

“How Do You Think Bear Felt?”: Enhancing Preschoolers’ Inferencing During Storybook Reading

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ABSTRACT

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Preschoolers’ inferential skills are a strong predictor of their vocabulary, story comprehension, and later reading comprehension. Preservice educators can play an important role in supporting these skills, but often lack knowledge about inferencing and inferential questions and strategies to support inferencing in early childhood settings. This study investigated the effectiveness of an instructional unit (including direct teaching; reading, observing, and reflecting; and practicing the targeted strategies) aimed at developing preservice educators’ knowledge about children’s inferencing skills as a component of emergent literacy, and about strategies to support such skills during storybook reading.

Participants were randomly assigned to either an experimental group that received instruction focused on asking inferential questions ($n = 13$) or a comparison group ($n = 12$), that received instruction on print referencing, another means of supporting emergent literacy. In both groups, knowledge about emergent literacy and inferencing was evaluated via a questionnaire, and their use of inferential questions was investigated via a role play. Mixed ANOVA demonstrated that both groups increased their emergent literacy knowledge significantly from pretest to posttest, as expected. However, as hypothesized, only participants in the experimental group improved significantly in their knowledge about inferencing and inferential questions from pretest to posttest. The role play data further showed that the experimental group significantly increased the frequency and diversity of inferential questions from pretest to posttest, and surpassed the comparison group on these measures at posttest. These results have direct implications for education and professional development for preservice educators.

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Introduction

Long before formal schooling, children begin to build precursory skills that are essential for later decoding and reading comprehension (Kendeou et al., 2009). These skills fall into two categories: code-based and meaning-based. Code-based skills comprise alphabet knowledge, phonological awareness, and print awareness. Meaning-based skills refer to knowledge of vocabulary and concepts, oral language skills, and inferential language skills (Dickinson et al., 2010). Although fostering children's language skills and conceptual knowledge is indispensable, there is also a growing interest in ways to ameliorate their inferential language skills (Tompkins et al., 2013). A lack of such skills has been suggested as a plausible cause for children's problems with reading comprehension (Cain & Oakhill, 1999), and early exposure to inferential language may be an effective way to prevent children's difficulties with later reading comprehension (Blank et al., 1978, as cited in Tompkins et al., 2013).

While inferential language includes both questions and comments, the current study will focus on questions since these are one of the most frequently used discourse forms in early childhood education (Zucker et al., 2010). The literature suggests that questions account for a substantial proportion of educators' utterances in contexts such as play-based activities (33%; Tompkins et al., 2013), shared book reading (33.5%; Massey et al., 2008), and whole-group instruction (48%; Chen & Liang, 2017). Of particular interest to researchers regarding educator questioning is the level of cognitive demand (Zucker et al., 2010) in two types of questions, literal and inferential, and how it affects children's language learning. Inferential questions provide children with opportunities to predict, reason, and explain (van Kleeck & Woude, 2003). They generally place higher cognitive demands on children than literal questions, as they require

children to mentally represent information removed from the ‘here-and-now’ (van Kleeck & Woude, 2003), which is critical to build children’s later language skills (Zucker, et al., 2010).

It is of vital importance for educators to provide children with opportunities to acquire these skills to be well prepared for school (Lane et al., 2014). Enhancing children’s language and emergent literacy skills requires educators to possess knowledge of content, pedagogy, and evidence-based classroom practices (Cunningham et al., 2015). Unfortunately, many educators lack knowledge in these areas (Cunningham et al., 2009) and do not provide children with frequent opportunities to engage in language and literacy-related interactions, such as interactive storybook reading (Girolametto & Weitzman, 2002). Considering these findings, researchers have recommended professional development for preservice and in-service educators, focused on fostering early language and literacy skills through interactive storybook reading (Lane et al., 2014). The goal of this study is to examine the effectiveness of an instructional unit to improve preservice educators’ use of inferential questions during storybook reading and their knowledge of emergent literacy, specifically inferencing.

Literal Versus Inferential Language

Definition of Literal and Inferential Language

Literal and inferential language have been distinguished according to the level of cognitive demand that each type places on children. Literal language refers to information “that is perceptually available, or that offers concrete choices” (Massey et al., 2008, p. 349) (e.g., in reply to the literal question “What is this?”, a child might provide a literal response: “This is a stripy caterpillar”). Inferential language refers to language about “nonpresent objects or past and future events” and talk that “requires children to draw an inference, analyze information, discuss vocabulary, or make predictions” (Massey et al., 2008, p. 349) (e.g., “Why do you think he is

sad?”). The distinction between literal and inferential language has also been elaborated (i.e., literal vs. inferential extratextual talk in Zucker et al., 2013) or captured with other binary terms such as less vs. more cognitively challenging language (Massey et al., 2008) or contextualized vs. decontextualized language (Hindman et al., 2008).

Literal and inferential language have also been described along a continuum (Tompkins et al., 2013). Blank et al. (as cited in Tompkins et al., 2013) suggested the literal-to-inferential continuum has four levels. Levels 1 and 2 correspond to literal / perceptual language because they refer to information that is perceptually available and concrete, while levels 3 and 4 correspond to inferential/abstract language. Details of the four levels (Blank et al., as cited in Tompkins et al., 2013; Chen & Liang, 2017; Van Kleeck et al., 1997) follow:

Level 1: Matching language onto perception. Children use language to label, identify, count, and locate people, objects, or events, based on what they can directly perceive.

Level 2: Selectively analyzing/integrating perception. Children selectively focus on aspects or features of objects, events, actions, or characters, such as describing the characteristics of an object and recalling a specific event.

Level 3: Reordering or inferring about perception. Children reorder or restructure their perceptions by summarizing, comparing/contrasting, and drawing text-to-life connections.

Level 4: Reasoning about perception. Children reason about their perceptions by defining, making predictions, identifying causes and effects, judging, commenting on characters' feelings, and providing background knowledge beyond the text.

The Relationship Between Children's Inferencing and Story and Reading Comprehension

Inferencing is a strong predictor of children's story comprehension (Cain et al., 2001; Kendeou et al., 2008; Tompkins et al., 2013). Kendeou and colleagues (2008) showed that 4- and

6-year-olds' inferencing skills made a significant contribution to narrative comprehension, above and beyond the contributions of basic language skills and narrative medium (aural, televised and written), both at the time of initial testing and two years later. Similar significant relationships were found between the inferences younger children spontaneously generated and story comprehension (Tompkins et al., 2013). Cain et al. (2001) demonstrated that 7- to 8-year-old children's inferencing ability was strongly associated with their story comprehension skills, even when the knowledge base relevant to the story episodes was controlled.

Inferencing also facilitates children's later reading comprehension (Van Kleeck et al., 2006). Cain et al. (2001) demonstrated that elementary students' processing skills, including inference making, accounted for unique variance in reading comprehension, even when word reading ability and vocabulary skills were controlled. In another study, Cain and Oakhill (2007, as cited in Elleman, 2017) found that inferencing skills were significantly related to reading comprehension two years later, beyond the contributions of vocabulary, IQ, and word reading. Collins (2016) has similarly claimed that inferencing plays a vital role in reading comprehension, independent of the contributions of language ability.

In summary, studies have demonstrated that inferencing is important to children's early story comprehension and a compelling predictor of their later reading comprehension. Exposure to inferential language and engaging children in inferential talk at an early age may thus benefit story comprehension and additionally serve as an effective way to prevent or reduce children's difficulties with later reading comprehension. But do educators engage in this type of talk?

Adults' Inferential Language Use and Its Effects

Educators' use of inferential language with young children has occasionally been investigated during play (De Rivera et al., 2005; Tompkins et al., 2013) or whole group

instruction (Chen & Liang, 2017), as well as during storybook reading, the context of interest in the proposed study. The ratio of literal to inferential language used by adults during interactive storybook reading with preschoolers has varied across studies, but generally, adults tend to use more literal than inferential language (approximately twice as much according to Hindman et al., 2012; Sembianti et al., 2018; Zucker et al., 2013). In the rare studies showing the reverse pattern (more inferential than literal language), the findings were unexpected and potentially due to past training and/or particularly high levels of education amongst the participating educators, variables that were not controlled for (Hindman et al., 2008; Massey et al., 2008).

There could be several explanations for the lower rates of inferential comments or questions. One reason might be that educators believe that young children cannot respond to inferential questions (Deshmukh et al., 2019), although research suggests this is not the case (e.g., Van Kleeck, 2008). Educators may also be unaware of the importance of inferential talk for children's vocabulary, or story and reading comprehension (elaborated below), or may not know the many ways one can integrate inferential talk while sharing storybooks. For instance, adults can ask children to define new vocabulary based on context, connect story content to their own lives, connect story events to one another, make inferences about characters' emotional states, summarize, and so on (Van Kleeck, 2008). These are amongst the issues I will explore in the present study with preservice educators.

Exposure to adults' abstract language and participation in high demand discussions provides children with opportunities to practice inferencing, which as van Kleeck argued, can enhance their language skills and later, their reading comprehension. Studies investigating the contributions of inferencing to these other skills are reviewed next.

Vocabulary Comprehension

Inferential talk with preschoolers during storybook reading has been found to be an important predictor of the vocabulary children understand (Dickinson & Porche, 2011; Dickinson & Smith, 1994; Hindman et al., 2008; Rowe, 2013). In a more recent study, Tompkins et al. (2017) demonstrated that mothers' inferential questions and comments predicted children's (three- to five-year-olds) receptive vocabulary growth over six months, even when the children's age, the mothers' education, and the frequency of reading were controlled. Rowe (2013) studied 50 parent-child dyads, examining the relations between the parents' use of decontextualized language in daily activities and their children's vocabulary. They found that children whose parents used more decontextualized language (such as explanations and narrative discourse) had greater vocabularies one year later than children whose parents used less language of this kind. In addition to studies showing that inferential question can increase the breadth of children's vocabulary, van Kleeck (2008) found that vocabulary depth was promoted by questions which required children to make inferences about the meanings of new words from the context.

Story Comprehension

Adults' inferential language use is also beneficial to children's story comprehension (Collins, 2016; Dickinson & Smith, 1994; Haden et al., 1996). Dickinson and Smith (1994) found that teachers' utterances involving analysis, prediction, and vocabulary accounted for approximately 20 percent of the variance in children's story comprehension performance. Haden et al. (1996) investigated the book-reading styles of North American mothers with their three- to five-year-old children. Mothers' reading styles were categorised as *describer style* or *comprehender style*. Describer style mothers focused on describing and labelling the characters, pictures, and events in the story; that is, on literal language. Comprehender style mothers put

greater emphasis on elaborating the story, inferencing, and predicting. The results demonstrated that children of comprehender style mothers had better story comprehension than the children who had describer style mothers two and a half years later. A more recent intervention study (Collins, 2016) investigated the effects of high-demand discussion on story comprehension. The data revealed that high-demand discussions (inferential talk) between adults and children after reading a story exerted significant effects on children's story comprehension, even after taking into account the children's vocabulary and levels of home reading.

Reading Comprehension

The positive association between children's inferences and reading comprehension was discussed above. Additional support for this relationship comes from studies of adults' inferential language use and its effects on children. A study of low- and middle-SES, European American and African American families by Serpell et al. (2005), for example, emphasized the importance of children's engagement in inferential discussion to their later reading achievement (as cited in Collins, 2016). The study showed that the amount of inferential discussion that children were exposed to during shared book reading in first grade was significantly related to their reading comprehension in third grade, particularly for children who were highly engaged in the shared book reading. The more the adult models inferential language in a book-sharing context, the more the child is exposed to it and actively uses it (Collins, 2016). The more the child participates in inferential talk in the early years, the greater the effects on later comprehension (Van Kleeck, 2006).

Contingent Relations Between Adults' and Children's Inferential Language

Studies using sequential analysis have demonstrated that adult utterances at a particular level of abstraction are likely to elicit children's responses at the same level (Tompkins et al.,

2013; Tompkins et al., 2017; Zucker et al., 2010). Tompkins et al. (2013) and Zucker et al. (2010) examined educators' literal and inferential questions and children's responses during a play-based activity and shared book reading. The studies found significant sequential associations between the level of abstraction of educators' questions and of children's responses (i.e., educators' inferential questions tended to be followed by children's inferential responses). A more recent study by Tompkins et al. (2017) focusing on parents' utterances and children's responses during shared book reading obtained similar findings. The result of a sequential analysis demonstrated that the level of abstraction of mothers' utterances matched that of children's responses. The findings in these studies suggest that adults' inferential language use tends to stimulate children's inferential language use.

Summary

Inferencing, a cognitively demanding process, is a strong predictor of preschoolers' vocabulary, story comprehension, and later reading comprehension. Therefore, it has been recommended that parents and educators use inferential language during interactions with preschoolers and encourage them to engage actively in discussions requiring abstract language and inferential talk. Indeed, engaging preschoolers in high-demand language discussions have been shown to be effective in fostering their inferential skills. These findings, coupled with low use of inferential language by educators, underscore the importance of enhancing preservice educators' knowledge in this area.

Educators' Knowledge of Emergent Literacy

As suggested earlier in the proposal, inferential language can be considered as an element of emergent literacy. I have not identified any studies yet which investigate preservice educators' emergent literacy *content knowledge*, defined as the most basic form of knowledge teachers need

in a specific domain (Cunningham et al., 2009). However, the literature on reading-related content knowledge provides some insights into the relationship of content knowledge to practice.

Content knowledge related to reading includes knowledge about phonemic awareness, phonics, language, print knowledge, fluency, vocabulary, and comprehension (e.g., Brady et al., 2009; Cunningham et al., 2004; Piasta et al., 2009; Spear-Swerling & Cheesman, 2012). The research indicates that teachers lack such knowledge. For example, Brady et al., (2009) found that first grade teachers' responses to questions about reading components were low (37% to 54%) prior to professional development. Piasta et al. (2009) found similarly weak results amongst first grade teachers, even though the teachers were experienced and well-educated (all held bachelor's degrees, and nearly a third had master's degrees). Spear-Swerling and Cheesman (2012) also found low scores amongst elementary school teachers on a survey of reading-related concepts. As Spear-Swerling and Zibulsky (2014) suggest, the lack of knowledge observed may be "traceable, at least in part, to problems in preservice teacher preparation and licensure" (p. 1357). Poor quality textbooks, shown to have inadequate and even incorrect information about literacy and related instructional procedures, may also play a role (Malatesha Joshi et al., 2009).

The findings reviewed above are troubling, since studies show that content knowledge is positively related to classroom practice (Piasta et al., 2020a; Spear-Swerling and Zibulsky, 2014), which, in turn, improves children's learning outcomes (Piasta et al., 2009). For example, a study of 102 kindergarten through grade 5 teachers by Spear-Swerling and Zibulsky (2014) revealed an association between their content knowledge about literacy and the amount of time that they spent on specific literacy activities. A more recent study of 485 early childhood educators by Piasta et al., (2020a) examined the relationship between their content knowledge about language and literacy, knowledge for practice, and literacy practices. Educators who had

more content knowledge tended to show more effective classroom language and literacy practices. Piasta et al. (2020b) also found positive associations between educators' knowledge and both the quality and quantity of their classroom emergent literacy practices. At the same time, content knowledge alone does not suffice; as Piasta et al. (2009) demonstrated, teachers must also know how to apply their knowledge to have positive effects on children's learning outcomes. The proposed study attempts to address this issue by fostering preservice educators' content knowledge about inferencing and by introducing them to strategies to support inferencing by children.

Multifaceted Instruction for Educators

Several researchers suggest that professional development should include diverse experiences that are ordered in such a way as to facilitate learning. For example, Cunningham and colleagues (2015) suggested including a series of learning experiences that build on each other as one of the key elements of effective professional development.

Girolametto et al. (2007) studied 16 early childhood educators who participated in a six-hour workshop on strategies for facilitating emergent literacy skills. The workshop included a variety of means, such as interactive lectures, role-plays to apply strategies, and self-reflection. Following the workshop, educators showed a significant increase in their use of abstract language and print references.

Piasta et al. (2010) conducted a study of 85 educators to examine the effectiveness of a 12-hour workshop (8 hours of initial training and a refresher) to enhance their use of print referencing during storybook reading. The research team used various teaching methods in the study, such as observation, video analysis, role play, and providing opportunities to practice. The results showed that educators who participated in professional development referenced print

during storybook reading more often than educators in the comparison group.

The two studies reviewed just above indicated that short-term on-site instruction using a variety of teaching methods resulted in gains for educators in the areas addressed by the instruction. Additionally, role play, self-reflection, observation, and lectures appeared to be effective teaching methods to facilitate educators' learning about emergent literacy skills. Thus, the current study will adopt an instructional approach for preservice educators with the following key facets: 1) direct teaching, 2) reading, observing, and reflecting, and 3) discussing and practising the targeted strategies. However, due to COVID-19, on-site instruction is not feasible. This study will use video and video conferencing as a medium to teach, model, and discuss the targeted concepts and strategies.

Video-based Training

In recent years, videotaped training has been used more and more to support learning by educators as well as parents. Video-based training might be a more feasible method than live training because it decreases the costs and increases the ease of training (Briesch et al., 2008). For instance, video can be a suitable tool for training teachers or others in remote areas, yet avoid the high cost and inconvenience of recruiting expert trainers (Norris & Hoffman, 1996). In addition, video-based instruction may help reduce barriers to participation such as distance, time, and costs for participants to receive training (Ezell & Justice, 2000). Another benefit of video training over on-site training is that participants can watch the video according to their individual needs and review the content when they need to refresh their knowledge (Norris & Hoffman, 1996). Moreover, the standardization of video training for research purposes may help avoid the possible effects resulting from using different trainers (Arnold et al., 1994)

Norris and Hoffman (1996) examined the effects of video training on special educators'

content knowledge concerning language interventions and their use of such intervention strategies in actual practice. Two hundred special education service providers watched a 50-minute instructional videotape teaching holistic intervention strategies for use with preschoolers with severe communication and developmental disorders. Results demonstrated that videotape in-service training was effective, as it caused both immediate and longer-term changes in participants' knowledge and positively affected their practices, although to a limited degree.

Video-based training has been examined not only with teachers, but also with caregivers. For example, Huebner and Meltzhoff (2005) tested the effectiveness of video training on participants' use of dialogic reading strategies in shared book reading practice. Participants (parents) were assigned to one of the following three conditions: 1) in-person instruction, 2) videotaped training with telephone follow-up, and (3) videotaped training with no telephone follow-up. Results indicated that parents who received instruction greatly increased their usage of dialogic reading techniques, no matter what training condition they were in. This means that the videotaped training was as effective as in-person instruction.

Other studies have focused on the effects of video-based training on children's learning outcomes (e.g., Arnold et al., 1994; Lonigan & Whitehurst, 1998). Arnold et al. (1994) examined the effects of video-based instruction of dialogic reading techniques on children's expressive language. Participants (mothers) were assigned to a control condition (no training), a traditional direct training condition, or a video training condition. The results suggested that video-based training was a cost-effective tool to put dialogic reading techniques into practice. Children whose mothers engaged in two brief video training sessions (altogether 35 minutes) scored higher on standardized outcome measures of expressive language than those whose mothers received no training on dialogic reading and were read to in a traditional style. More interestingly, the video

training was found to be more effective than the traditional direct training method.

Blom-Hoffman et al. (2007) also examined the relationship between caregivers' dialogic reading behaviours and children's expression (i.e., verbalizations). A 15-minute dialogic training video was used to train the caregivers. The results showed that caregivers implemented dialogic reading strategies with their preschool children after videotape training and maintained their use of dialogic reading techniques 12 weeks later. Additionally, parents' use of dialogic reading strategies enhanced children's verbalizations. More specifically, children whose parents learned dialogic reading strategies through video talked more during storybook reading compared to their baseline than did children in a control group whose parents did not watch the training video.

In conclusion, studies indicate that content and pedagogical knowledge concerning early literacy and language development can be supported through video training. These types of knowledge have also been shown to exert positive effects on practice, which in turn, leads to better language development and early literacy skills for children. These promising findings suggest that video-based instruction may be not only convenient and cost-effective but also beneficial to preservice educators.

The Present Study

This study aimed to examine the effects of multifaceted and video-based instruction to enhance preservice educators' knowledge about emergent literacy, specifically inferencing and their use of inferential questions during storybook reading. The research questions and expectations for the current study follow.

- 1) What strategies do preservice educators spontaneously mention when they are asked about the strategies they would use when reading a storybook to preschoolers (ages 4 to 5 years)?
- 2) Does the instruction provided (see Method) improve preservice educators' knowledge about

emergent literacy as well about inferencing and its relationship to literacy? Given the lack of research in this area, the question is exploratory. However, past research in related areas (e.g., teachers' knowledge of conventional literacy), suggest that educators may begin with low levels of knowledge in the areas noted and may thus improve significantly from pretest to posttest.

3) Does the instruction increase the number and diversity of inferential questions preservice educators ask during storybook reading? It is hypothesized that preservice teachers will ask more inferential questions on the posttest compared to the control group. This hypothesis is based on previous research demonstrating that training of short duration enhanced adults' use of open-ended questions (including inferential questions) during storybook reading (Blom-Hoffman et al., 2007), regardless of whether instruction was provided via video or in person (Huebner & Meltzhoff, 2005). I also expect the diversity of questions to be significantly greater in the experimental group than in the control group, based on prior work showing preservice educators asked more varied questions following a unit on dialogic reading (Chemali, 2015).

Method

Design

This experimental study used a pretest posttest design with preservice educators (undergraduate students) randomly assigned to either an experimental group or a comparison group. The experimental group received instruction focused on how to engage children and support their language during interactive storybook reading by asking literal and inferential questions. The instruction, elaborated below, includes preservice educators 1) engaging with direct teaching (video-based instruction); 2) reading, observing, and reflecting independently; and 3) discussing and practising the targeted strategies in a group supported by the researcher. The comparison group received an alternative instructional unit carried out by another graduate

student and focused on another means of supporting emergent literacy: print referencing.

Students in both groups completed the same pretests and posttests, but the data were coded and analyzed in light of each study's goals.

Participants

The participants in this study were 25 students in an undergraduate program at a university in a metropolitan area in the east of Canada, recruited as described in the next section. The 90-credit program aims to prepare students with a strong foundation to work with children or to undertake graduate studies in a related field through a curriculum combining theory and fieldwork. All the students in this study were enrolled in two courses: a field placement in an early childhood setting (replaced with simulated/indirect experience during the COVID pandemic) and a related seminar. The participating students were assigned a number and then randomly assigned to the experimental and control groups using an online tool for randomizing numbers (<https://www.random.org/lists>).

Recruitment

Following approval of the study and consent forms by the University Human Research Ethics Committee, the course instructor posted a video-recorded introduction to the study that I prepared, including explanation of all the tasks and research participants' rights. The students were asked to watch the recording and invited to contact me directly via email should they have questions; if willing to participate, they were asked to complete and sign the consent form available through the course-specific Moodle site (the university's learning management system) and return it via email directly to me (so that the instructor would not know which students participated or not).

Measures and Procedures

Pretest Session

Participants were asked to book a meeting with me or the other graduate student at a time they found convenient, using an online booking system (students saw only their own booking). The meeting lasted around 30 minutes and was held via videoconference (Zoom platform. The meeting required a password to enter. During the meeting, the student filled out a demographic questionnaire covering age, gender, completed credits, and experience with caregiving and working in childcare environments (See Appendix B). The student also completed two pretest measures: Role Play and Emergent Literacy Questionnaire. They received one point for participating in these activities (the point was applied to the course grade), but the responses were not graded with a letter or a score.

For the role play, each participant was asked to interact with me (experimental group) or with the other graduate student (comparison group). The students played the role of an educator reading a storybook to a child, with me or the other examiner (i.e., the other graduate student) pretending to be the puppet. To minimize the effect of the examiner, both researchers only gave correct responses to the questions that the participants asked, and did not initiate interactions. The role plays were recorded via Zoom and the recordings were stored on a password-protected computer. The instructions to students were: “I am going to show you a book. I’d like you to look through the book first to familiarize yourself with it. Then, I’m going to ask you to imagine you are an educator in a daycare working with children four- to five-years-old, and to read the storybook to me as you might to a child.”

All students role-played using the same book for the pretest: *Mr. King’s Things* (Côté, 2012) and a different book for the posttest: *Mr. King’s Castle* (Côté, 2013). These books were

selected because they are age-appropriate and model a complete narrative sequence including a beginning, a middle, an end, a problem, and a resolution. Additionally, the two books were written and illustrated by the same author, and are highly comparable to each other in length, imagery, and size. The two books were purchased in electronic format for each examiner. Thus, we both had access to the book on our private computers and shared it with the students via screen sharing. Students were given a maximum of 10 minutes to familiarize themselves with the book. They were given remote control of the book through Zoom, so they could proceed at their own pace. Then, they read the book to me or the other examiner.

The students then completed the Emergent Literacy Questionnaire (see Appendix C), intended to assess their knowledge about emergent literacy and the strategies linked to their instructional condition (i.e., asking literal and inferential questions or print referencing during storybook reading). The questionnaire includes (a) multiple choice questions targeting basic knowledge of emergent and conventional literacy skills (2 items); (b) ratings on a 5-point Likert scale targeting knowledge of emergent literacy (1 item), literal and inferential questions (5 items), and print referencing (5 items); and (c) questions focused on strategies to support children's emergent literacy and engage children in storybook reading (5 items, with 2 open-ended, 1 close-ended, and 1 rating question inviting the students to self-rate their knowledge about emergent literacy). The scoring is described in the Data Analysis section (below).

Instruction

The instruction was developed based on a review of the research literature guided by the research supervisor. Additionally, in the fall, the course instructor allowed me to be a guest speaker in the same course, but with an earlier cohort of 23 students. I was therefore able to test out the video-recorded lecture and tasks for students that form part of this study. I also guided the

students in a live discussion about the material during a Zoom session, and engaged them in reading a storybook together and practicing the strategies they learned from the lecture. I used this experience to refine my lecture, the measures, and the procedures for the current study. For example, I found that students within the earlier cohort had difficulty in distinguishing two types of inferential questions, “recalling a specific event” and “summarizing”. Thus, in my study, I made sure to clarify these two strategies during the lecture.

Engaging with Direct Teaching. Between weeks 1 and 2, students in the questions group watched a recorded lecture on strategies for asking literal and inferential questions during storybook reading (prepared by me with the guidance of my supervisor). The lecture combined explanation with rich examples and visuals (i.e., storybook pictures) for each questioning strategy. The lecture comprised two main sections: the importance of fostering children’s inferential skills, supported by evidence from the research literature, and definitions and explanations of literal and inferential questions. To help the students to better understand all types of questioning strategies, a storybook named *Mooncake* by Frank Asch was used to generate examples in the lecture. The students in the print referencing group watched a recorded lecture on strategies of print referencing during storybook reading which also included many examples.

Reading, Observing, and Reflecting. After the pretest, students in the literal and inferential questions group were asked to read an article written by Van Kleeck (2008) to understand the importance of fostering children’s inferencing ability through interactive storybook reading. They were also invited to read a book named *Carrot Soup* via a YouTube link and to observe an educator (recorded on video) demonstrating reading the same storybook to a small group of children and using the literal and inferential questioning strategies.

After reading the book and watching the video, participants were asked to identify two literal questions (in two subtypes) and eight inferential questions (in four subtypes) used by the educator as she read the story, and to type the exact question that the educator asked (see Appendix D). Additionally, as shown in Appendix D, students were required to provide an example of various types of literal and inferential questions that they could ask if they were reading *Carrot Soup* to children and to suggest a place in the book where they might ask the question, using the time code from the video of the book. Lastly, they answered a question related to the importance of asking both literal and inferential questions.

After the pretest, the control group (print referencing) participants were asked to complete highly similar tasks, but with different content. Students were requested to read an article to understand the basic concepts and the importance of print awareness. They were also invited to read a book via a YouTube link and to observe an educator (recorded on video) demonstrating reading the same storybook to a small group of children using print referencing strategies. After reading the book and watching the video, they were asked to identify the print referencing strategies used by the educator as she read the story and to type the exact question that the educator posed in the corresponding box, followed by the time code from the video. Lastly, they answered a question related to the importance of print referencing.

For the students in the literal and inferential questions group, their identification and generation of questions were graded and were worth 3 points (3%) towards their course grade. The assignment for the task was submitted two days before the interactive Zoom session (discussed in the following section) so that I had enough time to read the assignment and to determine the types of questions the students had the most difficulty with. During the interactive Zoom session, I focused more on those difficult types of questions.

The print referencing task was also graded and was worth 3 points towards the student's course grade. Students were required to submit the assignment two days before the interactive Zoom session (discussed in the following section) for the other researcher to have enough time to read the assignment and to identify students' difficulties. During the interactive Zoom session, she spent more time discussing those difficulties with the students.

Discussing and Practising the Targeted Strategies. After students completed their assigned tasks, and two weeks after the pretest, I met the students in the literal and inferential questions group via Zoom for 1 hour and 15 minutes during their scheduled class time. During the session, first I clarified the questioning strategies for the students, focusing on those that appeared most challenging (as described above). Then the students read a storybook entitled *Spike in the City* by Paulette Bogan together. Each student was asked to read a page of the book, to generate questions based on the content of the page, and to identify the question type. I also shared other questions which could be asked on the same page with the students. For the question types which appeared to be more difficult for the students, I added examples in a suitable place of the storybook. After reading the book together, the students shared their opinions by responding to three reflective questions: "Amongst the question types, were any brand new to you? Do you think you will adopt these newly-learned strategies in the future? Why or why not?". For the print referencing group, they met the other researcher via Zoom for 1 hour and 15 minutes and participated in similar activities focused on print referencing.

Posttest

The posttest was conducted following the Zoom session (two weeks after the pretest). The same procedure as for the pretest was applied to the posttest, except for the demographic questionnaire. For the posttest role play, students read the book *Mr. King's Castle* (Côté, 2013)

(see Measures). The data from the role play and Emergent Literacy Questionnaire were used as the posttest. The students also received 1 point for participating in these activities.

Data Analysis

Scoring of Emergent Literacy Questionnaire (Appendix C). For Part A, the two multiple choice questions, each correct response received 1 point (up to a maximum of 5 points per question). For Part B, the ratings were scored as follows for true statements: “strongly disagree” and “disagree” received 0 points, “neutral” 1 point, “agree” 2 points, and “strongly agree” 3 points. For false statements, reverse scoring applied (i.e., strongly agree and agree received 0 points, “neutral” 1 point, “disagree” 2 points, and “strongly disagree” 3 points). For my study, 8 items were analyzed: the two items from Part A and six items from Part B (one item on emergent literacy and five on inferencing). There are respectively shaded green and blue in Appendix C (the pink shaded items were analyzed only in the study of print referencing). Thus, the maximum score for the questionnaire for my study was 28 points. For Part C, the percent of students naming the strategies targeted in the current study and the confidence ratings were recorded for later calculation of descriptive statistics.

Transcription and Coding of Role Plays. Initially, all the questions asked by participants during the role play were transcribed and saved locally on a password-protected personal computer. Then I watched the video and coded the transcript using the coding system provided in Appendix E. There are two layers of codes. The first layer classifies the questions participants produce in the role play by abstraction level, using definitions adapted from previous studies (Blank et al. as cited in Tompkins et al., 2013; Chen & Liang, 2016; Van Kleeck et al., 1997). The second layer is more specific and categorizes the students’ questions into 16 types (7 for literal questions and 9 for inferential questions). Questions at levels 1 and 2 were categorized

as literal questions whereas those at levels 3 and 4 were classified as inferential questions. Given that the duration of storybook reading varied according to the student as well as for the pretest and posttest, the frequencies of the two categories of questions were converted into rates per minute by dividing the number of questions in each category (literal and inferential) by the number of minutes of storybook reading.

Data Analysis. There are three dependent variables in the current study: preservice educators' knowledge of emergent literacy, specifically inferencing (as measured by the Emergent Literacy Questionnaire score), the rates of literal and inferential questions, and the number of different question types they use during storybook reading. The two independent variables are time (pretest vs. posttest) and instructional group (literal and inferential questions vs. print referencing). When participants' scores were normally distributed, they were analyzed using mixed ANOVAs with instructional group (control vs. comparison) as the between-group variable and time as the within-group variable. Nonparametric tests were used to analyze the data if they were not normally distributed. More specifically, a Mann-Whitney U test was used to investigate between group differences and a Wilcoxon Signed Rank test (or an exact sign test, when required) was used to examine change from pretest to posttest.

Results

Participant Characteristics

As displayed in Table 1, the demographic questionnaire showed that the majority of the participants were female: 84.6% for the Question (Q) Group; 100% for the Print Referencing (PR) Group. Eleven out of 13 in the Q Group and all the participants in the PR Group ranged in age from 18-30 years. All of the participants had completed at least 60 credits for their BA degrees, and more than 80 percent in both groups had completed 30-39 credits in Child Studies. None of them had a college diploma in Early Childhood Education. Around 30 percent of

participants in the Q Group and more than 40 percent of participants in the PR Group currently work in an early childhood setting; more than 60 percent of participants from both groups worked in an early childhood setting in the past. Only 2 out of 25 participants are parents or the primary caregiver of a child at home, and both were in the Q Group.

Table 1

Demographic Characteristics of Participants by Group

	Questions Group		Print Referencing Group	
	n	%	n	%
Gender				
Male	2	15.4	0	0
Female	11	84.6	12	100
Age Range (years)				
18-30	11	84.6	12	100
31-39	1	7.7	0	0
40-49	1	7.7	0	0
Credits completed BA				
61-75	0	0.0	5	41.7
76-90	13	100.0	7	58.3
Credits in Child Studies				
30-39	11	84.6	10	83.3
40-45	2	15.4	2	16.7
DEC in ECE				
Yes	0	0.0	0	0
No	13	0.0	12	100
Current Experience ECE				
Yes	4	30.8	5	41.7
No	9	69.2	7	58.3
Past Experience ECE				
Yes	8	61.5	8	66.7
No	4	38.5	3	33.3
Parent or Caregiver				
Yes	2	15.4	0	0
No	11	84.6	12	100

Notes: Credit_BA = Credits completed for bachelor's degree; DEC = Diplôme d'études collégiales (Diploma of College Studies); ECE = Early Childhood Education

Emergent Literacy Questionnaire

Prior to analysis, the normality of the data obtained using the Emergent Literacy Questionnaire was tested. As Appendix F shows, most of the measures were not normally distributed. The results of normality tests for each variable are provided below under the relevant sections, along with the implications for analysis.

Strategies Mentioned by Participants

The first research question aimed to explore the strategies preservice educators mention when asked about the strategies they would employ during storybook reading with 4 to 5-year-olds. Participants mentioned various strategies, including asking literal and inferential questions (in the case of these questions, participants sometimes named them as such, and/or gave examples of one or both question types). They also mentioned using strategies related to print referencing, and other strategies (facial expression, reading with a slower speed, tone, voice, puppet, acting out, and so on) both at pretest and posttest. More specifically, as Table 2 displays, the percentage of participants in the Q group who listed asking literal questions increased dramatically (almost 70%) from pretest to posttest, as did the percentage listing inferential questions: more than 60% from pretest to posttest. In contrast, the percentage of participants in PR who mentioned asking literal questions decreased greatly from pretest to posttest while inferential questions remained stable.

Some participants also generally mentioned asking questions as a strategy when reading stories to children. As Table 2 shows, at posttest, fewer participants in both groups mentioned asking questions without specifying them as literal or inferential than at pretest. As expected, the number and percent of participants in the print referencing group mentioning print referencing as a strategy increased dramatically from pretest to posttest and dropped slightly in the questions

group. The other strategies are not discussed in detail since they are not the focus of the study.

Table 2

Number and Percentage of Participants Mentioning Targeted Strategies by Group and Time

	Question Group (N = 13)		Print Referencing Group (N = 12)	
Measure	n	%	n	%
Literal Questions Pretest	4	30.8	6	50.0
Literal Questions Posttest	13	100.0	1	8.3
Inferential Questions Pretest	4	30.8	5	41.7
Inferential Questions Posttest	12	92.3	5	41.7
Questions (unspecified) Pretest	5	38.5	9	75.0
Questions (unspecified) Posttest	0	0.0	6	50.0
Print Referencing Pretest	3	23.1	0	0.0
Print Referencing Posttest	2	16.4	10	83.3

Knowledge About Emergent Literacy

A second aim of the study was to investigate whether the instruction provided (see Method) improved preservice educators' knowledge about emergent and conventional literacy. Participants' knowledge of emergent literacy was examined with the Emergent Literacy Questionnaire. Prior to analysis, a normality test was conducted to see whether the data was normally distributed. As can be seen from Appendix F, the Shapiro-Wilk statistic was not significant at pretest ($p = .532$ for PR; $p = .238$ for Q) or posttest ($p = .407$ for PR; $p = .209$ for Q), indicating a normal distribution, and allow for parametric statistical analyses.

Table 3 displays the means and standard deviations of emergent literacy knowledge by group. As the table shows, on pretest, participants in the Q Group received a score of 7.38 out of 13 (57%); those in the PR Group received 6.33 points out of 13 (49%). These relatively low scores support the hypothesis that preservice educators lack emergent literacy knowledge.

Table 3*Emergent Literacy Knowledge by Time and Group*

Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Question	7.38	1.94	10.31	1.75
Print Referencing	6.33	3.09	8.58	2.15

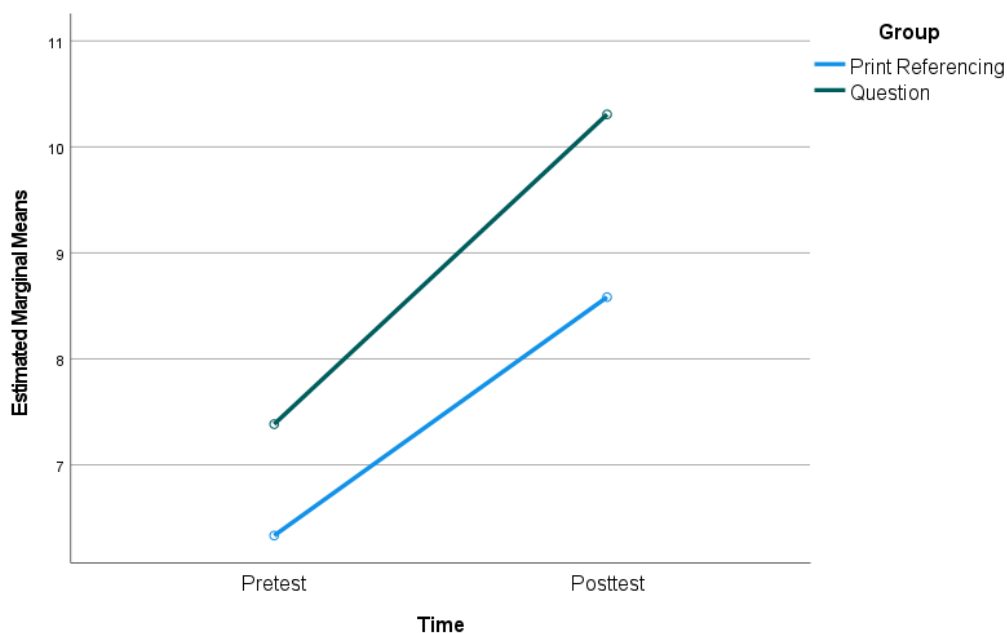
Note: Maximum score = 13

The data met the assumptions for mixed ANOVA. First, the data was normally distributed, as assessed by Shapiro-Wilk's test of normality ($p > .05$). There were no extreme outliers, as assessed by boxplots. There was homogeneity of variances ($p > .05$) and covariances ($p > .05$), as assessed by Levene's test of homogeneity of variances and Box's M, respectively.

The mixed ANOVA showed that there was no statistically significant interaction between group and time on the emergent literacy scores $F(1, 23) = .843, p = .368$, partial $\eta^2 = .035$. Follow-up tests (repeated measures ANOVA in SPSS) showed that both groups improved significantly from pretest to posttest: Questions $F(1, 12) = 36.10, p < .001$, partial $\eta^2 = .751$; Print Referencing $F(1, 11) = 16.60, p = .002$, partial $\eta^2 = .601$. The improvements from pretest to posttest are illustrated below in Figure 1. Follow-up univariate ANOVAs were also conducted to explore potential group differences at pretest and posttest. These showed that the scores of the two groups were not significantly different at pretest $F(1, 23) = 1.06, p = .314$, partial $\eta^2 = .044$. However, at posttest, the difference was significant, with the Question group scoring significantly higher than the Print Referencing group $F(1, 23) = 4.87, p = .038$, partial $\eta^2 = .175$.

Figure 1

Knowledge of Emergent Literacy by Time and Group



Knowledge About Inferencing and Inferential Questions

I also examined preservice educators' knowledge about inferencing and its relationship to literacy and whether instruction increased knowledge. As Table 4 shows, on the pretest, participants in the Q Group scored 7.85 out of 15 (52%) on average; those in the PR Group scored 7.83 out 15 (52%) on average. The result is also consistent with the hypothesis that preservice educators lack content knowledge related to inferencing and inferential questions.

Table 4

Knowledge of Inferencing And Inferential Questions by Time and Group

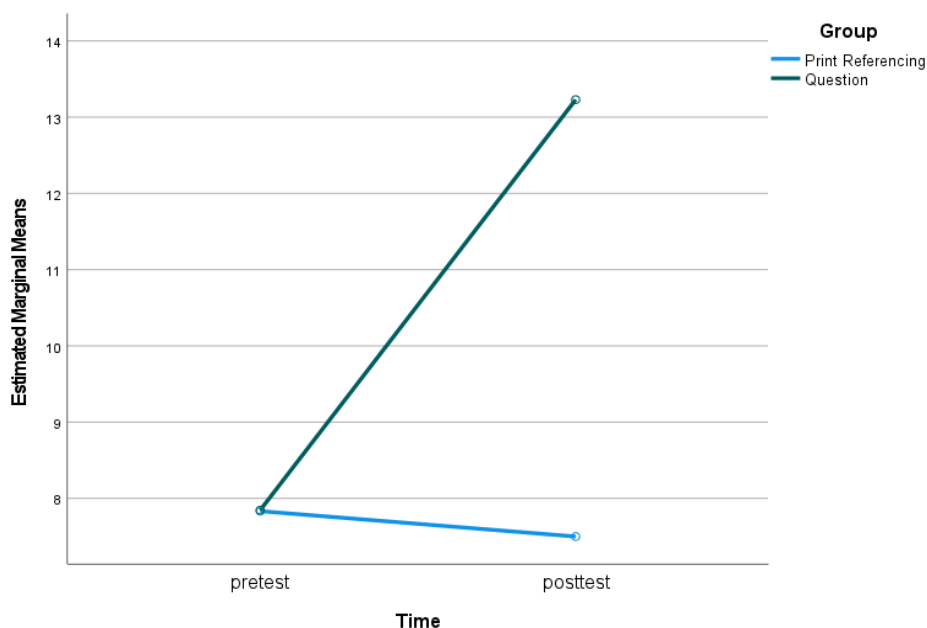
Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Question	7.85	1.86	13.23	1.59
Print Referencing	7.83	1.59	7.50	2.20

The data met the assumptions for mixed ANOVA. The data was largely normally distributed, as assessed by Shapiro-Wilk's test of normality ($p > .05$). The pretest scores for the question group were an exception ($p = .022$); however, the skew and kurtosis values were low enough to proceed with the analysis and the Kolmogorov-Smirnov, an alternative assessment of normality, was nonsignificant, suggesting the violation of normality was mild. There were no extreme outliers as assessed by boxplots. The Levene's test of homogeneity of variances and Box's M, assessing homogeneity of covariances, were both nonsignificant ($p > .05$).

The mixed ANOVA showed that there was a statistically significant interaction between group and time on the inferential question scores, $F(1, 23) = 44.38, p < .001$, partial $\eta^2 = .659$. group $(1, 23) = 34.63, p < .001$, partial $\eta^2 = .601$. The results are illustrated in Figure 2.

Figure 2

Knowledge of Inferencing And Inferential Questions by Time and Group



Follow-up tests (repeated measures and univariate ANOVAs in SPSS) showed that there were no significant differences between pretest and posttest scores in the Print Referencing group $F(1, 11) = .214, p = .653$, partial $\eta^2 = .019$, and no differences between the scores of the

two groups at pretest $F(1, 23) = 0, p = .985$, partial $\eta^2 = 0$. In contrast, at posttest, the Question group scored significantly higher than at pretest $F(1, 12) = 121.99, p < .001$, partial $\eta^2 = .910$, as well as significantly higher than the Print Referencing group: $F(1, 23) = 56.58, p < .001$, partial $\eta^2 = .711$. These findings are consistent with the study hypotheses.

Confidence in Storybook Reading

Participants' confidence in supporting children's emergent literacy during storybook reading was also investigated. Normality tests (see Appendix F) demonstrated that the variable was not normally distributed. Hence, a Mann-Whitney U test was used to investigate between group differences. The mean ranks were compared (rather than the medians) as the distributions between two groups were not similar. Given that difference scores from pretest to posttest in both groups were asymmetrically distributed, the Exact Sign Test was used to examine change. Table 5 displays the descriptive statistics for participant's confidence in storybook reading.

Table 5

Confidence in Storybook Reading by Group and Time

		Confidence	
Group		Pretest	Posttest
Question	Mean	3.23	3.85
	Median	3.00	4.00
	SD	0.93	0.80
	Mean rank	13.62	15.46
Print Referencing	Mean	3.08	3.25
	Median	3.00	3.00
	SD	0.79	0.87
	Mean Rank	12.33	10.33

According to the Mann Whitney U test of the mean ranks, there were no differences between the groups at pretest or posttest (respectively, $p = .689$ and $.087$, using an exact sampling distribution for U).

An exact sign test was conducted to examine the effects of time. The rank data showed that for the Q Group, 7 of the 13 participants increased in confidence from pretest to posttest, and the rest remained the same; the median of confidence in the Q Group rose significantly from pretest ($Mdn = 3.00$) to posttest ($Mdn = 4.00$), $p = .016$. In contrast, for the PR Group, 2 participants became more confident in storybook reading from pretest to posttest, 9 remained the same, and 1 participant became less confident; the exact sign test demonstrated no significant median increase from the pretest ($Mdn = 3.00$) to the posttest ($Mdn = 3.00$), $p = 1.000$.

Role Play

As Appendix F demonstrates, an overwhelming majority of the variables for the role play were not normally distributed. Thus, a Mann-Whitney U test was used to investigate between group differences, and the mean rank was tested when the distributions of the variables for the two groups were dissimilar. To investigate the effects of time (pretest to posttest), the Wilcoxon Signed Rank test was used if the distribution of the differences from pretest to posttest was symmetrical; if not, an exact sign test was used.

Number of Questions

Literal Questions. Although the number of literal questions asked by participants during the role play is not the focus of this study, the data are reported to provide a comprehensive picture of the questions participants used. Table 6 provides the descriptive statistics.

Table 6*Number of Literal and Inferential Questions in the Role Play by Group and Time*

		Literal Questions		Inferential Questions	
Group		Pretest	Posttest	Pretest	Posttest
Question	Mean	4.92	6.92	2.77	9.31
	Median	2.00	4.00	0.00	8.00
	SD	8.98	5.78	5.29	6.21
	Mean rank	13.50	17.00	12.69	18.96
Print Referencing	Mean	2.50	1.75	2.08	0.42
	Median	0.50	0.50	1.00	0.00
	SD	3.68	2.38	2.81	0.67
	Mean rank	12.46	8.67	13.33	6.54

A Mann-Whitney U test was conducted to determine if there were significant between group differences in the number of literal questions that participants asked. The distributions of the number of literal questions that participants asked in each group were not similar, as assessed by visual inspection; thus, the mean ranks were compared. At pretest, no significant differences were found in the number of literal questions participant asked between the Q Group (mean rank = 13.50) and the PR Group (mean rank = 12.46), $U = 71.50$, $z = -0.38$, $p = .728$, using an exact sampling distribution for U . However, at posttest, the number of literal questions was statistically significantly greater in the Q Group (mean rank = 17.00) than in PR Group (mean rank = 8.67), $U = 26$, $z = -2.88$, $p = .004$, using an exact sampling distribution for U .

The distribution of the difference of literal question from pretest to posttest was symmetrical for the Q Group. Hence, a Wilcoxon Signed Rank test was run to examine the effects of time. For the Q Group, 10 out of 13 participants asked more literal questions at the posttest and 3 of them asked fewer literal questions; however, the median for literal questions did not increase significantly from pretest ($Mdn = 2.00$) to posttest ($Mdn = 4.00$), $z = -1.61$, $p = .107$.

Given that the distribution of the difference of literal questions from pretest to posttest was asymmetrical for the PR Group, an exact sign test was run to determine the effects of time. The rank data showed when pretest and posttest data were compared, two of the 12 participants asked more literal questions, seven remained the same, and three asked fewer literal questions. In keeping with this pattern, the exact sign test showed no significant increase in the median for literal questions from pretest ($Mdn = 0.50$) to posttest ($Mdn = 0.50$) either, $p = 1.000$.

Inferential Questions. Next, I examined whether the instruction increased the number of inferential questions preservice educators asked during storybook reading.

Table 5 summarizes the descriptive statistics. A Mann-Whitney U test was conducted to examine between-group differences. Distributions of the number of inferential questions were not similar between groups at either pretest or posttest, as assessed by visual inspection; the mean ranks were thus compared. No significant differences were found in the number of inferential questions between the Q Group (mean rank = 12.69) and the PR Group (mean rank = 13.33) on pretest, $U = 74.00$, $z = -0.24$, $p = .852$, using an exact sampling distribution for U . However, on the posttest the number of inferential questions was statistically significantly greater for the Q Group (mean rank = 18.96) than that for the PR Group (mean rank = 6.54), $U = 0.50$, $z = -4.29$, $p < .001$, using an exact sampling distribution for U .

A Wilcoxon Signed Rank test was run to examine the effects of time. The rank data showed that for the Q Group, 12 out of 13 participants asked more inferential questions from pretest to posttest, while one asked fewer. The median in the Q Group increased significantly from pretest ($Mdn = 0.00$) to posttest ($Mdn = 8.00$), $z = -3.047$, $p = .002$, in accordance with the hypothesis. In contrast, for the PR Group, no participants asked more inferential questions from pretest to the posttest, 6 of them remained the same, and six participants asked fewer inferential

questions; the result of the exact sign test demonstrated the median of inferential questions decreased significantly for PR Group from pretest ($Mdn = 1.00$) to posttest ($Mdn = 0.00$), $p = .031$.

Rate of Questions

The rates of literal and inferential questions were examined in addition to number, since the duration of the role play varied.

Literal Questions. As can be seen from Appendix F, none of the data for rate of literal questions were normally distributed. Thus, a Mann-Whitney U test and an exact sign test were used to analyze the data. Table 7 (below) displays the descriptive statistics for the rate of literal questions. A Mann-Whitney U test was conducted to examine between-group differences. Distributions of the variable were not similar between groups, as assessed by visual inspection, hence the mean ranks were compared. No significant differences were found in the rate of literal questions for the Q Group (mean rank = 13.38) and for the PR Group (mean rank = 12.58) at pretest, $U = 73.00$, $z = -0.29$, $p = .810$, using an exact sampling distribution for U . However, at posttest, the rate of literal questions was statistically significantly larger for the Q Group (mean rank = 16.23) than that for the PR Group (mean rank = 19.50), $U = 36$, $z = -2.30$, $p = .022$, using an exact sampling distribution for U .

An exact sign test was run to examine the effects of time. The rank data displayed that for the Q Group, 10 of the 13 participants' rate of literal questions rose on the posttest, and the remaining three remained the same. The rate of literal questions did not increase significantly from pretest ($Mdn = 0.27$) to posttest ($Mdn = 0.65$), $p = .092$. For the PR Group, only 3 of the 12 participants increased their rate of literal questions from pretest to posttest, five of them remained the same, and four participants decreased it from pretest to posttest; the result of an

exact sign test indicated that no significant median increase in the rate of literal questions was found from pretest ($Mdn = 0.09$) to posttest ($Mdn = 0.12$), $p = 1.000$.

Table 7

Rate of Literal and Inferential Questions in Role Play by Group and Time

		Rate of Literal Questions		Rate of Inferential Questions	
Group		Pretest	Posttest	Pretest	Posttest
Question	Mean	0.54	0.77	0.29	1.03
	Median	0.27	0.65	0.00	1.15
	SD	0.76	0.45	0.45	0.37
	Mean rank	13.38	16.23	12.54	18.92
Print Referencing	Mean	0.37	0.30	0.32	0.08
	Median	0.09	0.12	0.22	0.00
	SD	0.49	0.36	0.37	0.13
	Mean Rank	12.58	9.50	13.50	6.58

Inferential Questions. The Shapiro-Wilk normality test results in Appendix F showed that the rate of inferential questions was normally distributed only in the Q group ($p = .82$). Thus, a Mann-Whitney U test and a Wilcoxon Signed Ranks test or an exact sign test were used to analyze the data, as in the previous analyses discussed above.

A Mann-Whitney U test was conducted to examine between group differences. Distributions of the rate of inferential questions at pretest and posttest between the PR Group and the Q Group were not similar, as assessed by visual inspection. No significant differences were found in the rate of inferential questions between the Q Group (mean rank = 12.54) and the PR Group (mean rank = 13.50) on pretest, $U = 72.00$, $z = -0.352$, $p = .769$, using an exact sampling distribution for U . However, on posttest, the rate of inferential questions was significantly higher in the Q Group (mean rank = 18.92) than that in the PR Group (mean rank = 6.58), $U = 1.00$, $z =$

-4.26, $p < .001$, using an exact sampling distribution for U .

Table 7 also displays the descriptive statistics for the rate of inferential questions. A Wilcoxon Signed Ranks test was conducted to examine the effects of time. The rank data showed that for the Q Group, 12 of 13 participants increased their rate of inferential questions from pretest to posttest, and only one decreased; the median also increased significantly from pretest ($Mdn = 0.00$) to posttest ($Mdn = 1.15$), $z = -3.110$, $p = .002$. In contrast, for the PR Group, no participants increased their rate of inferential questions from pretest to posttest, 6 out of 12 remained the same, and the rest participants decreased; an exact sign test indicated that the median rate of inferential questions for the PR Group on the posttest ($Mdn = 0.00$) dropped significantly compared to that on the pretest ($Mdn = 0.22$), $p = .031$.

Type of Questions

Literal Questions. The diversity of literal questions that participants asked is also reported here to be comprehensive. The Shapiro-Wilk statistic (see Appendix F) demonstrated that the data were normally distributed only for the Q group, on the posttest ($p = .229$); hence, a Mann-Whitney U test and Wilcoxon Signed Ranks or exact sign test were used for analysis.

Table 8 presents the descriptive statistics for the diversity of literal questions. A Mann-Whitney U test was conducted to determine if there were significant between-group differences at pretest or posttest. The distributions of the variable were not similar across the groups, as assessed by visual inspection; thus, the mean ranks were compared. No significant differences were found between the Q Group (mean rank = 13.96) and the PR Group (mean rank = 11.96) for the pretest, $U = 65.50$, $z = -0.73$, $p = .503$, using an exact sampling distribution for U . However, the type of literal questions was significantly greater for the Q Group (mean rank = 17.73) than that for the PR Group (mean rank = 7.88) for the posttest, $U = 16.500$, $z = -3.42$, p

$< .001$, using an exact sampling distribution for U .

Table 8

Type of Literal and Inferential Questions in Role Play by Group and Time

		Type of Literal Questions		Type of Inferential Questions	
Group		Pretest	Posttest	Pretest	Posttest
Question	Mean	1.77	3.38	1.08	4.23
	Median	2.00	3.00	0.00	5.00
	SD	2.17	1.66	1.61	1.30
	Mean rank	13.96	17.73	12.85	18.73
Print Referencing	Mean	1.00	0.92	1.00	0.58
	Median	0.50	0.50	0.50	0.00
	SD	1.35	1.08	1.28	1.00
	Mean Rank	11.96	7.88	13.17	6.79

A Wilcoxon Signed Rank test was run to examine the effects of time. The rank data demonstrated that for the Q Group, 11 of the 13 participants increased the diversity of literal questions from pretest to posttest, one remained the same, and one decreased; the median of the type of literal questions in the Q Group increased significantly from pretest ($Mdn = 2.00$) to posttest ($Mdn = 3.00$), $z = -2.858$, $p = .004$. In contrast, for the PR Group, only 2 of the 12 participants increased the diversity of literal questions from pretest to posttest, 8 of them didn't change, and two participants decreased from pretest to posttest; the result of an exact sign test demonstrated no significant median increase in the variety of literal questions for the PR Group from the pretest ($Mdn = 0.50$) to the posttest ($Mdn = 0.50$), $p = 1.000$.

Inferential Questions. The third research question asked whether the instruction would increase the variety of inferential questions preservice educators asked during storybook reading. The Shapiro-Wilk statistic (see Appendix F) indicated that the variable was normally distributed

only for the Q Group at posttest ($p = .083$). Hence, a Mann-Whitney U test and either a Wilcoxon Signed Ranks test or an exact sign test were used to analyze the data.

Table 8 presents descriptive statistics for the diversity of inferential questions. A Mann-Whitney U test was conducted to determine if there were significant between-group differences at pretest or posttest. As distributions of the type of inferential questions at pretest and posttest between the PR Group and the Q Group were not similar, as assessed by visual inspection, mean ranks were tested. No significant differences were found between the Q Group (mean rank = 12.85) and the PR Group (mean rank = 13.17) for the pretest, $U = 76.00$, $z = -0.118$, $p = .936$, using an exact sampling distribution for U . However, the type of inferential questions was significantly greater in the Q Group (mean rank = 18.73) than in the PR Group (mean rank = 6.79), $U = 3.500$, $z = -4.155$, $p < .001$, using an exact sampling distribution for U .

An exact sign test was conducted to examine the effects of time. The rank data indicated that in the Q Group, 12 of the 13 participants increased the diversity of inferential questions from pretest to posttest, and one participant remained the same; the median increased significantly from pretest ($Mdn = 0.00$) to posttest ($Mdn = 5.00$), $p < .001$. However, for the PR Group, only 2 participants increased the diversity of inferential questions from pretest to posttest, 7 did not change, and 3 participants decreased; the exact sign test demonstrated no significant median increase from pretest ($Mdn = 0.00$) to posttest ($Mdn = 0.50$), $p = 1.000$. These findings are consistent with the study hypothesis.

Figures 3 and 4 show the number of participants asking the different types (i.e., subtypes) of inferential questions in the role plays, by time. Predicting questions were used at pretest by about half the participants (6) in each group, while the other types were used either by a small minority of participants or not at all. At posttest, participants in the Q group asked all nine types

of inferential questions, particularly of the types: predict, comment on emotions, draw text-to-life connections, and identify causes and effects. In contrast, three participants in the PR group used predicting questions at posttest, but again rarely or never produced other types.

Figure 3

Number of Participants Asking Inferential Question Subtypes in Role Plays by Time (Q Group)

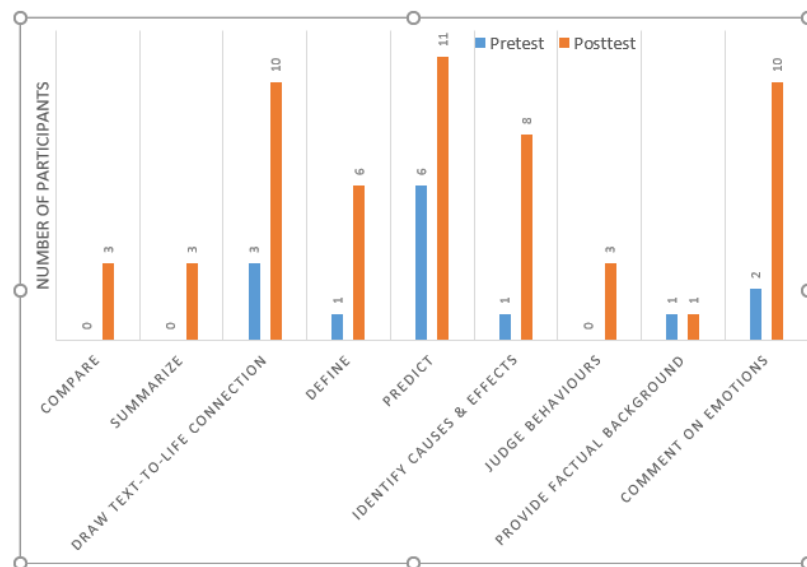
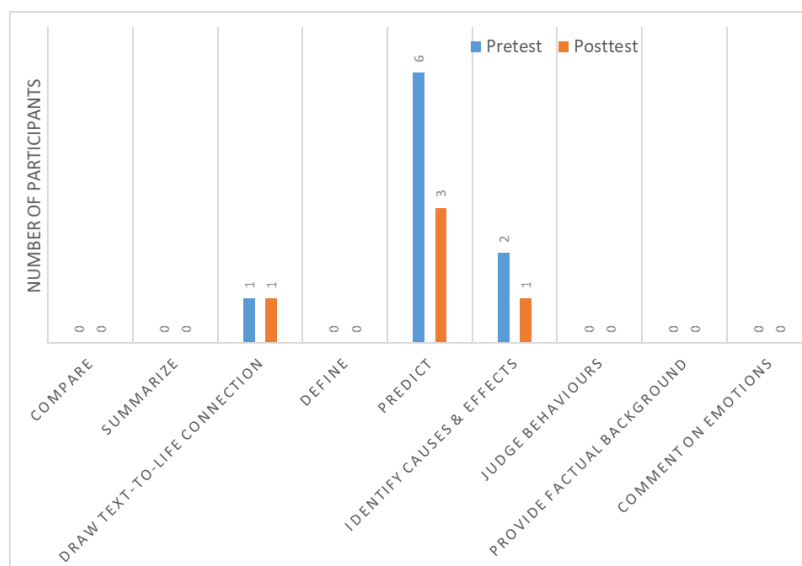


Figure 4

Number of Participants Asking Inferential Question Subtypes in Role Plays by Time (PR Group)



Discussion

The study investigated the effectiveness of a multifaceted and video-based instruction aimed at increasing preservice educators' knowledge about emergent literacy, especially inferencing, and their use of inferential questions during storybook reading. The results indicated that preservice educators improved their knowledge about emergent literacy and about inferencing and inferential question. Furthermore, participants increased the frequency and types of inferential questions they asked during storybook reading. They generally showed greater gains relative to a comparison group that received similar instruction on a different aspect of emergent literacy (specifically, PR or print referencing). The results are discussed further immediately below, organized by the study's key measures, namely the participants' responses to an emergent literacy questionnaire and the questions they asked during a role play where they played the role of an educator reading a storybook to a child.

Emergent Literacy Questionnaire

Strategies Mentioned by Participants

In keeping with one of the study's hypotheses, few participants (i.e., a small percentage) mentioned asking literal questions as a strategy for supporting emergent literacy at pretest, and even fewer mentioned asking inferential questions. This was the case in both the Q group (my experimental group) and the PR comparison group for the pretest. In the Q Group, there was a dramatic increase in the percentage of participants mentioning both literal and inferential questions as a strategy from pretest to posttest, suggesting that participants improved their knowledge about literal and inferential questions in storybook reading following the instruction. There was also a noteworthy decrease from pretest to posttest in the percentage of participants that mentioned asking questions but did not specify them as literal or inferential; this result

indicated that participants' knowledge about asking questions in storybook reading became more specific and specialized. The PR Group decreased in terms of the percentage of participants asking literal questions from pretest to posttest, and showed no change in the percent of inferential questions. These results provide further support for the effectiveness of the instruction regarding inferential questions. As expected, however, the PR group did show a dramatic increase in their mention of print referencing, the focus of the instruction they received.

Knowledge About Emergent Literacy

Participants in both the Q and PR Group received instruction aimed at augmenting their basic knowledge about emergent literacy and conventional literacy. Given the design of the study, the instruction was offered by different researchers, but the content and duration of the instruction was the same. The result showed that at pretest, participants in both groups scored low in emergent literacy knowledge (57% for the Q Group; 49% for the PR Group), as expected. Although I have not found any studies focusing on preservice educators' content knowledge of emergent literacy, similarly weak results have been found in studies of first grade teachers' content knowledge related to reading (Brady et al., 2009; Piasta et al., 2009).

Participants in both groups made statistically significant gains on emergent literacy knowledge at posttest, after receiving the instruction. This finding indicates the instruction was effective, which is consistent with the study hypothesis. The result also aligns with previous studies (Girolametto et al., 2007; Piasta et al., 2010). While participants in the Q Group had a higher score on emergent literacy knowledge at posttest, gains made by each group were similar as shown by the nonsignificant interaction between Time (pretest to posttest) and Group (Q and PR). One possible explanation for the difference on the posttest scores is that participants in the Q Group (100% had >76 credits) were more advanced since they have completed more credits in

the BA program than those in the PR Group (58.3% had >76 credits).

Knowledge About Inferencing and Inferential Questions

As expected, the average scores of participants' knowledge about inferencing and inferential questions were low for both groups on the pretest, indicating that participants lacked content knowledge related to inferencing. Teachers' content knowledge has been found to be positively linked to their classroom practice, resulting in positive effects on children's learning (Piasta et al., 2009; Spear-Swerling & Zibulsky, 2014). Thus, enhancing preservice educators' knowledge about inferencing is of vital importance to foster children's skills in this area.

Consistent with previous studies (Girolametto et al., 2007; Piasta et al., 2010), participants' knowledge about inferencing and inferential questions in the Q Group increased significantly from pretest to posttest. In contrast, the scores of the PR Group on these questions did not change significantly from pretest to posttest. The results indicate that the multifaceted and video-based instruction was an efficacious way to improve preservice educators' content knowledge related to inferencing.

Confidence in Storybook Reading

At the end of the Emergent Literacy Questionnaire, participants were asked to rate their confidence in terms of supporting children's emergent literacy during storybook reading. In keeping with the study hypothesis, the confidence of participants in storybook reading for the Q Group improved significantly from pretest to posttest suggesting that even short-term instruction can increase participants' confidence in storybook reading. In the PR group, the results were in the expected direction (i.e., slightly higher at posttest) but the gain was not significant. As one of the participants in the Q group said in the casual talk after the posttest, "I am more confident now because I have lots of strategies to use in storybook reading". One possible explanation for the

between group difference could be that participants in the Q Group associated their confidence with the number of strategies they learned; in the Q group the preservice educators were exposed to 16 different types of questions – each of which could be considered a strategy. In the PR group, they learned only five strategies: comprehensive for PR, but still fewer in number than in the Q group. Additionally, the sample in the current study was small, which reduces the power to detect very small improvements from pretest to posttest, such as those shown in the PR group.

Role Play

Number of Questions

Literal Questions. Previous studies showed that adults tend to use more literal than inferential language (including literal and inferential questions) in storybook reading (Hindman et al., 2012; Sembiente et al., 2018; Zucker et al., 2013). Similarly, in the current study, participants in both the experimental and comparison groups asked more literal questions than inferential questions on the pretest role play. As expected, no significant increase in literal questions was found for either group from pretest to posttest, perhaps because most of the preservice educators asked literal questions in storybook reading before receiving the instruction. However, participants in the Q Group asked significantly more literal questions than those in the PR group at posttest. Furthermore, as the discussion of diversity below indicates, the Q group also asked more varied questions at posttest. However, many of the participants asked the least complex literal questions, or asked no literal questions at all at pretest. Thus, the study demonstrates that it is still necessary to provide preservice educators instruction about asking literal questions.

Inferential Questions. Consistent with previous studies (Hindman et al., 2012; Sembiente et al., 2018; Zucker et al., 2013), participants from both groups in my study asked

fewer inferential questions than literal questions at pretest (See Table 6). What's more, more than half of the students in both groups asked no inferential questions on pretest. However, at posttest, all the participants in the Q Group asked inferential questions, leading to a higher overall frequency compared to the pretest and the PR group. This means that participants not only gained knowledge about inferencing and inferential questions (as discussed in the previous section) but also applied it in the role play; when preservice educators knew more about inferential questions, they asked them more. This result aligns with previous studies (Piasta et al., 2020a; Piasta et al., 2020b) showing that educators' content knowledge about emergent literacy was positively linked to their classroom emergent literacy practices. The positive effects in the current study also converge nicely with previous studies (Girolametto et al., 2007; Piasta et al., 2010) showing the effectiveness of a short-term multifaceted instruction on educators' use of abstract language during interactive storybook reading. Finally, the result is consistent with previous studies which also used video instruction to augment adults' inferential questions as part of dialogic reading techniques (Blom-Hoffman et al., 2007; Huebner & Meltzhoff, 2005).

Rate of Questions

The rates of literal and inferential questions were also investigated to ensure that the results were not due to variations in the time participants spent reading during the role play. The results for the rates of literal and inferential questions were similar to the total number of literal and inferential questions for the current study, providing additional support for the effectiveness of the instruction. No further discussion is provided in this section to avoid repetition.

Type of Questions

Literal and Inferential Questions. Consistent with the study hypothesis, the diversity of both literal and inferential questions in the Q Group increased significantly from pretest to

posttest and was significantly greater than that in the PR group at posttest. This aligns with a previous study showing that preservice educators asked more varied questions after learning dialogic reading techniques, which include literal and inferential questions (Chemali, 2015). As discussed in the previous sections, participants lacked content knowledge about literal and inferential questions before receiving the instruction. During the instruction, the participants in the Q Group were taught 16 different types of literal and inferential questions. The means for type showed that at posttest, they were producing over 7 different types of questions: compelling evidence that the instruction enriched preservice educators' knowledge of question types and that the preservice educators were able to implement that knowledge during storybook reading.

Limitations and Future Directions

Several important limitations must be noted for the current study. First, the sample size of participants was small. This was in part because only a single section of the course was offered during the term and the sample size was limited by the course enrolment. Furthermore, due to restrictions on research during the COVID-19 pandemic, recruitment in other settings was not feasible. The sample size could mean that small differences from pretest to posttest or between the two groups might be difficult to detect (reduced power). On the positive side, 100% of the preservice educators in the class where we recruited consented to participate and conducting the study in a single class meant that the participants were comparable and at roughly similar stages in their education.

A second limitation is that participants read the story to a puppet in a role-play instead of reading to a child. Due to the pandemic, participants were not able to practise the strategies with a child in an early childhood education setting. Reading a story to a puppet might make some participants feel uncomfortable or nervous. In addition, it would be more natural to read a story

to a child, and participants might have behaved differently. More specifically, a child might give wrong answers, or ask questions, which could elicit more turns in the conversation or more questions from the preservice educators. All these factors might have influenced participants' performance. A related limitation is that it was impossible to examine whether educators' use of inferential questions would elicit abstract/inferential language by children. The last limitation is that this study did not include a follow-up component (i.e., a delayed posttest) to determine if preservice educators retained their knowledge of emergent literacy concepts and strategies to support inferencing after receiving the instruction.

Thus, for future studies, I recommend a larger sample size to increase the power of data analysis; a real live early childhood setting to allow for more natural performance by participants and an investigation of children's responses to inferential questions; and a follow-up test to examine whether preservice educators keep using the strategies they learn following a short-term instruction in storybook reading.

Practical Implications

The present study is, to the best of my knowledge, the first to focus on preservice educators' knowledge about inferencing and inferential language as an aspect of emergent literacy. Most of the previous studies examined reading-related knowledge of elementary school teachers and emphasized phonological awareness, phonics, and decoding (Brady et al., 2009; Cunningham et al., 2004; Piasta et al., 2009). The current study provides novel evidence regarding preservice educators knowledge prior to instruction and further shows that instruction can help prepare them for the important role they play in enhancing preschoolers' literacy development and inferential skills. This information is important for curriculum planners, program developers, and instructors in early childhood education programs as it provides

insights into the evidence-based practical skills preservice educators need in their future career and might help bridge the gap between what knowledge and skills a university or a college teaches and what skills the field really needs.

Finally, the study shows that multifaceted instruction delivered remotely was effective. The pre-recorded lectures provided students with chances to learn the basic strategies by themselves at their own pace. An article on evidence-based instruction supported their learning with theoretical and background knowledge related to the topic. Observing an experienced teacher modelling the strategies in a live context made it possible for them to gain indirect experiences of applying the strategies in a classroom context. A live interactive meeting (via Zoom) resolved their questions and provided them with opportunities to practice the targeted strategies, which reinforced what they had learned in the instruction. This instructional format could be used when remote training is necessary, not only during a pandemic but also when the cost of training and the inconvenience of travelling become a barrier for educators or teachers to participate in professional development training. The instructional unit could also be easily modified for in-person or blended teaching.

Conclusion

This study investigated the effectiveness of multifaceted video-based instruction to enhance preservice educators' knowledge about emergent literacy, especially inferencing, and their use of inferential questions during storybook reading with children. The results demonstrated that the preservice educators lacked content knowledge on emergent literacy and inferencing and very rarely asked literal and inferential questions during storybook reading before receiving the instruction. These data indicate that preservice educators need opportunities to enhance their knowledge on emergent literacy and inferencing and to implement strategies

(i.e., asking both literal and inferential questions) in storybook reading; The current study shows that instruction was indeed effective in improving the content knowledge of the experimental group on emergent literacy and inferencing and in augmenting their use of inferential questions in storybook reading. The variety of literal and inferential questions asked by participants and their confidence in storybook reading also increased following the instruction. Thus, the multifaceted instruction, delivered remotely, had positive results and could be easily adapted to on-site or blended teaching combining remote and on-site instruction.

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Appendix A

Information Letter Outlining Elements of Participation

Dear Student,

We are graduate students in the Master's Child Studies program in the Department of Education, working with faculty member Diane Pesco on research related to teaching in early childhood classrooms. This term, we will carry out research with students in EDUC 461, with the collaboration of your professor, Dr. Marleah Blom. We are interested in knowing more about your thoughts and experience related to storybook reading.

For our research, we will ask students in EDUC 461 to complete some tasks, as part of the weekly assignments. These will be worth 3 points towards your course grade and will be graded in collaboration with Dr. Blom or her teaching assistant. All final decisions about grades will be up to Dr. Blom.

If you participate in our research, we will further examine your responses to the tasks. If you choose **not** to participate, you will not be penalized in any way. You will still be asked to complete the weekly assignments for course credit, and the assignment will still be graded, but we will not gather any data from you for our research.

In addition to completing the tasks, we will ask you to meet one of us via Zoom in early April and again, about two weeks later. Each meeting will last about a half hour. During the meeting, we will ask you to engage in a role play and to complete a brief questionnaire about storybook reading and children's literacy development. You will receive 2 points for participating in these activities (1 for each meeting). The point will be applied to your course grade, but your responses will not be graded with a letter. If you participate in our study, we will record this session so we can reflect on it later for our research. If you choose not to participate in our study, you will still be invited to this individual session, but the session will not be recorded and we will not gather any data from you.

Thank you very much! We greatly appreciate your cooperation.

Sincerely,

Signatures _____

Graduate students in Child Studies

Appendix B

Demographic Questionnaire

Name: _____

Instructions: Please provide a response for each of the following questions.

1. Age: 18-30 ☐ 31-39 ☐ 40-49 ☐ 50 or above ☐

2. What do you identify as: Male ☐ Female ☐

3. How many credits have you completed in the Child Studies program?

< 30 ☐

31-45 ☐

46-60 ☐

61-75 ☐

76-90 ☐

4. Did you complete a DEC in Early Childhood Education? Yes ☐ No ☐

5. Are you a parent or primary caregiver for any children in your home? Yes ☐ No ☐

If yes, how many: _____ Age(s) of the child(ren) : _____

6. Do you presently work or volunteer in a childcare environment, other than your field experience?

Yes ☐ No ☐

If yes, in what kind of environment (e.g., daycare, preschool, or specify other)? _____

For how long? _____ (year) _____ (month)

7. Have you worked in a childcare environment in the past, other than your field experience?

Yes ☐ No ☐

If yes, in what kind of environment (e.g., daycare, preschool, or specify other)? _____

For how long? _____ (year) _____ (month)

Appendix C

Emergent Literacy Questionnaire

Part A. Please highlight the response (s) that you think best fit(s) the question. There might be more than one correct answer.

1. Emergent literacy skills include: (correct answers are B, C, F, H, J)

- A. decoding
- B. phonological awareness
- C. letter writing
- D. writing
- E. reading comprehension
- F. alphabet knowledge
- G. reading fluently
- H. oral language
- I. spelling
- J. print awareness

2. Conventional literacy skills include: (correct answers are A, D, E, G, I)

- A. decoding
- B. phonological awareness
- C. letter writing
- D. writing
- E. reading comprehension
- F. alphabet knowledge
- G. reading fluently
- H. oral language
- I. spelling
- J. print awareness

Please continue to Part B on the next page

Part B. Below are several statements regarding children's literacy. Please read each one and indicate to what extent you agree or disagree with each statement.

The statements are currently ordered by domain, Inferential Questions then Print Referencing. The order of the statements was randomized for the study. The green and blue shaded items were analyzed in the present study, while the pink shaded items were examined separately in the study of print referencing.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Emergent literacy skills predict later reading and writing.	1	2	3	4	5
Inferential questions are questions children can answer by giving facts from the book or pictures	1	2	3	4	5
Teachers should avoid asking young children (4-5 years old) challenging questions during storybook reading.	1	2	3	4	5
Young children (4-5 years old) are not able to make inferences.	1	2	3	4	5
Inferencing is a strong predictor of children's reading comprehension.	1	2	3	4	5
Children are able to answer literal questions before inferential questions.	1	2	3	4	5
Children acquire print knowledge mainly through explicit teaching	1	2	3	4	5
Print concepts emerge after children begin to read and write.	1	2	3	4	5
Print awareness includes (Print concept, word concept and alphabet knowledge)	1	2	3	4	5
Five-year-old children are unable to recognize their name in print	1	2	3	4	5
Most educators draw children's attention to the printed words when reading storybooks.	1	2	3	4	5

Please continue to Part C on the next page

Part C. Open-ended questions

1. Name some strategies you would use when reading a book to a group of preschoolers (take 5 minutes to answer this question).
2. How would you rate your confidence in terms of supporting children's emergent literacy during storybook reading?
 - ☐ not at all confident
 - ☐ only a little confident
 - ☐ somewhat confident
 - ☐ quite confident
 - ☐ very confident

Appendix D

Questions Task (Observation and Reflection)

Name (type your name here, last name first):

Instructions

Read *Carrot Soup*, the storybook you will see in step 2, at this link:

<https://www.youtube.com/watch?v=ZBYtIXIE4I4>

Watch a video clip (called *Reading the Book "Carrot Soup"*) of excerpts of an educator reading *Carrot Soup* to children, at this link: https://www.youtube.com/watch?v=latmzymb14_Y

Respond to the following questions, drawing on the pre-recording and the readings.

1. Identify TWO literal questions (in two subtypes) and EIGHT inferential questions (in four subtypes) used by the educator as she reads. Type the exact question that the educator posed in the corresponding box below, followed by the time code from the video (1.25 points).

The educator may not have used ALL the types, so some boxes may remain blank.

Question Type	Subtype	Questions the educator asked (remember to give examples for 2 different literal subtypes and 4 different inferential subtypes)	Time code from educator video
Literal questions	Labeling		
	Noticing		
	Locating		
	Counting		
	Recalling a specific action/event/scene		
	Describing story actions/events/scenes		
	Describing perceptual qualities of objects		
Inferential questions	Comparing and contrasting		
	Summarizing		
	Connecting text-to-life		
	Defining a word's meaning		
	Predicting		
	Identifying causes and effects		
	Judging behaviours or characteristics of characters		
	Providing factual background beyond the text		
	Commenting on characters' internal states (cognitive states and emotions)		

2. Give an example for each question subtype (listed in the Table below) that you could ask if you were reading *Carrot Soup* to children. Suggest a place in the book where you might ask the question, using the time code from the book video at the following link (1.25 points):

<https://www.youtube.com/watch?v=ZBYtIXIE4I4>

Question Type	Subtype	Question you might ask (1 question for each category)	Time code from book video
Literal	Noticing		
	Locating		
	Recalling a specific action/event/scene		
	Describing story actions/events/scenes		
	Describing perceptual qualities of objects		
Inferential	Summarizing		
	Defining a word's meaning		
	Identifying causes and effects		
	Judging behaviours or characteristics of characters		
	Commenting on characters' internal states (cognitive states and emotions)		

3. Why are both literal and inferential questions important when reading stories to children? (maximum 200 words, .5 points)

Appendix E

Coding System for Level of Abstractness and Question Type

Level of Abstractness	Question Type	Example
Level 1 (Literal questions)	Label objects/characters	What can you see in this picture?
	Locate objects/characters	Where was Bear on this page?
	Notice objects/characters	Did you see the moon?
	Count concrete objects/characters	How many animals can you see on this page?
Level 2 (Literal questions)	Recall a specific action/event/scene	Do you remember what Bear did to get a bite of the moon?
	Describe story actions/events/scene	What did Bird suggest Bear try next?
	Describe perceptual qualities of objects	What color was the rocket?
Level 3 (Inferential Questions)	Compare similarities/differences of objects/characters	How was Little Bird different from Bear?
	Summarize/synthesize information	What did Bear do to get to the moon?
	Draw text-to-life connection	If you were Bear, what would you do to get a bite out of the moon?
Level 4 (Inferential Questions)	Define a word's meaning	Do you know what a junkyard is?
	Predict future events/conditions	What do you think Bear is going to do with the spoon and arrow?
	Identify causes and effects of events	Do you know why Bear fell asleep?
	Judge behaviours or characteristics	Do you think Little Bird is a good friend? Why?
	Provide factual background information beyond the text	Do you know why birds fly south in the fall?
	Comment on characters' cognitive states and emotions	How do you think Bear felt when the arrow and spoon went in the water?

Appendix F
Tests of Normality

Measure	Group	Shapiro-Wilk		
		Statistic	df	Sig.
EL_Common_Pre	Print Referencing	0.943	12	0.532
	Question	0.918	13	0.238
EL_Common_Post	Print Referencing	0.932	12	0.407
	Question	0.914	13	0.209
EL_IQ_Total_Pre	Print Referencing	0.912	12	0.224
	Question	0.842	13	0.022
EL_IQ_Total_Post	Print Referencing	0.925	12	0.331
	Question	0.905	13	0.158
EL_Confidence_pre	Print Referencing	0.824	12	0.018
	Question	0.809	13	0.009
EL_Confidence_post	Print Referencing	0.884	12	0.099
	Question	0.821	13	0.012
RP_Qtype_Number_LQ_Pre	Print Referencing	0.775	12	0.005
	Question	0.774	13	0.003
RP_Qtype_Number_LQ_Post	Print Referencing	0.801	12	0.010
	Question	0.903	13	0.147
RP_Qtype_Number_IQ_Pre	Print Referencing	0.787	12	0.007
	Question	0.725	13	0.001
RP_Qtype_Number_IQ_Post	Print Referencing	0.668	12	0.000
	Question	0.885	13	0.083
RP_Rate_LQ_Pre	Print Referencing	0.748	12	0.003
	Question	0.750	13	0.002
RP_Rate_LQ_Post	Print Referencing	0.771	12	0.004
	Question	0.857	13	0.036
RP_Rate_IQ_Pre	Print Referencing	0.808	12	0.011
	Question	0.706	13	0.001
RP_Rate_IQ_Post	Print Referencing	0.685	12	0.001
	Question	0.964	13	0.820
RP_LQ_Pre	Print Referencing	0.723	12	0.001
	Question	0.615	13	0.000

RP_LQ_Post	Print Referencing	0.756	12	0.003
	Question	0.816	13	0.011
RP_IQ_Pre	Print Referencing	0.783	12	0.006
	Question	0.612	13	0.000
RP_IQ_Post	Print Referencing	0.674	12	0.000
	Question	0.917	13	0.229