for children of minority Maori and Pacific Islands heritage in low income schools. An intervention that consisted of modified instruction in early literacy demonstrated that it is possible to raise achievement to near the national average for minority children in schools serving low socioeconomic communities. These results point to early literacy intervention as an important target to reduce the discrepancies in educational outcomes. Therefore, both early literacy instruction and culturally responsive teaching may be needed to reduce the achievement gap between Aboriginal and non-Aboriginal students.

The Importance of Early Literacy

Children who struggle with learning to read represent an important focus for general and special educators. Those who do not develop effective reading skills in Grade 1 tend to dislike reading and read considerably less material than good readers, both in and out of school (Juel, 1988). Individual differences in reading can be observed through the "rich-get-richer" phenomenon known as the *Matthew Effect* (Merton, 1968). Children with higher reading skills tend to read more outside of school and continue to expand their skills and vocabulary, while children with lower reading skills read less and fall further behind (Stanovich, 1986). Consequently, early success in reading appears critical to positive literacy outcomes.

Research has consistently shown that reading skill is a powerful predictor of academic failure and high school dropout (Ensminger & Slusarcick, 1992; Lehr, Johnson, Bremer, Cosio, & Thompson, 2004; McIntosh, Flannery, Sugai, Braun, & Cochrane, 2008). Juel (1988) sampled students from low socioeconomic backgrounds and found the probability that a poor reader at the end of Grade 1 would remain a poor reader at the end of Grade 4 was .88. Additionally, if a child had at least average reading skills in Grade 1, the probability that he or she would become a poor reader in Grade 4 was only .12. The evidence from this sample indicates that without intervention, poor Grade 1 readers tend to remain poor readers by the end of Grade 4 and beyond.

Kindergarten represents a critical time in which children acquire knowledge about oral and written language (Dickinson, McCabe, & Essex, 2006). This acquisition of an early knowledge base of literacy is known as early literacy. It is defined as the concepts, skills, and knowledge of young children in the years that precede conventional literacy instruction (Kaderavek & Sulzby, 1998). Foundational skills for learning to read include identifying and segmenting phonemes (phonological awareness), recognizing and producing letter-sound

correspondences and decoding a variety of word types (alphabetic principle), reading connected text accurately and fluently, vocabulary, and comprehension (Cummings, Kaminski, Good, & O'Neil, 2011; Hosp & MacConnell, 2008).

Generally, it is well accepted that children benefit more from formal reading instruction when they enter school with a strong early literacy foundation. A number of empirical studies support the power of early literacy skills to predict later literacy achievement (Badian, 2000; Catts, Fey, Zhang, & Tomblin, 1999; Lovett et al., 2008; Stuart, 1995; Torgesen, Wagner, & Rashotte, 1994). If children acquire foundational skills during early childhood, fewer than 5% may experience serious reading difficulty, rather than population estimates of 20% to 30% (McIntosh, Chard, Bolland, & Horner, 2006; Snow, Burns, & Griffin, 1998).

Phonological Awareness

It is possible to provide developmentally appropriate early literacy instruction that prevents future reading difficulties. Research has identified key foundational skills that are necessary for children entering Kindergarten to succeed in learning to read. One particularly important skill in Preschool and Kindergarten is phonological awareness (McConnell & Missall, 2008; Torgesen et al., 1994). Phonological awareness, the most powerful predictor of reading skills, is the understanding of and ability to manipulate the individual sounds within words (Adams, Foorman, Lundberg, & Beeler, 1998) and refers to the conscious awareness of the sound structure of speech, as opposed to its meaning (Torgesen, Wagner, Rashotte, Alexander, & Conway, 1997). For all students, including those with English as a first language and English learners, phonological awareness is an important pre-reading skill and predicts future reading achievement (Catts, Hogan, & Fey, 2003; Chiappe, Glaeser, & Ferko, 2007; Felton & Pepper, 1995; Lesaux & Siegel, 2003; Lovett et al., 2008; Stanovich, Siegel, & Gottardo, 1997; Torgesen

et al., 1999). Phonological awareness is essential in reading because to understand the alphabetic principle of written English (i.e., speech sounds in the alphabetic writing system are represented by specific graphics in the form of alphabet letters), children must understand that words are composed of sound segments (Rathvon, 2004).

Recent research suggests phonological awareness transfers across languages and is related to literacy performance in acquired languages (Lesaux & Siegel, 2003; McBride-Chang & Kail, 2002). For example, Quiroga, Lemos-Britton, Mostafapour, Abbott, and Berninger, (2002) found that phonological awareness in one's non-English first language predicted phonological awareness in English and English word reading. The researchers concluded that phonological awareness transfers across first and second languages and across oral and written language.

Deficits in phonological awareness are the primary causes of most reading disabilities (Rathvon, 2004). When poor readers in Grade 3 or 4 are asked to read grade-level text and encounter an unfamiliar word, they typically over rely on guessing the word based on the context or meaning of the passage. Their ability to decode letters to identify these words is usually severely impaired. In turn, poor readers produce a high rate of word-level errors in their reading, which adversely affects comprehension (Torgesen, 2002).

Fortunately, there is clear evidence that phonological awareness is teachable (Lovett et al., 2008; Shaywitz et al., 2004), making it a critical target for improving reading skills and other outcomes. For example, Kindergarteners who start school with phonological awareness deficits but are taught these skills are at considerably reduced risk for both reading failure and chronic problem behaviour (McIntosh, Sadler, & Brown, in press). These findings indicate that student outcomes could be enhanced if sufficient phonological awareness instruction occurred in Preschool and Kindergarten (Juel, 1988).

Phonological Awareness Instruction

Two critical components to building phonological awareness in early reading instruction are developing oral language vocabulary for students and teaching material explicitly (Biemiller, 2006; National Reading Panel, 2000). Students who enter Grade 1 low in knowledge about the phonological features of words or who have difficulties processing the phonological features of words are at high risk for difficulties in reading (Torgesen, 2002). Phonological awareness skills lie on a continuum of complexity; blending and segmenting onset-rimes is less complex than blending and segmenting individual phonemes (Chard & Dickson, 1999). Within phonological awareness instruction, teaching the larger units (onset-rime; referred to in this paper as basic phonological awareness) then the smaller units (individual phonemes; referred to in this paper as advanced phonological awareness) can increase students' success, especially struggling learners (Chard & Osborn, 1998). Both are high priority skills, but one subsumes the other in a hierarchy of skill development. Specifically, the combination of blending and segmenting instruction has been found to encourage generalized phonological awareness (O'Connor, Jenkins, & Slocum, 1995). Students may require explicit and systematic instruction to help them acquire the knowledge and strategies necessary for decoding print (Neuman, 2006).

A study by Lundberg, Frost, and Ole-Peter (1988) demonstrated that phonological awareness can be developed among Preschool students with explicit instruction. Their training program involved a variety of games, nursery rhymes, and rhymed stories. Children who received the program showed dramatic gains in phonological awareness skills. These positive effects persisted at one year follow up.

Another study evaluated the effects of training in phonological awareness and instruction in letter names and letter sounds on Kindergarteners' reading and spelling skills (E. W. Ball &

Blachman, 1991). Ninety students were randomly assigned to one of three groups. The first group received training in phonological awareness, the second group received training in language activities only, and the third group acted as a control. Results indicated that the group that received phonological awareness training significantly outperformed both the language activities group and control group on phoneme segmentation (i.e., segmenting words into their individual sounds) at posttest. There were no significant differences between the language activities group and control group. An interesting additional finding was that students who received instruction in phonological awareness were able to generalize the training to novel situations.

One recent study addressed whether 166 struggling readers from linguistically diverse backgrounds differed in their response to remedial reading programs (Lovett et al., 2008). Students were randomly assigned to a phonologically-based reading intervention or business-as-usual comparison condition. The reading intervention emphasized phonologically-based word attack and word identification training while focusing on remediation of basic reading skills. The comparison program was the material typically taught in that school's special education classes or resource rooms. Reading and reading-related outcomes were assessed before, during, and following 105 hours of intervention. Students who received the phonologically-based intervention had significantly better outcomes compared to the comparison condition on reading real and nonsense words. This and other studies have found no differences between English as a first language students and English learners in intervention outcomes or growth during intervention (e.g., Geva & Yaghoub Zadeh, 2006).

Cross Cultural Validity of Early Literacy Assessment Measures

Though effective instruction is critical, another essential need is to determine student performance with assessment measures that are valid across cultures. These measures need to be

not only accurate, responsive to the effects of interventions, and valid predictors of later reading outcomes, but also unbiased for all groups for whom inferences will be made. Research findings have suggested that invalid results or lower test scores have been found for Aboriginal students when compared to non-Aboriginal students on cognitive measures (e.g., Wechsler Intelligence Scale for Children; Mushquash & Bova, 2007). However, curriculum-based measurement is a promising approach for meeting the above mentioned requirements. Curriculum-based measurement refers to a family of tools for direct assessment of student performance that is tied to school curricula (either basic skills or content areas), sensitive to change in student achievement, and can be administered frequently by educators (Deno, 1992; Reschly, Busch, Betts, Deno, & Long, 2009).

Results from two studies show strong predictive validity of curriculum-based measures in reading and support the use of these measures for screening and progress monitoring with Native American students. Pearce and Gayle (2009) showed that reading skill, as measured by DIBELS Oral Reading Fluency, was a robust predictor of reading comprehension (i.e., the student would be proficient in reading comprehension if oral reading fluency scores, as measured by DIBELS Oral Reading Fluency, were above the benchmark criterion) on a state measure of adequate yearly progress across both Grade 3 American Indian ($n = 115$) and White cohorts ($n = 428$). In another study, Stage (2001) evaluated growth of a sample of Grade 2 students ($n = 99$) in DIBELS Oral Reading Fluency over the course of a school year. The sample was ethnically diverse, with 60% from Native American backgrounds. Results showed that students' Grade 1 DIBELS Oral Reading Fluency performance significantly predicted initial Grade 2 DIBELS Oral Reading Fluency performance. Results from these studies provided cross cultural validity

evidence that DIBELS Oral Reading Fluency, a curriculum-based measure of reading skill, is valid for predicting English reading outcomes for American Indian students.

To date, the cross cultural validity of curriculum-based measures of early literacy, such as phonological awareness, have not been researched as extensively as oral reading fluency. However, Kindergarten phonological awareness measures have been found to predict later reading skills similarly for English only and English Language Learners (Linklater, O'Connor, & Palardy, 2009). In addition, Hagans (2008) found that DIBELS Phoneme Segmentation Fluency (a standardized, individually administered assessment of phonological awareness) scores provided valuable information to inform literacy intervention regardless of socioeconomic background.

To examine cross cultural validity when little research is available for specific measures, researchers have used a theoretical frame of reference to understand and interpret student performance on tests in relation to the degree of cultural loading (i.e., test requires specific knowledge of or experience within the mainstream culture) and language required by the test (i.e., linguistic characteristic of the test). Validity of tests can be compromised if some unintended constructs (level of acculturation to the dominant culture or English-language proficiency) have been measured instead of the construct of interest (Flanagan, Ortiz, & Alfonso, 2007). Researchers have measured tests with the Culture-Language Test Classifications (C-LTC; Flanagan et al., 2007). Subtests are categorized in a 3 x 3 table based on degree of cultural loading and linguistic demand (high, moderate, low), though the approach currently has limited research support (Kranzler, Flores, & Coady, 2010). The Woodcock-Johnson Tests of Achievement has been assessed, and a number of subtests measure early literacy skills. Sound Awareness measures the student's ability to rhyme words and manipulate phonemes. This

measure is comparable to DIBELS Phoneme Segmentation Fluency, and the subtest is classified as having a moderate degree of linguistic demand and a low degree of cultural loading (Ortiz, 2005). In contrast, other subtests measuring early literacy, such as Reading Fluency, Passage Comprehension, Picture Vocabulary, and Reading Vocabulary, are classified as having high linguistic demand and moderate to high cultural loading. As a result, this system has rated a measure assessing phonological awareness as having lower linguistic and cultural demands than other possible measures to assess early literacy.

Sources of cultural bias in measures may include a test's content and response format. Regarding content, the DIBELS phonological awareness measures assess skills in dividing single words into individual phonemes (e.g., in the word cat, /k//a//t/). The measures assess skills needed in learning to read, and because phonological awareness is highly predictive of reading across student backgrounds, the content does not appear to be inherently biased if the goal is to predict English reading skill, even if students from different cultural backgrounds may have different home exposure to the skill. As phonological awareness skills are assessed in Preschool and Kindergarten, students may not have been exposed the skill in school yet. Therefore, students' responses may depend on what they have learned in their home environments. Students from some cultures may be more likely to be exposed to material in their home environments that is likely to have a positive effect on their test performance than students from other cultures (Evans-Hampton, Skinner, Henington, Sims, & Mcdaniel, 2002).

Though DIBELS directions and items are presented in English, and the test relies on students' receptive-language ability in order to comprehend the administrator's instruction, the response is not dependent on student vocabulary knowledge or exposure to the word, and skills could easily be assessed with words from any language. In addition, because there is no use of

print in the measure, decoding and reading written language systems are not prerequisite skills for the measure. Regarding response format, the timed nature of the test may lead to biased results. Students may be asked to orally produce sound segments in a 1-minute timed test while responding. Researchers have suggested that students from different cultures may have different concepts of time, and therefore may respond differently when being timed (Evans-Hampton et al., 2002).

Incorporation of Aboriginal Culture into Classroom Curricula

As previously discussed, effective instruction and culturally valid assessment measures are vital, but there is also an important need for students to be engaged at school. A school climate in which Aboriginal students feel welcomed and valued may help overcome feelings of alienation toward schooling (Canadian Council on Learning, 2008). Such outcomes may be attained by including Aboriginal content and approaches to learning within mainstream curricula and developing an understanding of Aboriginal approaches to learning (National Board of Employment Education and Training, 1995). A culturally responsive approach to teaching can be defined as using the traditional values and beliefs, incorporating both Indigenous and Western knowledge, and prior experiences of diverse students to make learning more appropriate and effective across content areas (Gay, 2000; Starnes, 2006). Culturally responsive teaching is important in British Columbia's increasingly diverse classrooms, for example, highlighting the importance of Aboriginal culture may teach all students about the values and culture of historically marginalized communities. Incorporating positive aspects of Aboriginal culture into classwide curriculum may help teach students to know and praise their own and each others' cultural heritages. To ensure a culturally responsive approach to education, Klingner and colleagues (2005) suggest incorporating culture, language, heritage, and experiences to facilitate

learning. When the strengths of a culture are emphasized and instruction is compatible with cultural patterns, improvements in student skills can be expected (Tharp, 1989). Collaboration and cooperation are culturally valued; therefore, instruction could include small group cooperative learning activities that focus on hands-on learning in activity-based contexts as opposed to individual, competitive activities (Ingalls, Hammond, Dupoux, & Baeza, 2006).

Though there are effective curricula for teaching phonological awareness, curricula rarely, if ever, reflect Aboriginal culture or values (McKeough et al., 2008; Smith, 1999), leaving students disconnected from tradition and decreasing school engagement (Brendtro, Brokenleg, & Van Bockern, 2002; Christenson et al., 2008). Marks, Moyer, Roche, and Graham (2003) noted that the early childhood education examined for American Indians and Alaskan Natives lacked both culturally appropriate curricula and attention to the development and use of language and literacy skills.

Tharp (1982) found positive effects of a culturally adapted reading program for students in Kindergarten through Grade 3. The Kamehameha Early Education Program (KEEP) was adapted to the cultural needs and abilities of Polynesian-Hawaiian children at high risk for educational failure and tailored according to their native Hawaiian culture. For example, tasks were accomplished by several people working together in relatively unspecialized roles and KEEP teachers allowed multiple and simultaneous responses to questions during discussions, both practices compatible with Hawaiian culture. Results found six critical elements to the program: systematic (active, teacher-led, direct) instruction in comprehension, small group instruction, positive reinforcement (i.e., high rates of teacher praise), continuous monitoring and feedback of student achievement, individualized and prescriptive instruction, and assessment of teacher performance (i.e., weekly observation of each teacher). The researchers found significant

differences in comprehension when they compared outcomes between experimental and control groups in two public schools with random assignment of students.

Classrooms that foster culturally based values, norms, and behaviours may be more effective environments for learning. Lipka (1991) made the assertion that most Yup'ik students learn best when academic content is related to cultural identity. In addition, McCarthy and Benally (2003) found that during skill acquisition, Navajo students benefited from watching a model demonstrate a skill and were reluctant to try new tasks without this period of observation.

Generally speaking, research shows that effective teaching includes a variety of instructional strategies that are accommodated to student needs. Effective strategies include diverse techniques such as modelling, corrective feedback, teacher-directed instruction, mediated scaffolding, and student-centered discovery (E. W. Ball & Blachman, 1988; Kame'enui, Carnine, Dixon, Simmons, & Coyne, 2002). Researchers suggest that all students (Aboriginal and non-Aboriginal) learn best when multiple strategies are incorporated into classroom instruction. Instructional strategies may include deductive learning (i.e., presenting the whole concept, then focusing on the specific details), a reflective style of processing information (i.e., integrating new learning into prior knowledge), observation (i.e., learning by first observing a model complete a task), group collaboration, visual strategies (i.e., presenting illustration with text), and using hands-on materials (Hilberg & Tharp, 2002; Marks et al., 2003; McCarthy & Benally, 2003; Starnes, 2006; Vasquez, 1990).

The Moe the MouseTM Speech and Language Development Program

An example of a curriculum that provides cultural exposure to the entire class is the Moe the MouseTM Speech and Language Development Program (Gardner & Chesterman, 2006). Moe the MouseTM is an early intervention curriculum created by Margaret Chesterman and Anne

Gardner, two speech-language pathologists, for the BC Aboriginal Child Care Society. It was created as a program to expose students aged three to five, regardless of background, to positive aspects of aboriginal culture, and improve speech and language skills.

Moe the MouseTM utilizes audio-visual and print resources, Aboriginal toys, storytelling, pretend play, and role playing to enhance language development. These activities may help children develop speech and language skills such as social language use, comprehension of spoken words, vocabulary, discrimination of speech sounds, ability to pronounce speech sounds, knowledge of position concepts (e.g., above, beside), and the ability to express feelings and ideas. Cultural components include stories told by Elders, use of traditional language, songs, animal puppets prevalent in many Aboriginal cultures, and arts and crafts coupled with vocabulary development. The activities and materials in the curriculum box are intended to help parents and educators provide opportunities for children to practice language skills in natural settings. There is no suggested schedule for individual activities in the program. Educators are given the opportunity to incorporate the program into their instruction as they wish.

The program is divided into seven sections. In Section One: Introducing the Mouse, the students are introduced to Moe, a mouse who is a member of the Nuu-Chah-Nulth First Nation (from British Columbia's Vancouver Island), and helps guide the children through the program. Students learn about his community, meet his animal friends (which are used to teach speech sounds and language skills) and learn from story books that are used to develop language skills. In Section Two: Moe the MouseTM DVD, a DVD developed to enhance Moe's Aboriginal identity provides the children with cultural history. Elders and other members from the Nuu-Chah-Nulth First Nation share their traditional stories and music, introduce traditional language, and acknowledge the important role of Elders in Aboriginal culture. There are seven segments to

the DVD, and each segment ends with a language activity for the children to complete. For example, in Segment Two: Paddles, Joe Martin, a famous carver of paddles and dugout canoes, tells how he makes paddles and sings a paddling song. The segment is followed by two arts and crafts activities, making a paddle and a canoe. These activities are enhanced by teaching specific vocabulary concepts through pretend play. In Section Three: Moe's Sleepover, each student is provided the opportunity to take Moe home for a night. Moe participates in the family routines and after the sleepover, the student returns to school to tell about his or her experience with Moe. In Section Four: Animal Friends and Speech Sounds, students learn to make English speech sounds by associating animal toys, which were selected as culturally appropriate symbols of Aboriginal culture, with a specific speech sound. Each animal toy is paired with a specific phoneme or speech sound. Activities are presented to help the children produce the sounds and use them in words. For example, students learn that the bear makes the /r/ sound when he says "rrr" (to mimic growling). In Section Five: More Traditional Language and Early Literacy, Moe and the students learn how to say the names of their animal friends in the local traditional language, which is to be provided by each site. In Section Six: Moe's Special Books, stories relevant to Aboriginal culture are read to the students to help them learn new vocabulary, grammar and sentence structures, make predictions about what may happen next, talk about emotions, and pretend and imagine. In Section Seven: Arts and Crafts/Vocabulary, the students are provided with the opportunity to practice fine motor development, organization, sequencing, hand-eye coordination, and important vocabulary concepts.

Although the effects of Moe the MouseTM on early literacy skills have not been tested, it is hypothesized that Moe the MouseTM might not be effective in improving phonological awareness skills. The Moe the MouseTM program provides informal opportunities for students to

practice language skills (e.g., social language use, comprehension of spoken words, vocabulary, discrimination of speech sounds, ability to pronounce speech sounds, knowledge of position concepts) but does not include explicit instruction in phonological awareness outside of the Moe's animal friends component, where students associated animal toys with speech sounds. The practice of general speech sounds with Moe's animal friends may not lead to enhanced phonological awareness skills. Associating the animal toys with general speech sounds instead of component phonemes of words (e.g., the first sound in the animals' names) may not be sufficiently explicit or intensive enough to build a meaningful connection between speech sounds and the sound system of spoken language. As phonological awareness plays a key role in reading acquisition and preventing reading failure, it is recommended that educators teach these skills explicitly (Torgesen, 2000).

An enhanced Moe the MouseTM program was created by the researcher by integrating the Moe the MouseTM program and explicit instruction in early literacy from a research based intervention program (FreeReading, 2008). The explicit instruction from FreeReading was incorporated to enhance students' early literacy knowledge along with the important cultural and language components of the Moe the MouseTM program.

The enhanced program consisted of multiple overlapping sequences of instruction, each systematically addressing a critical early literacy skill. Accuracy was built through teaching students to discriminate between similar items, and fluency was built through regular practice to become automatic in foundational skills. Throughout the enhanced program, error correction routines for the teachers to use with the students were also made explicit. See Table 1.1 below for an overview of the enhanced Moe the MouseTM program.

Table 1.1 Overview of the Enhanced Moe the Mouse™ Program

Weeks	Early Literacy Activities	Moe the Mouse™ Activities
1-5	<ul style="list-style-type: none">• Basic phonological awareness (rhyming, onset-rime, introduce phoneme blending and segmenting)• Letter sounds• Letter writing	<ul style="list-style-type: none">• Introducing the Mouse• Moe the Mouse™ DVD (Chapter 1: Moe the Messenger)• Moe's Special Books
6-10	<ul style="list-style-type: none">• Segmenting first, last, and middle phonemes• Continue letter sounds and letter writing• Begin sounding out (CVC and CVCC words)	<ul style="list-style-type: none">• Moe's Sleepover• Moe the Mouse™ DVD (Chapter 2: Paddles)• Arts and Crafts/Vocabulary• Moe's Special Books
11-15	<ul style="list-style-type: none">• Phoneme substitution• Continue letter sounds and letter writing• Continue sounding out (stop sounds and CVCC words)• Introduce word-form recognition• Introduce irregular (sight) words	<ul style="list-style-type: none">• Moe the Mouse™ DVD (Chapter 7: Animal Friends)• Animal Friends and Speech Sounds• Arts and Crafts/Vocabulary• Moe's Special Books
16-20	<ul style="list-style-type: none">• Complete letter sounds and letter writing• Continue sounding out (CCVCC and CCCVCC words) and word-form recognition• More irregular words	<ul style="list-style-type: none">• Animal Friends and Speech Sounds• Moe the Mouse™ DVD (Chapter 3: The Bat Story)• Arts and Crafts/Vocabulary• Moe's Special Books
21-25	<ul style="list-style-type: none">• More irregular words• Introduce letter combinations• Introduce VCe words	<ul style="list-style-type: none">• Animal Friends and Speech Sounds• Moe the Mouse™ DVD (Chapter 4: Old Ways)• Arts and Crafts/Vocabulary• Moe's Special Books• More Traditional Language and Early Literacy

Table 1.1 Overview of the Enhanced Moe the Mouse™ Program

Weeks	Early Literacy Activities	Moe the Mouse™ Activities
26-30	<ul style="list-style-type: none">• Accelerate the introduction of irregular words• Continue letter combinations	<ul style="list-style-type: none">• Animal Friends and Speech Sounds• Moe the Mouse™ DVD (Chapter 5: Uncle Phil)• Arts and Crafts/Vocabulary• Moe's Special Books• More Traditional Language and Early Literacy
31-35	<ul style="list-style-type: none">• Complete letter combinations• More irregular words• Begin advanced phonics (word families, double-letter words, silent-letter words, compound words, contractions, -ed and -s words)• Introduce reading connected text	<ul style="list-style-type: none">• Animal Friends and Speech Sounds• Moe the Mouse™ DVD (Chapter 6: Language)• Arts and Crafts/Vocabulary• Moe's Special Books• More Traditional Language and Early Literacy
36-40	<ul style="list-style-type: none">• More irregular words• Longer connected text passages fiction and nonfiction up to 80 words	<ul style="list-style-type: none">• Animal Friends and Speech Sounds• Arts and Crafts/Vocabulary• Moe's Special Books• More Traditional Language and Early Literacy

Although research findings suggest that successful early literacy acquisition includes oral language development (McConnell & Missall, 2008; Pinnell, Lyons, Deford, Bryk, & Seltzer, 1994; Torgesen et al., 1997) and early immersion in phonological awareness (Juel, 1988; Torgesen, 2002; Torgesen, Rashotte, Alexander, Alexander, & MacPhee, 2003), little has been studied in relation to the effectiveness of incorporating Aboriginal culture into early language and literacy instruction. Moe the Mouse™ is a program that exposes students to positive aspects of Aboriginal culture and speech and language skills. An enhanced version of the program was created to provide additional explicit instruction in early literacy. Moe the Mouse™ was designed

to be a cultural curriculum, but its effectiveness in improving phonological awareness skills has yet to be assessed. The current study examined the effectiveness and perceived cultural content of two versions of the Moe the MouseTM program.

The Current Study

The purpose of the current study was to assess the effects of the Moe the MouseTM Speech and Language Development Program and an enhanced Moe the MouseTM program, which was coupled with high quality early literacy instruction, on the phonological awareness skills of Kindergarten students. Specifically, the study examined how each program affected the phonological awareness skills of Kindergarten students.

Research Questions

The study systematically evaluated the following research questions:

1. What are the effects of the Moe the MouseTM program on student phonological awareness?
 - (a) Specific Hypotheses: Kindergarten students participating in the Moe the MouseTM condition will show significantly improved phonological awareness skills when compared to students in the comparison condition, and students participating in the enhanced Moe the MouseTM condition will have significantly larger gains in phonological awareness than students in the Moe the MouseTM condition.
 - (b) Specific Hypotheses: there will be a significantly larger proportion of students on track for future reading success among students participating in the Moe the MouseTM condition when compared to students in the comparison

condition, and there will be a significantly larger proportion of students on track among students who participate in the enhanced Moe the MouseTM condition.

(c) Specific Hypothesis: there will be no significant difference between Aboriginal and non-Aboriginal students' growth in advanced phonological awareness skills from the Moe the MouseTM and enhanced Moe the MouseTM conditions following the intervention.

2. To what extent do Kindergarten teachers perceive the Moe the MouseTM program to be socially valid? Specific Hypothesis: teachers will rate both versions of the program to be in line with their beliefs about how students should be taught.
3. To what extent do Kindergarten teachers perceive the Moe the MouseTM program to contain appropriate cultural content? Specific Hypothesis: teachers will rate both versions of the program as containing appropriate cultural content.

Chapter 2: Method

Setting

The study took place in a large metropolitan school district in British Columbia's Lower Mainland. Demographic information for this district from the 2006 BC Census showed that 16% of households had a single parent, the average number of children per family was 1.0, and 19% of families had an annual income under \$30,000. The top three primary languages normally spoken in the home across the district in the 2008/09 school year was English (47%), Cantonese (15%), and Mandarin (9%; Ministry of Education, 2009).

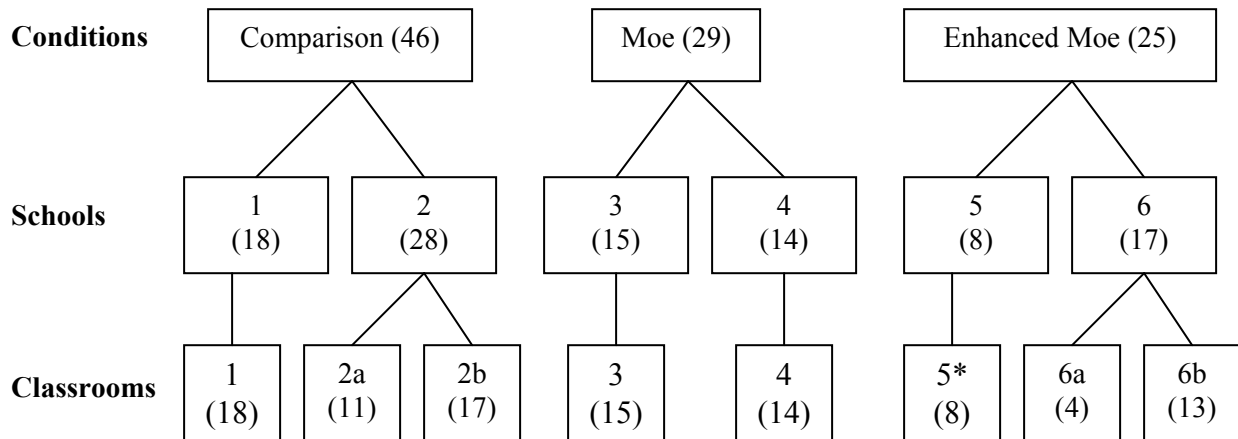
In the 2009/10 school year, there were a total of 109 public schools in the district with 59,978 students enrolled in Kindergarten through Grade 12 and 3,547 enrolled in Kindergarten specifically. Classroom demographics indicated that the average Kindergarten class had 19 students. Four percent of the district's elementary student population was Aboriginal, 35% had English as a Second Language, and 10% were classified with special needs (including sensory disabilities, learning disabilities, behaviour needs, and those classified as gifted; Ministry of Education, 2010). Results from an annual provincial assessment of student academic performance in reading comprehension indicated that for Grade 4 students in the 2007/08 school year, 65% of non-Aboriginal students met or exceeded expectations, whereas 37% of Aboriginal students met or exceeded expectations in the district (Ministry of Education, 2009).

Classrooms in six schools were selected to participate in the study. Two schools continued implementing the existing district literacy instruction to serve as a comparison condition. Two schools were assigned to implement the regular Moe the MouseTM program. Two schools were assigned to implement the enhanced Moe the MouseTM program. All students in the Kindergarten classrooms at the six schools were eligible for participation.

Participants

A total of 100 students, from eight classrooms in six schools, participated in the current study (see Table 2.1).

Table 2.1 Condition (and Number of Participants) Breakdown



*Note: the researcher conducted the Enhanced Moe the Mouse™ lessons in School 5

One hundred and sixteen students were initially invited to participate, parents of 111 students (96%) provided consent, and 11 students were excluded from the study. Of these 11 students, six moved before the posttest administration occurred, three did not provide assent for testing, and two were non verbal. Independent-samples t-tests were conducted to determine whether there were statistically significant differences in the two dependent variables between the six students who moved before the posttest administration occurred and the 100 students who participated in both the pre and posttests. There were no statistically significant differences for either measure; $t(104) = -0.128, p = 0.898$ and $t(104) = 0.564, p = 0.574$.

The mean age of the students at pretest was 64.18 months (with a standard deviation of 3.39 months and a range of 57.96 to 69.96 months). There were 54 boys and 46 girls. Nineteen percent of the students had Aboriginal status. Seventy percent of the participants were

categorized as English as a Second Language (ESL) students. At the time of the study, 62% spoke a language other than English at home (38% English, 31% Chinese [20% Cantonese, 4% Mandarin, 7% unspecified], 9% Punjabi, 5% Vietnamese, 4% Spanish, 3% Japanese, 2% Bengali, 2% Tagalog, 1% Hindi, 1% French, 1% Filipino, 1% Korean; data were unavailable for two participants). Seven students had special education designations—three with the label of Physical Disabilities/Chronic Health, two with Intensive Behaviour/Serious Mental Illness, one with Autism Spectrum Disorder, and one with Moderate to Severe/Profound General Intellectual Disabilities. All demographic information was obtained from the school district’s official records (see Table 2.2).

Table 2.2 Participant Demographic Information

Demographic	Comparison	Moe the Mouse™	Enhanced Moe the Mouse™
Number in Condition	46	29	25
Mean Number of Students per Classroom	15	14	8
Mean Age in Months	63.64	65.55	63.60
% Male	46%	66%	56%
% Aboriginal	4%	14%	52%
% English Second Language	85%	66%	52%
% Special Education	2%	3%	20%

Preexisting Language Differences

The Peabody Picture Vocabulary Test - 4th Edition (PPVT-4) was administered to all students at pretest. The PPVT-4 is an individually administered, norm-referenced assessment that measures an individual’s receptive vocabulary knowledge (i.e., understanding of spoken words) and does not require a spoken response. The test was administered to determine whether there

were statistically significant preexisting language differences between the students in the three conditions (i.e., comparison condition, Moe the MouseTM, enhanced Moe the MouseTM). A one-way between-groups analysis of variance was conducted to identify whether there were preexisting language differences as measured by the PPVT-4. There was no statistically significant difference in PPVT-4 scores for the three conditions, $F(2, 97) = 1.394, p = 0.253$ (see Table 2.3).

Table 2.3 Means and Standard Deviations for the PPVT

	PPVT at Pretest	
	M	SD
Comparison	92.48	20.71
Moe the Mouse TM	99.90	18.87
Enhanced Moe the Mouse TM	97.84	19.22

Measures

Basic Phonological Awareness

Dynamic Indicators of Basic Early Literacy Skills (DIBELS) First Sound Fluency (FSF; Good & Kaminski, 2010) is a standardized, individually administered test designed to measure a student's ability to recognize and produce the initial sounds in orally presented words (e.g., “cat” begins with the sound /k/). It is administered from the last year of Preschool through the middle of Kindergarten. To administer FSF, the examiner says a series of words, one at a time, and asks the student to produce the first sound in the word until one minute elapses. Two points are recorded for each first sound produced, and one point is recorded for each initial sound blend produced (see Appendix A).

DIBELS provides research-based criteria for placing student skills into one of three categories of risk for future reading problems (see Table 2.4). Criteria exist for the beginning,

middle, and end of the year. For example, at the beginning of Kindergarten, students receiving 10 or more correct FSF points per minute are considered to be on target and at “Low Risk” for having later reading difficulties. Students receiving between 5 and 9 correct FSF points per minute are considered to be at “Some Risk” for later reading problems, and it is recommended they receive additional intervention. Students receiving fewer than 5 correct FSF points per minute are considered to be performing at a level that places them in the category of “At Risk” for later reading problems and are in need of more intensive intervention.

Table 2.4 DIBELS Kindergarten First Sound Fluency Criteria (Good & Kaminski, 2010)

	Beginning of the Year Sept. to Nov.	Middle of Year Dec. to Feb.	End of Year March to June
DIBELS First Sound Fluency (FSF) Points			
Low Risk	≥ 10	≥ 30	Test not administered
Some Risk	5 to 9	20 to 29	Test not administered
At Risk	0 to 4	0 to 19	Test not administered

Technical adequacy of the DIBELS FSF measure is provided by Cummings and colleagues (Cummings et al., 2011). The one-month, alternate-form reliability of the FSF measure in Kindergarten is .82. The concurrent, criterion-related validity of FSF with DIBELS Phoneme Segmentation Fluency is .71 in January of Kindergarten and the predictive validity is .45 with the Phonemic Awareness Composite of the Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999) in the middle of Kindergarten (Cummings et al., 2011).

Advanced Phonological Awareness

DIBELS Phoneme Segmentation Fluency (PSF; Good & Kaminski, 2002) is a standardized, individually administered test designed to measure a student’s phonological

awareness by assessing his or her skill in segmenting three and four-phoneme words into their individual phonemes (e.g., the examiner says, “sat,” and the student says, “/s/ /a/ /t/”). It is administered from the middle of Kindergarten through the end of Grade 1. To administer PSF, the examiner orally presents words and asks the student to say the individual phonemes for each word. The number of correct sound segments produced within one minute is the final score (see Appendix B). DIBELS provides research-based criteria for the beginning, middle, and end of the year for placing students’ skills into one of three categories of risk for future reading problems (see Table 2.5).

Table 2.5 DIBELS Kindergarten Phoneme Segmentation Fluency Criteria (Good & Kaminski, 2002)

	Beginning of the Year Sept. to Nov.	Middle of Year Dec. to Feb.	End of Year March to June
DIBELS Phoneme Segmentation Fluency (PSF): Correct Sound Segments			
Low Risk	Test not administered	≥ 18	≥ 35
Some Risk	Test not administered	7 to 17	10 to 34
At Risk	Test not administered	0 to 6	0 to 9

The technical adequacy of the DIBELS PSF measure is provided by a number of studies. The two-week, alternate-form reliability for the PSF measure is .88 (Kaminski & Good, 1996), and the one-month, alternate-form reliability is .79 in May of Kindergarten (Good et al., in preparation). Concurrent criterion validity of PSF is .54 with the Woodcock-Johnson Psycho-Educational Battery Readiness Cluster score in spring of Kindergarten. The predictive validity of spring-of-Kindergarten PSF with (a) winter-of-Grade 1 DIBELS NWF is .62, (b) spring-of-Grade 1 Woodcock-Johnson Psycho-Educational Battery Total Reading Cluster score is .68, and (c) spring-of-Grade 1 CBM ORF is .62.

Interrater Agreement

Interrater agreement data between the researcher and a second administrator were collected by the researcher on 30% of the individually administered sets of both phonological awareness measures during the study (26% of the pretest and 34% of the posttest sessions). Total percent agreement was calculated for each probe by dividing the total number of agreements (e.g., number of first sounds correct or incorrect) per probe by the number of agreements plus disagreements and multiplying by 100. FSF agreement scores ranged from 75% to 100% with a mean agreement of 98%, and agreement for PSF ranged from 83% to 100% with a mean agreement of 98%.

Social Validity and Cultural Content Survey

At the end of the study, teacher perceptions of the social validity and cultural content of the Moe the MouseTM and enhanced Moe the MouseTM programs were assessed through surveys developed by the researcher (see Appendix C). Social validity is defined as implementers' perceptions of the social importance and acceptability of goals, procedures, and outcomes of an intervention. Using a questionnaire, consumers can be queried about the acceptability of the program goals, methods, personnel, outcomes, and ease of incorporation of program components (Foster & Mash, 1999; Schwartz & Baer, 1991). The social validity and cultural content scale rated perception of the Moe the MouseTM program. Each of the eight items was rated on a 4-point Likert-type scale (e.g., 0 = Strongly Disagree; 3 = Strongly Agree). Social validity was measured by the teacher rating improvement in student early literacy skills after implementation of Moe the MouseTM, the likelihood that the program helped students become more successful with language and early literacy, whether the elements of the program were consistent with the way they believed students should be taught language and early literacy, whether they knew what they

were expected to do to implement the program, ease of implementation (e.g., amount of time or effort), and their likelihood of implementing the program with students in the future. Cultural content of the program was measured by the teacher rating perceptions of the activities and materials and the degree to which the program instilled cultural pride in the students and taught the values of Aboriginal peoples. The specific questions pertaining to the cultural content of the program were suggested by the Moe the MouseTM developers.

Procedures

Consent and Assent

The District Principal for Aboriginal Education from the school district identified administrators from six elementary schools, provided them with information about the study, and obtained verbal consent for schools to participate. The four schools selected to participate in the Moe the MouseTM and enhanced Moe the MouseTM conditions had previously been selected to participate in a Moe the MouseTM pilot project that involved 40 schools in the district. The two comparison schools were identified to participate based on similar school demographic information. All participating teachers provided written consent. All students in the Kindergarten classrooms at the six schools were eligible for participation. Student assent forms were read individually to each student to obtain assent.

Training

Teachers in both the Moe the MouseTM and enhanced Moe the MouseTM schools attended a six hour Moe the MouseTM training session conducted by one of the program's authors. The training utilized audio-visual equipment and print resources for using the program. During the training, the components of the curriculum box were reviewed, and important vocabulary

concepts, book reading strategies, speech development, speech sounds activities, language development, and language activities were described and modeled by the instructor.

The teachers in the enhanced Moe the MouseTM schools received training in using the enhanced Moe the MouseTM program. In the three hour enhanced Moe the MouseTM training, teachers were taught how to provide explicit instruction and correction and learned how to model the skills they taught. It was suggested by the researcher that the teachers conduct thirty minute enhanced Moe the MouseTM lessons three times per week throughout the school year. For both the Moe the MouseTM and enhanced Moe the MouseTM conditions, one hour of technical assistance per week was offered but not used by any of the teachers.

Measurement

Data collection for individual students occurred twice during the year (October and May) to identify changes in students' phonological awareness skills. Each participant was administered the set of phonological awareness measures (FSF and PSF measures) individually. It took approximately five minutes for each student to complete the assessment. The same measures were administered again in April. At the end of the study, social validity and cultural content of the Moe the MouseTM and enhanced Moe the MouseTM programs were assessed through surveys of the participating teachers' perspectives. It is important to note that no surveys were completed for the third enhanced Moe the MouseTM classroom, as the researcher was the instructor.

Intervention

Teachers in the comparison condition conducted the district's regular early literacy instruction; components that took place in the typical kindergarten curriculum were not observed by the researcher. As there were no district directives or prescribed curricula for early literacy, it was not assumed that instruction included explicit instruction in either phonological awareness or

Aboriginal culture. Teachers in the Moe the MouseTM condition selected activities, such as teaching students about Moe's animal friends and their speech sounds, watching culturally relevant stories from the DVD, and singing Moe's special song from the Moe the MouseTM program at a self-determined pace as described in the manual and training. The teachers in the enhanced Moe the MouseTM condition taught three thirty minute scripted lessons per week, following the explicit instruction from the enhanced Moe the MouseTM manual.

It is important to note that one of the three enhanced Moe the MouseTM classrooms were taught the program by the researcher. The teacher originally agreed to participate in the study but was frequently absent for personal reasons. Therefore, on-call substitute teachers, who did not receive the Moe the MouseTM or enhanced Moe the MouseTM training, were teaching in the classroom. In collaboration with the school administrator, it was determined that the program would be taught by the researcher three times per week to ensure consistency in program delivery. The researcher had knowledge about the benefits of systematic instruction (e.g., multiple overlapping sequences of instruction, teaching accuracy and fluency through regular practice, explicit error correction routines) and previous experience with teaching material in this manner but did not have pre-service teacher training or teaching certification.

Fidelity of Implementation

Fidelity of implementation is the measurement of how well an intervention is implemented in comparison to the intended program design (O'Donnell, 2008). Treatment fidelity for the Moe the MouseTM program was measured indirectly through teacher report of usage of the program. At the end of the study, those teachers in the Moe the MouseTM condition self-reported use of the program. Because the teachers implemented the Moe the MouseTM components at a self-determined pace, it was not viable to use direct observation of implementation within this

condition. The teachers rated how often they incorporated the Moe the MouseTM program into their day, on a 5-point Likert-type scale (e.g., 0 = Less than once per month; 4 = Daily), and how often they used each component of the Moe the MouseTM program box (e.g., animal friends, DVDs, arts & crafts), also on a 5-point Likert-type scale (e.g., 0 = Never; 4 = Daily).

A direct measure of treatment fidelity was used in the enhanced Moe the MouseTM condition. Fidelity was measured in all three enhanced Moe the MouseTM classrooms, including the one that the researcher conducted. Fifteen intervention sessions (thirty three percent) were randomly selected to monitor whether the teacher implemented the components of the enhanced Moe the MouseTM program as expected. A checklist was created for each lesson detailing the components that were intended to be taught during that lesson. The fidelity of implementation form varied depending on the lesson (see Appendix D for an example). For each observation, a percent of completed components was recorded during the lesson by the researcher. In the classroom where the researcher conducted the lessons, the percent of completed components was recorded after the lesson by the researcher. In addition, brief implementation feedback was provided to teachers after each observation.

Design

The design employed was a quasi-experimental pre-post cluster trial with three conditions: comparison, Moe the MouseTM, and enhanced Moe the MouseTM. The design included three phases: (a) pretest measurement, (b) Moe the MouseTM program, and (c) posttest measurement (see Table 2.6).

Table 2.6 Study Design

	Pretest Measures	Moe the Mouse™ Program	Enhanced Moe the Mouse™ Program	Posttest Measures
Comparison Schools	O			O
Moe the Mouse™ Schools	O	X		O
Enhanced Moe the Mouse™ Schools	O	X	X	O

Note. O = observation (assessment), X = treatment

Analyses

Effects on Phonological Awareness

To address the first question of this research study, “What are the effects of the Moe the Mouse™ program on student phonological awareness?,” pre and post intervention data were collected on students’ phonological awareness skills. Data were analyzed to determine changes that occurred in phonological awareness knowledge as a result of participation in the district’s typical early literacy instruction, Moe the Mouse™ program, or the enhanced Moe the Mouse™ program. Data were analyzed using the Statistical Package for Social Sciences, version 16.0 (SPSS).

To assess effects on phonological awareness, two separate univariate two-way between groups analyses of covariance (ANCOVA) were conducted. For each analysis, the independent variable was the condition (comparison, Moe the Mouse™, or enhanced Moe the Mouse™). Classroom was used as a random effects independent variable to account for the nesting of students within classrooms and teachers. For the first analysis, the dependent variable was the posttest FSF score, administered following the intervention. Scores on the FSF measure at pretest were used as a covariate to control for individual differences before intervention. For the second analysis, PSF was used. The omnibus or overall F test was used to test the null hypothesis to

determine if there were differences in the means of the dependent variables for the three conditions.

Post-hoc comparisons, using the Tukey Honestly Significant Differences (HSD) test, were conducted to investigate where the statistically significant differences occurred between conditions. Tukey's HSD has sufficient power to detect significant differences and control for Type 1 error. Tukey's HSD was chosen as the post-hoc comparison because the study had similar sample sizes and the population variances were similar.

Level of Significance and Magnitude of Treatment Effects for Dependent Measures

For this study, the level of significance (α) was established at $p < .05$. Effect sizes (ES) were calculated to measure the relative magnitude of the treatment effect for dependent measures from pretest to posttest. Partial Eta squared (ηp^2) was used to determine the effect size for all analyses. Values can range from 0 to 1. Cohen (1988) provided effect size criteria for small (.01), moderate (.06), and large (.14) effects.

To measure the percent of students on track for meeting DIBELS benchmark criteria for FSF and PSF, descriptive statistics for the three categories of risk ("Low Risk," "Some Risk," and "At Risk") were calculated for the pre and posttest results. In addition, a 3x2 chi-square test was conducted to determine whether there was a statistically significant difference in the proportion of students in each condition (comparison, Moe the MouseTM, enhanced Moe the MouseTM) who fell in the "At Risk" category for PSF at posttest.

To measure whether there were differential effects by Aboriginal heritage, two one-way repeated measures ANOVAs were conducted to compare scores on the PSF measure between Aboriginal and non-Aboriginal students in the Moe the MouseTM and enhanced Moe the MouseTM conditions prior to and following the intervention.

Social Validity

To address the second question, “To what extent do Kindergarten teachers perceive the Moe the MouseTM program to be socially valid?,” descriptive statistics from the Likert-type scale survey were calculated. In addition, a Mann-Whitney U Test was conducted to determine whether the opinion of teachers in the Moe the MouseTM condition differed significantly from teachers in the enhanced Moe the MouseTM condition in terms of their perceptions of the social validity of the Moe the MouseTM program.

Cultural Content

To address the third question of this research study, “To what extent do Kindergarten teachers perceive the Moe the MouseTM program to be culturally appropriate?,” descriptive statistics from the Likert-type scale survey were calculated. A Mann-Whitney U Test was also conducted to determine whether the opinions of teachers in the Moe the MouseTM condition differed significantly from the teachers in the enhanced Moe the MouseTM condition in terms of their perceptions of the cultural content of the program that they taught. In addition, descriptive observations were made throughout the study and described in relation to the cultural components of the Moe the MouseTM program.

Chapter 3: Results

Results examined the extent to which (a) the Moe the Mouse™ sessions were implemented with fidelity, (b) there were effects on student phonological awareness, (c) the intervention was rated as being socially valid and containing cultural content by the teachers, and (d) the cultural components of the Moe the Mouse™ program were observed.

Fidelity of Implementation

Treatment fidelity of the Moe the Mouse™ program was measured indirectly through teacher report of use of the program on a 5-point Likert-type scale (e.g., 0 = Less than once per month; 4 = Daily). The teachers rated how often they incorporated the Moe the Mouse™ program into their day and used specific components from the Moe the Mouse™ curriculum box (e.g., animal friends, DVDs, arts and crafts activities). See Table 3.1 for results.

Table 3.1 Teacher Ratings from the Moe the MouseTM Treatment Fidelity Survey

Item	Average Response (Out of 4)	Average Rating
How often did you use the Moe the Mouse TM curriculum book	2	Once or twice per week
Rate how often you used the animal friends from the curriculum box	3	Weekly
Rate how often you used the DVDs from the curriculum box	0.5	Never - Once or twice
Rate how often you used the arts & crafts from the curriculum box	0.5	Never - Once or twice
Rate how often you used Moe's sleepover from the curriculum box	4	Daily
Rate how often you used the speech sounds from the curriculum box	3	Weekly
Rate how often you used the story books from the curriculum box	1.5	Once or twice - Monthly
Rate how often you used the language activities from the curriculum box	2.5	Monthly – Weekly
Rate how often you used Moe's special song from the curriculum box	3.5	Weekly – Daily

Treatment fidelity of the enhanced Moe the MouseTM program was measured through direct observation of implementation of lesson components. Thirty three percent of the lessons were randomly evaluated for fidelity. On average, across the three classrooms, 91% (range = 67 - 100) of the intervention components were implemented accurately. The average number of intervention components implemented with accuracy was 84% (range = 67 - 100) for one teacher, 91% (range = 71 - 100) for the other teacher, and 98% (range = 88 - 100) for the researcher.

Phonological Awareness

Preliminary checks were conducted to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. Two univariate two-way between groups analysis of covariance (ANCOVA) were conducted to assess the effectiveness of three early language and literacy interventions on students' phonological awareness (measured by the FSF and PSF scores). Descriptive statistics for these measures are reported in Table 3.2.

Table 3.2 Means and Standard Deviations for FSF and PSF at Pre-Posttest for Within and Between Conditions

Comparison		FSF		PSF	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Comparison	Pretest	9.33	12.37	5.30	7.85
	Posttest	23.89	15.37	13.93	14.73
Moe the Mouse TM	Pretest	12.52	12.86	10.14	12.98
	Posttest	30.38	14.23	22.72	15.40
Enhanced Moe the Mouse TM	Pretest	8.44	9.02	5.68	8.37
	Posttest	31.52	15.44	31.92	16.96

Basic Phonological Awareness

A univariate two-way between groups analysis of covariance (ANCOVA) was conducted to assess the effects of condition on the students' basic phonological awareness (measured by the FSF score). The independent variables were the condition (comparison, Moe the MouseTM, or enhanced Moe the MouseTM) and classroom. After adjusting for FSF scores at Time 1, there were no statistically significant main effects for classroom, $F(5, 91) = 1.97, p = 0.091$, or condition $F(2, 5.198) = 1.611, p = 0.286$ (see Figure 3.1). The effect for classroom was moderate ($\eta^2 = 0.098$), and the effect for condition was large ($\eta^2 = 0.383$; see Table 3.3).

Figure 3.1 First Sound Fluency Scores at Pre and Post Intervention by Condition

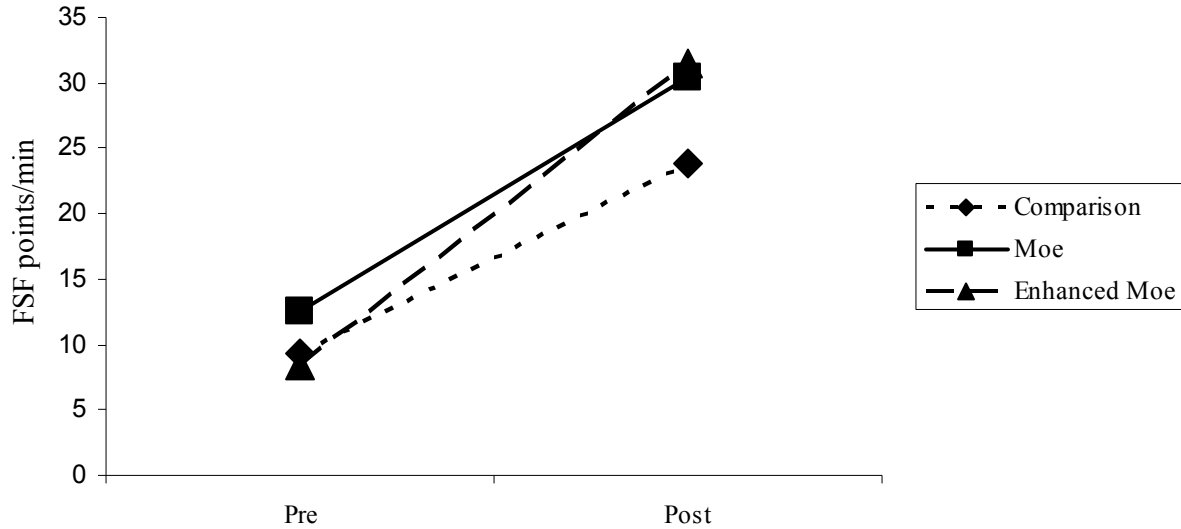


Table 3.3 Analysis of Covariance for Basic Phonological Awareness by Condition

Source	Sum of Squares	df	Mean Square	F	Partial Eta Squared
Condition	902.11	2	451.06	1.611	0.38
Classroom (Condition)	14260.40	5	285.28	1.970	0.10
Error	13176.24	91	144.79		

Advanced Phonological Awareness

After adjusting for PSF scores at Time 1, there was a statistically significant main effect for classroom, $F(5, 91) = 3.425, p = 0.007$, but no statistically significant main (overall) effect for condition $F(2, 5.164) = 5.071, p = 0.060$. The effect for classroom ($\eta^2 = 0.158$) and condition were large ($\eta^2 = 0.663$; see Table 3.4).

Table 3.4 Analysis of Covariance for Advanced Phonological Awareness by Condition

Source	Sum of Squares	df	Mean Square	F	Partial Eta Squared
Condition	3775.271	2	1887.635	5.071	0.663
Classroom(Condition)	1933.760	5	386.572	3.425*	0.158
Error	10274.728	91	112.909		

* $p < 0.05$

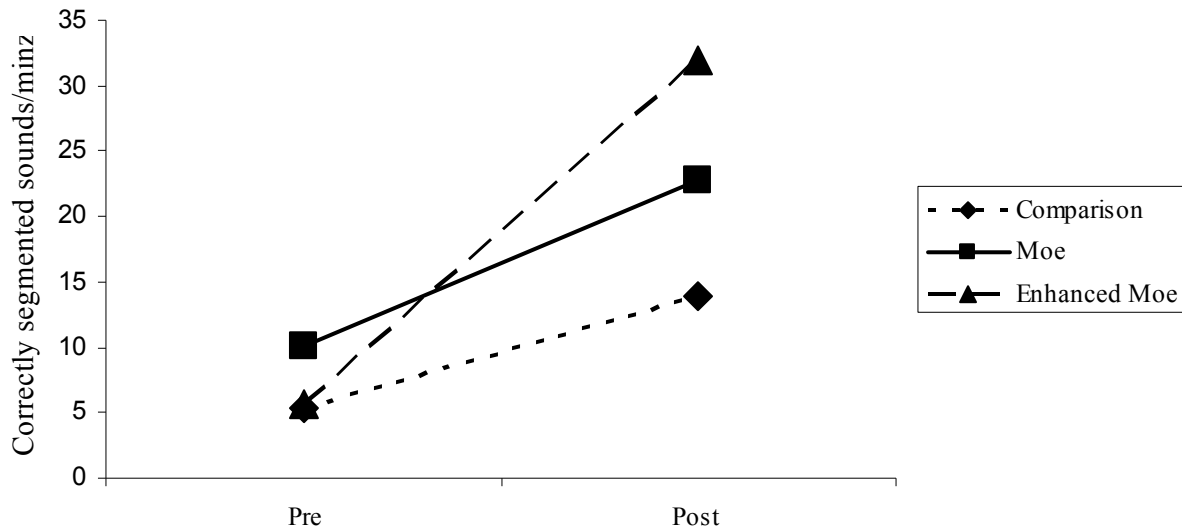
The statistically significant main effects for classroom suggest that effects on PSF scores differed significantly based on the classroom. To investigate where the differences existed, a post-hoc comparison, using the Tukey HSD test, was conducted. The Tukey HSD test indicated that the mean score for the enhanced Moe the MouseTM condition ($M = 31.92$, $SD = 16.96$) was statistically significantly higher than the Moe the MouseTM condition ($M = 22.72$, $SD = 15.40$) and the comparison condition ($M = 13.93$, $SD = 14.73$; see Table 3.5). Effects for the Moe the MouseTM condition did not differ statistically significantly from the comparison condition (see Figure 3.2).

Table 3.5 Tukey HSD Comparison for Conditions

(I) Condition	(J) Condition	Mean Diff (I-J)	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Comparison	Moe the Mouse TM	-4.02	2.62	-9.22	1.17
	Enhanced Moe the Mouse TM	-16.55	2.87*	-22.25	-10.84
Moe the Mouse TM	Comparison	4.02	2.62	-1.17	9.22
	Enhanced Moe the Mouse TM	-12.53	3.14*	-18.76	-6.30
Enhanced Moe the Mouse TM	Comparison	16.55	2.87*	10.84	22.25
	Moe the Mouse TM	12.53	3.14*	6.30	18.76

* $p < 0.05$

Figure 3.2 Phoneme Segmentation Fluency Scores at Pre and Post Intervention by Condition



DIBELS Benchmark Criteria

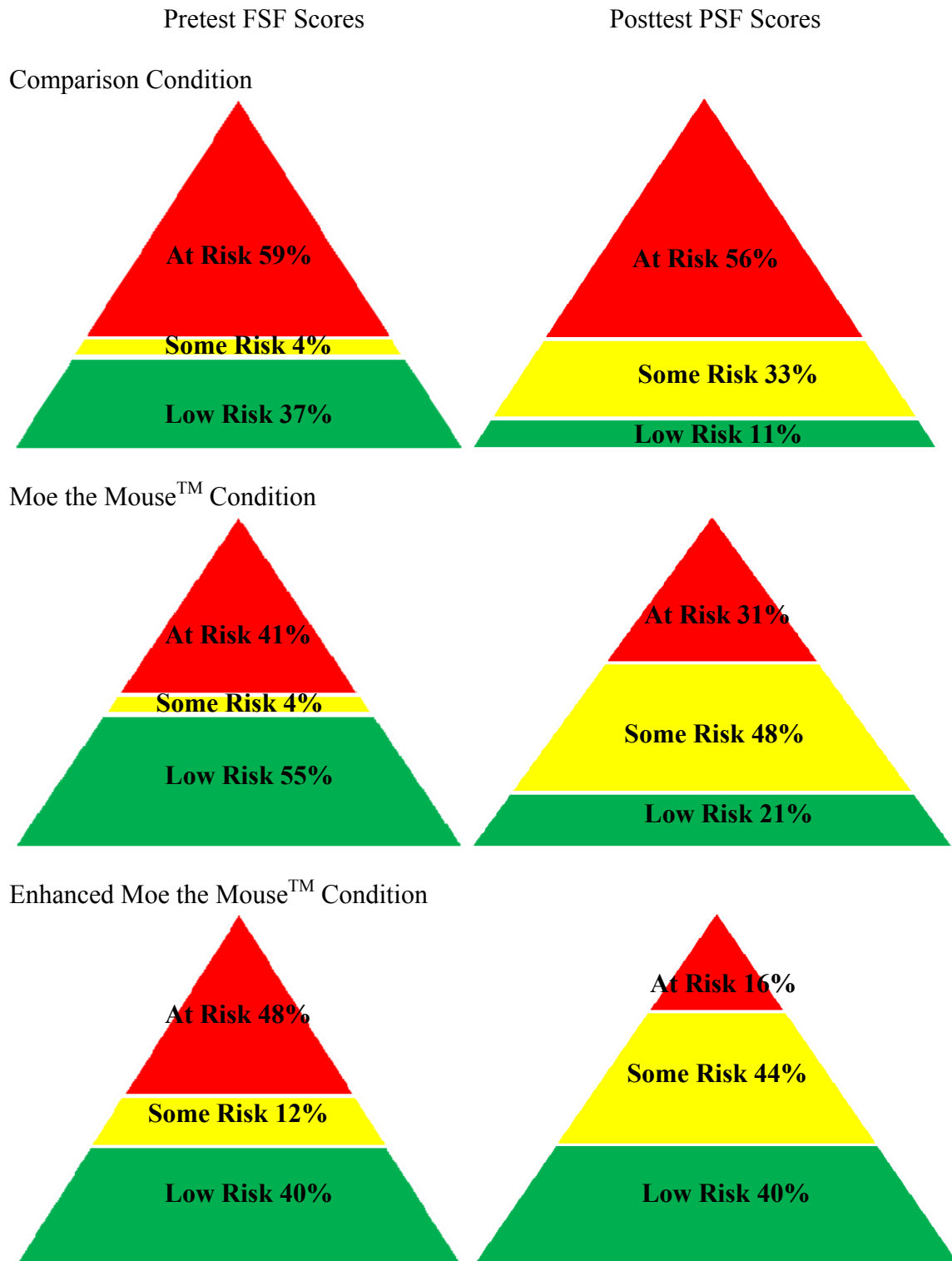
It was of interest to determine the percent of students on track for positive literacy outcomes by condition. Descriptive statistics were generated to describe the mean differences between the students' basic phonological awareness (measured by FSF) before the intervention and advanced phonological awareness (measured by PSF) after the intervention (see Table 3.6).

See Figure 3.3 for a visual representation for each condition.

Table 3.6. Percent of Comparison, Moe the Mouse™, and Enhanced Moe the Mouse™ Students in each Risk Category at Pre and Posttest

		Low Risk	Some Risk	At Risk
Comparison Condition	Pretest FSF	37%	4%	59%
	Posttest PSF	11%	33%	56%
Moe the Mouse™	Pretest FSF	55%	4%	41%
	Posttest PSF	21%	48%	31%
Enhanced Moe the Mouse™	Pretest FSF	40%	12%	48%
	Posttest PSF	40%	44%	16%

Figure 3.3 DIBELS Early Reading Benchmark Criteria: Pretest FSF Scores versus Posttest PSF Scores



Comparison Condition

From pre to posttest, the percent of students in the “Low Risk” category decreased by 26%. The percent of students in the “Some Risk” category increased by 29%, and at posttest, the percent of students in the “At Risk” category decreased by 3% over the intervention.

Moe the MouseTM Condition

From pre to posttest, the percent of students in the “Low Risk” category decreased by 34%. The percent of students in the “Some Risk” category increased by 44%, and at posttest, the percent of students in the “At Risk” category decreased by 10%.

Enhanced Moe the MouseTM Condition

From pretest to posttest, the percent of students in the “Low Risk” category remained unchanged. The percent of students in the “Some Risk” category increased by 32%, and those in the “At Risk category” decreased by 32%.

A 3x2 chi-square test was conducted to determine whether there was a significant difference among the proportions of students in each condition who fell in the “At Risk” category for FSF at pretest. Results showed the proportion of students in the “At Risk” category for FSF at pretest was not significantly different among the conditions, $\chi^2(2, N = 100) = 2.25, p = .324$. The same test was again conducted at posttest with PSF. Results showed the proportion of students in the “At Risk” category for PSF at posttest was significantly different between the conditions, $\chi^2(2, N = 100) = 12.27, p = .002$.

Differential Effects by Aboriginal Heritage

Two one-way repeated measures ANOVAs were conducted to compare scores on the PSF measure between Aboriginal and non-Aboriginal students in the Moe the MouseTM and enhanced Moe the MouseTM conditions at Time 1 (prior to the intervention) and Time 2 (following the

intervention). Within the two conditions (Moe the Mouse™ and enhanced Moe the Mouse™), there were no ancestry by time interactions $F(1, 27) = 0.846, p = 0.366$; $F(1, 23) = 0.387, p = 0.54$, indicating that there was not a significant difference between the gains made by Aboriginal and non-Aboriginal students. The means and standard deviations are presented in Table 3.7.

Table 3.7 Means and Standard Deviations for Aboriginal versus Non-Aboriginal Students' PSF Scores within the Moe the Mouse™ and Enhanced Moe the Mouse™ Conditions

	Pretest			Posttest	
	<i>n</i>	Mean	SD	Mean	SD
Moe the Mouse™					
Aboriginal	4	12	18.78	19.50	23.78
Non-Aboriginal	25	9.84	12.32	23.24	14.29
Enhanced Moe the Mouse™					
Aboriginal	13	6.54	10.37	31.08	20.15
Non-Aboriginal	12	4.75	5.82	32.83	13.52

Social Validity and Cultural Content

To address the second and third questions of this research study, “To what extent do Kindergarten teachers perceive the Moe the Mouse™ program to be socially valid?” and “To what extent do Kindergarten teachers perceive the Moe the Mouse™ program to be culturally appropriate?,” the teachers from the Moe the Mouse™ and enhanced Moe the Mouse™ conditions rated the intervention on social validity and cultural content after the intervention. Descriptive statistics were calculated, and a Mann-Whitney U Test was conducted for each question to determine whether teacher perceptions from the enhanced Moe the Mouse™ condition differed significantly from the Moe the Mouse™ condition.

The average score from the two Moe the Mouse™ teachers was 2.25 (between Agree and Strongly Agree) for social validity and 2 (Agree) for cultural content. The average score from the two enhanced Moe the Mouse™ teachers was 2.33 (between Agree and Strongly Agree) for social validity and 2.75 (between Agree and Strongly Agree) for cultural content, indicating high

ratings of the interventions by all participating teachers. It is important to note that one Moe the Mouse™ teacher did not feel qualified to answer the question “The curriculum instills cultural pride in the students and teaches the values of Aboriginal peoples,” and therefore left that question blank (see Table 3.8 for a breakdown of average ratings by condition).

Table 3.8 Average Ratings from the Teacher Social Validity and Cultural Content Survey

Item	Moe the Mouse™	Enhanced Moe the Mouse™
Social Validity (From 0 to 3)		
To what extent are you pleased with the overall improvement in the students’ language and early literacy skills?*	2.5	3
This curriculum is likely to help the students to be more successful with language and early literacy.	3	3
The elements of this curriculum are consistent with the way I believe students should be taught language and early literacy.	2	2.5
I know what I am expected to do to implement this curriculum.	2	2
The curriculum is relatively easy to implement (e.g. amount of time/effort).	2	1.5
I am likely to implement the curriculum with students in the future.	2	2
Cultural Content (From 0 to 3)		
The activities and materials in the curriculum box are culturally appropriate.	2	3
The curriculum instills cultural pride in the students and teaches the values of Aboriginal peoples.**	2	2.5

Note. 0 = Strongly Disagree, 1 = Disagree, 2 = Agree, 3 = Strongly Agree

*0 = Very Displeased, 1 = Somewhat Displeased, 2 = Somewhat Pleased, 3 = Very Pleased

**1 of 2 teachers responded to this question in the Moe the Mouse™ condition

Mann-Whitney U Tests were conducted to evaluate whether teachers implementing the Moe the Mouse™ program differed significantly from those implementing the enhanced Moe the Mouse™ program in terms of their perceptions of the social validity and cultural content of the Moe the Mouse™ programs. The results of the tests showed no statistically significant differences in the teachers' perceptions of social validity or cultural content between conditions (see Table 3.9).

Table 3.9 Condition Differences from the Moe the Mouse™ Social Validity and Cultural Content Teacher Survey

<i>Social validity Questions</i>	<i>U value</i>	<i>Z value</i>	<i>p value</i>
To what extent are you pleased with the overall improvement in the students' language and early literacy skills?	1.00	-1.00	.317
This curriculum is likely to help the students to be more successful with language and early literacy.	2.00	.00	1.00
The elements of this curriculum are consistent with the way I believe students should be taught language and early literacy.	1.00	-1.00	.317
I know what I am expected to do to implement this curriculum.	2.00	.00	1.00
The curriculum is relatively easy to implement (e.g. amount of time/effort).	1.00	-1.00	.317
I am likely to implement the curriculum with students in the future.	2.00	.000	1.00
<i>Cultural Content Questions</i>			
The activities and materials in the curriculum box are culturally appropriate.	.00	-1.73	.083
The curriculum instills cultural pride in the students and teaches the values of Aboriginal peoples	.50	-.707	.480

Descriptive Observations

In addition to the quantitative results, field notes were completed in the enhanced Moe the Mouse™ condition throughout the study. Observations focused on student, adult, and family engagement in the enhanced Moe the Mouse™ program, as well as incorporation of the enhanced Moe the Mouse™ program into general classroom instruction.

Student Engagement

Overall, student engagement in the program appeared high. During a number of observations, the students cheered when the teacher announced that it was time to play with Moe and Moe's animal friends. In another example, all of the students in the enhanced Moe the MouseTM condition were given the opportunity to care for Moe during the school day. From this experience, students appeared to feel a sense of pride when it was their turn to care for Moe and appeared to take the responsibility seriously. For example, before recess, one student described the areas of the playground that she was going to show Moe and explained how she was going to keep him warm because it was cold outside. When students brought Moe back into the classroom from recess, they often approached their teacher to describe the activities they completed with Moe, and the teacher often took the opportunity to create conversations about these experiences.

Students also related to the cultural aspect of the program. For example, when the teacher introduced Moe to the students and read his photo book, one student made the connection that he and Moe were both Aboriginal. He ecstatically said, "Moe is like me, I am Aboriginal too." When the teacher at another enhanced Moe the MouseTM school introduced Moe's animal friends, one student made the connection that the Aboriginal art on his t-shirt looked similar to the art on Moe's animal friend the moose. The teacher took the opportunity to create a conversation about culture and art with the students.

The Moe photo book includes pictures of his friend, a real life girl named Laterra. Students were told that if they mailed her a postcard, they would get one back in return. The students from one enhanced Moe the MouseTM classroom made and sent postcards describing themselves and the fun things they did with Moe at school and home. The students highly anticipated postcards in return from Laterra.

Adult Engagement

The teachers appeared engaged in the Moe the MouseTM program. The teachers completed a number of formal lessons around Moe and his animal friends. For example, direct instruction with practice and corrective feedback on the sounds each animal made was often observed. Additional school staff also showed interest in the program. For example, at one of the enhanced Moe the MouseTM schools, the adults (e.g., principal, teacher, teaching assistant) took Moe home for a sleepover. Each adult created a “Moe and Me” storybook about their experiences at home with Moe and shared those experiences with the students.

Family Engagement

The students’ parents also became engaged in the Moe the MouseTM program when their child was given the opportunity to take Moe home for a sleepover. A letter was sent home to the parents introducing them to Moe. The letter let parents know about Moe so they were able to talk with their child about his or her new friend at school. The letter home helped keep them informed and also reinforced the excitement of Moe’s visit. At home, parents were encouraged to help the students create “Moe and Me” storybooks about their experiences and adventures with Moe. Upon return, students were given the opportunity to share those experiences with their classmates. For example, Moe participated in family activities such as making dinner, washing dishes, and bedtime stories while visiting the students’ homes.

Incorporation into General Instruction

Informal lessons around Moe’s animal friends were observed across the school day. Throughout the intervention, teachers were observed relating specific animal sounds to sounds in other words during general instruction or conversations. For example, during a conversation about food, the teacher in an enhanced Moe the MouseTM classroom stated that food starts with

/f/, and asked the students to determine which of Moe's friends also makes the /f/ sound.

Incorporating the sounds learned from Moe's animal friends during the Moe the Mouse™ lesson, across the school day, is an example of generalization of the skills learned in the program to situations outside of the lessons. Additionally, one enhanced Moe the Mouse™ class integrated Moe into their classroom community and daily activities. For example, Moe helped the students tend to the school's garden and build a sandbox. The teacher took pictures and had them displayed around the school.

Use of Program

Teachers from the Moe the Mouse™ condition rated that they used Moe's sleepover, Moe's special song, and Moe's animal friends and their speech sounds from the curriculum box on a daily or weekly basis. Teachers rated that they used the language activities and story books from the curriculum box weekly or monthly, but rarely, if ever, used the DVDs and the arts and crafts from the curriculum box. The teachers from the enhanced Moe the Mouse™ condition were observed using the majority of the curriculum and materials. During various observations, the enhanced Moe the Mouse™ teachers did not use the component of associating a specific animal friend with a specific speech sound to produce individual speech sounds. This task may have been omitted because the students learned the associations quickly and may have mastered the task during earlier instruction. Similar to the teachers from the Moe the Mouse™ condition, none of the enhanced Moe the Mouse™ teachers were observed using the arts and crafts activities.

Chapter 4: Discussion

The purpose of the current study was to evaluate the effectiveness of the Moe the MouseTM Speech and Language Development Program and an enhanced Moe the MouseTM program that was coupled with explicit early literacy instruction on student phonological awareness skills. Three measures were used in the current study. Two research validated measures of phonological awareness were used to assess initial skills and intervention outcomes of varying levels of phonological awareness instruction. A social validity and cultural content survey was administered at the end of the study to measure teacher perceptions of the social validity and cultural content of the Moe the MouseTM and enhanced Moe the MouseTM programs.

A quasi-experimental pre-post cluster design with three conditions (comparison, Moe the MouseTM, and enhanced Moe the MouseTM) was used. Phonological awareness measures were administered to all participants prior to and after the completion of the program. Participants in the intervention conditions received either the regular Moe the MouseTM or enhanced Moe the MouseTM program that was coupled with explicit instruction in early literacy. Across the intervention, no statistically significant differences were found in relation to basic phonological skills. When controlling for classroom effects, there was no main effect of condition on students' advanced phonological skills. A post-hoc comparison determined that students participating in the enhanced Moe the MouseTM program had improved advanced phonological skills when compared to the original Moe the MouseTM program or the district's early literacy instruction. Aboriginal and non-Aboriginal students responded similarly within the Moe the MouseTM and enhanced Moe the MouseTM conditions. A chi-square test determined that after the intervention, a statistically significant difference in proportions was observed. A smaller proportion of students from the enhanced Moe the MouseTM program fell in the "At Risk" category for later reading

difficulties when compared to the other conditions. Additionally, both programs were rated by teachers as socially valid and containing cultural content.

Effects on Phonological Awareness

Although no statistically significant differences were found between conditions (comparison, Moe the MouseTM, or enhanced Moe the MouseTM) for the students' basic phonological skills, results indicated that, when controlling for classroom effects, there were significant differences in advanced phonological skill outcomes based on the condition. Upon post hoc analysis by condition, results indicated that there were significantly stronger effects on advanced phonological skills for students from the enhanced Moe the MouseTM condition compared to Moe the MouseTM or business as usual conditions. There were no statistically significant differences in student skills between Moe the MouseTM and the district's typical instruction.

Whether a statistical test correctly identifies differences between groups depends on the power of the test. One factor that influences the power of a test is the sample size. Because the sample size determines the amount of sampling error inherent in test results, effects are harder to detect in smaller samples (Pallant, 2005). Although there were 100 student participants (an adequate sample size), there were only eight classrooms (a small number of clustered groups). Classroom was used as a random effects independent variable to account for the nesting of students within classrooms and teachers. Therefore, non-statistically significant condition results may have been due to this insufficient power. Especially when sample sizes are a concern, Kirk (2001) states that sound statistical practice includes consideration of effect sizes to determine practical significance of the intervention. The size of the effect for basic and advanced phonological awareness skills between the conditions was large, suggesting that enhanced Moe

the Mouse™ may hold promise in improving Kindergarten students' basic and advanced phonological awareness skills.

The data regarding the percent of students on track for positive literacy outcomes also indicated meaningful change. Before the intervention, there were no significant differences among the three conditions for the percent of students who fell in the "At Risk" category for later reading difficulties. However, after the intervention, the percent of students in the "At Risk" category for later reading difficulties was significantly different among the conditions. Descriptive statistics illustrated an increase in the percent of students "At Risk" for later reading difficulties from pre to posttest for both the comparison and Moe the Mouse™ conditions. However, the percent of students in the "At Risk" category from the enhanced Moe the Mouse™ condition decreased after the intervention. These results illustrate that the enhanced Moe the Mouse™ program was the only condition in which student risk for later reading difficulties was consistently reduced.

The enhanced Moe the Mouse™ program included explicit instruction in phonological awareness, and this addition may have helped improve the phonological awareness skills of the students from the enhanced Moe the Mouse™ condition. The literature points to explicit instruction in phonological awareness as beneficial to students' long term reading outcomes (E. W. Ball & Blachman, 1991; Biemiller, 2006; Lovett et al., 2008; Lundberg et al., 1988; National Reading Panel, 2000). The original Moe the Mouse™ program did not include explicit phonological awareness instruction outside of the Moe's animal friends component, where students associated animal toys with speech sounds. In this study, practice of general speech sounds with Moe's animal friends did not lead to enhanced phonological awareness skills. Associating the animal toys with general speech sounds instead of component phonemes of

words (e.g., the first sound in the animals' names) was not sufficiently explicit or intensive enough to teach the students that spoken words are made up of these small sounds. Explicit instruction in phonological awareness is more specified, and may have helped build a more meaningful connection between speech sounds and the sound system of the English language for those students in the enhanced Moe the MouseTM condition. However, the students in both Moe the MouseTM and enhanced Moe the MouseTM conditions appeared to be engaged in instruction during the program. The use of Moe and his animal friends may have made learning exciting for the students and increased engaged, on-task time in academic learning, whether or not instruction was effective in enhancing literacy outcomes.

Differential Effects by Aboriginal Heritage

As hypothesized, the results from the current study did not show significant differences between the advanced phonological awareness scores of Aboriginal and non-Aboriginal students from the Moe the MouseTM and enhanced Moe the MouseTM conditions at pretest, and the gains made by Aboriginal and non-Aboriginal students were not significantly different. This finding is relevant because in general, the literature states that a significant gap in school achievement exists between Aboriginal and non-Aboriginal students (Canadian Council on Learning, 2008; Cowley & Easton, 2006). A unique and contributing aspect of the current study may be that a large proportion of the sample (66% from the Moe the MouseTM condition and 52% from the enhanced Moe the MouseTM condition) spoke English as a Second Language. This unique characteristic of the sample may account for the similar phonological awareness skills results between the Aboriginal and non-Aboriginal students and make the data look less similar to results from other studies.

As previously discussed, a significant gap in school achievement generally exists between Aboriginal and non-Aboriginal students. Therefore, it is important to teach early literacy skills to increase positive trajectories. The earlier that support is provided, the more likely it is that outcomes can be improved (Vaughn & Fuchs, 2003; Vaughn et al., 2003; Vaughn et al., 2005). The literature speaks to the need to incorporate cultural exposure into literacy instruction to intervene effectively during students' education (Klingner, Artiles, Kozleski, Harry, Zion, Tate, Duran et al., 2005; National Board of Employment Education and Training, 1995; Tharp, 1982). Culturally responsive teaching incorporates positive aspects of Aboriginal culture into classroom curricula and may help teach students to view their own and each other's cultural heritages in a positive manner. In the current study, enhanced student engagement during both the Moe the MouseTM and enhanced Moe the MouseTM instruction was observed, and this on-task time in academic learning potentially enabled the enhanced curriculum to be more effective.

In line with results from previous studies, the current study demonstrated improved early literacy skills (specifically phonological awareness) with the use of explicit instruction. The enhanced Moe the MouseTM program consisted of multiple overlapping sequences of instruction that systematically addressed critical early literacy skills. Accuracy was built through teaching students to discriminate between similar items, and fluency was built through regular practice to facilitate automaticity in foundational skills. This explicit instruction and corrective feedback in the enhanced Moe the MouseTM condition may have led to improved outcomes, as the literature includes these methods as effective instructional strategies (E. W. Ball & Blachman, 1988; Cunningham, 1990; Kame'enui et al., 2002; O'Connor et al., 1995).

Cultural Content

Generally speaking, implementation of the Moe the MouseTM program in the Kindergarten classrooms showed an effort on the school district's part to create a climate among all students in which Aboriginal culture was welcomed and valued, an important element to facilitate learning (Canadian Council on Learning, 2008; Christenson et al., 2008; National Board of Employment Education and Training, 1995). The literature states that students learn best when there is a positive relationship between academic learning and a strong sense of cultural identity (Hilberg & Tharp, 2002; Phillips et al., 2004). The Moe the MouseTM program was designed to incorporate culture, language, heritage, and experiences to facilitate learning. The activities from the Moe the MouseTM curriculum provide exposure to some aspects of Aboriginal culture in a positive manner through the use of Aboriginal toys, stories, and arts and crafts projects to enhance language development. For example, on the DVD, Elders from the Nuuchah-Nulth First Nation share culturally appropriate stories and music, introduce traditional language, and acknowledge the important role of Elders, and, as a result, represent Aboriginal children and families positively and accurately. The arts and crafts projects included in the Moe the MouseTM program involve students in activities with objects important to some Aboriginal cultures (e.g., canoes, paddles, totem poles, tepees). These efforts to address traditional values and beliefs are examples of culturally responsive approaches to education, and, based on the literature, may facilitate learning for Aboriginal students.

In addition, teachers using the Moe the MouseTM and enhanced Moe the MouseTM programs all perceived their respective programs to be socially valid. Teachers also rated both programs as culturally appropriate, instilling cultural pride in the students, and teaching the values of Aboriginal peoples. These results indicate that either Moe the MouseTM program could

be a valuable addition to a classroom, as they incorporate early language and a sense of cultural identity through visual learning strategies and hands-on activities, which appeared to be engaging to both students and teachers.

Limitations

Several limitations should be considered when interpreting results from the current study. First, the power in the study was low. As previously discussed, significant effects are harder to detect in smaller samples, and there was a small number of participating classrooms. Therefore, non-significant condition results may have been due to this insufficient power. Future studies could include more classrooms to increase the power of the study. Second, the Moe the MouseTM program was designed for 3 to 5 year olds; however, the current study included Kindergarten aged students only. The narrow age group of this study may limit generalization of results for use of the Moe the MouseTM program with younger children. Third, this study did not use random assignment of students to the three conditions. The six participating schools were selected to take part in the study by the District Principal for Aboriginal Education from the school district. Additionally, those with a higher population of Aboriginal students were assigned to the Moe the MouseTM and enhanced Moe the MouseTM conditions. Although the students had no statistically significant preexisting language differences, the lack of random assignment of participants to conditions may lead to less confidence in the study's results. Fourth, psychometric assessments can have some degree of cultural loading. Diverse cultural backgrounds may not be represented in the standardization sample of many norm referenced measures of academic achievement (Overton, 1996). It is important to take into consideration that the interpretation of scores may be unfair or biased when test performance of children from diverse backgrounds primarily reflects level of acculturation (Kranzler et al., 2010). For example, one study found that over half of the

test items on the PPVT displayed Differential Item Functioning (i.e., when the probability of answering the item correctly differs for two groups) according to socioeconomic level, and these items decreased the reliability of the test (Kurnaz & Kelecioğlu, 2008). Another study indicated that African American children and children whose mothers had low education levels tended to score lower on the PPVT–III than did children from European American backgrounds and children whose mothers had a high school or higher education (Restrepo et al., 2006). Cross-cultural validity of curriculum based early literacy measures have not been researched as extensively, and as a result, there is little to no evidence regarding bias due to Aboriginal heritage in the measures used. However, it has been suggested that practitioners use alternative assessment methods such as nonstandard and dynamic assessments to test children's vocabulary skill (Laing & Kamhi, 2003; Restrepo et al., 2006). Fifth, class size was not controlled for in this study. On average, there were 15 participants in the comparison condition, 14 in the Moe the Mouse™ condition, and eight in the enhanced Moe the Mouse™ condition. Class size may have confounded the results and been a threat to internal validity. Sixth, students' time on task may be a potential mechanism for improvement in skills. Students may have had more time on task in reading activities in the enhanced Moe the Mouse™ condition when compared to the Moe the Mouse™ condition. The scripted version of the program was created to provide additional explicit instruction in early literacy and may have encouraged more time on task and active responding than the regular Moe the Mouse™ program. However, time on task was not measured in this study. Future research could address the amount of academic on-task time within the participating classrooms. Seventh, fidelity of implementation for the comparison group was not measured. Therefore, implementation of the district's early literacy instruction (e.g., curriculum content, delivery method) was unknown in this study. Fidelity of implementation for

the Moe the MouseTM program was measured indirectly through teacher self-reported use of the program, whereas a direct measure was used in the enhanced Moe the MouseTM condition. For future studies, it is recommended that fidelity of implementation is measured consistently across conditions to ensure understanding of the content delivered to all students in the study. Eighth, in one classroom, the enhanced Moe the MouseTM program was delivered by the researcher due to unforeseen complications in the classroom. Fidelity of implementation data was collected from a checklist detailing the components that were intended to be taught during each lesson. The percent of completed components was recorded after the lesson through self-report by the researcher. This factor may have influenced the results as the researcher had knowledge about the benefits of systematic instruction and previous experience with teaching material in this manner. The researcher did not participate in the social validity and cultural content survey. It is recommended that, in future studies, the classroom teacher delivers the program. Ninth, although the Moe the MouseTM and enhanced Moe the MouseTM programs were rated by teachers as culturally appropriate, instilling cultural pride in the students, and teaching the values of Aboriginal peoples, cultural content was only assessed through a teacher survey. Although it is appropriate for teachers to include a respectful recognition and celebration of Indigenous culture into their curriculum and instruction, concerns arise regarding the qualifications of classroom teachers to rate the cultural appropriateness of curriculums (e.g., Moe the MouseTM program). Future research could include the perspective of members of the Aboriginal community, detailing a wider range of outcomes, and therefore providing a deeper, more qualified view of the Moe the MouseTM program. For example, more detailed questions examining cultural pride, cultural awareness, and cultural identity could be included in a survey. Qualitative research involving open-ended questions or comprehensive interviews would also add depth of knowledge.

Furthermore, Marker (1992) suggested additional ways to bring awareness and genuine understanding of Aboriginal culture into the classroom; for example, teachers could suggest to students that there is more than one way to approach daily challenges (offering Aboriginal values and viewpoints) or invite tribal elders to speak to students at the school.

Implications

Despite these limitations, the results from this study are both noteworthy and relevant in the area of early literacy instruction and cultural curriculum intervention efforts for student literacy outcomes. The findings from this study add to the literature and the field's practical understanding of a cultural curriculum incorporated into early literacy instruction, as it is among the first empirical studies of practices that integrate Aboriginal culture into early literacy instruction. More specifically, this study was the first to evaluate the Moe the MouseTM program, which is widely used across British Columbia. The Moe the MouseTM program alone did not produce improved phonological awareness outcomes when compared to the district's typical instruction. The results indicate that the enhanced Moe the MouseTM program, a cultural early literacy curriculum, has promise to enhance the phonological awareness skills of students above and beyond the regular Moe the MouseTM program or the district's typical instruction. The current study was the first to examine the effectiveness of the Moe the MouseTM Speech and Language Development Program and adds to the cultural curriculum and early literacy research by examining its effects on student phonological awareness skills.

Implications for Future Research

The Moe the MouseTM program was originally designed for Preschool students. Therefore, future research could include the assessment of Preschool students' language and early literacy skills in relation to participating in the Moe the MouseTM program. It would be of interest

to see the effects of the program across the span of intended participants. The perspective of Preschool teachers on the intervention's social validity and cultural content could also be collected.

In addition, future research could evaluate the long-term maintenance on literacy outcomes over time. Specifically, it would be interesting to determine whether the phonological awareness skills gained from the program led to improved reading skills in Grade 1. As this study examined only short term outcomes of the programs, it may be beneficial to assess effectiveness in terms of long term reading trajectories. There has not been a study examining the longitudinal effects of the Moe the MouseTM or enhanced Moe the MouseTM program; therefore, conclusions on their long term impact and effectiveness are limited at the present time.

Implications for Practice

Early literacy skills are an important target for improving the outcomes of all students, but potentially, most notably for Aboriginal students. On an annual provincial assessment in reading comprehension for Grade 4 students, only 37% of Aboriginal students in the study's district met or exceeded expectations of student academic performance (Ministry of Education, 2009). The goal of the Moe the MouseTM program is to provide opportunities for children to practice language skills in natural settings. The enhanced Moe the MouseTM program was specifically designed with scripts and structured activities to reduce instructor workload, but it allows for paraphrasing of these scripts, which leads to flexibility in chosen activities to make them relevant to student needs. It also engages students to learn through interactive instruction.

Likewise, addressing cultural content is a key target for schools. The Moe the MouseTM program alone did not produce improved phonological awareness outcomes, but teachers rated it as culturally appropriate, instilling cultural pride in the students, and teaching the values of

Aboriginal peoples. Klingner and colleagues (2005) suggest incorporating culture, language, heritage, and experiences to facilitate learning. The Moe the MouseTM program utilizes audio-visual and print resources, Aboriginal toys, storytelling, pretend play, and role playing to enhance language development.

According to these preliminary and tentative findings regarding cultural content, the Moe the MouseTM program may incorporate Aboriginal cultural effectively and is recommended as a cultural curriculum for Preschool and Kindergarten classrooms, regardless of Aboriginal heritage, because all students appeared to be engaged in the activities. The enhanced Moe the MouseTM program, on the other hand, is promising in addressing both phonological awareness and cultural content simultaneously, therefore, the use of the enhanced Moe the MouseTM program is recommended if both areas are a concern in the classroom.

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Make sure you have reviewed the long form of the directions in the *DIBELS Administration and Scoring Guide* and have them available. Say these specific directions to the student:

Listen to me say this word. Man. The first sound that you hear in the word man is /mmm/. Listen. /mmm/. Man. What is the first sound you hear in the word, man?

CORRECT RESPONSE: Student says /mmm/ or /ma/, you say.	INCORRECT OR NO RESPONSE: If student gives any other response, you say,
<i>Good. /mmm/ is the first sound in man. (present the next practice item)</i>	<i>/mmm/ is the first sound that you hear in the word man. Listen. /mmm/. Man. Say it with me. /mmm/. Let's try it again. What is the first sound you hear in the word, man?</i>
<i>Good. (present the next practice item)</i>	<i>/mmm/. Say /mmm/.</i>
<i>Good. (present the next practice item)</i>	<i>(present the next practice item)</i>

Good. Listen to me say another word. Moon. What is the first sound that you hear in the word, moon?

CORRECT RESPONSE: Student says /mmm/ or /ma/, you say.	INCORRECT OR NO RESPONSE: If student gives any other response, you say,
<i>Good. /mmm/ is the first sound in moon. (present the next practice item)</i>	<i>/mmm/ is the first sound that you hear in the word moon. Listen. /mmm/. Moon. Say it with me. /mmm/. Let's try it again. What is the first sound you hear in the word, moon?</i>
<i>Good. (present the next practice item)</i>	<i>/mmm/. Say /mmm/.</i>
<i>Good. (present the next practice item)</i>	<i>(present the next practice item)</i>

Let's try another word. Sun. Pause. If the student does not say the first sound ask, What is the first sound you hear in the word sun?

Test Items	Correct Responses		Incorrect 0 points
	2 points	1 point	
1. socks	/s/	/so/	0
2. team	/t/	/tea/	0
3. black	/b/	/bl/, /bla/	0
4. trim	/t/	/tr/, /tri/	0
5. fast	/f/	/fa/	0
6. slush	/s/	/sl/, /slu/	0
7. wet	/w/	/we/	0
8. blob	/b/	/bl/, /blo/	0
9. peek	/p/	/pea/	0
10. creaked	/k/	/kr/, /krea/	0
11. stamp	/s/	/st/, /sta/	0
12. side	/s/	/sie/	0
13. through	/th/	/thr/	0
14. met	/m/	/me/	0
15. glad	/g/	/gl/, /gia/	0
16. gap	/g/	/ga/	0
17. trash	/t/	/tr/, /tra/	0
18. truck	/t/	/tr/, /tru/	0
19. shack	/sh/	/sha/	0
20. camp	/k/	/ka/	0
21. plot	/p/	/pl/, /plo/	0
22. clapped	/k/	/kl/, /kla/	0
23. dish	/d/	/di/	0
24. line	/l/	/lie/	0
25. drag	/d/	/dr/, /dra/	0
26. chase	/ch/	/chai/	0
27. snap	/s/	/sn/, /sna/	0
28. ranch	/r/	/ra/	0
29. pound	/p/	/pow/	0
30. free	/f/	/fr/	0

2-pt Words: _____
x 2: _____ + 1-pt Words: _____ = Total: _____

DIBELS® Phoneme Segmentation Fluency

Short Form Directions

Make sure you have reviewed the long form of the directions in the *DIBELS Administration and Scoring Guide* and have them available. Say these specific directions to the student:

I am going to say a word. After I say it, you tell me all the sounds in the word. So, if I say, "sam," you would say /s/ /a/ /m/. Let's try one (one-second pause). Tell me the sounds in "mop."

CORRECT RESPONSE: If student says /m/ /o/ /p/, you say	INCORRECT RESPONSE: If student gives any other response, you say
<i>Very good. The sounds in "mop" are /m/ /o/ /p/.</i>	<i>The sounds in "mop" are /m/ /o/ /p/. Your turn. Tell me the sounds in "mop."</i>

OK. Here is your first word.

Give the student the first word and start your stopwatch.

Benchmark K.2

DIBELS® Phoneme Segmentation Fluency

hat	/h/ /a/ /t/	hear	/h/ /ea/ /r/	___/6
as	/a/ /z/	punch	/p/ /u/ /n/ /ch/	___/6
means	/m/ /ea/ /n/ /z/	by	/b/ /ie/	___/6
seam	/s/ /ea/ /m/	ship	/sh/ /i/ /p/	___/6
ought	/o/ /t/	pack	/p/ /a/ /k/	___/5
jam	/j/ /a/ /m/	if	/i/ /f/	___/5
yell	/y/ /e/ /l/	ham	/h/ /a/ /m/	___/6
calls	/k/ /o/ /l/ /z/	ear	/ea/ /r/	___/6
key	/k/ /ea/	crowd	/k/ /r/ /ow/ /d/	___/6
loud	/l/ /ow/ /d/	choose	/ch/ /oo/ /z/	___/6
bare	/b/ /ai/ /r/	bills	/b/ /i/ /l/ /z/	___/7
guy	/g/ /ie/	stand	/s/ /t/ /a/ /n/ /d/	___/7

Total: ___

Error Pattern:

Appendix C: Teacher Survey

Teacher Survey Moe the Mouse™ Speech and Language Development program



Name of School Staff: _____

The questions below ask for your opinion about the Moe the Mouse™ program. In addition, you are asked to rate the extent to which the program is consistent with your personal values, and your perceptions of how easy it is to implement. Please provide a rating for each question by circling only one answer. Thank you for your contribution and assistance.

To what extent are you pleased with the overall improvement in the students' language and early literacy skills?

Very displeased	Somewhat displeased	Somewhat pleased	Very pleased
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This program is likely to help the students to be more successful with language and early literacy.

Strongly disagree	Disagree	Agree	Strongly agree
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The elements of this program are consistent with the way I believe students should be taught language and early literacy.

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

I know what I am expected to do to implement this program.

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

The program is relatively easy to implement (e.g. amount of time/effort).

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

I am likely to implement the program with students in the future.

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

The activities and materials in the curriculum box are culturally appropriate.

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

The program instills cultural pride in the students and teaches the values of Aboriginal peoples.

Strongly disagree	Disagree	Agree	Strongly agree
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How often did you use the Moe the Mouse™ program

Less than once per month	Less than once per week	Once or twice per week	Three to four times per week	Daily
-----------------------------	----------------------------	---------------------------	---------------------------------	-------

Rate how often you used each component of the curriculum box by circling the option that best represents how often you used that component

<u>Animal friends</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>DVDs</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>Arts & Crafts</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>Moe's Sleepover</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>Speech Sounds</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>Story books</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>Language activities</u>	Never	Once or twice	Monthly	Weekly	Daily
<u>Moe's special song</u>	Never	Once or twice	Monthly	Weekly	Daily

Teacher Survey
Enhanced Moe the Mouse™
Speech and Language Development program



Name of School Staff: _____

The questions below ask for your opinion about the enhanced Moe the Mouse™ program. In addition, you are asked to rate the extent to which the program is consistent with your personal values, and your perceptions of how easy it is to implement. Please provide a rating for each question by circling only one answer. Thank you for your contribution and assistance.

To what extent are you pleased with the overall improvement in the students' language and early literacy skills?

Very displeased	Somewhat displeased	Somewhat pleased	Very pleased
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This program is likely to help the students to be more successful with language and early literacy.

Strongly disagree	Disagree	Agree	Strongly agree
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The elements of this program are consistent with the way I believe students should be taught language and early literacy.

Strongly disagree	Disagree	Agree	Strongly agree
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I know what I am expected to do to implement this program.

Strongly disagree	Disagree	Agree	Strongly agree
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The program is relatively easy to implement (e.g. amount of time/effort).

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

I am likely to implement the program with students in the future.

Strongly disagree	Disagree	Agree	Strongly agree
-------------------	----------	-------	----------------

The activities and materials in the curriculum box are culturally appropriate.

Strongly disagree	Disagree	Agree	Strongly agree
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The program instills cultural pride in the students and teaches the values of Aboriginal peoples.

Strongly disagree	Disagree	Agree	Strongly agree
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Appendix D: Treatment Integrity Form from Enhanced Moe the Mouse™ Lesson

Class:

Date: Jan 19

Lesson: Week 8 Lesson 2

☐

First sound segmenting accuracy (Moe version): lock,
mix, nest, nut, rat, saw, socks, six, bird, bear, tire, dice

☐

Introduce /r/

☐

Introduce writing a letter: r

☐

Letter writing fluency: t

☐

Moe the Mouse -Sing Moe's Special Song

☐

Moe the Mouse -Sleepover Story-telling

☐

Moe the Mouse -Animal/Sound: Listen for the Sound

☐

Moe the Mouse -Animal/Sound: Imitating the Sounds in
Words

☐

Moe the Mouse -Moe's Sleepover

Notes: