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On the cover: The greeting wall in the Calgary Board of Education's Niitsitapi li tass ksii nii mat tsoo kop (Niitsitapi Learning Centre) follows traditional Blackfoot teepee protocols and was designed in collaboration with Elder Randy Bottle. The wall's canvas colour and texture represent the buffalo hide, and greetings from all 68 Indigenous languages across Canada are featured. The top section represents the upper boundary of our world, the cosmos. The seven stars on the far left represent the Big Dipper and are associated with the Blackfoot creation story. The middle five stars represent the Milky Way, and the seven stars on the right represent the Little Dipper. The bottom section represents the foothills and acknowledges the land on which we are situated. Behind the words are four turtle shapes representing Turtle Island (which is also featured in the bird's-eye view of the building). Photo courtesy of Michelle Ranger.

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From the Editors' Desk

Early Childhood Education is a medium for communicating recent research insights, in-depth pedagogical reflections and current issues in the field of early childhood education. It serves as a tool for connecting early childhood educators, researchers, curriculum makers and educational administrators for the enrichment of early childhood education. The journal is deeply rooted in the local context of educational practices but also aims to communicate and discuss universal topics in early childhood education with a broader audience. As editors of the journal, we hope to promote a meaningful dialogue between research and practice.

This issue includes five articles and a book review, and covers diverse topics in early childhood education.

In their article "Supporting Children's Vocabulary and Thinking in a Magic Potion Laboratory: A Reflective Conversation Between Educators, a Speech-Language Pathologist and a Linguist," Janice Greenberg, Pam Bowles, Shelley Stagg Peterson and Alison Altidor-Brooks demonstrate the power of interdisciplinary dialogue. They discuss how teachers can take an active role in building young children's vocabulary and deepening their thinking through everyday interactions.

"A Personal Journey Through Reggio Emilia" is a reflective piece written by Kiren Hans on her pedagogy, which is inspired by the Reggio Emilia philosophy.

In "Supporting Literacy Instruction in the Early Childhood Classroom: Ideas for Kindergarten Teachers and Administrators," Barb Hogan reviews

the literature on early literacy and discusses how teachers can support literacy instruction in early childhood education.

Shayla Jaques, Beaumie Kim, Anna Shyleyko-Kostas and Miwa A Takeuchi introduce their collaborative project on early numeracy and mathematics board game redesign in their article "I Just Won Against Myself!": Fostering Early Numeracy Through Board Game Play and Redesign."

Su-Jeong Wee, Kyoung Jin Kim and Beverly Boals Gilbert present insights on using fractured fairy tales in the kindergarten classroom, especially for developing critical-thinking skills.

Joy de Nance reviews Marian Small's recent book *Fun and Fundamental Math for Young Children: Building a Strong Foundation in PreK-Grade 2* (Teachers College Press and Rubicon, 2018) from the perspective of an experienced early childhood educator.

All the articles in *Early Childhood Education* are peer reviewed by our dedicated reviewers. We appreciate their constructive feedback to maintain the quality of this journal.

This issue is our last as editors. Thank you for all your support over the past three years. Sherry Woitte, University of Alberta, will take on the role of editor starting with the 2020 issue.

We hope you enjoy the 2019 issue of *Early Childhood Education!* 🐾

Miwa Aoki Takeuchi and Cynthia Prasow
University of Calgary

Supporting Children's Vocabulary and Thinking in a Magic Potion Laboratory: A Reflective Conversation Between Educators, a Speech-Language Pathologist and a Linguist

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and Alison Altidor-Brooks*

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Alison Altidor-Brooks is a PhD candidate in the Language and Literacies Education program at OISE, where she conducts research on language education policy, academic literacies and sociolinguistic theories of polycentric languages.

Abstract

This article is a reflective conversation between a kindergarten teacher, a speech-language pathologist, a linguist and a literacy researcher as they reflect on how teachers can intentionally create opportunities for extending children's thinking and supporting vocabulary development. The authors use the context of a magic potion laboratory, involving an educational assistant and six kindergarten students, as a starting point for their reflective conversation. They propose ways in which teachers can take an active role in building young children's vocabulary and deepening their thinking in everyday interactions with others with regard to objects

and literature. The professional learning stemming from this reflective conversation points to the value of collaboration between educators, speech-language pathologists and linguists.

Reflective practice involves teachers examining their practice and their assumptions about teaching and learning—a process that often leads to generating knowledge that can benefit other teachers (Zeichner and Liston 2014). Knowledge creation through reflection can be enhanced through reflective collaboration with other professionals from related fields. This article is a reflective conversation between a kindergarten teacher, a speech-language pathologist, an education professor and former primary teacher, and a doctoral candidate with a specialization in linguistics.

We reflect on interactions in a magic potion laboratory, an imaginative context in a kindergarten classroom where children and an educational assistant combined food items (such as pudding, soda pop and gummi worms) to create "potions" to eat or drink. These interactions were video recorded at the beginning of our four-year collaborative action research project, which explored ways to support young children's writing and oral language through creative, collaborative curriculum activities (Portier et al 2018; Portier and Peterson 2017). As this context was created in the early stages of our research project, the interactions are not presented as exemplary teacher–student interactions but, rather, as starting points from which we have all

learned more about supporting young children's vocabulary and thinking. We benefited from the collegial conversations with colleagues and from time for reflection to propose additional ways in which teachers and educational assistants can support children's language development.

In agreement with Swartz (2019) that words matter in children's everyday lives and that it is important to create contexts that focus on vocabulary development, our conversation here builds on research showing that repeated and meaningful exposure to and use of new words in meaningful contexts support children's vocabulary development (Beck, McKeown and Kucan 2002; Dickinson, Golinkoff and Hirsh-Pasek 2010). Our conversation also draws from research showing the important contributions of exploratory talk to deepening thinking. Exploratory talk involves teachers and students in proposing ideas and possible interpretations that are then examined, critiqued, clarified and shaped through dialogue (Mercer and Littleton 2007). When engaging in exploratory talk, students are active meaning makers who can deepen and extend their thinking processes. In classrooms where teachers create environments that invite interaction, children use talk to construct meaning, drawing on their background experience and knowledge (Weitzman and Greenberg 2002, 2010). These understandings about young children's learning support the assertion that early childhood learning environments should "provide multiple opportunities for children to actively explore ideas and materials, and talk about their ideas with others" (Makovichuk et al 2014, 29).

Pam's Kindergarten Classroom in Alpine Hill

Although this article focuses on our reflections on a particular video-recorded context, we provide contextual information here about Pam's kindergarten classroom to give readers a sense of how it was set up.

Alpine Hill is a rural community in northern Manitoba with a population of approximately 400 people.¹ At the time of the video recording, Pam's junior/senior kindergarten class at Alpine Hill Elementary School had 26 four- and five-year-old students and an educational assistant (Vicki). Of the children, 12 attended for the full day every day, and 14 attended for the full day on every other day. Twenty-two children had European cultural backgrounds, and four were Indigenous. All spoke

English as their primary language at home and at school.

Typical daily activities in Pam's classroom included carpet time; time dedicated to literacy and math; and the teaching of art, science, social studies and health through thematic units across the school year. The children spent 50 minutes every day in free-choice play, either exploring toys and other play materials or playing at a centre based on a thematic unit.

Magic Potion Laboratory

The first unit of the school year focused on the science laboratory, including safety issues and practices. Pam read nonfiction books to the children to provide background knowledge and concrete contexts for discussions about the five senses and safety. Her students made observations and learned to gather information in various ways. For example, they pretended they were scientists exploring science and health topics. Pam invited them to pose questions as they participated in lessons about the five senses, the role of a scientist and safety symbols. They learned procedures for staying safe while measuring, exploring and manipulating a variety of materials and while completing a variety of experiments.

In October, Pam introduced a magic potion laboratory as a fun activity to wrap up the unit and allow the children to create a themed snack. This idea came from a variety of sources, such as Wiggins (2006), as well as from the children's and Pam's interests—especially their interest in books from J K Rowling's (1997, 1998) Harry Potter series, which follows the life and wizarding adventures of a young orphan boy, as well as other books about magic and potions, such as Mem Fox and Julie Vivas's (1990) *Possum Magic* and Tomie dePaola's (1975) *Strega Nona*. These stories are populated by witches, wizards, spells, wands and magic. (See Appendix A for more children's books about magic spells and potions.)

Pam and Vicki searched Pinterest to find ideas for making the magic potion laboratory come to life. Vicki found instructions for a craft activity for making magic wands. Pam provided a variety of edible treats the children could use to make their own imaginative magic potions (for example, green, purple and yellow Jell-O; chocolate and vanilla pudding; gummi worms, frogs and teeth; sprinkles; coconut flakes; and soda pop for the fizzing effect).

We recognize that in some kindergarten classrooms, especially in urban schools, sugary foods are banned, but we hope that readers will respect the culture of Alpine Hill (a northern, rural

community) and find ways to adapt the magic potion laboratory for their contexts. It is important that the oft-unheard voices of rural teachers can join the voices of urban teachers, whose work is most frequently presented in educational research (Burton, Brown and Johnson 2013; Corbett 2014). In Alpine Hill, children have abundant opportunities to play and be physically active outdoors, and sugar in children's diets (in moderation) is accepted throughout the community. Parents and other members of the community have a close relationship with the teachers and other school professionals, and they support teachers' professional judgment about what foods are appropriate to use in classroom activities.

On the final day of the unit, the 26 students were placed in groups and rotated through five stations: the magic potion laboratory, a sorting bugs activity, a patterning with bugs activity, an "If I Had a Magic Wand" craft and a writing activity. Pam facilitated the writing activity, and Vicki facilitated the magic potion laboratory.

Vicki introduced the activity by welcoming the children and explaining the purpose of the station. She set the stage for imaginary play by vividly describing the ingredients available for the children to use in their potions. Vicki and the children made their magic potion snacks (see Figure 1). They discussed the wording to use in spells (for example, *abracadabra* and *hocus-pocus*); described their observations as they mixed various edible solids and liquids; and predicted what might happen after they ate their potions. The children then used their magic wands to cast their own spells on their potions, and then they enjoyed eating their snacks. They then moved on to the writing station to write about their magic potions.



FIGURE 1. Vicki and children at the magic potion laboratory.

Our Reflection Process

As part of our collaborative action research project, Pam set up an iPod at the magic potion laboratory to video record the children's and Vicki's

interactions. Their actions and language in a five-minute video were transcribed, and the four of us reviewed the video multiple times individually, taking notes about our observations of the children's language and use of imagination, as well as the kinds of supports Vicki provided.

We met once, in a video conference, to discuss our observations. We then used notes from our observations to guide a second round of individual viewing of the video, this time reflecting on how other types of support could have been provided. To do so, we drew on the literature (Beck, McKeown and Kucan 2002; Dickinson, Golinkoff and Hirsh-Pasek 2010; Weitzman and Greenberg 2002, 2010) and on our own experiences in teaching and supporting the speech and language of young children.

In a second video conference, we agreed to focus our reflections on two goals for children's learning:

- Building vocabulary and conceptual learning
- Extending children's thinking processes

With reference to examples from the transcript of the video recording, we present our reflections on Vicki's interactions with the kindergarten students at the magic potion laboratory using these two goals.

Building Vocabulary and Conceptual Learning

In our interdisciplinary discussion, we concluded that during the activities leading up to the magic potion laboratory, Pam and Vicki supported students' vocabulary learning by modelling and encouraging the use of scientific terms, safety symbols and words, and names of tools in the lab.

Vicki continued to focus on vocabulary in the magic potion laboratory by introducing less familiar words (such as *wand*, *spell* and *potion*). These words are referred to as tier 2 and tier 3 words (Beck, McKeown and Kucan 2002; Biemiller 2009). Tier 2 words tend to be more sophisticated and to occur less frequently, and they are generally not part of children's everyday vocabulary. Tier 3 words occur even less frequently and are generally tied to a specific topic.

Through our interdisciplinary reflections on the activities in the video, we agreed that scaffolding students' vocabulary and conceptual learning could include explaining the meaning of these new words and providing specific examples of how they relate to magic. Teachers and educational assistants can deepen children's understanding by relating the words to children's previous knowledge or experiences. Reading books can be a particularly helpful way to expose children to knowledge or experiences they do not encounter in everyday life.

In the following examples, we propose additional ways Vicki could have supported and enhanced students' learning:

What Vicki said: "Welcome to our magic potion lab."

What Vicki could have said: "A potion is a special mixture that is supposed to have magical powers. Remember when we read the book *Possum Magic*? Grandma Poss looked for a magical potion that would make Hush visible again."

What Vicki said: "Hold your magic wand like this."

What Vicki could have said: "A wand is a stick that we wave over something to pretend to make something magical happen [*describing the meaning*]. Have you ever seen someone use a wand to make magic happen? Do you think that was really magic? [*relating to children's existing knowledge*]."

What Vicki said: "This is how you say your spell—'Abracadabra.'"

What Vicki could have said: "A spell is a special word we can say to magically make something happen [*describing the meaning*]. Our spell is *abracadabra*. Do you know any other spells? [*drawing on children's existing knowledge*]."

Vicki had, in fact, read *Possum Magic* (Fox and Vivas 1990) to the children before the magic potion laboratory activity, but here she missed the opportunity to make connections to what the children already knew about potions from the story reading.

Additionally, Pam and Vicki could have been more intentional about introducing new tiers 2 and 3 vocabulary (*magic, invisible, visible, wand, cauldron, spell*) in their prior reading of stories such as *Possum Magic* (Fox and Vivas 1990) and *Room on the Broom* (Donaldson and Scheffler 2001). This vocabulary could have then been reinforced in the magic potion laboratory.

Vicki could have further deepened the children's understanding of vocabulary by introducing the multiple meanings of words such as *spell* and *cast* (as in *cast a spell*), as well as other tiers 2 and 3 vocabulary, such as nouns (*wizard, magician, witch*), for more clearly defining their pretend roles; adjectives (*gooney, goopy*), for describing the muddy concoction created with chocolate pudding; and verbs (*transform*), for describing what the magic wand did as she waved it over the chocolate pudding.

Extending and Deepening Children's Thinking

Vicki set the imaginary context by introducing the concepts of magic wands and spells. She continued the theme of magic by telling the children that they could wave their magic wands while saying the magic spell, by providing language for use with the magic wand (*hocus-pocus, abracadabra*) and by providing imaginary labels for the potion ingredients (coconut flakes were called snowflakes, and chocolate pudding was called mud). Vicki maintained the pretending by telling the children, "You have to use your imagination" and "We can make it what we want." This activity interested the children and successfully engaged them in making observations and comments about the potions.

The following is an interaction from the video:

VICKI. Put that in there. That's where the special potion is going. Oh, look at the bubble. Did you see a bubble?

DAVID. Oh!

VICKI. You can have two droppers.

SIMON. I did two drops.

VICKI. Two drops.

Here is a later interaction:

VICKI. Do you want some mud?

DIRK. Yeah

DAVID. Looks like chocolate pudding.

VICKI. You have to use your imagination. It's mud today with our magic wands. We can make it whatever we want.

In our reflective conversations about these interactions, we proposed ways to modify them to extend children's thinking so that they would have opportunities to predict, explain, evaluate, describe, problem solve, project and make connections to previous knowledge and experiences.

Predicting

- "What do you think will happen if we add more drops?"
- "What is happening here?" [*pointing to a bubble*]
- "What do you think might happen if someone drinks this magic mud?"

Explaining

- "Why do you think there are bubbles in our magic potion?"
- "Why did our potion turn brown like mud?"

Evaluating

- “Which potion do you think will be stronger, the one with bubbles or the muddy potion? Why?”
- “Do you think this potion looks like a potion a real wizard might make? Why or why not?”

Describing

- “What do all these bubbles look like to you?”
- “Tell me why this potion looks like mud.”

Problem Solving

- “What can we do if the spell doesn’t work?”
- “I think we need more bubbles in this potion to make it more powerful. Which ingredient do you think we should add?”

Projecting

- “What do you think it would be like to have magical powers?”
- “What kind of spells would you cast?”
- “If I was a real wizard, I would want to make sure my potions were very powerful!”
- “I would be afraid to drink this potion if I did not know what would happen to me!”

Making Connections to Previous Knowledge and Experiences

- “Have you ever seen anyone else mix up potions like this?”
- “I remember that Harry Potter made a magic potion that looked like this in the movie.”

Making explicit connections to the background knowledge and experiences children have gained from stories they have previously heard can be effective in deepening their understanding. In this situation, children could have drawn upon their memory of the Harry Potter story to assume pretend roles in the magic potion laboratory, in a teacher-directed pretend activity and in subsequent child-led dramatic play scenarios. Adding props similar to items described in the story would also help extend their pretending and understanding. Re-enacting a related story can also deepen children’s understanding of a story narrative. Through assuming pretend roles, children gain increased understanding of the sequence of events in a story and the personalities and motivations of the characters.

With these examples of interactions in the magic potion laboratory, we have focused on how Vicki could have enriched her use of vocabulary and questions to extend and deepen the children’s thinking. However, we also agreed in our reflections that although what the teacher asks and tells children is important, it is also critical for teachers to pause and take the time to observe, wait and listen

in order to allow children to initiate their own comments and ask their own questions. This may be particularly helpful for children who have limited background experiences or less developed language skills, or who might simply need more processing time and more support to join the conversation (Weitzman and Greenberg 2010). What children contribute on their own helps teachers understand their interests, their level of comprehension and the background knowledge they bring to new learning. Teachers can then follow children’s lead by validating and expanding on their message. Moreover, when teachers follow children’s interests in this way, children will be more motivated to continue the conversation (Weitzman and Greenberg 2010).

Some children have more difficulty joining in a conversation than others. Ways to support these reluctant communicators include positioning them in the teacher’s view, offering them a role to play or a task to perform, and providing them with additional language models.

Bringing What We Have Learned to Other Classrooms

Drawing on our reflections on the interactions in the magic potion laboratory, we have come to see that teachers and educational assistants need to explicitly plan intentional conversations to facilitate language development when setting up teacher-directed, curriculum-related activities and dramatic play centres for child-directed play. Often, teachers focus on planning and implementing the learning activity, and language is an afterthought.

Through our interdisciplinary conversations, we have created understandings about how teachers can take a more active role in building children’s vocabulary and conceptual knowledge and in extending their ideas and understanding. Teachers should consider the following strategies:

- Learn about and take into account the existing knowledge and experiences children bring to a planned learning activity, which can be drawn upon to deepen their understanding.
- Intentionally select related books for prior shared reading to introduce new vocabulary and establish necessary background knowledge and understanding. Pay particular attention to children who may lack this knowledge.
- Brainstorm new words that can be introduced, and if necessary, consult resources for the best way to describe word meanings and relate the

meanings to children's previous knowledge and experiences.

- Be prepared to take time to pause and listen to children, to allow them to spontaneously initiate comments and questions, and to expand on their interests in order to extend the conversation.
- Identify strategies for engaging children who are reluctant to participate in group conversations.
- Plan specific ways to extend the conversation, with comments and questions that model thinking and encourage children to go beyond the here and now in order to predict, explain, evaluate, describe, problem solve, project and imagine.
- Select props that support children's ability to assume roles and extend the pretending (for example, long wizard coats, dimmed lights and wizard hats).

Our reflections on the interactions in the magic potion laboratory highlight the great potential of contexts (where children and their teachers interact with objects and materials and with each other) for promoting language development. Children can be actively engaged in back-and-forth conversations in which adults validate and expand children's messages, to expose them to more-complex language models, new vocabulary and new ideas. Teachers can maximize the language learning opportunities in classroom activities by intentionally planning possibilities for supporting children's vocabulary and extending and deepening their thinking while stimulating their imagination and making connections to literature. In the process, teachers establish a culture that values talk in the classroom. Although our examples come from one learning activity in a particular kindergarten classroom, we hope that other teachers will find our reflections and suggestions useful for supporting children's language, literacy and learning across the curriculum and across age levels.

Appendix A: Children's Literature About Magic Spells and Potions

The Haunted House That Jack Built, by Helaine Becker and David Parkins (illus). 2010. Toronto: Scholastic.

The imagery in this read-aloud, which is a haunted version of a classic rhyme, provides an opportunity for a class discussion about edible potions.

Strega Nona, by Tomie dePaola. 1975. Upper Saddle River, NJ: Prentice Hall.

When *Strega Nona* goes off on a visit, her apprentice, Big Anthony, tries the spell that makes her magic pasta pot start producing a large amount of pasta, but he cannot remember the spell that makes the pot stop producing pasta. This traditional tale provides children with another perspective on magic spells and is a rich source for dramatic play.

Room on the Broom, by Julia Donaldson and Axel Scheffler (illus). 2001. Toronto: Scholastic.

A witch loses her personal items while riding her broomstick. She meets some animals along the way that help her find those items in exchange for a ride. With too many riding on it, the broom snaps in two. The witch must use her cauldron and cast a spell to fix her broom. This rhyming book provides a lot of descriptive vocabulary and an opportunity for dramatic retell.

Possum Magic, by Mem Fox and Julie Vivas (illus). 1990. Sydney, Australia: Omnibus.

Grandma Poss makes a potion to make her granddaughter Hush invisible, but she forgets the spell to bring Hush back to visibility. The search for a way to reverse the spell makes this story a good pairing with *Strega Nona*, with lots of potential for dramatic play.

Shivery Shades of Halloween: A Spooky Book of Colors, by Mary McKenna Siddals and Jimmy Pickering (illus). 2014. New York: Scholastic.

In this rhyming book, a little monster ventures through the colours of Halloween. This story is a good source of Halloween- and magic-themed vocabulary and allows children to learn about colour, a kindergarten science curricular outcome.

Note

1. All names of places and people are made up.

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A Personal Journey Through Reggio Emilia

Kiren Hans

Kiren Hans is an early childhood educator in Calgary, Alberta. She has been teaching for 12 years, primarily with gifted children. Her passion for early childhood education led her to complete a master of education degree from the University of Calgary, with a specialization in curriculum and learning. She is inspired by the Reggio Emilia philosophy of teaching and incorporates it in her teaching practice.

Abstract

The Reggio Emilia philosophy of education focuses on the concept of “the hundred languages of children,” put forward by founder Loris Malaguzzi. This article explores the characteristics of the Reggio approach in a particular historical context and the author’s reflection on her journey through Reggio using the visual arts. The emphasis is on incorporating drawing, clay and weaving in an early childhood classroom to help children understand their school community. Embedded in the personal examples are key characteristics of Reggio: the image of the child, documentation, and the importance of the classroom environment and connecting children with nature. Examples of student work illustrate key Reggio concepts and demonstrate how lingering can help children construct meaningful knowledge about their world.

Loris Malaguzzi, founder of the Reggio Emilia philosophy of education, proposed the idea of “the hundred languages of children” to explain the many ways children understand the world around them. Malaguzzi (1993) expanded on his musings about the hundred languages in his poem “No Way. The Hundred Is There.”

It is important to “recognize the hundred languages as an extraordinary potential in children and human beings, which transforms and multiplies during journeys of knowledge and relations” (Cavallini et al 2011, 15). My journey through the hundred languages began when I entered a Grades 1 and 2 classroom as a student teacher. I felt

a sense of belonging the moment I stepped foot in the classroom and was in awe of its beautiful aesthetic quality. The space incorporated an abundance of natural materials (such as branches, rocks, seashells and plants), and it was unlike any classroom I had been in. An immediate feeling of calmness came over me and pulled me into the world of Reggio Emilia. My partner teacher became my guide to understanding the world through the lens of this particular philosophy of education. This became the platform for exploring my own interest in the visual arts with children. Through this article, I will reflect on my journey into the history of the Reggio Emilia philosophy of education and its adaptation in my classroom in a local context, using the lens of the visual arts.

The Reggio Emilia approach was developed in Italy at the end of World War II and took its name from the city of its birth. World War II marked the end of dictatorship in Italy, and “in a spirit of Liberation,” citizens “wanted a new and different school for their children” (Cavallini et al 2011, 9). The city dedicated itself to “developing an educational system for young children through the collaborative efforts of parents, teachers, and the general community, under the guiding influence of Loris Malaguzzi” (Hewett 2001, 95). The Reggio approach is embedded in a particular context, history and community that “prepared to embark on local cultural projects of childhood, to combine utopian thought and action, to dream about the future, to hope for a better world” (Dahlberg and Moss 2006, 21).

Beyond its historical significance, the Reggio approach includes the following fundamental principles (Cadwell 2003, 4–5):

- The child as protagonist
- The child as collaborator
- The child as communicator
- The environment as third teacher
- The teacher as partner, nurturer and guide
- The teacher as researcher
- The documentation as communication

- The parent as partner
- Organization as foundational

The underlying philosophy of this approach is the idea that “children are competent to do research, construct knowledge and knowingness, to express themselves through all they have—hands and thoughts—thanks to the *hundred languages* they possess” (Cavallini et al 2011, 9). These languages, “which already co-exist in children’s minds and activities, have the power to become generative energy for other languages, other actions, other forms of logic and other creative potential” (p 14). Thus, children bring their own experiences and perspectives into the classroom that, in turn, guide the learning that takes place through the act of doing.

The idea of learning by doing creates a platform for different languages to manifest within children. According to the Reggio approach, children use various modes of expression to “represent their plans, ideas, and understandings” (Hewett 2001, 98). This “symbolic representation” includes “words, movement, drawing, painting, building, sculpture, shadow play, collage, dramatic play, and music, which leads children to surprising levels of communication, symbolic skills, and creativity” (Cadwell 2003, 4). These modes of communication allow children to express “what they know, understand, wonder about, question, feel, and imagine” (p 4), allowing their thinking to become clear through the hundred languages. As a result, children can further their thinking to enhance and expand their knowledge base through using different materials (Hewett 2001, 99).

The visual arts are a natural way for children to “represent their understandings in concrete ways” (Griebing 2011, 6). However, the arts are not considered to be a subject in themselves but, rather, an avenue for expressing understandings through exposure to an array of materials, with a focus on specific tools and techniques (Katz 1993, 27). The *atelier*, a studio in which adults and children “hold, organize, and continue to play and interact with collections of materials,” is central to advancing the visual arts as a mode of communication for children (Cadwell 2003, 107). It “provides a place for children to become masters of all kinds of techniques, such as painting, drawing and working in clay—all the symbolic languages,” as well as “assists adults in understanding processes of how children learn” (Vecchi 1993, 120). A long-time *atelierista* states, “Searching for and discovering how a particular material presents itself and is transformed helps the child acquire knowledge about the material itself—about texture, form,

shape, color, exterior and interior appearance” (Gandini 2005, 14). The freedom to explore various materials lends itself to the creation of knowledge.

Through this discussion about the visual arts as a language for expressing understanding, I am reminded of a student from my kindergarten class last year. During our study of dinosaurs and other extinct animals, this five-year-old boy found it extremely difficult to convey his knowledge through written or oral means. He was shy and lacked confidence in his abilities. Our learning about dinosaurs expanded when the children began to use figurines to sort and determine groups of herbivores, carnivores and omnivores. This little boy used his knowledge base and participated in creating these groups as a class. Immediately after, he spontaneously sat down with one figurine in particular and did several sketches to explore the anatomy of the dinosaur (Figure 1).

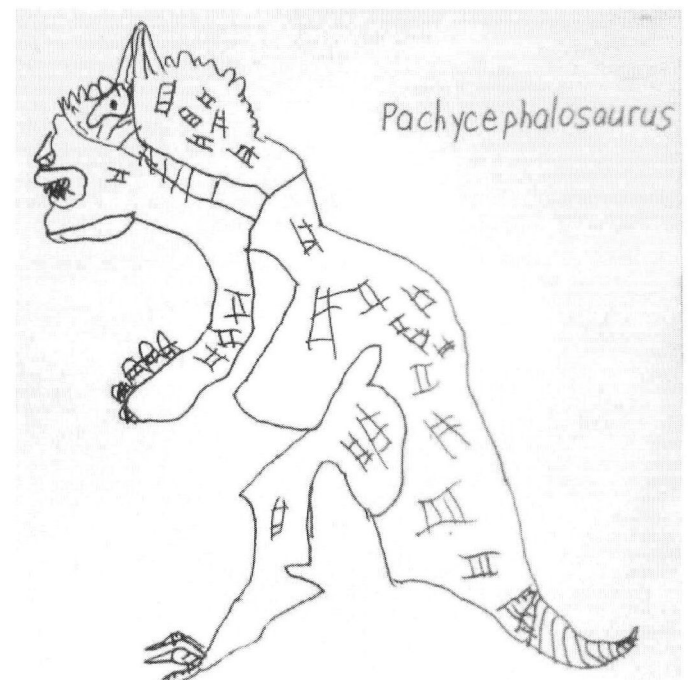


FIGURE 1. *Pachycephalosaurus* sketch. A five-year-old boy expresses his understanding of dinosaurs through drawing.

Using “graphic languages” (Katz 1993, 20) allowed this little boy to explore his understanding of dinosaurs. It instilled confidence in him and gave him an avenue to experiment with the written word. He began to take risks with his writing when journaling on the topic of dinosaurs. For the teacher observing this sketching, the Reggio approach adds an additional layer of understanding in recognizing the importance of drawing in “communicating the thinking of young children, who have not yet developed an adequate vocabulary

to convey the same information through words” (Fraser 2006, 210). Providing children with access to materials allows them to explore different languages in an organic way.

Children have the potential to use their hundred languages if given the opportunity to do so. I was exposed to the philosophy of Reggio Emilia as a student teacher, and this greatly influenced my view of children in the world. David Jardine, a professor at the University of Calgary, often stated in his lectures that “the way you treat the thing can change the thing” (personal communication, 2005). After all, how can we expect children to listen to us if we cannot take the time to listen to them and give them the chance to try different things? In the Reggio approach, teachers view “children [as] rich, strong, and powerful. They see the children as possessing great potential—potential it is the privilege of the teacher to perceive and empower. They see children *not* as having needs but, rather, as having rights” (Hendrick 1997, 43). Children need nourishment through our support, our encouragement and, most important, our faith that they can do quality work.

Many of the main characteristics of the Reggio philosophy came to life for me as a student teacher in a Grades 1 and 2 classroom. Our focus that year was getting to know the community around the school, which was very close to the Bow River in Prince’s Island Park, in Calgary, Alberta. We visited the Bow River repeatedly throughout the seasons, and it became an extension of our classroom into the world. My partner teacher and I had countless conversations about the learning that took place as we embarked on our journey to know the community. Often, the amount of learning that happened in that short time out in the natural environment could not have been accomplished by reading a book, looking at a photograph or watching a video.

Direct contact with nature creates an environment where authentic learning can take place. The nature study movement of the late 19th and early 20th centuries encouraged teachers “to bring nature into the classroom,” in the form of “plant fronds, tree branches, seedpods, bunches of long grasses, or flowers” (Armitage 2009, 157). More recently, Louv (2008) has advocated for direct exposure to nature as a way of getting out into the community and engaging the five senses. As Moore (1997, 209) writes,

Children live through their senses. Sensory experiences link the child’s exterior world with their interior, hidden, affective world. Since the natural environment is the principal source of

sensory stimulation, freedom to explore and play with the outdoor environment through the senses in their own space and time is essential for healthy development of an interior life.

This is very much in tune with the Reggio Emilia philosophy in early childhood education. The Reggio approach serves to establish a connection between children and nature by exploring their senses.

Direct contact with nature and the world around us leads to understanding the surrounding community. My journey through Reggio has taken me back to the Bow River once again, as a Grade 1 teacher. The Bow River lends itself to being part of our school community because of its proximity. We first explored the Bow River in September. I asked the children to take in the season of fall through their five senses and to sketch items they believed to be treasures out in nature. We lingered at the river for the entire afternoon. May (1991, 140) describes *lingering* as “making room for myself and reflecting upon my relation to the world and what it means to be in it.” The children explored bark, tree trunks, stems, twigs, acorns, grass, leaves, rocks and feathers in the natural surroundings; sketched their observations; and added details using watercolour pencils (Figure 2).

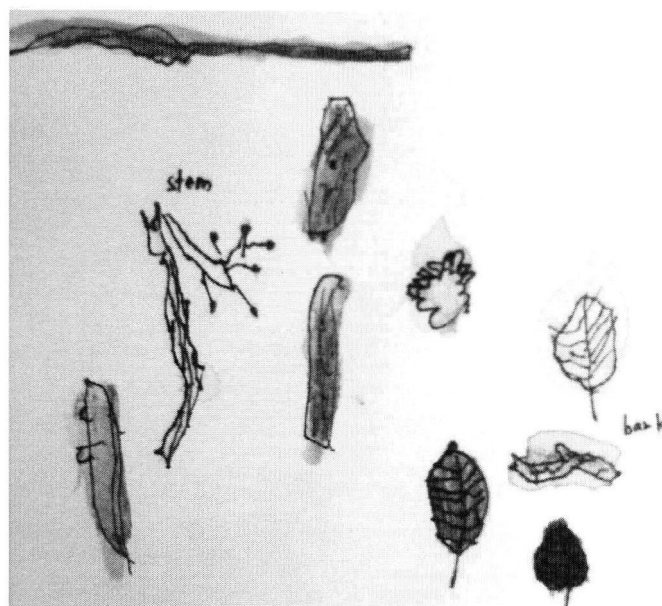


FIGURE 2. Fall nature sketch. A six-year-old boy’s interpretation of the Bow River, using black pen and watercolour pencils.

The process became increasingly meaningful as we made an effort to “slow down and tackle fewer activities on which we could emphasize more in-depth research” (Breig-Allen and Dillon 1997, 128). We collected some items to bring back to the

classroom in order to provide further opportunity to “manipulate them and sufficient time to reflect on their discoveries, to construct new and more elaborate understanding” (p 128). This sense of lingering continued from the Bow River into our classroom as we began to “draw, build, and transform” (May 1991, 152) our understanding of the season of fall. We gave students slabs of clay to explore the textures of fall and create clay impressions (Figure 3).

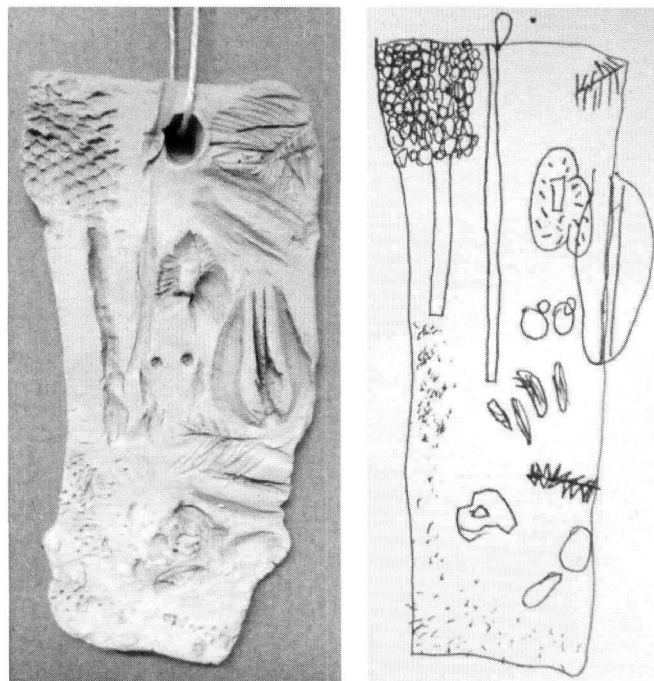


FIGURE 3. Clay impression and sketch of clay impression. A six-year-old girl’s textural exploration of acorns, twigs and pine needles, using clay and drawing.

Through representing fall using various media, children gained deeper understanding. Furthermore, as Hewett (2001, 99) writes,

“As children compare these various representations, they confront new possibilities and generate new questions that would not have occurred had they used only one medium” (Forman, 1996, p. 172); meaning is enhanced and expanded. Therefore, the use of various expressions of knowledge may be understood as assisting to create and continually unfold multiple forms of knowing.

I observed this taking place when children began to ask new questions related to fall as they engaged with the various media. It became even more apparent in the self-directed conversations that took place with their peers. Setting out purposeful materials allowed the children to explore, interact

and construct meaning related to fall. Allowing children to express their understandings using multiple media enhanced their learning in a meaningful way.

We gained a new understanding of the Bow River when the children wondered about the purpose of the wire mesh around the trees. We discussed how the mesh protects the trees from animals that live along the river. A couple days later, I saw some mesh on the side of the road, and I was inspired by an art project I had completed as a student teacher. I pulled over, picked up the mesh and brought it into the classroom the next day. The children were ecstatic!

We talked about ways we could use the mesh and the idea of transforming found materials into art. This falls in line with the Reggio philosophy of using “reclaimed objects” and the ability to “explore the possibilities for the object’s inclusion in an artwork” (Eckhoff and Spearman 2009, 11). I asked the children to go home and gather bendable objects that represented their summer and told them they could also incorporate objects from the Bow River. They were “challenged to look at everyday objects with a new perspective” and “reconsider the notion of ‘valuable’” (p 12). We thoroughly explored the objects, and the children were invited to share their significance. During this process, the children constructed knowledge, and “the transformed material [became] a conduit for expression communicating the child’s thoughts and feelings” (p 13).

Parent volunteers dismantled the wire mesh into smaller squares to provide a structure to weave objects into, and the children set to work creating their weavings. Throughout this process, we transcribed their thoughts, and children sketched their understandings of their work (Figure 4).

We documented our learning through the summer weavings in a way that honoured children’s work. The process of documentation brings together the importance of “gathering evidence and artifacts,” “reflection” and making “children’s learning visible to the children, to the teachers” and to the parents (Wurm 2005, 98). Thus, “working with reclaimed materials can lead students down interesting, unique paths on their journey toward understanding themselves and their world” (Eckhoff and Spearman 2009, 14), and this process is captured through documentation.

These weavings using found objects have become an integral part of our physical classroom environment. Curtis and Carter (2003) explore the idea of creating a beautiful environment for children in *Designs for Living and Learning: Transforming Early Childhood Environments*. They assert,

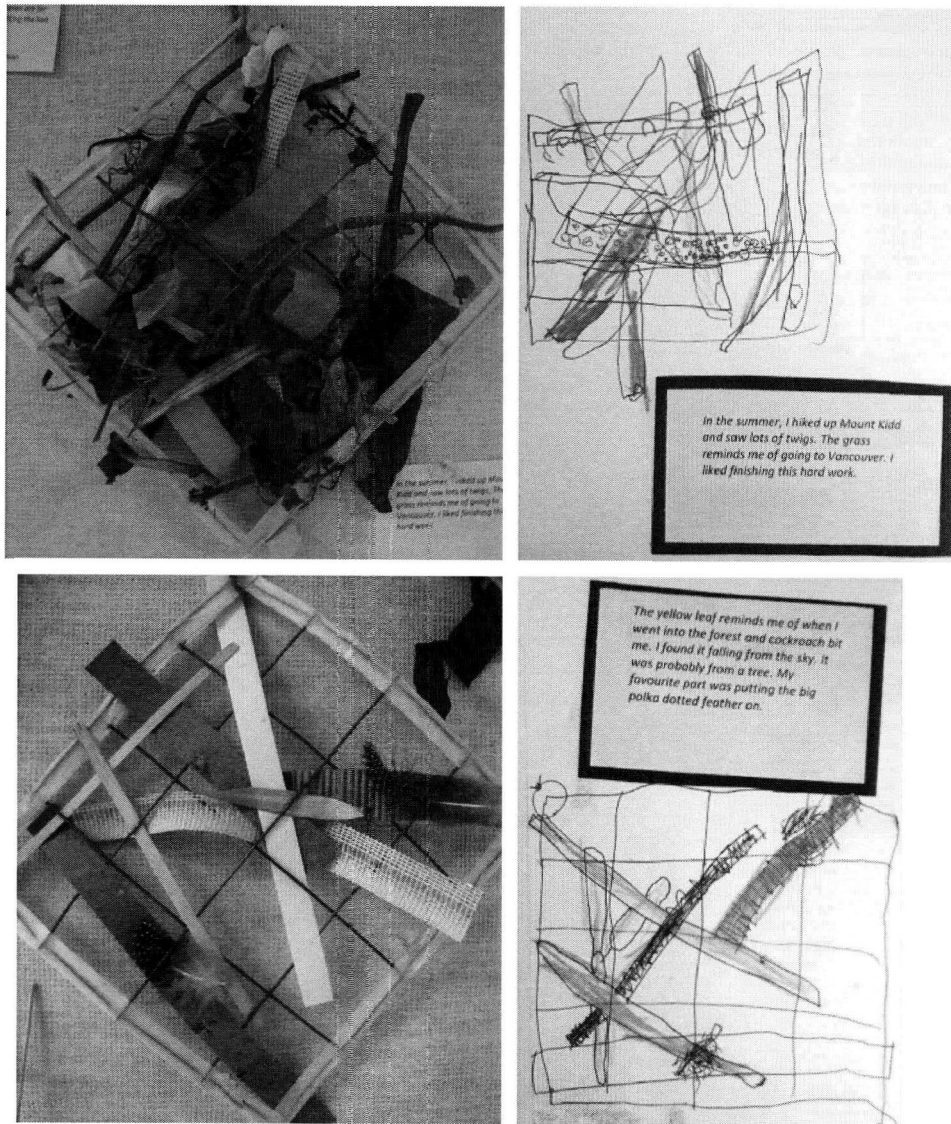


FIGURE 4. Two examples of summer weaving and sketch. Two six-year-old boys' summer weavings made from found materials to represent their summer, enhanced by drawings and transcriptions of their thoughts.

"Children deserve to be surrounded with beauty, softness, and comfort, as well as order and attention to health and safety. Childhood is a time of wonder and magic, where dreams and imagination get fueled, and issues of power are explored" (p 6). The idea of the environment as a third teacher allows children to "create meaning and make sense of their world through living in complex, rich environments" (Tarr 2001, 36). There is a focus on natural materials adorning the classroom, with "attention to design and placement of objects to provide a visual and meaningful context" (p 36). Through creating an environment worthy of children, we support children in building their true identity and a sense of self.

Gardner (2001, 339) reflects, "I have found it challenging to make sense of the Reggio

experience. . . . It has a 'feel' to it that is self evident to residents but not easily caught by others. . . . Such communities are best captured by art and metaphor." The Reggio Emilia philosophy of education focuses on the idea that "children have a far greater capacity than has been assumed to articulate their ideas through visual representation" using the hundred languages (Houck 1997, 29). Eisner (1991, 37) discusses the "sea of assumptions about mind and knowledge that have marginalized the arts by putting them on the back burners of mind and understanding." The arts act as a vehicle for children to convey their knowledge, and they need to be brought to the forefront by educators.

This article recounts the history of the Reggio Emilia approach and important aspects of the philosophy. Through exploring Reggio, I have

adapted some of its underlying characteristics to fit my classroom in a local context. I began my journey at the Bow River, as a student teacher, and I have made my way back there as my students and I have explored nature using various media—more specifically, drawing, clay and weaving. Reggio has allowed me to focus on “beauty and order, the multiple languages of children, letting go of the clock, listening and observing as a basis for teaching” (Rankin et al 1993, 282). These are ultimately my goals as an educator.

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Supporting Literacy Instruction in the Early Childhood Classroom: Ideas for Kindergarten Teachers and Administrators

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through doing and that they are “co-constructors of knowledge” (p 4).

Currently, some kindergarten teachers are forgoing playtime to engage in teaching the hard skills of alphabet and number recognition, basic math facts, and recognition of sight words. At times, they perceive that undue pressure is being placed on them to prepare children for Grade 1. Time for play is either limited or removed from the daily agenda altogether in favour of academic tasks. Students often do these skill-and-drill activities independently, with little collaboration or discussion with peers. Thus, they have minimal opportunity to gain important skills such as communication and negotiation.

Barriers to Implementation

Kindergarten in Alberta started as an optional, play-based program. There has been a dramatic shift in the purpose of kindergarten toward preparing children for Grade 1 and having them reading and writing by the end of the school year. Pressure on kindergarten teachers comes from many sources: administrators, parents and teachers of higher grades. As Schmidt (2009, 128) writes, “Teachers feel a heavy responsibility towards helping students become literate individuals for the twenty-first century. . . . Teachers today are under great pressure to make sure this happens.”

As a result of this pressure, many kindergarten teachers are giving up playtime for more academically rigorous tasks. The problem of practice is that teachers feel a need to prepare children for Grade 1 by having them reading and writing, yet Alberta Education (2008) does not require this through its provincially prescribed curriculum. A great deal of research has found that

Abstract

This article looks at a current problem of practice in Alberta: early childhood teachers feel a need to prepare children for Grade 1 by having them reading and writing, yet Alberta Education does not require this through its provincially prescribed curriculum. Thus, this article aims to explore how teachers can support literacy instruction in early childhood classrooms, through reviewing the relevant literature. The guiding questions are, Why is play important? and, What is 21st-century literacy? A subsidiary question is, How can teachers embed literacy activities into kindergarten play?

Kindergarten is a time when children set their attitudes, beliefs and opinions about themselves as learners and their capacities as members of a community and of society. It is the first foundational step in the educational journey. As Alberta Education's (2008, 1) kindergarten program statement says, “What young children learn at this stage will have a major impact on successful learning experiences in school, on personal development and on future participation in society.” Public education attempts to prepare children to be 21st-century learners with diverse skills and a wide range of aptitudes. The kindergarten program statement reminds educators that children learn

children learn best through play and experimentation, yet we continue to give up playtime.

In her study on children's literacy play environments, Newman (2016, 101) speculated that "practitioners had either forgotten, or had never learnt, deep understandings about literacy teaching and learning." Furthermore, the teachers did not engage in pedagogical discussions around literacy: "There was little or no use of literacy meta-language (e.g. phonemic awareness), discussion of multi-literacies, critical literacy or specific concepts and processes such as phonological awareness or oral language" (p 101). Teachers need to engage in deep pedagogical discussions about literacy and task design for our youngest learners.

Purpose of This Inquiry

This inquiry aims to explore how teachers can support literacy instruction in early childhood classrooms. There is a great deal of current research on engaging literacy practices, which will serve as the starting point for this inquiry. The questions guiding the inquiry are, Why is play important? and, What is 21st-century literacy? A subsidiary question is, How can teachers embed literacy activities into kindergarten play?

The Importance of Play for Young Children

It is very important for young children to engage in play. Play allows them to express themselves, socially negotiate with others, use their imagination, self-regulate, and set and achieve goals. Through play, children learn skills such as perseverance, cooperation, sharing and advocating for oneself. As Copple and Bredekamp (2009, 14–15) write, "Play is an important vehicle for developing self-regulation as well as for promoting language, cognition, and social competence. . . . Rather than detracting from academic learning, play appears to support the abilities that underlie such learning and thus to promote school success." Alberta Learning's (2000, 60) *Kindergarten Guide to Implementation* sums up the province's beliefs about play:

As children play, they are clarifying information, integrating ideas from previous experiences, and exploring and experimenting with their environment. Play gives children opportunities to add to their knowledge, learn new skills and practise familiar ones. Through play, children learn to deal with their feelings, interact with others and resolve conflicts. They develop their

imagination, creativity and ability to solve problems.

Socio-dramatic play is important for children. Vygotsky (1986) believed that the skills learned in everyday play and spontaneous experiences help develop more-formal conceptual knowledge later. Children's experiences in imaginative play lead to answers to the questions they formulate for themselves and help them make sense of the world around them.

Overall, young children need to engage in play as the most significant part of their day. Fleer (2009, 14) writes, "Considering play as the leading activity in the development of young children is different to thinking about play as the 'child's world' or the 'child's work.'" Thinking about play as the most important activity allows us to reframe our thinking about young children and what classrooms should look like for this age group.

Literacy in the 21st Century

The definition of *literacy* is changing in the 21st century. "Contemporary conceptions of literacy move beyond reading and writing towards literacy as an enabler for people's independence and flexibility in society" (Newman 2016, 95). The concept of literacy is becoming much broader, encompassing a broader skill set than just reading and writing. "Literacy then, is both a function of everyday life and a cultural tool, necessitating language and literacy research, beginning in the very earliest years of life where it is 'the most exciting and important aspect of human development' (Whitehead, 2007, p. xiii)" (p 95). Literacy now has a critical-thinking component:

Citizens of the twenty-first century need to go beyond the core subjects in order to function effectively and . . . need to know how to use their knowledge and skills to:

- think critically
- apply knowledge to new contexts
- analyse information
- understand new ideas
- communicate
- solve problems
- make decisions. (Yelland et al 2008, 3)

This wider view of literacy affects how we teach children. Newman (2016, 96) notes, "Street ([2006]) differentiates between 'autonomous' (individual) literacy, involving discrete skills and techniques such as letter recognition and phonics, and 'ideological literacies' (social) that more broadly include social-cultural-historical concepts: 'literacy as

social practice', 'multiliteracies and multimodal literacy' and 'critical literacy.'

The digital world we live in also has an impact on literacy. McCabe (2013, 14) writes, "In a 21st century classroom students need to know how to ask and answer questions, build new knowledge and collaborate with others in a digital world." She continues, "How to read fluently, research, analyze, write, speak and listen are the foundations of thinking: without them, learning can't occur. As educators, we must help students develop foundational skills in addition to thinking skills to truly have literate students" (p 15).

From the research, it is apparent that there is very little agreement between experts and scholars on what *literacy* actually means for the early childhood classroom. As Rowan and Honan (2005, 197) write, "While there is widespread agreement among educators, parents and members of the community that early childhood education plays a vital role in the consolidation of children's literacy skills, there is increasingly *less* agreement about what it is that the word 'literacy' actually means." Once educators conclude that literacy encompasses many skills, especially critical-thinking skills, then the next step is embedding these diverse skills into purposeful play.

Embedded Literacy Activities

How can teachers create engaging literacy tasks that can be embedded into purposeful play in kindergarten? The first step is knowing and understanding the learner. Personalized learning requires educators to carefully consider the instructional design decisions they make, the impact those decisions have on student learning and what is required of them for the next best step in teaching (Calgary Board of Education 2013; Friesen 2009; Hattie 2009). Teachers need to understand where children are in the learning cycle and meet their needs accordingly. Understanding developmentally appropriate practice and how to scaffold literacy skills is vital to the process of personalization.

The Calgary Board of Education (CBE 2013, 5) suggests that instructional design has three components: the teacher, the student and the content. Teachers iterate the learning cycle based on what students are achieving. Part of this cycle is an understanding of the task design (opportunities to engage in literacy in play) and the content (curricular expectations for kindergarten students).

An easy way to embed literacy into play is to make writing materials available throughout the classroom. As Rowe and Flushman (2013, 243) write, "Classroom geography is as much a part of

supportive conditions of learning to write as are teacher interactions." Teachers should model the purpose of writing and invite children into the writing process. Hanline, Milton and Phelps (2010, 1014) suggest that "the inclusion of vocabulary development, representational construction, socio-dramatic play and literacy materials within block play provides experiences for young children that may help them build the cognitive structures that support later literacy learning." Materials for writing should be available at all centres throughout the classroom. See Table 1 for suggested literacy materials and tasks and Table 2 for purposes for writing during play.

TABLE 1. Suggested literacy materials and tasks

<i>Centre</i>	<i>Materials</i>
Blocks	Blueprints Maps Tape measures Photographs of bridges and familiar buildings Traffic signs
House	Menus Food labels Order forms Recipes Specials of the Day signs Grocery lists
Science	Magnifying glasses iPods for taking photographs Research books Post-it Notes Wonder charts Journals
Small worlds	Characters Writing materials iPods for creating video stories Cards
Hospital	Prescription pads X-rays Requisition forms Patient charts Eye charts
Art	Caption strips for artwork Labels Instruction

TABLE 2. Purposes for writing during play

Purpose	Tasks
Writing to inform	Title and artist name Labelling Signs with information (such as store hours) Pricing and menus Labelling for storage Record keeping Creating books
Writing to convince	Advertisements and invitations Warnings (such as Do Not Enter) Proposals for new centres Requests for supplies
Writing to observe	Documenting observations Writing about changes noticed
Writing to create	Plans for play Scripts for imaginative play Songs and lyrics Blueprints
Writing to remember	Recipes Storytelling Rules and instructions for games and activities
Writing to connect	Cards and letters (“Thank you,” “I miss you,” “I love you”) Requesting information from experts Connecting through letters with other classes

Adapted from Corter (2019).

Creating an environment that encourages writing and reading is vitally important. Schmidt (2009, 129) suggests that we broaden our thinking about what counts as literacy: “If we want students to truly be learners and inquirers, we must work to find ways to change the student script that is so pervasive in classrooms today.” Playing with reading and writing can happen during centre time and can help children develop literacy skills in a natural and authentic way.

In the rush of a kindergarten day, read-alouds are often pushed aside for more-pressing tasks. “Engaging children in interactive read-alouds and cognitively challenging discussions about books enhances children’s vocabulary learning” (Christ and Wang 2010, 87). Reading aloud needs to again become a priority in the kindergarten day. Furthermore, adding the books that have been read aloud to the block or house centre further stimulates conversation and opportunities for reading and

writing. In a study by Hanline, Milton and Phelps (2010, 1014), “Books were available to children in the block centre and were often used to introduce the block play. The introduction of the block play also included an emphasis on vocabulary associated with block construction.” Encouraging literacy engagement throughout all centres helps children develop authentic skills.

Planning for literacy-rich activities must happen in conjunction with the children. “Rigid planning that does not include students encourages passive learning by students and active learning by teachers. That does not mesh with the most effective roles for learners and teachers in schools” (Schmidt 2009, 123). Teachers should keep the following questions in mind when designing literacy activities in the classroom:

- What are the children’s interests?
- How can we capitalize on these interests to create engaging learning through purposeful play?

Play-based programs that support imagination will build children’s capacity in cognitive tasks, including priority areas such as literacy and numeracy. Therefore, it is important to design tasks that embed imagination and consciousness (Fleer 2011). The tasks kindergarten teachers design must engage children in hard work and leave them with feelings of success and confidence. Children investigate, observe, analyze, synthesize and communicate findings. Effortful study becomes a form of work/play that is undertaken by the learner (Davis, Sumara and Luce-Kapler 2008). Hard work, at each student’s own level, should be the norm.

Schmidt (2009, 124) suggests that many children find school literacy “boring and non-purposeful” because they are asked to engage in “scripted lessons.” Children don’t relate to many basal textbooks (levelled readers), and when these materials are overused, they become nonengaged and “choose not to persevere and learn the tenacity” (p 124) needed for developing literacy skills.

Conclusion

Our world is changing. Our definition of *literacy* is evolving, and the teaching of literacy skills for our youngest children is under scrutiny. Whether through play or direct instruction, intentional teaching must happen. “Activities that encourage play, creativity and imagination should become the norm. Curriculum should be relevant and available in a variety of forms” (Alberta Education 2010, 6). Preparing our early learners for their future

education is critical. Giving children the skills and attitudes they need in order to persevere is vitally important. Literacy activities should be engaging for children and should allow them to play, experiment and learn language skills. Although this seems like common sense, it doesn't happen all the time. Roskos and Christie (2013, 252) describe the situation perfectly:

That literacy-rich play environments increase young children's literacy behaviors is one of the more robust findings in play-literacy research (Morrow & Schickedanz, 2006; Roskos & Christie, [2011b]; Roskos, Christie, Widman & Holding, 2010). . . .

To date, however, implementation of this strategy is not universal in all early childhood classrooms, reflecting perhaps a need for stronger play environment design content in teachers' professional education.

Kindergarten in Alberta needs to be play-based, with embedded literacy activities. Teachers need to take opportunities to have deep pedagogical discussions around their understandings of 21st-century literacy for young children.

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“I Just Won Against Myself!”: Fostering Early Numeracy Through Board Game Play and Redesign

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and Miwa A Takeuchi*

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Abstract

Children can develop a variety of mathematical concepts, as well as a positive relationship with mathematics, through playing and redesigning board

games. In this article, the authors introduce the process of integrating board game play and redesign into the early mathematics classroom. Presenting cases from a diverse school, they highlight learning opportunities that fostered early numeracy. They discuss how children demonstrated their understanding of integrated numeracy (including subitizing, ordinality and cardinality of number, the area model of multiplication, spatial reasoning, and problem posing and solving). The project not only fostered children’s early numeracy but also helped them to develop a positive relationship with mathematics and social rules and to see themselves as designers, problem solvers and creative people.

During the early years, children can develop a wide variety of concepts through everyday practices. Play is a meaningful context in which children can develop mathematical concepts, symbolization and representation (Charlesworth and Leali 2012; van Oers 2010). Through play, children develop key concepts such as arithmetic and counting, one-to-one correspondence, estimating, spatial reasoning, measuring, understanding shapes, logical classification, comparing, ordering, and understanding parts and wholes (Charlesworth and Leali 2012; Clements and Sarama 2014; Ginsburg, Inoue and Seo 1999; Ginsburg, Lee and Boyd 2008).

In the context of game play, McFeetors and Palfy (2018) focused on the development of strategy and mathematical reasoning in students when they played games such as Gobblet Gobblers, Othello, Tic Tac Toe and Go. Centralizing playfulness in early numeracy can also foster a positive relationship with mathematics (Takeuchi, Towers and Plosz 2016). Alberta Education defines *numeracy* broadly as “the *ability, confidence* and *willingness* to engage with quantitative or spatial

information to make informed decisions in all aspects of daily living.”¹

In this article, we present a particular context of early numeracy development—playing and redesigning board games. Creating artifacts has a special place in the mathematics classroom. Children understand new ideas and form their identities through creating and inventing symbols and artifacts (Kim, Tan and Bielaczyc 2015). In their play, they invent rules while developing key concepts. Game design encompasses both the creation of artifacts and the invention of rules. In designing board games, learners use their bodies by creating game pieces and create a coherent system in which their invented rules govern the play (Kim and Bastani 2017), and they also invent alternative ways to do mathematics (Barta and Schaelling 1998). Learners model, play and revise the invented system, in which players engage in movements and actions and make more sense of it through play (Salen and Zimmerman 2006).

Few studies exist that focus on early learners’ design of games for their mathematics learning. A rare example of engaging children in mathematical game play and design in the early years is Barta and Schaelling’s (1998) work on Grades 1 and 2 students’ construction of a Native American counting game. The children created the counting game using sticks, played the game and then generated new rules, becoming vehicles of their own learning.

Through modelling, learners quantify, categorize and systematize relevant objects, relationships and actions (Lesh and Doerr 2003). In this article, we highlight the experience of redesigning an existing board game and discuss how children’s early numeracy was fostered, along with their positive relationship with mathematics.

Project Context: Board Game Play and Redesign for Mathematics Teaching and Learning

This article is based on a research–practice partnership in an inner-city school in Alberta. The school had a diverse population of students, 90 per cent of whom were English-language learners (ELLs). The school development plan centred on teaching ELLs complex concepts through rich tasks, expanding their understanding regardless of language.

The school took on the project of playing a variety of board games in every classroom and

exploring the possibility of redesigning those games or changing some rules. Through the partnership, we held co-design workshops with teachers, researchers, and a professional board game designer and mathematician (Gord Hamilton).² We played and then redesigned a variety of games (Hex, Codenames, Aggression, Qwirkle); built our understanding of game play and idea iteration; and came up with ideas for facilitating a similar experience for students in the classroom. Giving the teachers time together to work through the first steps of the game redesign process helped them visualize its place in their own classrooms.

In this article, two teachers recount how board game play and redesign lived in their classrooms (Grades 3/4 and kindergarten) in the first year of the research partnership. In both classes, students’ activities in terms of progressing their game redesigns took varying forms, including the following:

1. Playing games and noticing patterns of winning or losing
2. Brainstorming new rules
3. Redesigning the game and playtesting
4. Creating rule books
5. Making good copies of the game
6. Inviting others to play (final showcasing)

Starting with playing the games (before thoroughly reading the official rules) was important as it demonstrated the need to understand the rules in order to participate fully in the game. Some of these activities were planned, but others emerged as we worked with the students.

Redesigning Inversé in Grades 3/4 (Teacher-Author 1)

In my Grades 3/4 classroom, I chose many games to play. The class’s mathematics learning at this point focused on arrays and basic multiplication. My students immediately noticed that many board games have arrays and grids built into them.

Playing and Noticing

We began playing board games in October, when I brought in my games (such as Tsuru, Connect 4 and Codenames). We also borrowed some popular games from the school library (Qwirkle, Triominos, Guess Who? and Jenga).

The biggest challenge at this stage was ensuring that the students understood the official rules of the games. Many groups played with their own house rules or did not play competitively (for example,

placing pieces without keeping score, or working together to create patterns with the pieces). To tackle this challenge, we played several games as a whole class. I chose a small group of students to play with, and the rest watched the game play. We made an anchor chart of the most important rules of each game—rules that the students often misunderstood or overlooked when they played on their own.

As we incorporated board games into our classroom culture, students deepened their understanding of the official rules, as well as the social rules (such as turn-taking, graceful winning or losing, and basic game play strategies). They began to plan a turn or two ahead and to take on their opponents' perspectives to develop an effective defence. Playing a wide variety of games helped them build up a vernacular around gaming. In classroom discussions, we began comparing games based on the balance of luck and strategy, the number of players, the length and complexity, and even how the first player was chosen.

After the students had developed a foundational understanding of board games, I introduced the project. We were going to redesign one of our class favourites, *Inversé* (Figure 1). *Inversé* involves a 12-by-12 grid board and wooden blocks of five colours and five shapes, each with a volume of 48 cubic units. The goal is to be the last player to play a piece, placing it in such a way that your opponent cannot make a legal move.

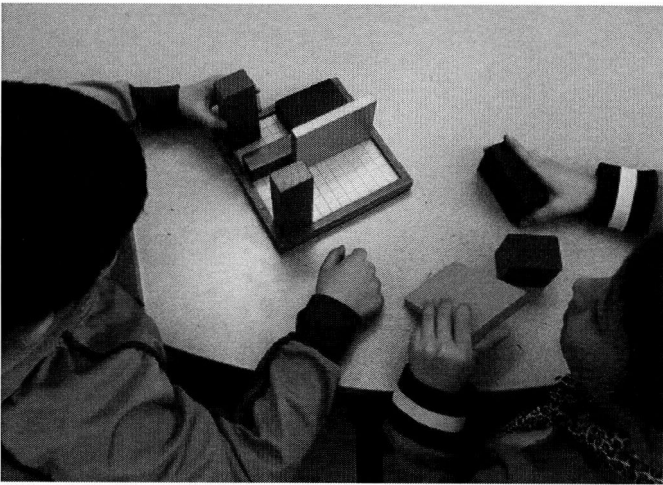


FIGURE 1. Two Grade 3 students playing *Inversé*.

I chose *Inversé* because it is short (less than two minutes per game) and simple to teach. It has only three rules: pieces of the same height can't touch, pieces of the same colour can't touch, and pieces of the same colour can't be placed in the same orientation. It also has lots of depth in terms of mathematical thinking (spatial awareness, estimating

area and height, and comparing the size and shape of rectangles).

We spent a couple math classes honing our *Inversé* skills, playing tournaments and keeping track of the success of various strategies. We documented how many times the first player was the winner, and how many times the person who played the yellow piece first was the winner. This deeper understanding of the system of *Inversé* was combined with continuous but more-focused playing and noticing.

Brainstorming New Rules

I challenged my students to find a way to make *Inversé* a two-dimensional game, and I asked them what rules would have to change and what rules they could potentially keep. For example, we had learned that the *Inversé* pieces do not all fit on the board at once, and the students realized that they would have to consider the relationship between the board size and the number of pieces. As a whole class, we brainstormed possible variations, such as using a shape other than rectangles, adding a third player or changing the rules about which tiles could touch. I recorded the students' ideas during this brainstorming session (Figure 2).

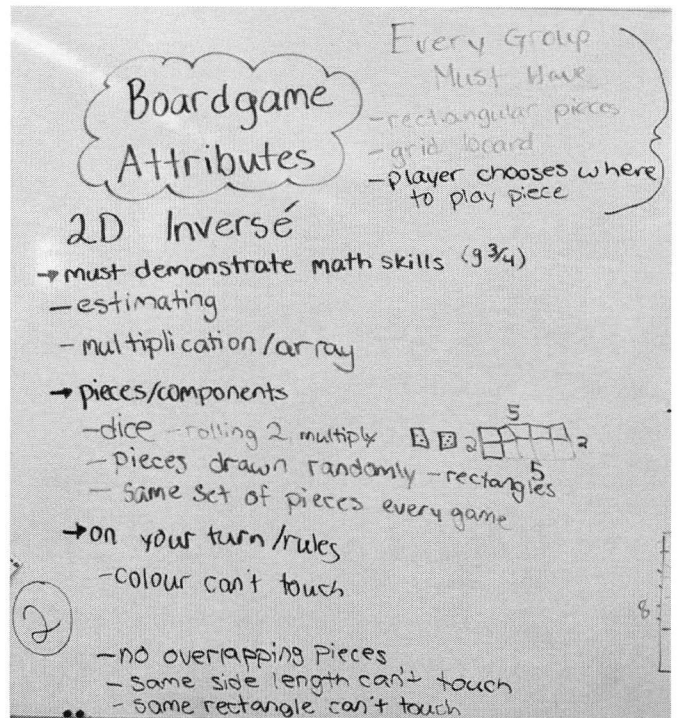


FIGURE 2. Recording student-generated ideas during the brainstorming phase.

We also spent time brainstorming the mathematics we saw in *Inversé* and which of those skills might transfer to the students' redesigns. We

explored questions such as, “Which piece is the biggest?” Students learned about measurement and estimation, and they were able to verbalize their estimates of arrays and areas. (For example, one student said, “I don’t think my piece will fit there. That spot is too skinny.”) Students then practised mathematical vocabulary, such as *longest*, *widest* and *tallest*. They measured the area, the length and even the volume of the pieces by rebuilding them with unit cubes. Inversé also allowed them to practise their spatial reasoning as they oriented the pieces in different ways and visualized how pieces of different sizes might fit together.

After our initial class discussion about redesigning the game, I gave the students time to individually brainstorm new rules and components. Then I placed them in groups of two or three, based on their initial ideas.

Redesigning and Playtesting

We spent several classes redesigning Inversé by refining the students’ initial ideas; creating rough copies out of construction paper; and playtesting and adjusting the rules, pieces and boards (Figure 3).



FIGURE 3. One group’s paper rough copy of their Inversé redesign.

The redesign process is complicated, even more so when children are in heterogeneous groups, with a range of language, math and social skills. This project allowed for scaffolding, as students had agency over the complexity of their designs and could lean on their group members when they felt challenged by particular aspects of the project.

The biggest challenge as a teacher was keeping the groups on track to finish their games on time; some groups spent multiple class periods debating a single rule, whereas others were finished and ready to create a good copy of their game after just a few days. The strategy I used to help the students move forward and make progress every day was to provide checkpoints and deadlines, without taking away their agency and choice. For example, after

the first week I said, “By the end of today your group should have decided on whether you are creating pieces to be placed or using a blank board that the players can draw on.” This gave them a few options and left the project open-ended enough for customization, while also narrowing their focus so that they could make a choice and move on to the next step. This process was organic and responsive rather than premeditated; when I felt that most groups were ready to move on, I presented the deadline and the choices to the remaining groups.

When many of the groups were struggling to make a decision about the same component of the game, we talked as a class and wrote down all their ideas. This gave them a jumping-off point, and each group could then zero in on the idea that would work best for their game.

It was essential for the students to playtest their games as often as possible so that they could adjust the games when they were too easy or too difficult, or if they found that the first player always won.

Creating Rule Books

Once all the groups were happy with their new game designs, we moved on to creating rule books.

The students learned how to articulate the mechanics of their game, the procedures of a player’s turn and the special placement rules they had chosen. As they playtested their games over and over, they constantly revised their rule books, adding more details to clarify the systems of their games.

Many groups who found the complex language and layout of traditional rule books challenging chose to explain the rules of their games through photos or drawings (Figure 4). These ELL students used symbols such as a check mark and an X to clarify which moves were allowed and which were against the rules.

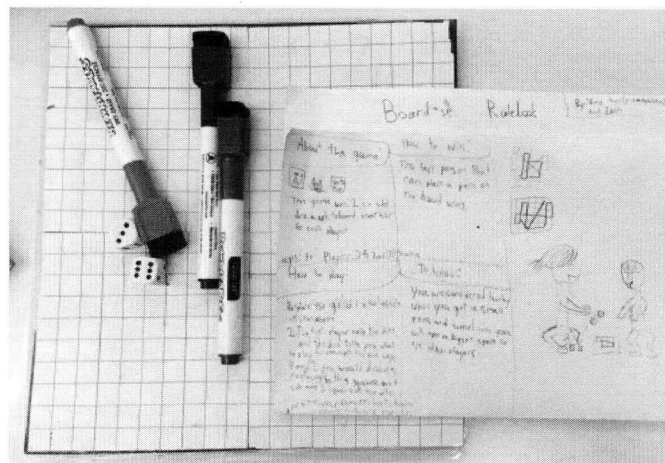
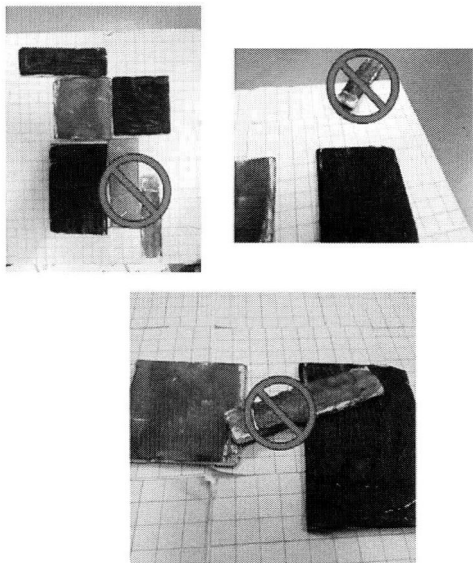


FIGURE 4. A rough copy of a rule book, with headings, pictures and symbols.

After finishing rough copies of their rule books and receiving feedback from me and from their Grade 6 buddies, my students worked with the older students to type up the rule books and print them out (Figure 5).



How to Win

You win if you are the last player to play a piece. If no one else can play a piece then you win! You are trying to strategize to block your opponent so they can't fit their pieces.

FIGURE 5. One group's rule book, using photos and symbols, created with the help of an older student.

Creating Good Copies of the Games

With their rule books complete, students moved on to creating good copies of their games out of materials that were more durable.

This proved to be challenging, as many of their rough copies had been created using tiny pieces of construction paper. They wanted to make a game that was as engaging to play as the original *Inversé*, which uses large, brightly coloured wooden blocks. However, the relationship between the size of the pieces and the size of the game board was vital to making their games work.

I gave the students time to struggle with this problem before introducing some tools that might help, including graph paper in various sizes, rulers and unit cubes. One group figured out how to measure the size of their pieces with the smaller-sized graph paper and then count out the same units on the larger-sized graph paper to ensure that the ratios were intact. The rest of the class gathered around to watch them use this method and then went back to their own games. Some groups borrowed this idea, and others used it as inspiration and went on to use rulers and multiplication to create larger versions of their pieces.

Showcasing Our Games

After six weeks of playing, noticing, planning, designing and creating, students finally had games they were proud to produce. We talked about how designers get their ideas and products out to the public, and many students suggested using flyers and brochures.

We created an invitation to send out to families, asking them to participate in our board game night. Many families and staff members showed up after school one afternoon, and the students were thrilled to teach them the rules of their games and see the games being played by members of the community.

Since then, these student-created board games have been added to our school library's games collection, and children can sign them out to play at home or at school.

Outcomes

This game redesign project changed how my students approached mathematical tasks, design thinking and group work. They learned that creating high-quality work takes time, and they felt a sense of satisfaction when they were able to produce and showcase that level of quality.

They also showed growth in specific mathematics skills. As a result of the nature of the design project, each group of designers produced a different type of game that targeted different mathematics skills.

For example, a group of three that included a recent Chinese immigrant student created a game combining the principles of the traditional Chinese game *Go* with the area-based themes of *Inversé*. In their game, players were to roll two dice and create a rectangle with the area shown on the dice, trying to surround their opponent's rectangles (Figure 6). These learners developed a deeper understanding of the relationship between area and side length as they worked out the best ways to orient their rectangles.

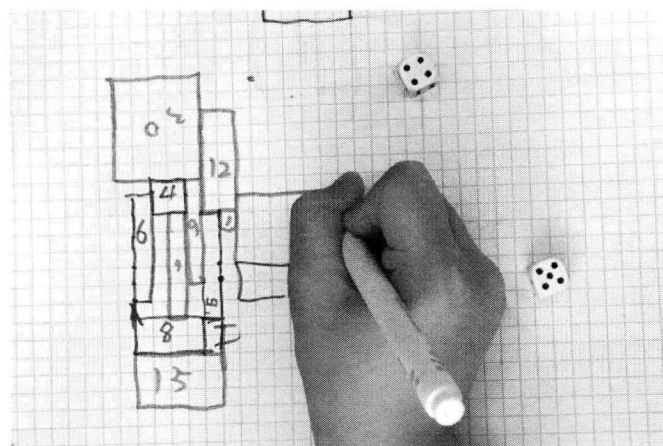


FIGURE 6. A game designed using the principles of the Chinese game *Go*.

Meanwhile, another group developed a three-player game in which the goal was for players to fill the space with their own pieces and not leave space for opponents (Figure 7). This group explored the concepts of shape composition, combining area and arrays.

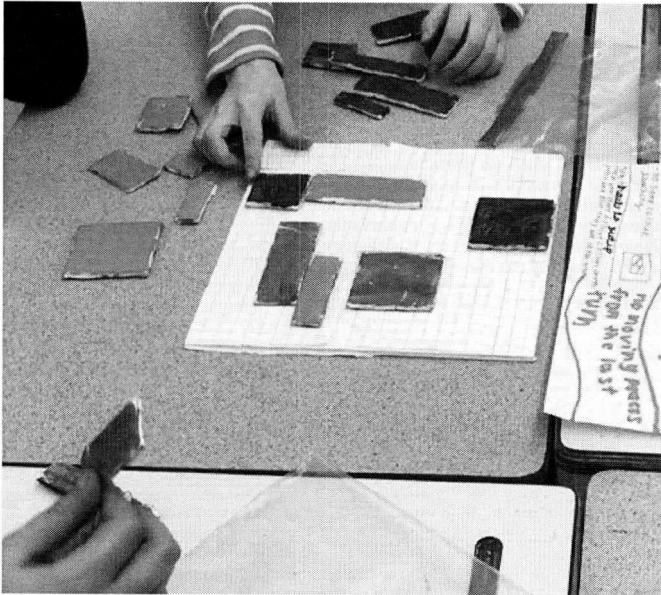


FIGURE 7. A three-player fill-the-space game.

Redesigning Connect 4 in a Kindergarten Classroom (Teacher-Author 2)

In my kindergarten classroom, I introduced the game Connect 4 to my students. Through play, we were able to use mathematics vocabulary, and the children's redesign ideas emerged from their own need to be playful.

Playing and Noticing

I had Connect 4 set up on a table when the students arrived. As they approached the table, some commented that they had the game at home. Some said, "I know this game!" Others picked up the coloured playing chips and started dropping them into the grid.

In a short time, the sense of excitement grew as the students took turns at the table, and many gathered to watch what their peers were doing. Something about Connect 4 connected with this group of children more than the other games I introduced. They would go to the Connect 4 table first (despite having other activity options), watch their peers play while waiting for their turn, and sound joyful when talking about the game.

In the beginning, I gave the students time to interact with the game and play it in their own way. Some talked about the rules with each other, stating the rules as they understood them. Others enjoyed dropping chips at random into the grid and hearing the clinking sound. Others used the chips to make patterns or stacked them to build towers.

Soon, I brought more copies of the game into the classroom to allow more students to interact with it. We had many small-group conversations about game rules (for example, how the rules one student played by could be the same as or different from the rules another student played by), as well as social rules (such as what players should do with their hands while waiting for their turn, whether it is OK for players to cover the opening of the grid with their hands and how to win gracefully). We also talked about the object of Connect 4 and what it means to win the game. This led to larger group conversations and documentation so that children had a shared understanding of all aspects of the game.

There was also mathematical vocabulary to teach, like *grid*, *line*, *vertical*, *horizontal* and *diagonal* (Figure 8). The students' interactions with each other and with the game guided the conversations and learning intentions in our work.

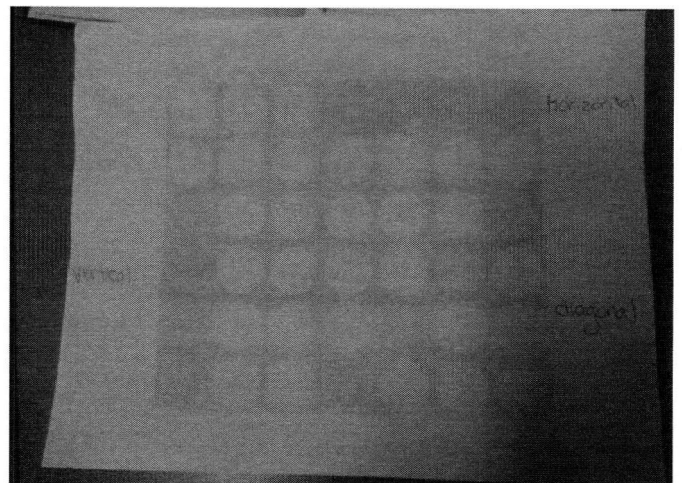


FIGURE 8. Connect 4 game board with mathematical vocabulary.

Once the children were familiar with Connect 4 and satisfied with playing in their own ways, we began talking about our thinking while playing the game. I encouraged them to talk as they played (that is, to think out loud). This led to their play becoming more purposeful, allowed for more observation and documentation of their understandings, and began shaping their strategies for playing the game.

Brainstorming New Rules

When considering how Connect 4 could be redesigned, I intended to listen to the students and allow the redesign concept to come from them. Being present with a small group of children playing the game allowed me to make observations, ask questions and document their experiences. I watched for any changes they might make to the game on their own. I did not have to wait for long.

During table centres, groups of children were playing Connect 4. One child didn't have a partner because he kept winning against everyone. So he decided to play the game by himself. After a few minutes of dropping chips of alternating colours into the grid, he declared, "I just won against myself!" A few children and I laughed after hearing that, since by having control of both colours of chips, he had, of course, allowed one colour to make a winning line. We used elements of this discovery in our Connect 4 redesign.

Redesigning and Playtesting

We played around with this concept of Connect 4 as a one-player game, keeping all other rules in place. Players were to play one chip at a time, alternating colours, and the way to win was to form a vertical, horizontal or diagonal line with four chips of the same colour.

I gave the children a paper copy of the Connect 4 grid so that they could document their game play by recording the moves they made with the red and yellow playing chips. This became the answer key. As an example, the key in Figure 9 reads as "Yellow goes first, with 11 moves, and red must win." The balloons (three circles connected with lines) indicate the celebratory winning.

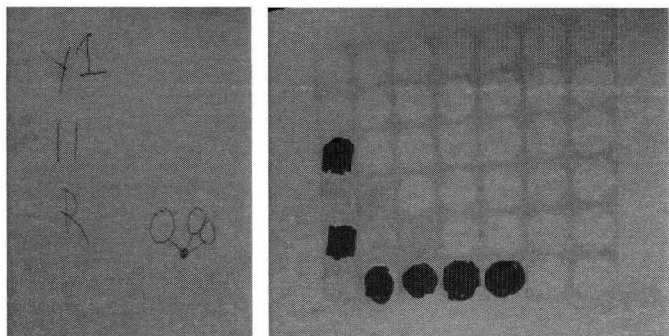


FIGURE 9. One kindergarten student's answer key for one-player Connect 4.

In this process of redesigning and playtesting, the children encountered the concept of cardinality and ordinality of numbers. In other words, they counted the number of red and yellow chips on the board,

but they also counted the order in which the chips were placed.

Creating Rule Books

Creating rule books went along with playtesting the new game. The students realized that it was difficult to remember which playing chip they had placed first, second, third and so on. They also realized that various arrangements of the playing chips could all result in a given colour forming a winning line.

This led to their making starting cards with a limited number of playing chips coloured in on the paper grid. The remaining chips were placed on instruction cards that told the player which colour to start with and how many moves were needed to make a given colour win. (See Figure 10.)

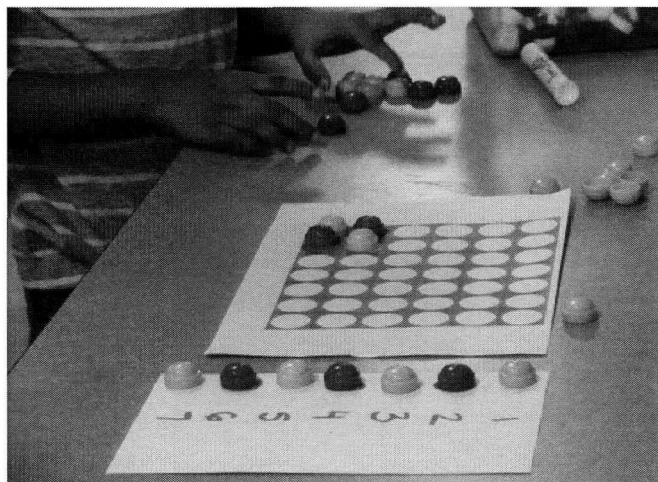


FIGURE 10. A kindergarten student playing with a starting card (top) and an instruction card (bottom).

Creating Good Copies of the Game

I laminated the starting cards and the instruction cards that the students and I had made together. These became the good copies that we kept so that we could play our redesigned Connect 4 game over and over.

Showcasing Our Game

The students shared their game cards with each other to play in class. We showcased our redesigned Connect 4 game at a math night so that students' families could see our work.

Conclusion

This article highlighted learning opportunities that fostered early numeracy by introducing narratives from a kindergarten classroom and a Grades 3/4 classroom in a linguistically diverse school.

These narratives depict how children used and demonstrated their understanding of integrated numeracy (including subitizing, understanding ordinality and cardinality of number, the area model of multiplication, spatial reasoning, and problem posing and problem solving). These various aspects of early numeracy were integrated and emerged under the goal of board game play and redesign.

The children were engaged in holistic learning throughout this process. They developed early numeracy through play and design, and they formed a positive relationship with mathematics by creating games that they themselves enjoyed playing and that they were proud to share with their families. Moreover, the social aspects of game play and redesign allowed them to talk about and create social rules for playing games and to position themselves as designers, problem solvers and creative people.

Notes

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1. See <https://education.alberta.ca/media/159477/numeracy-definition-poster-colour.pdf> (accessed October 11, 2019).

2. Gord Hamilton's website (<http://mathpickle.com/puzzles-and-games/>) has a range of puzzles and games that are highly relevant to mathematics learning (accessed October 11, 2019).

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The Magic of Fractured Tales in the Early Childhood Classroom: From Entertainment to Critical Thinking

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Abstract

Despite their importance and educational benefits, fractured tales are not used regularly in early childhood classrooms. This article demonstrates kindergarten children's learning experiences through reading and discussing traditional fairy and folk tales and their fractured counterparts, along with participating in follow-up activities. The literary instruction using fractured tales took place in a kindergarten classroom in a metropolitan city in South Korea. Sixteen children's

picture books, including seven traditional fairy and folk tales and nine fractured tales, were read during read-aloud time over five months. The findings show that children enjoyed fractured tales as a genre of literature, used critical-thinking skills, and identified stereotypes and biases in the stories. Effective book selection, questioning strategies and enrichment activities are suggested.

Whereas traditional fairy and folk tales usually convey strict lessons and morals, fractured tales transform and expand the original stories. A fractured tale is designed to be humorous by changing the story in an unexpected way, by altering characters, or by adding modern language and events. Hale (2016, 3) notes that although some use the terms *fractured tale* and *parody* interchangeably, a fractured tale "uses the characters or concepts of a fairy tale to tell a new story with an updated message (Bottigheimer, 2000)," whereas a parody is a story "that mock[s] a tale . . . in an amusing way."

Scholars have found that reading fractured tales has positive effects on various domains of children's development, including the cognitive, affective and social domains (Bang, Lee and Jang 2011; Stange and Wyant 1999). Specifically, Kim (2017) found that fractured stories helped students expand their response and form various ways of thinking. Stange and Wyant (1999) found that fractured stories improved children's social perspective taking. Furthermore, when young children are introduced to fractured tales corresponding to fairy and folk tales that are familiar to them, they are required to revisit and rethink previously held notions (Bouslough 2014; Lee 2014). Fractured tales can raise awareness of different points of view, allowing children to think about different perspectives and intentions of writers (Bouslough 2014; Jeon and Lee 2008).

Through this process, fractured tales enable young children to gain a sense of empowerment through confronting conventionally pervasive notions with questions of change, meaning and significance (McGillis 1996). This notion of challenging traditional social norms and values aligns with the critical literacy approach (Dozier, Johnston and Rogers 2006; Vasquez and Felderman 2012). Critical literacy involves examining and challenging issues of power and ideology in texts by asking why the author chose a certain topic or perspective to write about and why certain ideas were included or excluded (McLaughlin and DeVogd 2004; Norris, Lucas and Prudhoe 2012).

However, in spite of their importance and their many educational benefits, fractured tales have yet to be used regularly in practice in early childhood classrooms (Wee, Kim and Lee 2019). Park and Yang (2008) found that preservice early childhood teachers perceived difficulties in using fractured tales, because of the complexities involved in guiding children's critical thinking and responding to their questions appropriately.

This article aims to provide early childhood educators with guidelines and tips for effectively using fractured tales in the classroom by presenting various activities using fractured tales and discussing the skills and abilities children gain from literacy and language experiences using both traditional fairy and folk tales and their fractured tale counterparts.

Fractured Tale Activities in a Kindergarten Classroom

Here, we describe kindergarten children's learning experiences through reading and discussing traditional fairy and folk tales and their fractured tale counterparts in a whole group and through participating in follow-up activities.

The instruction using fairy and folk tales and fractured tales took place in Ms Han's kindergarten classroom, in a metropolitan city in South Korea.¹ Ms Han taught 20 five-year-old children (10 boys and 10 girls), who were all of Korean ethnicity and who all came from middle- to upper-middle-class families. None of the children had any diagnosed special needs. The children's first language was Korean, and all instruction and activities were delivered in Korean.

During read-aloud time over five months, Ms Han read 16 children's picture books, including seven traditional fairy and folk tales and nine fractured tales. All the books selected for this study except one—*Tomboy Snow White and the Stylish Prince*

(Koo and Cho 2013)—were originally written by Western authors and were read in Korean translations. This selection was the result of the lack of availability of fractured tales for traditional Korean folk tales, as well as the participating children's familiarity with Western fairy and folk tales. (See Appendix A for the complete list of books.)

Ms Han used the following procedures and instruction strategies during her read-aloud session. First, she read the stories and encouraged the children to listen attentively. After reading, she led the discussion, prompting the children to share their thoughts and responses freely. While reading and discussing, she asked open-ended, stimulating questions (for example, why a character acted or felt a certain way and what other characters might feel in the same situation). Then, she offered various follow-up activities (such as creating their own fractured stories, making cover pages for their stories, role-playing, writing letters to characters in the story and drawing Venn diagrams).

How the Magic of Fractured Tales Works

Understanding Fractured Tales as a Genre of Literature

When initially asked about their familiarity with fractured tales, all the children answered that they had never read any fractured tales.

However, toward the end of the study, the children started to show a deeper and better understanding of the concept. For example, Minhee explained, "The author of the fractured tales wrote a story based on the original story." Sungjoon said, "The author chose one of the characters and told the story differently."

Reading fractured tales and gaining an understanding of their unique characteristics allowed the children to learn about a particular literary genre, to analyze characters, and to make inferences about characters' actions and intentions.

Engaging In and Having Fun with Reading

Children learn better when they are engaged and motivated (Jablon and Wilkinson 2006). The children were frequently observed actively engaged in reading and talking about fractured tales.

The children expressed an interest in and a preference for the fractured tales. Specifically, when asked to vote for which story they liked better—the traditional story *The Three Little Pigs* (Jacobs 2008)

or its fractured tale, *The True Story of the Three Little Pigs!* (Scieszka and Smith 2008)—18 children out of 20 voted for the fractured tale. During the discussion, children shared the various reasons they liked fractured tales more:

- “I like fractured tales better, because they are funnier. They have similar characters and places to the original ones, but have a totally unexpected story!”
- “Fractured tales include more imagination and surprise me.”
- “It’s fun to see the wolf change to be kind and the pigs to be bad.”

The element of surprise and the unexpectedness appealed to the children and provided entertainment and amusement.

Taking Multiple Viewpoints

When the children first read the fractured tales, they had difficulty with the perspectives and the narrators, which were different from the traditional tales. However, over time, reading and discussing fractured tales helped them understand that there can be multiple versions of a story, depending on who is telling it.

After reading the fractured tale *Seriously, Cinderella Is So Annoying!: The Story of*

Cinderella as Told by the Wicked Stepmother (Shaskan and Guerlais 2014), Jiwoo said, “The original [story] did not tell us why the stepmother made Cinderella work all the time, but when the stepmother told the story, she told us what we did not know,” which was that “Cinderella was talkative and why she couldn’t go to the party.”

After reading the fractured tale *Seriously, Snow White Was So Forgetful!: The Story of Snow White as Told by the Dwarves* (Loewen and Guerlais 2015), the children created their own fractured tales about Snow White. In this process, children chose a perspective different from that of the traditional tale, carefully taking characters’ intentions and situations into consideration. Figure 1 shows two pages from the fractured tales the children created, along with brief synopses.

In their fractured tales, both children took the king’s perspective, but how they unfolded the story was quite different. One story involved a reconciliation between the queen and Snow White, while the other saw the queen kicked out of the castle by the king. These examples demonstrate not only children’s ability to take a different perspective but also their creativity in conceiving their own unique stories.

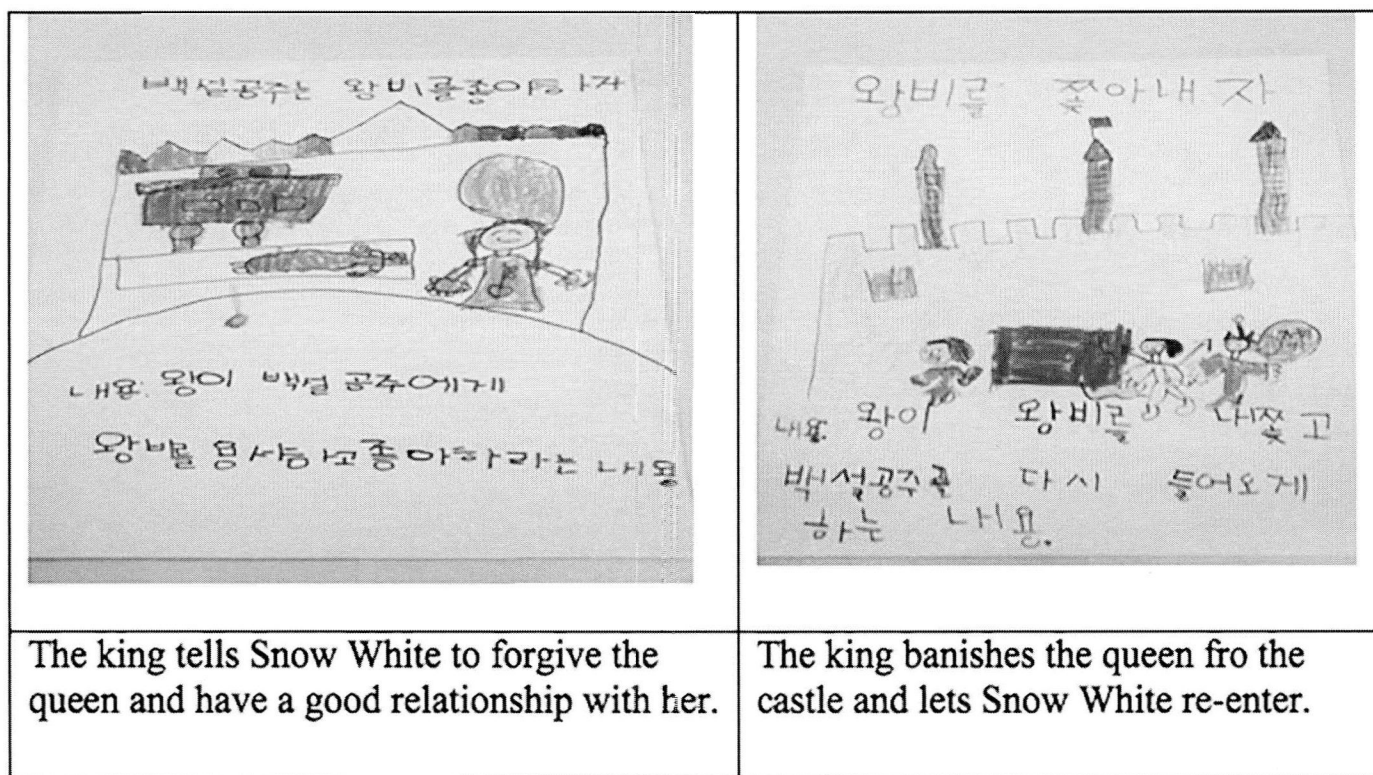


FIGURE 1. Student-created fractured tales about Snow White, using different perspectives.

Thinking Critically

Over time, the children developed critical-thinking skills through reading and discussing traditional fairy and folk tales and their fractured tales. Critical thinking focuses on confirming that one's arguments are sufficiently supported by evidence and free of unclear representation through a process involving logic and mental analysis (Smith 2015).

In this study, the children began viewing and interpreting characters and events critically, and developed the ability to explain their reasoning.

For example, after reading *The True Story of Hansel and Gretel* (Schwartz 2010), Minho shared his thoughts about the characters: "I thought Hansel and Gretel were innocent and nice, but reading *The True Story of Hansel and Gretel* changed my idea. Hansel and Gretel might not be always good. They were very cruel because they pushed the witch into the hot pot." Soyoung said, "Hansel and Gretel seemed to not be very clever, because when they got lost in the woods, they followed a white bird without thinking carefully." Jinhee shared, "They were rude to eat candies from the gingerbread house without asking." Figure 2 shows the children's drawings in which they reinterpreted the characters Hansel and Gretel. These examples show that they were able to reinterpret the characters from a critical viewpoint, rather than passively accepting that Hansel and Gretel were naive and innocent and the witch was wicked and cruel.

For critical thinking, the children were asked to reflect on why they thought in certain ways. When they murmured, "Just because . . .," without providing a clear explanation, Ms Han gave them more time to think and offered guided questions ("What if . . .?"), as well as questions about the characters' intentions and actions and the relationships between characters.

Developing Language and Literacy Skills

Through reading, discussing and creating fractured tales, the children had numerous chances to develop their language and literacy skills.

While presenting their own fractured tales, the children included a wide variety of vocabulary, as well as various story components (such as conflicts and solutions) and structures (such as how the story began and ended).

The following is part of Jinwoo's oral presentation on her own fractured tale of Snow White:

Once upon a time, Snow White was kicked out from the castle. It was not the stepmother that kicked her out. Actually, the stepmother cared about her, but she made terrible mistakes. She meant to give Snow White a comb and an apple with adding the magical liquid that made Snow White's dreams come true. But, by accident, she poured poison onto the comb and the apple. She

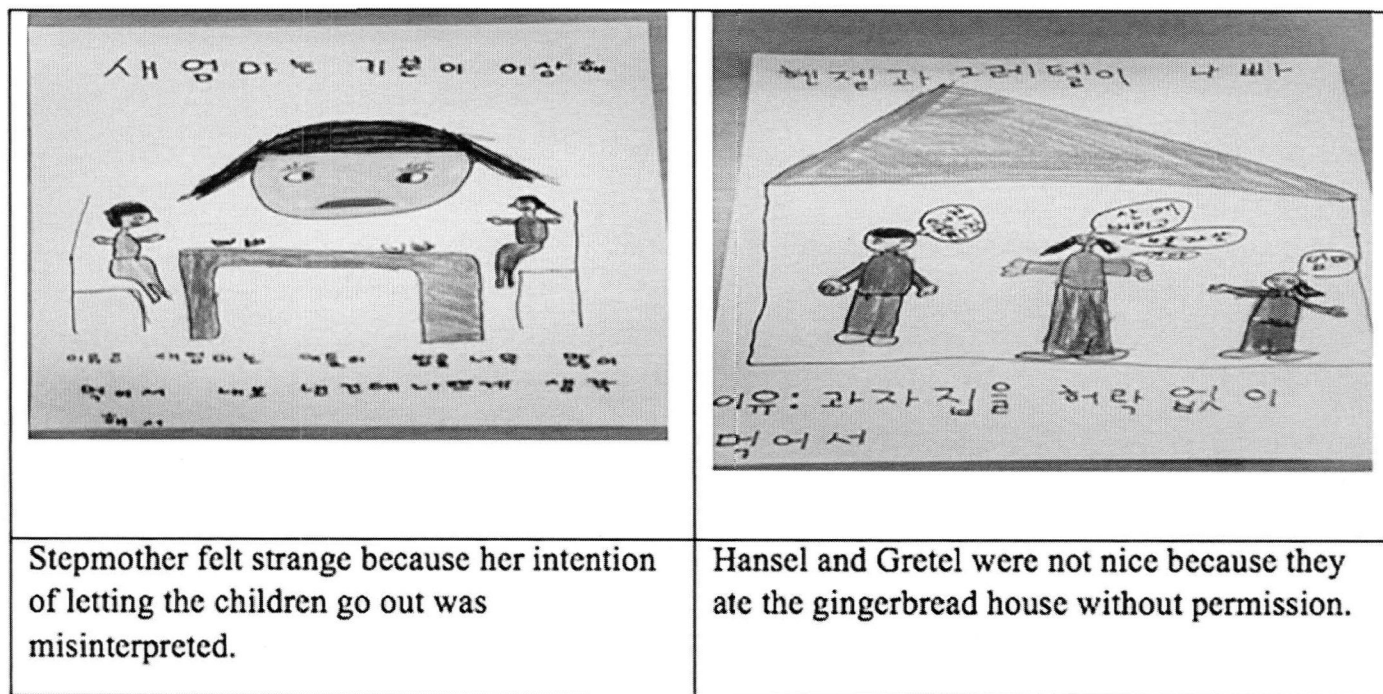


FIGURE 2. Children's reinterpretations of the characters Hansel and Gretel.

looked for someone to help Snow White, and found Prince Charming. She sent him to save her, and they lived happily after.

Jinwoo confidently shared her version of the story, which included a clear beginning, conflict, solution and ending. She narrated her story with appropriate sequences.

The children also developed their literacy abilities through various writing activities, including writing synopses of their own stories and writing letters to characters in the stories they read.

For example, after reading *The Three Little Wolves and the Big Bad Pig* (Trivizas and Oxenbury 2006), the children chose a character from the story and wrote a letter to that character. Figure 3 presents two children’s letters. The content of the letters varied, ranging from asking the pig why he blew the wolves’ house down and inviting him to have a treat and a cup of tea at their house, to suggesting how pigs should treat wolves.

Developing Empathy

Reading and discussing fractured tales encouraged the children to imagine and articulate how characters would feel in certain situations.

While discussing the characters in *Seriously, Snow White Was So Forgetful!* (Loewen and Guerlais 2015), Ms Han urged the children to write down their emotional responses to the characters. They tried to imagine how Snow White would feel by making connections to their own experiences, and they explained why they felt that way. The following are some of their responses:

- “Snow White would be scared in the woods. When I was three years old, I got lost at the mall and I was very scared.”
- “She would be so sad because the stepmom hated her. My mom is very nice and loves me.”
- “Snow White might feel happy because she was so tired after walking a lot and finally could take a rest there.”
- “She might feel angry because she lived in a castle but the dwarfs’ house was tiny.”

The children used various strategies to try to understand how Snow White would feel—recalling their own experiences, making connections to their own lives and thinking about Snow White’s situation carefully—which helped them empathize with her.

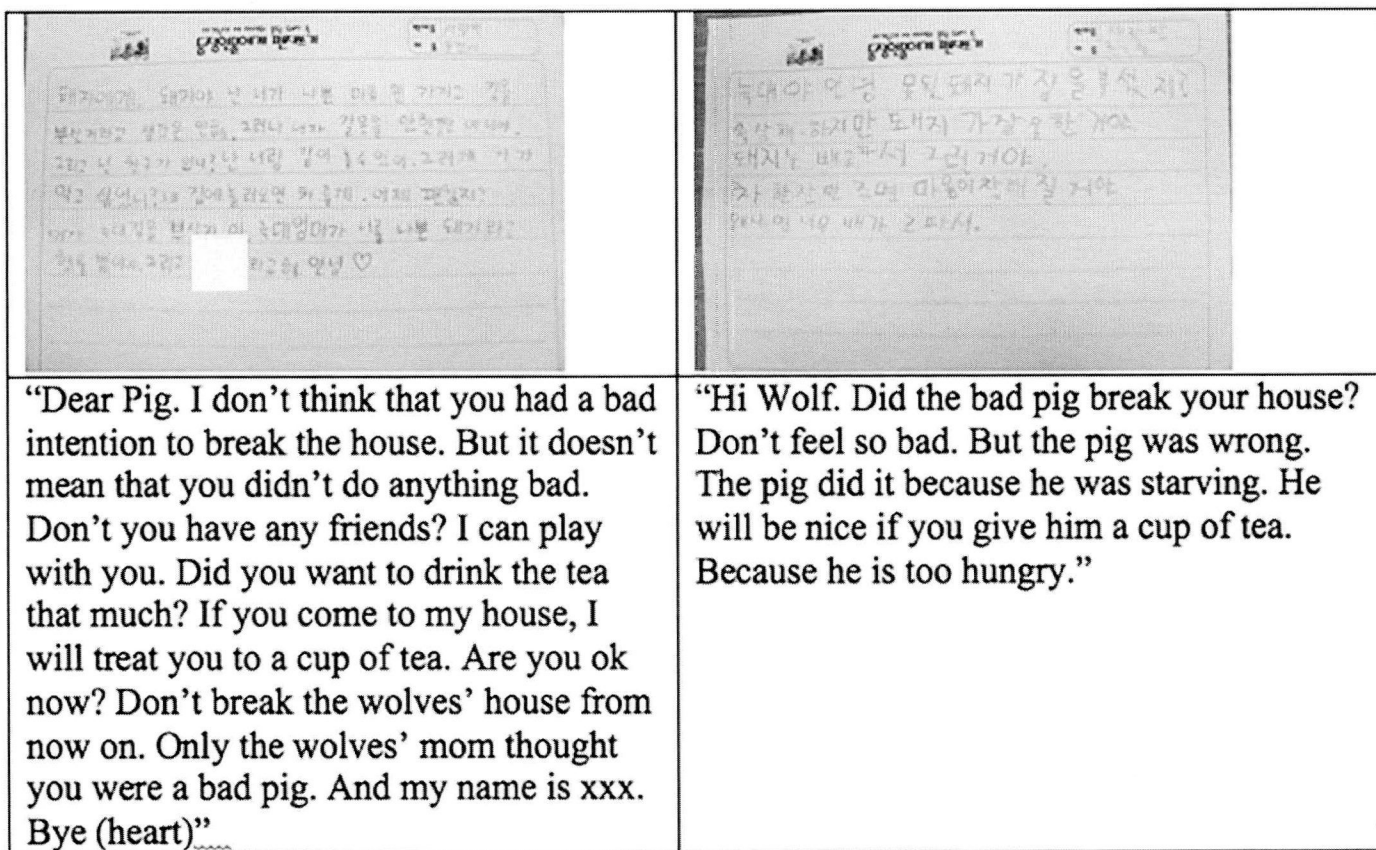


FIGURE 3. Children’s letters to characters in *The Three Little Wolves and the Big Bad Pig*.

Interacting and Exchanging Ideas with Peers and with the Teacher

During the discussion, the children were encouraged to exchange their ideas and experiences with their peers and with Ms Han. This helped them see that other people saw the characters and situations differently, which reinforced the idea of respecting others' ideas.

The following interaction took place during the discussion about *Seriously, Cinderella Is So Annoying!* (Shaskan and Guerlais 2014):

JWOO. I did not know Cinderella was talkative and why she couldn't go to the party.

MINJI. I thought Cinderella did not go to the party because the stepmother gave her lots of house chores.

HARI. I thought because she did not have a pretty dress to wear.

JEEMIN. She couldn't go because she talked too much and had a sore throat.

SUNGWOO. Maybe the stepmother made up a story to make her look nice?

YONGHA. I don't think that she made a fake story. She might really think that way.

DOYOON. I agree with Yongha. The stepmother was actually nice because she worried about Cinderella when she had a sore throat.

JIAN. It was Cinderella that lied! She told her mom that she would not go to the party, but she did.

When the fractured tale presented information that children had not known about Cinderella, the children not only supported and reinforced similar opinions but also explained why they had different ideas from others. For example, when Sungwoo suggested that the stepmother might have made up the story, Yongha and Doyoon respectfully explained why they did not agree with him. Such exchanges allowed the children to acknowledge each other's different thinking and learn how to address different ideas appropriately. Moreover, these social interactions contributed to children's active engagement in discussions and the development and elaboration of different ideas.

Identifying Stereotypes

Traditional fairy and folk tales often include stereotypical portrayals of gender (that is, girls as dependent, quiet and feminine and boys as masculine and brave). Ms Han read the children fractured tales that subverted these stereotypes through their characters and storylines. This

encouraged the children to notice and think about socially prevalent stereotypes and prejudices.

In the following interaction, children identified and responded to stereotypical gender roles after reading *Tomboy Snow White and the Stylish Prince* (Koo and Cho 2013):

MS HAN. How was Snow White different between the original fairy tale and its fractured story?

SEOYOON. In the original story, Snow White was kind and quiet.

DOYOUNG. She always wore a dress and looked pretty.

JINSEO. She was shy and scared.

MS HAN. Then how about Snow White in the fractured story?

SUNGWOO. She hated wearing a dress. She wore pants, because she rode a horse and did more fun things that only boys could do.

MS HAN. What are the things that only boys could do? Are there such things?

CHILDREN. No.

MS HAN. Then why did Snow White think only boys could do something?

CHAEYOON. She thought there were separate things only boys could do, but actually there are no such things.

MS HAN. Do you think that there are kinds of playing that only boys or only girls can do?

JISOO. Each person likes to do different things.

MS HAN. Why do you think the author wrote this *Tomboy Snow White and the Stylish Prince* story?

DOYOUNG. To tell us boys and girls can do anything.

At the beginning of the discussion, some children demonstrated stereotypical attitudes toward gender, such as Snow White being seen as pretty, shy and quiet. They pondered the concept of conventional gender and its role in the story, and they concluded that being a boy or a girl should not limit them.

Afterward, Ms Han asked them how they would respond to comments that involved gender stereotypes. Their responses varied:

- "Girls can do rough-and-tumble and play."
- "Girls can look nice without being dressed up."
- "All boys don't need to be brave. We are all different."

These activities helped them learn to identify stereotypes and respond appropriately.

Suggestions for Using Traditional Tales and Fractured Tales in the Early Childhood Classroom

As shown by Ms Han's kindergarten class, the use of traditional fairy and folk tales and their fractured tale counterparts can bring about meaningful opportunities for young children's enhanced growth, learning and skill development in various areas.

Based on these findings, we here present suggestions for teachers in the areas of book selection, instructional strategies focused on questioning, enrichment activities and consideration of students' cultural contexts.

Book Selection

When selecting children's books for exploring fractured tales, teachers should choose high-quality literature that requires children to think about different perspectives and consider social and environmental issues relevant to their own lives. To enhance children's critical and creative thinking, select books that allow them to explore differences and to experience alternatives to "happily ever after" endings (Meller, Richardson and Hatch 2009).

Furthermore, comparing various versions of fractured tales allows children to consider multiple perspectives and expanded ways of thinking, as well as to explore story elements, characters, recall, rewrites and story maps. For example, the traditional tale of *The Three Little Pigs* (Seibert and Elena 2002) has multiple fractured versions, including *The Three Pigs* (Wiesner 2001), *The Three Little Javelinas* (Lowell and Harris 1992), *The Fourth Little Pig* (Celsi and Cushman 1992), *The Three Little Fish and the Big Bad Shark* (Geist and Gorton 2007), *The Three Little Wolves and the Big Bad Pig* (Trivizas and Oxenbury 1993), and *The Three Little Pigs and the Somewhat Bad Wolf* (Teague 2013). Other examples include multiple versions of *Goodnight Moon* (Brown and Hurd 2011) and the Mrs Wishy-Washy series (Cowley and Fuller 1999). Providing a variety of versions of a story can demonstrate to young children that there is no single correct version, as well as give them permission to create their own versions and endings.

Instructional Strategies Focused on Questioning

Teachers should ask meaningful and thought-provoking questions to help young children explore

characters, endings and outcomes while scaffolding to enhance thinking and learning. Critical questions enable children to examine their own insights and those presented in texts.

Particularly, drawing on critical literacy approaches, teachers should ask questions that help children challenge their own assumptions and prejudices related to the status quo and gender roles (Comber and Simpson 2001; Vasquez 2001).

For example, regarding gender stereotypes in *Cinderella* (Perrault 2007) and its fractured tales, such as *Seriously, Cinderella Is So Annoying!* (Shaskan and Guerlais 2014), the teacher can ask questions such as "Whose voice dominates, and whose voice is marginalized?" "What does the story say about boys or girls?" and "Is it important that Cinderella is beautiful?" (Harwood 2008).

Another stereotypical notion is light/white represented as good and dark/black represented as bad in *Little Red Riding Hood* (Grimm and Grimm 2015) and *Snow White* (Grimm and Grimm 2009). Ask questions such as "I have black hair—do you think I am a bad person?" and "What if Snow White had dark-coloured skin? What would be her new name?"

Critical questions like these guide children to identify how a text can value the knowledge and perspectives of a particular group while ignoring those of other groups (Simpson 1996).

Enrichment Activities

We recommend that teachers use various multimodal follow-up and enrichment activities to extend children's learning experiences.

For example, children could create their own fractured tales, write or draw their own endings, and fill in speech or thought bubbles (as shown in the figures above).

Using visual and graphic organizers (such as Venn diagrams and T-charts) or voting for their preference between traditional tales and fractured tales can help children learn to compare and contrast and to understand various versions of a story.

These enrichment experiences can also focus on dramatic play, role-playing and puppetry, which enable and empower children to become the characters in the story, allowing their creativity to flow.

Through the teacher's repeated practices in recording ideas, responses and actions of characters in the books, children can broaden their thinking and consolidate their experiences by exploring atypical options and ideas.

Consideration of Students' Cultural Contexts

Last, teachers must consider students' cultural contexts. Simpson (1996) stresses that when children connect texts with their own experiences and beliefs, they become more deeply engaged in critique and analysis.

In our study, Western fairy and folk tales were read and discussed in a Korean kindergarten classroom. Although the children were familiar with these tales, we found cultural gaps between the texts and the children's contexts. Reading stories with protagonists of Korean ethnicity (or similar backgrounds) living their daily lives could have helped the children more easily connect to and become engaged with the stories.

Thus, teachers should keep in mind the significance of selecting books that reflect children's lives and values.

Conclusion

Through this study, we have shown how fractured tales can expand children's ideas beyond the typical boundaries, allowing them to explore alternative scenarios and solutions. For the many reasons stated above, we recommend that young children regularly experience diverse fractured tales to aid their development and growth in various areas. Early childhood educators and other professionals should pay attention to guiding children's own interests and questions in critical ways and offering literacy activities that enhance critical perception and the connection to each child's own context.

Appendix A: Selected Traditional and Fractured Tales Exploring Stereotypical Representations (for the Early Childhood Classroom)

In this study, all the books were read in Korean translations.

Cinderella

Traditional Tale

Cinderella, by Charles Perrault. 2007. [In Korean.] Trans Y-J Choi. Seoul: Woongjin Think House. Stereotypical representations: gender, stepmothers.

Fractured Tale

Seriously, Cinderella Is So Annoying!: The Story of Cinderella as Told by the Wicked Stepmother, by Trisha Speed Shaskan and Gerald Guerlais (illus). 2014. [In Korean.] Trans S Suh. Seoul: Kids M.

Narrated by the stepmother, this story describes how the stepmother finds Cinderella weird and annoying and how she can't wait for the prince to take Cinderella away.

The Three Little Pigs

Traditional Tale

The Three Little Pigs, by Joseph Jacobs. 2008. [In Korean.] Trans R Kim. Seoul: Woongjin Think House.

Stereotypical representations: power, appearance, wolves.

Fractured Tales

The Three Little Wolves and the Big Bad Pig, by Eugene Trivizas and Helen Oxenbury (illus). 2006. [In Korean.] Trans K Kim. Seoul: Neverland.

Three little wolves build houses using different materials. When a big bad pig tries to blow down the houses, he smells the fragrant flowers and recognizes his wrongdoing. He then becomes a good pig, and he and the wolves become good friends.

The True Story of the Three Little Pigs! by Jon Scieszka and Lane Smith (illus). 2008. [In Korean.] Trans E Hwang. Seoul: Borim. A wolf named Alexander tells the story of how he became a "big and bad" wolf. He asked three pigs for some sugar to make his grandmother's birthday cake, but they said no. The third pig insulted the wolf's grandmother, which made the wolf yell, sneeze and huff at the brick house. The police then arrested the wolf for attempted sugar robbery.

Snow White

Traditional Tale

Snow White, by Jacob Grimm and Wilhelm Grimm. 2009. [In Korean.] Trans S Kim. Seoul:

Samsung.

Stereotypical representations: gender, stepmothers.

Fractured Tales

Seriously, Snow White Was So Forgetful!: The Story of Snow White as Told by the Dwarves, by Nancy Loewen and Gerald Guerlais (illus). 2015. [In Korean.] Trans Y Choi. Seoul: Kids M.

The dwarfs explain how Snow White's terrible memory caused many problems, including her long sleep, and relate exactly how she was rescued by the prince.

Tomboy Snow White and the Stylish Prince, by S Koo and S Cho. 2013. [In Korean.] Seoul: Olive M & B.

The tomboy Snow White likes to play with a sword and explore, and the stylish prince likes to dress up. They both want to change their gender.

Hansel and Gretel

Traditional Tale

Hansel and Gretel, by Jacob Grimm and Wilhelm Grimm. 2014. [In Korean.] Trans J Baek. Seoul: Word Best.

Stereotypical representations: stepmothers, witches.

Fractured Tale

Trust Me, Hansel and Gretel Are Sweet!: The Story of Hansel and Gretel as Told by the Witch, by Nancy Loewen and Janna Bock. 2016. [In Korean.] Seoul: Kids M.

The witch tells the story of how she rescued the children from their wicked stepmother and taught them food art.

Little Red Riding Hood

Traditional Tale

Little Red Riding Hood, by Jacob Grimm and Wilhelm Grimm. 2015. [In Korean.] Trans H Cho. Seoul: Samsung.

Stereotypical representations: wolves, appearance.

Fractured Tale

Honestly, Red Riding Hood Was Rotten!: The Story of Little Red Riding Hood as Told by the Wolf, by Trisha Speed Shaskan and Gerald Guerlais (illus). 2014. [In Korean.] Trans S Suh. Seoul: Kids M.

The Big Bad Wolf tells the story of how he ran out of food and had not eaten anything for a week. He met Little Red Riding Hood, who had a cake and some butter for her granny. Granny and Little Red Riding Hood were thinking only about their appearances. The wolf ate both of them.

Jack and the Beanstalk

Traditional Tale

Jack and the Beanstalk, by Joseph Jacobs. 2015. [In Korean.] Trans I-K Kim. Seoul: Samsung.

Stereotypical representations: appearance, giants.

Fractured Tale

Trust Me, Jack's Beanstalk Stinks!: The Story of Jack and the Beanstalk as Told by the Giant, by Eric Braun and Cristian Bernardini (illus).

2014. [In Korean.] Trans H Kang. Seoul: Kids M.

The giant tells the story of how he was always hungry and hated people because they made fun of him. A boy named Jack tricked the giant's wife into feeding him and stole a bag of gold, a goose and a harp. While chasing Jack down a beanstalk, the giant fell.

Goldilocks and the Three Bears

Traditional Tale

The Three Bears, by Paul Galdone. 2004. [In Korean.] Trans E S Huh. Seoul: Borim.

Stereotypical representations: age, appearance.

Fractured Tale

Believe Me, Goldilocks Rocks!: The Story of the Three Bears as Told by Baby Bear, by Nancy Loewen and Tatevik Avakyan. 2015. [In Korean.] Trans S Seo. Seoul: Kids M.

Sam, the youngest bear, did not like his breakfast and did not like to be called Baby Bear. When he came home by himself one day, he found Goldilocks in his house. Sam played with Goldilocks. However, Sam's parents thought he had been brave and had chased the intruder Goldilocks out of their house. They then allowed Sam to do everything he wanted.

Note

1. All names have been changed.

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Fun and Fundamental Math for Young Children: Building a Strong Foundation in PreK–Grade 2

by Marian Small
Teachers College Press and Rubicon, 2018
213 pages

Joy de Nance

Joy de Nance has been working with the Calgary Board of Education since 1983 and has taught kindergarten for most of her teaching career. She earned her BEd and early childhood diploma from the University of Calgary; an MEd in elementary education, with a specialization in early childhood education, from the University of Alberta; and a graduate certificate in early childhood and elementary math from the University of Calgary. A long-time member of the Early Childhood Education Council, she currently serves as past president and as codirector of the annual conference, to be held April 23–25, 2020, in Banff.

examining worthwhile mathematical tasks. The glossary provides a comprehensive list of math terms and their definitions.

The book is divided into chapters highlighting the concepts of counting and cardinality, operations and algebraic thinking, number and numerical operations in base 10, measurement and data, and geometry.

Each chapter begins with a section on the fundamentals—the mathematical skills and knowledge required by teachers to understand what children need to learn. Small provides clear explanations of mathematical concepts as they apply to early learners. For example, in the chapter on counting and cardinality, she highlights and explores various counting principles: 0 and 1, teen numbers, subitizing, multiple representations, anchors to 5 and 10 (benchmark numbers), numerals, counting patterns to 100, and sense of quantity. Readers will appreciate how she encourages the use of various mathematical tools. In the first chapter alone, she provides options for using pictures, ten-frames, rekenreks, tally marks, arrays and number lines.

Each chapter also includes a list of common student misconceptions to watch for and suggestions for remediation as children participate in mathematical activities.

The third section of each chapter is where the fun begins. Small shares many examples of engaging learning opportunities that are appropriate for pre-K to Grade 2 students. She provides suggestions for children's literature and activities that can be done at home as a family. These home activities include stories, playful and interesting games, and songs that are simple to learn, not a series of

Marian Small is well known for her publications on questioning in mathematics and teaching mathematical thinking. *Fun and Fundamental Math for Young Children: Building a Strong Foundation in PreK–Grade 2* is her first book specifically designed for teachers of young children.

The book's layout is user friendly, complete with visuals and suggestions that are easy to follow. I was pleased to discover that sound pedagogical principles and research ground Small's work. She states that mathematical tasks should be worthwhile and that there is value in rich mathematical conversation, in teaching through play and in learning through concrete materials. She stresses the importance of differentiation, of providing appropriate challenges in the classroom and of listening to children.

The reference list at the end of the book includes relevant research, such as the learning trajectories theory, and even explores Learn Alberta for

worksheets for practice. In each chapter, the home activities are categorized as pre-K and kindergarten, Grade 1, or Grade 2, but they could easily be modified as needed.

I like the format and design of each section. Small explains the fundamentals and the activities in a way that makes it easy for teachers to read, review, and pick and choose. So many math resources recommend the purchase of software or online materials, so I was pleasantly surprised by the quantity, quality and variety of activities (using classroom materials common to most early childhood programs) recommended in this book.

I acknowledge Small's awareness of expectations in the chapter on number and operations in base 10. Learning about place value and making meaning of quantities above 10 is not part of Alberta's kindergarten curriculum; however, Small provides activities that will encourage understanding and an opportunity to explore these concepts at an appropriate level.

My one caveat is that this resource is aligned with the Common Core State Standards Initiative in the United States and, therefore, it may not reflect current or upcoming Alberta curriculum expectations. The American influence is evident in the chapter on measurement, which requires students to use inches and feet, in addition to centimetres and metres. Nonetheless, the book is useful for Canadian readers because of its clear descriptions of key mathematical concepts.

Fun and Fundamental Math for Young Children is not designed to be a teacher's only resource for classroom use, but it does provide engaging concept-based activities and suggestions for assessing student learning. Small strikes a balance between explaining the knowledge needed by teachers to fully understand the mathematical concept they are trying to teach and providing the meaningful activities necessary to complete the task. 🧑

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Early Childhood Education is published to

- promote the professional development of educators in improving practice in early childhood education and
- stimulate thinking, explore new ideas and offer various points of view.

Articles from all educators and educational researchers are welcome. Classroom teachers especially are invited to consider writing about topics that interest them. Submissions are requested that will stimulate personal reflection, theoretical consideration and practical application. Teachers appreciate articles that present differing perspectives; innovative classroom and school practices; recent literature reviews; trends and issues; research findings; descriptions, reviews or evaluations of instructional and curricular methods, programs or materials; and child-related humour.

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- contribute your opinion on matters concerning early childhood education;
- meet other professionals interested in and involved with early childhood education;
- participate in activities sponsored by the ECEC regional for your area;
- attend the annual Early Childhood Education Council conference to glean new and exciting ideas and to share your concerns with colleagues;
- receive *Issues, Events and Ideas*, a newsletter published several times a year, featuring council news and ideas for classroom use; and
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The objective of the Early Childhood Education Council of the Alberta Teachers' Association is to improve practice in early childhood education by increasing members' knowledge and understanding of this specialty.

Membership

Total membership of the council is currently 2,799.

Conference and Other Programs

The council organizes an annual conference for its members on early childhood education. Attendance at annual meetings over the last several years has averaged 600.

Several regional organizations of the council carry on programs for members in their areas. The council supports these regionals. It also occasionally offers workshops and other activities in areas where regionals have not been organized.

Publications

The Early Childhood Education Council publishes a newsletter (*Issues, Events and Ideas*) and a journal (*Early Childhood Education*). Members of the council receive these publications as part of their membership. Nonmembers wishing to receive copies of these publications may obtain them by paying the subscription rate of \$30 (Canadian funds) annually and writing to the Early Childhood Education Council, ATA, Barnett House, 11010 142 Street NW, Edmonton, AB T5N 2R1.

Website

The council maintains an Internet site at www.ecec-ata.com.

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