SUPPORTING NUMERACY AND LITERACY IN PLAY-BASED EARLY LEARNING PROGRAMS

GRAPHIC REPORT

Dr. Jessie-Lee McIsaac, Dr. Christine McLean, Randi Cummings, Dr. Lyse Anne LeBlanc, Anne Briscombe, M. Ed, Milena Pimentel

Early Childhood Collaborative Research Centre

Mount Saint Vincent University

LAND ACKKNOWLEDGEMENT

Our research was conducted in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people. This territory is covered by the "Treaties of Peace and Friendship," which the Mi'kmaq and Wolastoqiyik (Maliseet) people first signed with the British Crown in 1725. The treaties did not deal with the surrender of lands and resources but recognized Mi'kmaq and Wolastoqiyik (Maliseet) titles and established the rules for what was to be an ongoing relationship between nations.

We also pay respect to the histories, contributions, and legacies of African Nova Scotian communities that have been here for over 400 years and the 52 African Nova Scotian communities throughout the region today.

CONTEXT

CONTEXT

Numeracy and literacy are both enhanced through young children's play, exploration, and learning. There are many ways for children to communicate ('literacies') and apply mathematical knowledge ('numeracy') and understanding and acknowledging this supports a sociocultural perspective of early childhood curriculum. This perspective is what guides the Nova Scotia Early Learning Curriculum Framework. This approach recognizes the important role of children, families, educators, and communities in the development of literacy and communication; important parts of human development.

This research study looked at how providing a meaningful and functional numeracy and literacy-rich play-based environment helps to build positive attitudes and competencies for children in Pre-primary. Play is a valuable resource in the early learning environment. It is through play that a child has the freedom to learn and explore on their own terms. Knowing this, early childhood educators are able to support and encourage children's emerging numeracy and literacy through their intentional design of the learning environment, programming and interactions.

PROJECT AIMS

1. To capture and reflect on how numeracy and literacy is supported within the Pre-primary Program through pedagogical documentation.
2. To use documentation as a tool to discuss and critically think about numeracy and literacy within the Pre-primary Program. Also, to use documentation as a way of sharing experiences and building skills.
3. To collaborate on ideas of how to enhance play-based programming to support children's numeracy and literacy development in Pre-primary Programs in Nova Scotia.

METHOD

This research study included a series of six workshops. The workshops consisted of three information-sharing sessions, followed by two photo-sharing sessions and one final group brainstorm. Recognizing the vast knowledge early childhood educators carry, all sessions were collaborative. Each group shared their personal experiences as an early childhood educator (ECE) in a Pre-primary classroom, examples of numeracy and literacy in their play-based classrooms, and collaborated on and approved a final visual representing the themes discussed throughout the workshops.

PARTICIPANTS

Three groups of Pre-primary educators were recruited into this study. These groups were selected based on the unique community perspectives, as well as the opportunity gaps in professional development and expectations for numeracy and literacy.

Rural Communities

"We've had a lot of opportunities even through COVID like for our Pre-primary children. There's a like a seniors home not too far away that we visit. We've had lots of input from like community groups [...] so there's a lot of like local groups that are happy to be involved in the school."

5 Pre-primary Educators from 3 Regional Centres for Education (RCE) across Nova Scotia participated

Years of experience ranged from 15 to 22 years

Black and ANS Communities

"For me, it's not really particularly about literacy and numeracy-just like a child walking up to me and saying something like 'Ohh, I like your hair [it's] just like mine. When I grow up, I'm gonna be just like you. I'm gonna be a teacher'. That beauty and confidence in the children that they could be anything they want to be is very unique to me."

7 Pre-primary educators from 2 RCE participated. Four participants identified as Black or African Nova Scotian and four participants identified that they worked in a community with a population of African Nova Scotian students and families

Years of experience ranged from 4 months to 30 years

Francophone Communities

"I think it's perhaps less the fact that we have a Francophone [early learning] environment and more that we work in a Francophone environment, in a minority setting [...] but I think our students are lucky because we spend so much time working on their communication skills"

5 Pre-primary Educators working in the Conseil Scolaire Acadien Provincial participated

Years of experience ranged from 9 to 22 years

Rural Communities

Let's find out!

"So we planted a bunch of plants last week, [we] started them from seeds and on Friday some of them were starting to peek through. And then on Monday when we came back, some of them were just, well, one was 19 centimeters tall. So he comes in all excited. And he's like, 'wow, those are so big. How big are they?' *So I said like,* 'how big do you think they are?' *And he threw out a number. And I said,* 'well, why don't we get a ruler and we'll measure them to see'."

Tallying it up

"So they're like, 'what is a tally?' So I kind of drew one and [explained]. They thought that was really exciting and then they started making their own tallies, like, right on the floor book and they had decided on different items that they wanted to find [...] it was a nice little chance to kind of reflect with them. And then we planned what our next experience is going to be."

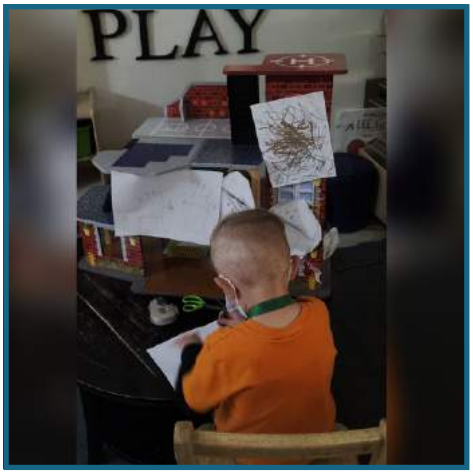
A loose parts classroom

"[I] just try to put out different things. Some of them like to have a space of their own and others just like to join the table, right? [...] I've been trying [to be] really intentional about extending their play to get them a little bit deeper into their play. And I mean they'll spend a good, good portion of the morning and then come back to it and like adjust it and then bring their friends over to do work with them."

The exchange

"...the imaginative play that they're doing is fostering a mathematical understanding of how they're exchanging [...] and that can be visible through everyday experiences like what they would be doing with their parents. Mostly like going to grocery stores or stepping outside into the community."

Rural Communities



The Fire station

"...he had like a whole story of to keep out and that there was a fire and all this stuff, and then some of the kids were just kind of hanging around, seeing what he was doing. But then they just [...] didn't even ask him to join. They just went and got paper and scissors and they just started making signs too. So it was really cool to watch them extend the play and extend the story, they were just coming up with their own things."

X means No

"So I thought it was pretty neat that he used X's as like a symbol of 'no-you cannot come by.' *So then the other little boy says* 'well, how come I can't come in?', *He said* 'Because I have-' *and he started counting, he said* 'I have 4, 5, 6, 7' *and he counted them all around him* '12', *he said* 'I have 12 X's around here and that means you can't enter.' *So he said* 'You have to make 12 X's yourself'. *[...] So they were counting and using symbols as like communicating."*

Best of friends

"So this little girl she just came over and she started squealing with excitement because she found this worm and it's shaped itself into the letter L and her name starts with L. [...] And she came over and she said, 'Look! Look! The worm. It loves me because it made the 1st letter in my name' *and she was very, very excited. And she was convinced that this worm was now her very best friend because of course, it made the first letter of her name."*

Measuring and Comparing

"We had these materials on the table. They used them to measure the plants to see how tall they had grown and to see if they could build something the same size. Then this little girl started measuring a bunch of other things and she measured the chair. And she said, like the guessing game, 'which one is bigger?'"

Black and ANS Communities

Bugs on a log

"They find bugs. They count the bugs. They- it's amazing what they do. They take the magnifying glasses and they're searching for treasure, finding treasure and everything. [...] They search, they tear the bark off and they're finding the different colors and they're counting the bumps on the logs and on the bark."

Expression through paint

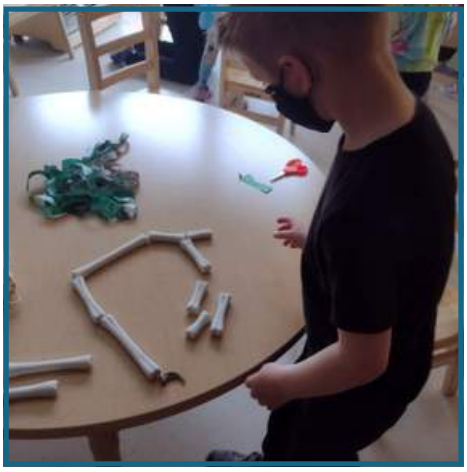
"We were having a group discussion and it was all about feelings and this little girl walked over and she decided she wanted to paint. When she was painting, she was talking up a blue streak about how much she loves her cat and her dog and her favorite color is purple and she wrote her name. This story went on for about 15 minutes, if not longer. [...] It just got so big and it stemmed from just feelings..."

Community connections

"They were asking, 'why are there numbers on these houses?'. *And I said,* 'have you seen same numbers on any house, the same one?' *And they're like,* 'no, they're all different'. *And I'm like,* '...well, it just shows every number on every house on the same street makes it unique. So people know where that person lives'. *And they're like, just making connections with numbers in real life. [...] It also extended on literacy because they were learning the different vocabularies..."*

Collaborative teaching

"...he's made sure that the smallest ones were on one end and the biggest ones were on the other end. And as he's doing it, the kids are asking him questions about why he's sorting them to different spots, and he's explaining-he's one of our kids that really likes to teach [...] and they were sharing stories and ideas about how to line them up and where to put them and different ways of displaying them and measuring them and saying, 'well, this one's bigger.'"



Black and ANS Communities

A book of construction

*"...he stated arranging all the Legos on top of themselves here [...] So I saw that he had a plan. Later I went to him and said, ''*what are you doing?*' He looked at me, he thought for a while, looked at what he did, and said '*construction sites*'. [...] There was this confidence, this satisfaction that "*I got to the end of it. Now- with pride, I can share this*". I was so happy that his confidence- which we are actually working on- is coming out."*

Counting forwards and back

*"I put it on the floor and I just wanted to see where it would go. And she was the first one that went to it right away. [...] She walked along [and] started at one and then counted right up to 12. And then she said '*I'm going backwards. I'm going to go up the other way'. *And so she started [saying] '*12, 11, 10', *and she was counting."*

Parade of patterns

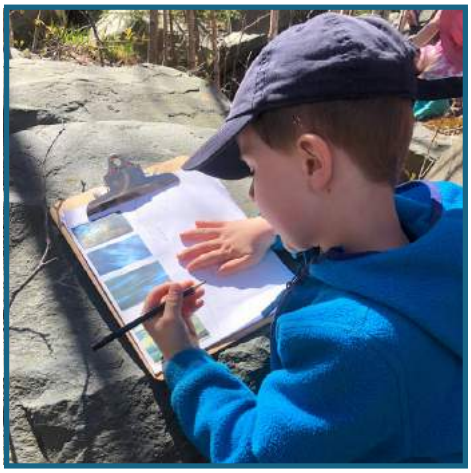
*"I wasn't sure [about the worksheets]. But then I started watching how the kids were manipulating and using it in other ways. I'm like, "*OK, we can keep those"*[...] But this day she got our loose parts off the shelf and she was lining them up, she was making a pattern as well with them. So she was alternating the colours. And as she was doing it like the other kids were watching her and she was counting them to see if it worked out to be 5 to fill it in. And they were trying to figure out their own patterns on different numbers. And they went and got their number cards off the shelf."*

Elastic Letters

*"So they all started out with shapes and afterward one of the children said '*Ohh I'm gonna make my name. I'm gonna make a letter*' and then the others just switched up, took off the rubber bands, and started doing the same thing. So they're kind of feeding off of each other and wanting to make this as cool as the other person."*

Francophone Communities

Please note all quotes have been translated from French and are therefore not exact quotations.



Cloud gazing, observing, and documenting

We were looking at the clouds and I had a sheet of paper with different clouds [...] the child was sitting and he was writing the [names of the] clouds-he wrote the letters and he observed. It really fascinated me [...] and then he did that for about 15-20 minutes, just with his pencil and wrote the clouds that he saw.

Finding Balance

...it was never equal, then after that he emptied them, then he filled them, he put 2, he put 3, but never the same amount on both sides, it was always unbalanced. But what he started to do in the end, instead of emptying, then filling, then emptying, then filling- is that he left them in there, but, he changed sides. So he took the rocks of different sizes from one side, then he transferred it to the other side, then he observed. He had fun like that for a long time, and he ended up getting it to balance.

Labelling Nature

There I was drawing tulips, without telling them "look at me, I'm making tulips"*, I was just doing it at the same time as the others without saying anything. [...] Then they came and asked me,* "What are you doing?" *Then I said,* "well, I saw a tulip there, I drew the tulip, then here I wrote 'a tulip'"*. [...] The child immediately began to draw and document many, many things. [...] She had written a lot of things near the drawing, and then she came to see me and looked at my sheet and copied what I had written.*

An artist's signature

*She wrote it backwards and at the bottom, we can't see it well but it says '*from [child's name]*' so it's something that has been done all of the time, in all of her drawings. Each time she makes something for someone she's going to say it's coming from her and she's going to write for whom it's for. [...] in fact in her drawings, whatever drawings she makes, the creations are always for someone.*

Francophone Communities

Please note all quotes have been translated from French and are therefore not exact quotations.

Earthworm Researchers

They wanted to see the size, the length of the worm, 'this one is small, this one is big', then I said we should measure them. What I found interesting, is that it was like roles were defined. There were the researchers of earthworms. There were those who reported that there were earthworms, there were those who monitored the earthworm, those who measured the earthworm, those who wrote down the data [...] it's really a big team effort...

Equal Measurements

He explained that each cup was like [...] when the bees put their nectar in the cells to make honey afterward. That's what he's putting in there, it's all little balls of nectar. [...] But he was particular about how much nectar to put in each cup and the fact that it was necessary to fill all the cups. Then at the end, he counted them. [...] it was just the fact that it looked like it filled well because he had tried a 4th and it was too full, with 2, it was too empty.

Accessible Materials

She found a lead pencil on the ground broken. Then she began to write on a rock [...] [she went to] go get a reference because she did not remember how to do [the letters] herself. Then she did the whole alphabet on her big rock, there were lots of others who followed, some followed with the letters their names, others just did drawings.

Numeracy Lens

She exchanged the balloons in her hands to have 2 yellow, 2 purple. She is a child that when there are colorful things, they are often put in patterns. When I saw this I thought, this is very typical of [the child] [...] And then we see you know if we weren't looking with like numeracy lenses, maybe we wouldn't have seen this?

THEMING

Following each photo sharing workshop, participants engaged in a brainstorming session to compile and group ideas and common themes across photos within their cohorts. These discussions were then condensed into a visual, which was brought back to the group for further revision (See pages 10-12). This collaborative process gave participants a voice in finalizing the main concepts that arose from the six weeks of discussion.

While each group had their own perspectives of how numeracy and literacy were exhibited in their photos, there were common themes found across all groups. Through their reflections, participants spoke about the role of the educator, the child, the environment and relationships in a play-based early learning program, and emphasized the interconnectedness of their themes. The visual on page 13 was co-created by the research team and highlights how the common themes that emerged within all three groups work independently and together to support numeracy and literacy in a play-based early learning program.

"...relationships—the foundation of all learning right? So when we have responsive interactions with the children and we share passions with them. If we're passionate, about literacy and numeracy [...] the children are going to share that joy with us"

It's not always easy to be able to see the value in their free play or initiated by others. For us to be able to see with our numeracy and literacy lenses what is happening—it's not always obvious.

"...each of these attributes here, the well being, the discovery, and everything actually intertwines, because we cannot have one without the other and make up a childcare space..."

Rural Final Visual

Relationships are the foundation

- Responsive interactions
- Secure attachments
- Connection
- Sharing passions
- Child-focused/Child-led

Spontaneous and Unplanned learning opportunities

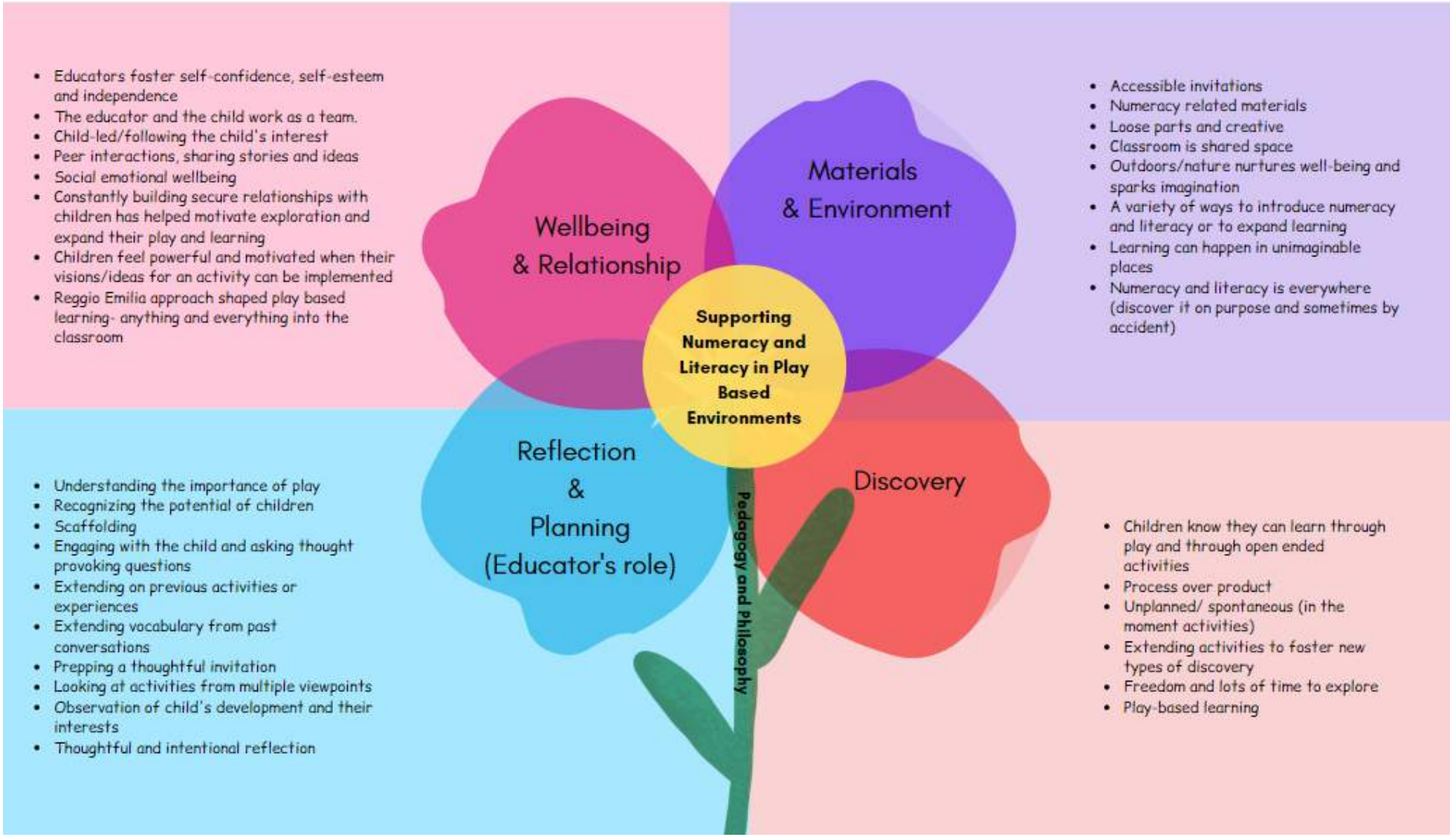
- Evidence of meaningful and joyful connections of learning environments and experiences for children

Reflective Planning Cycle

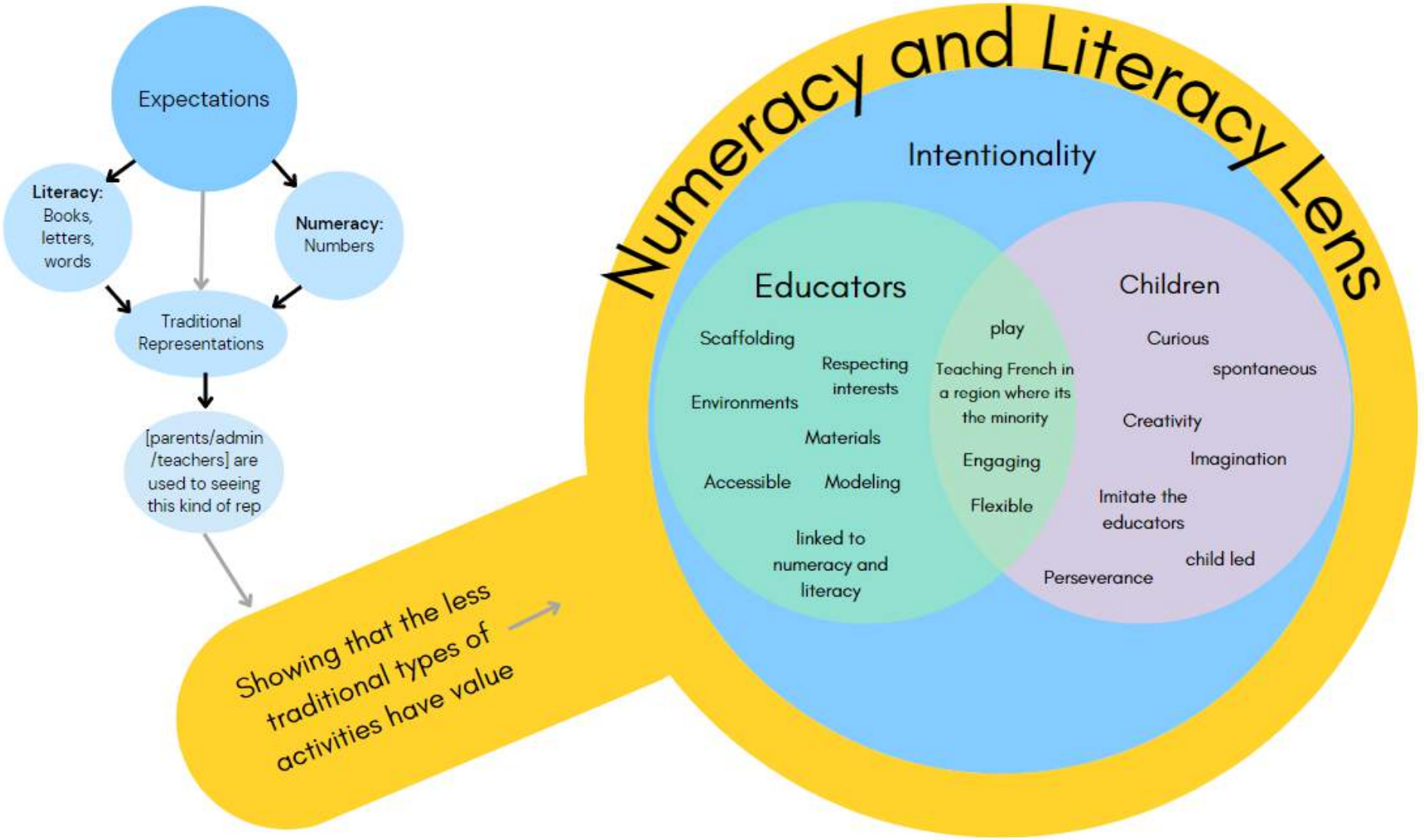
- Accessible, flexible and aesthetically pleasing materials
- Intentional reflection
- Meaningful documentation,
- Multiple perspectives,
- Provocations based on observations,
- Invitations

This process fosters the building blocks of Numeracy and Literacy

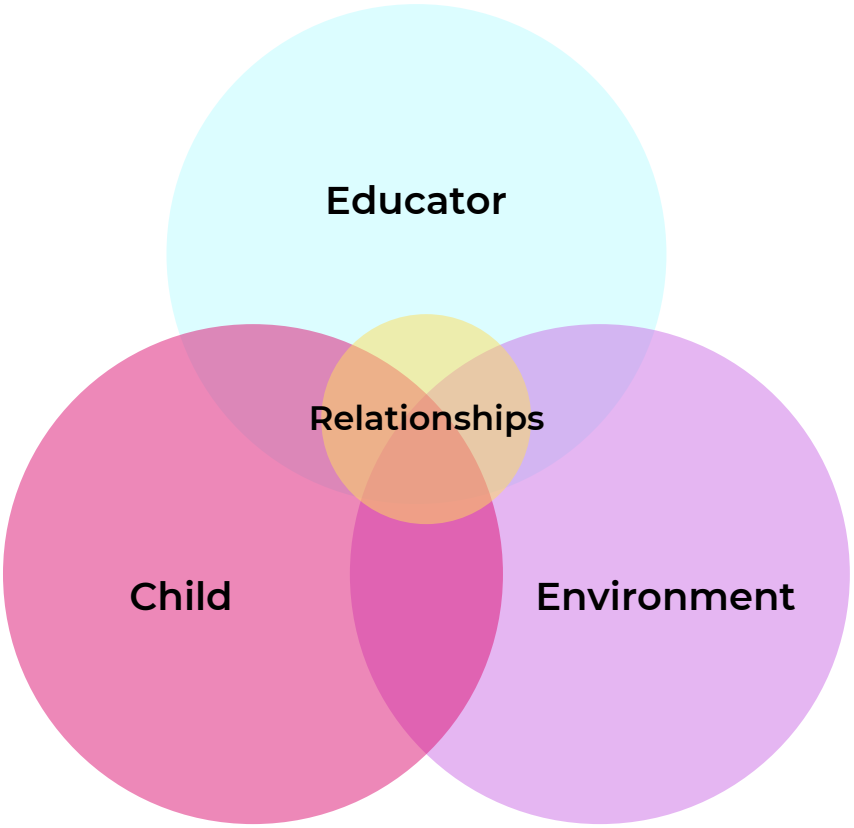
ANS/Black Communities Final Visual



Francophone Communities Final Visual



Themes across all groups



A numeracy and literacy lens:

Relationships are the connection between the child, the educator, and the environment. They act as the foundation for all learning, working together and separately to inform play-based approaches and responsive interactions.

Educators support numeracy and literacy by being thoughtful and intentional in their planning of the play environment, and by drawing on their knowledge of the child to model and scaffold opportunities for learning and growth.

By creating an **environment** that fosters exploration through accessible and flexible materials, educators supply children with opportunities for play-based learning. This emerges through invitations, unplanned/spontaneous learning opportunities and extensions of past activities.

A **child**-focused environment takes into consideration all characteristics of the child and how they influence and interact with the educator and the environment. Through observing the children and building relationships with them, educators can take into account their natural curiosity, perseverance, and independence when planning their play-based early learning environments.

PARTICIPANT EXPERIENCES

Participants were engaged in the workshops and brought forward many examples of numeracy and literacy in their play-based classrooms. They had many ideas about how to share the numeracy and literacy lens with their colleagues.

We asked participants about their experiences participating in the workshops and overall, received a positive response. Elements of this workshop that participants appreciated were: the structure of the workshops, how it framed their experiences and widened their lens, and the interactive/collaborative nature of the workshops.

Structure of the workshops	*"It's just been a great opportunity for me to learn a lot from you and all the administrators of this program and more so, learn a lot from all the colleagues of mine, from different schools who have been using various unique methods to enhance the numeracy and literacy in their classrooms. And an opportunity to air my view as well."*
A Wider Lens	*"I mean, you see literacy and math all the time, just the kids doing it on their own. But like, how much I see now just by doing this is like 'oh my goodness'. Like, they're so beyond what I even thought they were. Like, even though I've been doing this for 20 some years, right. It's just kind of like you just need that little like boost every so often to kind of get you excited again."*
Interactive and Collaborative	*I really liked when we shared our photos. It was like 'yes, I'm going to get to show my photos', I had like this excitement [...] It was like having one step ahead, having something to share on Monday nights.*

Conclusions

- The discussions that arose from the photos shared within workshops, clearly highlighted how numeracy and literacy are embedded in play-based learning environments and are cultivated (or fostered) and supported by the relationships between the educator, child and the environment.
- Hosting workshops that were facilitated but emphasized group collaboration seemed to validate early childhood educators' experiences in supporting numeracy and literacy in a play-based learning environment, while also inspiring them with new learning opportunities.

Next Steps

- Further dissemination information will be made available on our website (msvu.ca/eccrc). Keep an eye out for a full report, a one-page summary and future research publications.
- These materials are being created with the intention of highlighting and promoting how numeracy and literacy is supported in play-based early learning environments.

Acknowledgements

The research team would like to thank the Margaret and Wallace McCain Family Foundation for funding this project and the Department of Education and Early Childhood Development for it's support of this project.
We would also like to express our deep gratitude to the participants for sharing their knowledge with the research team and with one another.

Questions? Contact us at:

Jessie-Lee McIsaac: jessie-lee.mcisaac@msvu.ca
Christine McClean: christine.mclean@msvu.ca
CSAP Contact Lyse Anne: lyse-anne.leblanc@csap.ca

eccrc_msvu eccrc_msvu ECCRCmsvu msvu.ca/eccrc