

Supporting Indigenous children's oral storytelling using a culturally referenced, developmentally based program

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Indigenous communities in Canada have struggled with systemic inequities that have affected education outcomes of their children. In collaboration with a Stoney Nakoda community in Western Canada, a university research team, composed of Indigenous and non-Indigenous members, offered an instruction program designed to use storytelling as a gateway to early literacy development. Indigenous researchers and collaborators guided program adaptation to increase its cultural relevance, and non-Indigenous researchers drew upon developmental research to tailor scaffolded instruction that supported increased story-structure complexity. A total of 100 children aged 5 to 7 years participated in an eight-month storytelling program, which included pre- and post-instruction assessments of storytelling and recall. After instruction, participants generated more complex, detailed stories that contained more references to their culture compared to same-age peers. They also more accurately recalled the gist of stories they were read. This study demonstrates the importance of making curricula relevant to Indigenous children by including content that is culturally relevant and developmentally appropriate.

Keywords: storytelling, Indigenous learners, culturally referenced instruction, cognitive scaffolding

Introduction

This research project was a collaboration between a Stoney Nakoda First Nation (i.e., Îethka Wichasta), two schools that serve children of the Nation, and a University of Calgary research team. The Îethka Wichasta First Nation is located in Alberta, Canada. The Nation comprises the Chiniki, Bearspaw, and Wesley First Nations. The University of Calgary rests on the traditional territories of the Siksikaitstapi (Blackfoot Confederacy), comprised of the Siksika, Kainai, Piikani, and Amskapi Piikani First Nations; the Tsuut'ina First Nation; and the Îethka Wichasta First Nation. The City of Calgary is also home to the Métis Nation of Alberta, Region III. The university is situated on land adjacent to where the Bow River meets the Elbow River, traditionally named Mohkinstsis by the Blackfoot people.

The Îethka Wîchasta are closely aligned with the Plains Assiniboine (Snow, 1977). Like many Indigenous communities in Canada, the community of Mîithnî Mâkoché (formerly referred to as Morley) has been affected by colonisation and families differ in degree of acculturation, including use of Indigenous language, knowledge, and practice of Indigenous culture, and spiritual beliefs. A 2016 population census (Statistics Canada) found that 43% of the Îethka Wîchasta members reported speaking an Indigenous language most often in the home, whereas 53% reported speaking English most often. Furthermore, this community is challenged by systemic educational inequities, such as low academic attainment, high school absenteeism, and lower high school completion rates, due to colonial attitudes and practices (MacDonald & Steenbeek, 2015).

The current project was not the first contact between the research team and Îethka Wîchasta. Prior to this project, two researchers sought the participation of the Îethka Wîchasta Education Authority in a professional development project. Over the course of this project, the topic of literacy through storytelling emerged as a point of mutual interest. Subsequently, a university research team, which included Indigenous and non-Indigenous members, assembled to explore potential collaboration with two schools that served the Îethka Wîchasta community. Meetings included members of the university team (i.e., two Indigenous people and one descendent of white Settlers) and members of the community team (i.e., elders, cultural experts, school administrators and teachers).

The project was a community-engaged, collaborative effort (Mark, 2007; Menzies, 2001). Throughout discussions, Indigenous collaborators voiced historical concerns about Settler researchers benefiting financially from work with Indigenous communities and agreed that their concerns would be allayed if research outcomes from the project would be shared solely for academic purposes and the Îethka Wîchasta Band owned the finished program. Additionally, Indigenous collaborators guided meeting protocols and discussions of the wishes of the community related to children's literacy development. Settler education collaborators contributed information related to children's learning needs, current classroom practices and logistics. Finally, researchers (both Indigenous and non-Indigenous) offered potential, evidence-based directions for teaching and learning strategies and materials, subject to collaborators' input.

Research team

The university team was led by Dr Graham and Dr McKeough, descendants of Settler-Canadians who study language and literacy in young children. Dr McKeough previously designed and evaluated a developmental program for supporting children's storytelling skills. She worked with members of the university research team and community collaborators to adapt the program to enhance its appropriateness for children of the Mîithnî Mâkoché community. Dr Schroeder, a descendent of Settler-Canadians, served as overall project manager and led the analysis of the data and the preparation of the manuscript. Dr Ottmann is Anishinaabe and considers her life's work to be driven by the desire to positively impact education systems by transforming them to be fully supportive of Indigenous students in culturally appropriate, responsive and respectful ways. Dr Jeary, a descendant of Settler-Canadians, played a central role in liaising with one of the two research sites. As well, she was involved in literature reviews and positioning the current research within the field. Multiple graduate students were also involved in the project, two of whom played central roles. Doctoral student and descendant of Settler-Canadians Erin Tourigny had been a regular and special education classroom teacher. She was extensively involved with designing and adapting teaching material and strategies, providing the instruction, and liaising with classroom teachers. A second doctoral student, Dr Bird, took the lead in

adapting the stories' cultural and community contents, working with community collaborators and the university team to enhance the relevance of the program and the evaluation criteria. Additionally, he shaped the research protocol and reporting procedures to better align with Indigenous research protocols. The remaining graduate students, descendants of Settler-Canadians, were involved in data collection, analysis, reporting and make-up lessons.

Community collaborators

Two elders and a culture and language educator represented the community. The elders served as a liaison between the community and school by sharing their knowledge of Îethka Wîchasta history, language and cultural practices (e.g., gender roles). To illustrate, Elder Fox and Elder Kootenay offered cultural experiences to students and staff via ceremonies, storytelling and language education. Elder Kootenay also played a crucial function in aligning the research project to the community's needs and values by shaping instruction materials and research procedures. Culture and language educator Duane Mark, a member of the Mîithnî Mâkoché community school staff, develops curricula that involves classroom-based and land-based cultural and language education. This expertise was invaluable in informing story content in the instruction program, as well as guiding culturally sensitive research protocols. Because of their cultural knowledge and standing in the community, these three community members were the main Indigenous collaborators on the project. As well, Settler school personnel, including teachers and administrators, were included in decision-making about the research (e.g., scheduling, input on instruction strategies, and feedback on students' potential and actual responses to story content and instruction strategies).

Indigenous education

The overarching aim of this study was to support early literacy development by fostering Indigenous children's understanding of story as a gateway to literacy practices. The education of Indigenous children in Canada has been one casualty of historic wrongs and ongoing systemic inequities (Truth and Reconciliation Commission of Canada, 2015). Ongoing barriers to quality education have resulted in Indigenous children placing below their majority-culture counterparts in academic outcomes (e.g., MacDonald & Steenbeek, 2015), lower pre-literacy levels at school entry (Chalmers, 2006), lower proficiency in English and Indigenous languages (Freeman & Fox, 2005) and lower rates of school completion (Canada Council on Learning, 2007). Experts in the field have cautioned against situating causal factors within the child, instead pointing to contextual factors including the absence of Indigenous culture and language in the school curriculum (Amato, 2021), a mismatch between Indigenous learning environments and formal schooling (Ball, 2012), government underfunding of education (Drummond & Rosenbluth, 2013) and historical distrust in Western education (Neeganagwedgin, 2013).

In response to the lack of Indigenous culture and language in curricula, researchers have underscored the necessity of using culturally referenced materials to support learning, including the importance of incorporating the knowledge practices of Indigenous communities, maintaining native language and linking Indigenous knowledge to curricula (Scull, 2016). Understanding Indigenous story forms and their inter-relatedness and drawing upon this understanding are ways to decrease the culture-curriculum gap. Indigenous cultures around the world have used oral traditions to preserve their language and identity and to safeguard its continued existence (Bird, 2014; Cajete, 2017). Indigenous stories reflect an "interconnectivity of Indigenous peoples, their culture, and ways of life with the land" (Greenwood & de Leeuw, 2007, p. 29), even across distinct geographical, linguistic and historical circumstances (Mark,

2007). The important role of storytelling for Indigenous communities continues today. Hare (2011) documented a breath of literacy activities that occurred in Indigenous homes in Western Canada, including traditional oral stories, ceremonies and seasonal activities that are tied to the land. If these Indigenous literacy practices were to be within the schools, educators could begin to build a link between the knowledge that Indigenous children bring to school and school literacy learning.

Researchers have successfully collaborated with Indigenous peoples to infuse Indigenous knowledge in schools, typically through programs that supplement rather than replace mainstream curricula (e.g., Allen & Lalonde, 2020; Inglebret et al., 2008; Timmons et al., 2006). For instance, Eastern Canada Mi'kmaq communities' oral histories have been used as models to support Indigenous youths' storytelling and recall, resulting in significant improvement on measures of word recognition, reading comprehension and listening comprehension (Timmons et al., 2006). Culturally referenced material has also been shown to positively impact language development in Alaska Native children (Inglebret et al., 2008). Thus, evidence supports the value of including culturally relevant learning activities and content into classrooms.

Early literacy development and storytelling

Considerable research has documented that hearing and co-constructing stories impact children's literacy development. Stories allow knowledge to be communicated and meaning to be made from life's experiences (e.g., Battiste, 2005; Bruner, 1990; Cajete, 2017). Pre-literate children encounter stories through various events such as family reminiscences (Fivush & Haden, 2003), reading picture books (Saracho, 2017) and play-inspired co-constructed stories (Nicolopoulou, 2008). These activities help children to select, order and link events together into social scripts and lead to the formation of a simple story schema by the age of 4 or 5 years (Hudson & Shapiro, 1991). For instance, a young child might relate the following event sequence: "We went to the pow wow and saw the jingle dance." It is later in development that children adopt more complex story schemas, building their stories around goals/problems that need to be met/resolved, as the following abridged example shows: "One day a little girl and her parents went camping, but they didn't have a tent so they made a teepee."

Current study

The study is predicated on two lines of research: (a) studies showing that storytelling is predictive of literacy development in Western and Indigenous learners (Dickinson et al., 2006; Palmer et al., 2001; Peltier, 2010), and (b) studies demonstrating that instructional materials that reference Indigenous learners' culture improve literacy outcomes (Allen & Lalonde, 2020; Hare, 2011). We sought to augment the government-mandated literacy curriculum with storytelling instruction based on an existing program, Story Thinking (McKeough et al., 1995). Story Thinking was revised by replacing stories that included Eurocentric content and themes with content that was more familiar to children (e.g., legends, land inhabitants and community events). This was done to empower the children to use their existing knowledge in the literacy activity of storytelling and, in so doing, become aware of their story knowledge and of its utility within the school context. We reasoned that such self-knowledge can play an important role in learning to tell more complex stories and to recall more content in stories that they hear. Our specific research questions follow.

Following the adapted instructional program, did students:

1. Tell stories with more complex story structure (e.g., fewer social scripts and more problem/resolution plots)?
2. Include more mental states of characters in their stories?
3. Tell longer, more detailed stories?
4. Include story content that reflected their culture?
5. Remember more components of a story read to them?

Method

Research collaboration

The university team and community collaborators met regularly to develop and implement the program, focusing on how to adapt the research project to fit with the community, including (a) program design (e.g., story content and instruction materials), (b) research design, and (c) participant recruitment.

Program design

To adapt the existing program, Indigenous researchers and community collaborators guided changes to Eurocentric stories, the inclusion of new stories and new instruction materials. Education of the Settler-Canadians concerning appropriate community and culturally referenced content was extensive. To illustrate, Indigenous community collaborators gave permission to adapt a traditional story for use in the program and guided the adaptation. Moreover, it was agreed that, although the content of the stories and teaching materials would be aligned with the background knowledge and experiences of participants, the story structure taught in the program would align with that of the government-mandated curriculum, not with that of Indigenous storytelling, to support students' school achievement. Additionally, it was agreed that the tools used to measure children's storytelling would align with standardised measures rather than be adapted to fit with Indigenous storytelling practices. Although adapting both story structure and scoring to reflect Indigenous epistemologies is seen as an important future goal, the goal of the community collaborators within this project was to support their children's development within the current education structure.

Research design

When discussing the research design, the community collaborators wanted children to be viewed from a strength-based perspective. Because teachers and Indigenous collaborators saw the program as supporting curricular goals and potentially beneficial for all students, they requested the intervention be delivered as part of the classroom instruction and be supplemental to the regular curriculum. Thus, all students received the intervention, even if they declined to participate in the research component. In addition, it was agreed that the university team would offer make-up sessions to children who missed instruction. The community collaborators approved other design components, including the assessment measures, the nature of the story-telling prompts and how the stories were analysed.

Participant recruitment

Two schools were involved in the study. One school, situated within the community and governed by the Stoney Education Authority, served Indigenous children from the community exclusively. The second school was situated in a hamlet close to the community and served children from the surrounding community as well as children from the First Nation community whose parents opted to have them attend the school. The curriculum of both schools was mandated by the provincial government. All participating classroom teachers and school administrators were descendants of Settler-Canadians. Community collaborators at both schools indicated that parents/guardians would be more likely to respond to an invitation to participate in the study if a draw for a gift certificate were offered to all those who returned a form either granting or denying participation. Moreover, collaborators suggested that families would feel more comfortable being contacted by someone they already knew. For the first school, an elder assumed this role, whereas a staff member performed this function in the second school.

Participants

A total of 100 students participated in the study, all of whom were members of the Îethka Wichasta community. At pre-instruction, there were 33 children in kindergarten (Group 1), 46 children in grade 1 (Group 2), and 21 children in grade 2 (Group 3). At post-test, 61 participants remained in Group 1 ($n = 24$; mean missed days = 3.2) and Group 2 ($n = 38$; mean missed days = 2.6), for a completion rate of 77%. Group 3 acted only as a comparison group to Group 2 and did not receive instruction. See Table 1 for demographic information.

Table 1: Demographic information for groups

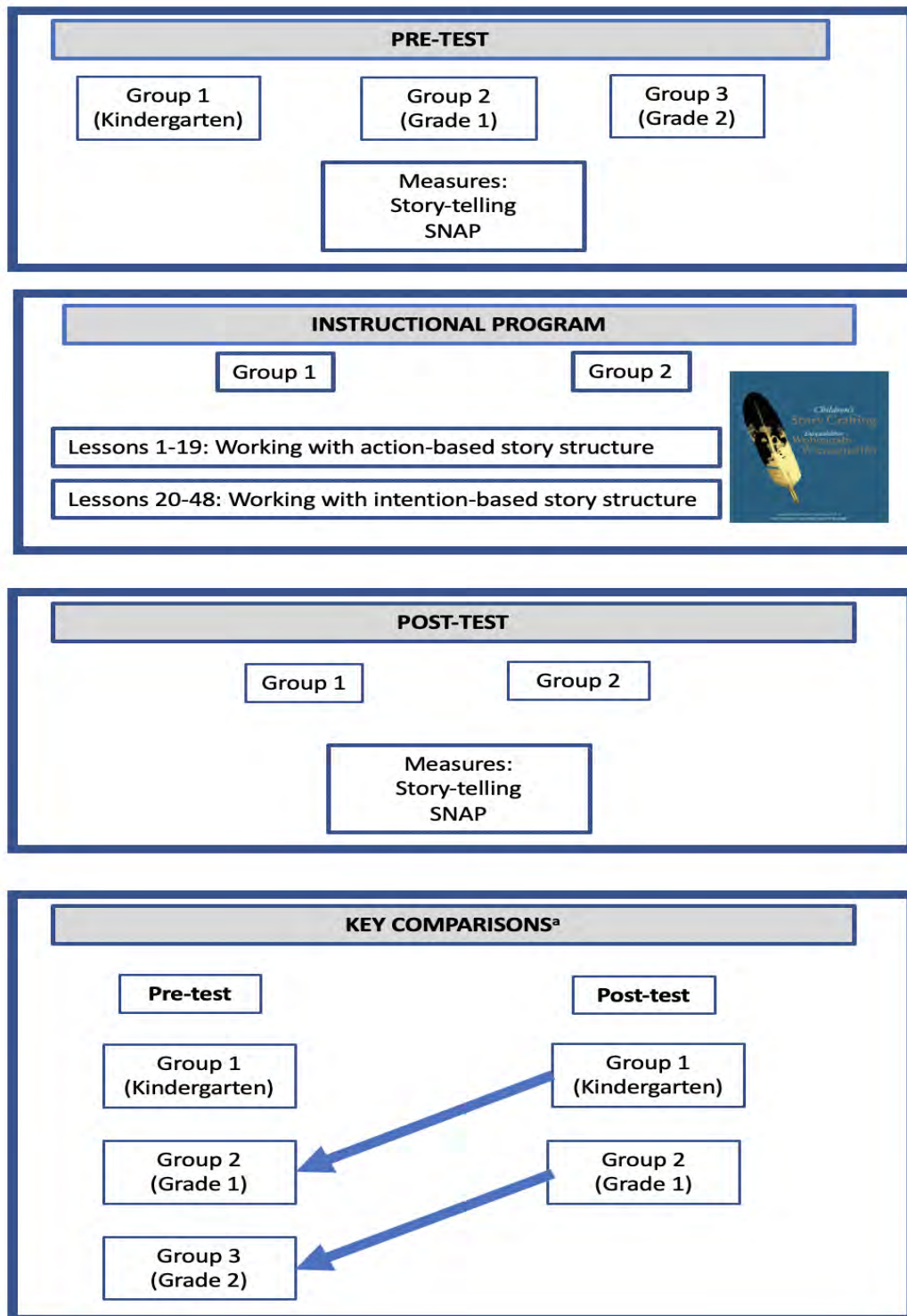
Group	Pre-test	Post-test
Group 1		
<i>N</i>	33	24
mean age	5 years 7 months	6 years 8 months
gender	19 boys, 14 girls	
grade	kindergarten	grade 1
Group 2		
<i>N</i>	46	38
mean age	6 years 7 months	7 years 9 months
gender	18 boys, 28 girls	
grade	grade 1	grade 2
Group 3		
<i>N</i>	21	
mean age	7 years 9 months	
gender	12 boys, 9 girls	
grade	grade 2	

Comparison group design

At the request of community collaborators, a novel comparison group design was used. See Figure 1 for an overview of the design and the pre- and post-testing and comparison group schemata. Groups 1 and

2 started the storytelling program in kindergarten and grade 1 respectively. The eight-month program spanned two academic years with post-testing occurring in the second year when the groups were near the end of grades 1 and 2. Students who were in grade 1 at post-instruction (Group 1) were compared to the students who were in grade 1 at pre-instruction (Group 2). Group 2 was in grade 2 at post-instruction so they were compared to Group 3, which was in grade 2 at pre-instruction and participated in pre-instruction only.

Figure 1: An overview of the experimental design and key comparisons



Measures and scoring

Storytelling

Each student was given a narrative prompt (i.e., pre-instruction: Tell me a story about a little boy/girl and a horse; post-test: Tell me a story about a boy/girl and a big teepee). These prompts were chosen for three reasons: (a) both objects (i.e., horse and teepee) were present in the children's community and so were likely to be familiar to them, (b) prompts were relatively neutral in that associated storylines might or might not include goals or conflicts, and (c) similar prompts had been successfully used in previous research. Stories were taped, transcribed and scored on five dimensions: (a) developmental story structure, (b) intentional t-units, (c) story length, (d) story content that references Indigenous community and cultural life, and (e) story content that specifically reflects collaborative relationships and practices (e.g., interrelatedness and reciprocity).

Developmental level of story structure

The structure of each participant's story was assigned a Level of 1 to 9 on a developmental scale (Davis, 1998; adapted from McKeough et al., 1995; see Table 2 and supplementary material for more details¹). Stories assigned Levels of 1 to 3 comprised a social script that contained two or more of the following story grammar components: setting, initiating event, response and outcome. The social scripts increased in semantic coherence² across the three levels (see Table 2). Level 1 stories contained a series of events without elaboration and were loosely unified. For example, "The girl had a pony [event 1]. The horse came [event 2] and that cougar ran away [event 3]." Level 2 stories had a recognisable script and formed a more complete episode. For example, "The girl was riding on the horse. She was riding with the horse on the cliff and he didn't see it. The horse and the girl fell off." Level 3 stories not only had a unified episode, but events were connected with conjunctions (e.g., and, then) and included more elaborative details. For example:

There was this girl on a horse and she was on a parade. And that was my sister riding a pony and me. I was riding a pony and she was riding my Dad's horse. And then they just went straight to the rodeo and they were watching some bull riding.

Stories assigned Levels of 4 to 6 display the structural organisation of a simple folk tale (i.e., the protagonist has a goal or faces a problem that triggers attendant mental states or social judgements in the first episode, followed by a resolution and attendant mental states in a second episode). At Levels 7 to 9, stories maintain their goal or problem/resolution focus, but protagonists encounter additional challenges as complicating events arise or attempts fail prior to reaching a resolution. Semantic coherence increases across levels.

¹ See supplementary material at https://osf.io/dx8m3/?view_only=c4707ec6c09144e5aa9c1e6bea866002 for application of the scoring scheme.

² Semantic coherence, which permits a reader to follow the story line, requires three conditions: (a) story content is topically and referentially unified (i.e., the relations among story events and characters are stated or can be logically inferred), (b) events are linked by means of conjunctions (e.g., additive, temporal, causal and adversative), and (c) events include main ideas and elaboration (Halliday & Hasan, 1976).

Table 2: Developmental story structure scoring scheme

Story structure type (Level)	Description
Action script Low (1)	Comprises a minimally developed scripted event sequence of at least two story grammar components (i.e., setting, initiating event, response and outcome) that are loosely unified topically, having only the most basic linking conjunctions, and lack elaborations of the main ideas.
Action script Average (2)	Expansion of the Level 1 story to form a recognisable script. The inclusion of a sequence of three or more topically unified, temporally ordered events form a more complete episode (e.g., setting/character introduction, initiating event, response and outcome) that is linked together with conjunctions. Elaborative detail is lacking.
Action script High (3)	Consists of a more complete topically unified episode, wherein events are explicitly linked through the use of conjunctions. Additionally, a few descriptive or elaborative details flesh-out the sequence, although these are minimal at this level.
Problem-Resolution plot Low (4)	Includes goal- or problem-oriented stories. Semantic coherence is negatively impacted by a lack of topical coherence and/or appropriate use of conjunctions. This lack of coherence is seen within and/or between the problem and resolution.
Problem-Resolution plot Average (5)	Characterised by semantic coherence within and between the problem and resolution event sequences, where the flow of events is made logical and clear through topical coherence and/or appropriate use of conjunctions.
Problem-Resolution plot High (6)	As Level 5, but with additional elaborative detail.
Problem-Failed Attempt-Resolution plot Low (7)	Includes stories that are goal- or problem-oriented and additionally contain failed attempts or complicating event sequences prior to resolution. Lack of topical unity within or between these structural components compromises semantic coherence. Elaboration is sparse.
Problem-Failed Attempt-Resolution plot Average (8)	Semantic coherence within or between structural components is marked by topical unity and appropriate use of conjunctions. The stories still lack elaborative detail.
Problem-Failed Attempt-Resolution plot High (9)	As Level 8, but with additional inclusion of elaborative detail.

Intentional t-units

A t-unit is the shortest grammatically complete sentence in a story. Intentional t-units (McKeough et al., 2005) refer to first-order mental states (i.e., what people think, know, want or feel; see Table 3). Stories are considered more complex when characters' physical and mental worlds are inter-related. The total number of intentional t-units in children's stories was tallied.

Table 3: Categories of intentional t-units with examples

Categories of intentional t-units	Examples
Mental states that describe thoughts and desires	"She wanted to go for a ride on the pony."
Mental states that describe emotion	"She loved the pony."
Social judgments	"The horsie was a kind little horsie."
Social rules	"The dad said, 'No fighting!'"
Actions clearly suggesting a mental state	"And he cried and cried."

Story length

Story length was established by first eliminating repetitions (e.g., "~~and then he got away~~ - and then he got away from ..."), false starts (e.g., "~~And when she had~~ - The boy had a look ...") and fillers (e.g., "um") and then tallying the remaining words.

Story content

Analyses centred on content that depicted: (a) experiences within Indigenous community and cultural life (Allen & Lalonde, 2020; Greenwood & de Leeuw, 2007; Hare, 2011), and (b) collaborative relationships and practices such as interdependence and reciprocity (Cajete, 2017; Rogoff et al., 2017). One researcher of Settler descent and two Indigenous members of the team shaped the scoring criteria development through wide-ranging discussions and consideration of the nature of community/cultural life and the potential symbolic and inter-relational meaning expressed in participants' stories. Stories were analysed iteratively, resulting in coding categories with exemplars. Two members then jointly scored approximately 25% of stories to establish consistency. Any ambiguous referents were reviewed by the three-member team. One member then scored the remaining stories. The two types of analysis are described below.

References to community and cultural life identified in participants' stories included (a) the environment in which the story was situated (e.g., on a trail, in the woods), (b) story characters (e.g., local animals, extended family members), and (c) activities or events (e.g., hunting, pow wow). Participants' community/cultural knowledge potentially derived from children having first-hand experience, hearing talk of community gatherings or ceremonies and hearing stories of activities from the past. The storytelling prompts (i.e., boy/girl and horse/teepee) were tallied as referents when paired with an action and/or elaborative detail, thus making the prompt a part of the storyline's development. The number of referents in each story was summed.

Story content that represented collaborative relationships and practices involved characters' interactions (i.e., the ways story characters engaged with story events and other characters). Four categories of collaborative activity were identified (see Table 4). Next, each story was assigned to the category that best captured the quality of characters' engagement (Elders Gathering, 2000; Rogoff et al., 2017).

Table 4: Categories of collaborative activity

Category of engagement	Description
Uncooperative	Activity is oppositional and the storyline ends in conflict.
Self-sufficient	Activity is individually focused.
Collaborative Level 1	Activity is cooperative and typical of what many children do, but not unique to Indigenous communities.
Cooperative Level 2	Activity is cooperative and situated in community life or is emblematic of traditional Indigenous cultural and values.

Story recall

Story recall was assessed using the Strong Narrative Assessment Procedure (SNAP: Strong et al., 1998). Students listened to taped versions of the stories *Frog, Where Are You?* (Mayer, 1969) at pre-instruction, and *One Frog Too Many* (Mayer & Mayer, 1975) at post-test, while following along in the wordless picture book. After listening to the story, the participants were asked to recall it from memory. Story recall was measured in two ways: by number of gist items and story length.

A story's gist comprises the substance of the story (i.e., the summary of the story), and is not a verbatim account. The gist of each story included five key ideas, which were arrived at through discussions within the research team. To determine how many gist items children recalled for each story, recalls were broken into t-units, each t-unit was coded as either gist or detail, and gist items were enumerated.

Length of story recall was calculated in the same way as previously described for storytelling.

Story Crafting instruction program

Daguskâbin Wohnagabi Wichagijarhbi (Story Crafting) is based on the Story Thinking program (McKeough et al., 1995), which was informed by research on children's developmental understanding and use of story structure (see supplementary material). Instruction followed a developmental sequence whereby earlier lessons focused on simple scripted stories and later lessons centred on more complex story structures. To reduce the cognitive load of constructing more complex stories, instruction included materials that provided verbal (i.e., oral and written story forms), spatial (i.e., line drawings, mental state icons such as sad/happy faces) and action-based supports (i.e., hand, finger and stick puppets used to act out stories). A range of activities (e.g., group storytelling, story completion and storytelling by "reading" line drawings) were used as scaffolds to independent storytelling. Instruction delivery took the form of mutual regulation (Case & McKeough, 1990), where the child's understanding dictated when and how the teacher offered instruction to build on that knowledge. Finally, over the course of instruction, more independent storytelling gradually took the place of guided instruction as children became more competent and confident.

Procedure

After obtaining ethics approval, participants were recruited through information and consent letters sent home to parents/guardians. Consent forms, which asked parents/guardian to give or decline assent for their children, were written in English. Although children did not actively consent, they were not put

under undue pressure to perform tasks (i.e., responses such as "I don't know" or silence were accepted). A liaison from each school either telephoned or visited the home of those parents who did not return consent forms. These individuals introduced themselves and inquired if the parent/guardian had questions about the project. Further, they reiterated that all parents who returned the forms (either consenting to or declining participation) were entered in a draw for a gift certificate. This last step was requested by our community partners to ensure parents did not feel coerced. No data was collected on students whose families declined participation.

Pre- and post-testing

At pre- and post-testing, students told a story based on a prompt. Next, they were read a story using the SNAP and asked to retell it.

Instruction

The Story Crafting program consisted of two 20- to 30-minute sessions each week over an eight-month period. Erin Tourigny, who had extensive teaching experience, delivered the program. The regular teachers remained in the classroom to observe the instruction and to ensure that students were not uncomfortable by the sole presence of a different teacher. A graduate research assistant conducted make-up lessons for students who missed sessions.

Plan for analysis

Scores from the storytelling and SNAP were summed and group means used in statistical analysis. Statistical analyses focused on (a) analysis of developmental differences in pre-instruction storytelling and recall using analysis of variance and (b) response to instruction analysis using *t*-tests that compared Groups 1 and 2 to their comparison groups (see Figure 1). Within-group comparisons were not conducted because interpretation of any observed changes from pre- to post-test were confounded by maturation. The 9-level developmental scoring scheme was treated as a continuous variable. A comparison of the proportion of collaborative activities in the storytelling was not analysed because cell counts were low for some groups.

Nine stories (5.5%) were removed from the pre- and post-instruction storytelling data because they could not be scored for one of three reasons: (a) the story modelled closely on a story used during instruction, (b) the story was very difficult to understand largely due to sentence fragmentation or pronoun confusion (e.g., "He was in the toy box but he couldn't [inaudible] there. Under the house. Then we didn't check there."), or (c) the story could not be sufficiently transcribed because the participant's voice was inaudible.

Interrater reliability

One Settler-Canadian researcher scored all data and a second Settler-Canadian member rescored 25% of the measures for the following interrater agreement: story structure developmental level = 92%, intentional t-units = 92%, and gist recall = 83%. An Indigenous researcher applied the coding of the content analyses to 25% of the stories to obtain interrater reliability (cultural life referents = 92%, collaborative referents = 86%). Story length was determined by word count and so did not require interrater agreement. Disagreements between coders were discussed and resolved.

Results

Correlations were conducted to determine if post-test scores were correlated with the number of missed sessions. No correlations were significant, $ps = .35-.93$ indicating that the number of missed sessions was not related to children's response to instruction. We then conducted a comparison across the three groups' storytelling scores at pre-instruction (using ANOVAs) to check for group differences on developmental level, t-units, story length and cultural referents. There was a significant main effect for the developmental level score, $F(2, 77) = 8.47, p < .001$, and cultural referents, $F(2, 77) = 7.06, p = .002$. Older children (i.e., Groups 2 and 3) told more advanced and complex stories and included more cultural referents than the younger children (Group 1). Table 5 includes mean scores for the three groups at pre- and post-test. These findings confirm there was an increase in story complexity as children matured.

Table 5: Means (SD) of measures of storytelling and story recall

	Group 1		Group 2		Group 3
	Pre-test	Post-test	Pre-test	Post-test	Pre-test
Measure	<i>n</i> = 27	<i>n</i> = 23	<i>n</i> = 37	<i>n</i> = 37	<i>n</i> = 16
Storytelling					
Developmental level	.67 (1.14)	3.91 (1.24)	2.43 (2.34)	4.70 (1.96)	2.94 (2.32)
Intentional t-units	.52 (1.60)	.78 (1.24)	.51 (.96)	1.59 (2.17)	1.56 (2.94)
Story length*	20.04 (36.64)	47.95 (17.28)	29.79 (32.25)	66.22 (40.07)	34.50 (30.91)
Cultural referents	.33 (.73)	3.26 (1.82)	1.11 (1.27)	3.76 (2.96)	1.75 (1.73)
SNAP story recall					
	Pre-test	Post-test	Pre-test	Post-test	Pre-test
	<i>n</i> = 29	<i>n</i> = 22	<i>n</i> = 40	<i>n</i> = 38	<i>n</i> = 18
Gist items	1.55 (1.40)	3.59 (1.26)	2.45 (1.84)	3.82 (1.35)	2.56 (1.76)
Story length	43.86 (60.64)	98.23 (66.12)	77.28 (72.67)	120.53 (67.66)	86.39 (91.52)

Note: Group 1 instruction was compared to the pre-test scores of Group 2. Group 2 post-test was compared to Group 3.

*Outliers were removed from the data leaving Group 1 post-test $n = 22$, Group 2 pre-test $n = 33$, Group 2 post-test $n = 36$, and Group 3 pre-test $n = 14$.

Our primary analyses focus on comparing the impact of the instructional program, addressing the research questions outlined in the Introduction.

Question 1

Did the students who received instruction tell stories with more complex story structure (e.g., fewer social scripts and more problem/resolution plots)? Comparison of the developmental levels of stories pre- and post-instruction indicated that both instruction groups generated more complex stories post-

instruction than their same-age peers (see Table 5 for comparison group means and standard deviations and Table 6 for *t*-test comparisons). Students in Group 2 at pre-instruction, who were the comparison group for Group 1 at post-instruction, had a mean developmental story structure score close to Level 2. These Group 2 students were likely to tell action-script stories that were linked within a sequence of events. For instance, "The girl was riding on the horse and she was riding with – on the cliff and he didn't see it and the horse and the girl fell off." These events are loosely related, linked by only an additive conjunction (e.g., and) and contain minimal elaborative detail. In comparison, after receiving instruction, Group 1 had a mean that was close to Level 4 stories. These types of stories included a goal or a problem that was resolved. Level 4 marks a qualitative shift from action-based scripts to problem-resolution stories. Children's first attempts at creating such stories are characterised by less topical unity than they showed when composing Level 3 action-based scripts due to the cognitive challenge they face when using the new story structure. For the same reason, their resolution of the problem may seem to appear out of nowhere. Both elements are present in the following story (i.e., the girl's crying appears out of sequence and her resolution shows limited development).

There was a little girl riding a horse and her dad told her to come inside and let the horse have time to eat. And then the girl went out and she ride in the horse again and she snuck outside when it was night-time [problem 1]. And she got the horse and she got down and she started crying [problem 2]. And another girl came and said, "That's my horse." And they started fighting [problem 3]. They told their dads and their moms and they said that's my daughter's horse [resolution to problem 3].

A similar pattern was seen with the Groups 2 and 3 comparisons. After instruction, students in Group 2 had an average developmental level close to Level 5, whereas students in comparison Group 3 had an average score of close to a Level 3. Again, the non-instruction group tended to tell social script scores and the instruction group tended to tell problem- or goal-oriented stories that had resolutions that were well developed.

Table 6: Significant t-test comparisons for storytelling and story recall

Measure	Comparison 1 Group 1 – Group 2		Comparison 2 Group 2 – Group 3	
	<i>t</i>	<i>p</i> (<i>d</i>)	<i>t</i>	<i>p</i> (<i>d</i>)
Storytelling				
Developmental level	3.24	.002(.79)	2.85	.006 (.82)
Story length	2.71	.009(.70)	2.66	.010 (.89)
Cultural referents	4.99	.000(.87)	3.08	.003(.83)
Story recall				
Gist	2.88	.006(.72)	2.95	.005(.80)

Question 2

Did the students who received instruction include more mental states of characters in their stories? Measured by intentional t-units, students who received instruction did not include more mental states of their characters in the stories compared to the non-instructional groups ($p < .35$).

Question 3

Did the students who received instruction tell more detailed, longer stories? Both instruction groups told stories that were longer in word length post-instruction than their same-age peers (see Table 5).

Question 4

Did the students who received instruction include story content that reflected their culture, as measured by (a) references to community and cultural life, and (b) collaborative relationships and practices? References to community and cultural life identified in participants' stories included the environment, story characters and activities or events. To illustrate the application of the scoring criteria to the current data, referents are italicised and categorised [bracketed] in the following sample story (repetitions removed):

The little boy found *a teepee in the woods* [environment]. And he told his mom if he can go camping ... And she said yeah. And then he brought his whole stuff. And when he got up, *he saw a coyote* [character]. And he (the boy) was *hiding in the teepee* [activity]. And then when he looked, *the coyote was gone* [activity]. And he ran back home. And then told his dad if he could *shoot the coyote* [activity] now and make it for supper. And that's the end of my story.

To score the stories, the number of referents in each participant's story was tallied. When group mean number of referents were compared, Group 1 included significantly more referents in their post-instruction stories than their comparison group, Group 2, pre-instruction, $t(35.32) = 4.99$, $p = .000$, $d = 1.37$. Similarly, after instruction, Group 2 included significantly more referents than the comparison group, Group 3, $t(46.11) = 3.08$, $p = .003$, $d = .83$.

Story content on collaborative relationships and practices that involved characters' interactions was analysed and categorised (see Table 7). To illustrate, an abridged sample story from the Collaborative Level 2 category is used. It is set on the land and comprises several actions that reflect core Indigenous values of collaboration (e.g., interdependence and reciprocity) which are italicised:

Once upon a time there was a little girl named Lisa. She liked to ride a horse ... and to ... *help her mom make the fire. She likes to help her dad to make a teepee ... when they go home to the teepee, they cook the meat and they start eating it. And then the skin for it - they make a blanket out of it for the mom when she gets cold. And she (Lisa) likes sitting down with her (mom). And her mom covers the blanket with her too.*

In this story, Lisa willingly helps her parents as they engage in various traditional practices. In working with her parents, Lisa contributes meaningfully to family life, which is characteristic of Indigenous child-rearing practice, and which highlights collaboration and interdependence. When the family returns home to the teepee, considered a place of safety, they cook and eat the meat of the hunted game together. Working collaboratively, they use all parts of the animal, including the hide to make a blanket for Lisa's mother, who, in turn, shares the blanket's warmth with her daughter. These actions reference reciprocity,

an essential component of Indigenous relationships. A comparison of groups' levels of performance (see Table 7) shows that the proportion of collaborative content increased following instruction. Together, these content analyses demonstrate that Story Crafting both improved participants' capacity to produce a story and encouraged them to draw upon their cultural values related to collaboration when telling a story in school.

Table 7: Percentage (N) of type of collaboration content by group and time of testing

	Group 1		Group 2		Group 3
	Pre-test	Post-test	Pre-test	Post-test	Pre-test
Content	<i>n</i> = 25	<i>n</i> = 23	<i>n</i> = 37	<i>n</i> = 38	<i>n</i> = 16
Oppositional activity	4 (1)	9 (2)	3 (1)	0 (0)	13 (2)
Independent	26 (7)	9 (2)	51 (19)	26 (10)	31 (5)
Collaborative Level 1	7 (2)	21 (5)	3 (1)	8 (3)	0 (0)
Collaborative Level 2	4 (1)	60 (14)	16 (6)	66 (25)	38 (6)
No story	64 (16)	0 (0)	27 (10)	0 (0)	19 (3)

Question 5

Did the students who received instruction remember more components of a story read to them? The SNAP measured participants' ability to retell a story. Both instruction groups recalled more main components of the story (i.e., its gist) than their same-age peers; however, the length of their recall was not significantly longer.

Discussion

This collaborative project was undertaken with members of the Îethka Wichasta Nation by adapting an instruction program that drew upon two lines of research: using storytelling as a route to Indigenous children's literacy development (Allen & Lalonde, 2020; Battiste, 2005; Cajete, 2017) and using developmentally sequenced, cognitively scaffolded instruction to improve children's storytelling and recall (e.g., Case & McKeough, 1990; Westby et al., 2002). The established link between storytelling and a variety of skills associated with early literacy development, such as improved vocabulary (Loftus-Rattan et al., 2016) and listening comprehension (Kotaman & Balci, 2017), potentially situates participants on a track to more successful literacy learning.

The findings demonstrated that the Indigenous children's knowledge of story structure improved significantly after Story Crafting instruction, in that they not only told more complex, coherent stories, but also recalled the essential components of a story read to them. After participating in the instruction program, participants made significant gains in the complexity of stories as measured by developmental level and story length. They improved in semantic coherence (i.e., evidenced in topical unity and use of conjunctions and elaborations; Halliday & Hasan, 1976), and produced more stories organised around a problem or goal and its resolution (i.e., Levels 4 to 6; see Table 1). The increased complexity of the stories

led to increased story length. In comparison, non-instruction groups tended to tell shorter stories that were limited to increases in topical unity and elaborative detail across only action-based, scripted stories (i.e., Levels 1 to 3; see Table 1).

Although the developmental level of instruction groups' stories increased post-instruction, significant change was not noted in participants specifying the mental states of characters (e.g., feeling sad, wanting a horse) within the problem and resolution event sequences. These mental states occur in response to events in the physical world and motivate characters' further actions (Bruner, 1990). Their presence in stories unite the two narrative landscapes, namely the landscapes of actions and of consciousness (Bruner, 1990). The current findings suggest that, although students learned the problem/resolution story structure taught in Story Crafting, they did not specify mental states while also creating stories with a more coherent, complex plot. To integrate both components places a greater cognitive demand on learners and may take more time and practice to achieve.

Not only was the program designed to be developmentally appropriate for the children, but the instruction was also intentionally revised to include Indigenous content (e.g., legends, land inhabitants and community events). The increase in cultural referents in children's stories demonstrated that they were encouraged to use what they knew of life to tell their stories. If the original program had not been adapted, it is possible that Indigenous children's storytelling and recall would still have improved because of its developmental and narrative foci. Nevertheless, the adapted program provided a space and time for participants to engage in storytelling in a way that affirmed their experience and knowledge and simultaneously carried the message that the participants' world and knowledge is relevant in school activities.

Furthermore, familiar story themes and content may have supported learning of story structure by reducing the processing load of storytelling (Westby et al., 2002). That is, the use of familiar vocabulary in the program may have meant children had to put less work into understanding the content of the lessons, so they could put more effort into utilising more complex storytelling structures. Although further investigation is necessary to satisfactorily account for this pattern of developmental growth, the findings echo that call of other scholars to include content into curricula that is more meaningful and familiar to Indigenous children (Peltier, 2010; Scull, 2016).

Limitations

Despite attempts to make Story Crafting culturally relevant, it reflected the story structure found in the government-mandated curriculum. Although students responded positively to the program, future research must consider the effect of instruction that includes Indigenous languages (Scull, 2016) and Indigenous literacy practices (Hare, 2011). For instance, future research might explore the efficacy of dual-language books (Naqvi et al., 2013) in which Indigenous languages and stories are shared by Indigenous language speakers who are familiar with traditional storytelling practices. Such community-based instruction programming has potential to offer authentic early literacy experiences that respect traditional knowledge sharing practices, while also exposing children to English language literacy experiences. Second, the sample is relatively small when divided by grade, the instruction was given by a Settler researcher and students who missed lessons were given make-up lessons provided by a research assistant. These components of the design and study could limit external validity. Third, this study did not collect data on demographics of the families, the response of the parents to the program or track the transfer of storytelling skills to literacy levels of students over time.

Conclusion

Despite limitations, the results hold important implications for researchers and educators. First, our results demonstrate that Indigenous students responded positively to scaffolded, developmentally based storytelling instruction. Since stories play a central role in the culture of Indigenous communities (e.g., Battiste, 2005; Ottmann, et al., 2007), such a program has the potential to improve the early literacy learning of Indigenous children. Second, the findings highlight the value of integrating well-researched instructional design practices (e.g., cognitive scaffolding; McKeough et al., 2008) with culturally referenced content (Palmer et al., 2001) to assist Indigenous learners. Finally, the study offers empirical evidence that young Indigenous learners' early literacy skills can be improved when instruction is offered in conjunction with the mandated curriculum. This latter finding buttresses the argument put forward by Indigenous scholars that culturally relevant content is preferable to Eurocentric curricular content for Indigenous learners (Hare, 2011). Our findings also beg the question: What greater benefit might be possible by delving deeper into traditional Indigenous stories, storytelling practices and language?

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