

Walking Many Paths, Our Research Journey to (Re)present Multiple Knowings

Creating our own spaces

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Résumé de l'article

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Walking Many Paths, Our Research Journey to (Re)present Multiple Knowings: Creating Our Own Spaces

Melitta Hogarth and Kori Czuy

ABSTRACT Indigenous peoples globally are seeking new ways in which to communicate and share our worldviews. Sometimes defined as resistance research, emancipatory research, decolonising research — our research (re)presents the multiple journeys we live and come to know. Emerging Indigenous research methodological approaches are centring Indigenous ways of knowing, being and doing, to privilege Indigenous voices that have been suppressed through colonization. The intricate weaving of Western methodologies with Indigenous knowledges evokes agency in two emerging Indigenous researchers (from Australia and Canada) and weaves a path of reconciliation between their diverse disciplines and the seemingly dichotomous knowledge systems they are challenged to work within. Using metalogue, a way of authentically bringing together multiple voices through dialogue, we discuss the creative and radical Indigenous methodological approaches developed and enacted within our PhDs. The paper will provide insights into the epistemological, ontological and axiological principles that inform emerging Indigenous approaches to research.

KEYWORDS Indigenous methodologies, decolonization, creative methodologies, creativity, metalogue

Globalization of knowledges through the ever-increasing realms of technology have allowed for the ways in which we communicate to evolve. Indigenous peoples are also involved in this evolution of language. As an act of resistance to the colonizers' language, Indigenous peoples worldwide seek new ways to communicate and share our worldviews. Indigenous poets and activists are finding ways to blend the colonizers' language with their own (see Nga Hine Pukorero, 2019) or refusing to maintain the grammatical and spelling structures through the use of free verse (e.g., Cole, 2006; Czuy, 2021; Four Arrows, 2008; Hogarth, 2019).

Within academia, Indigenous academics also seek ways to disrupt the status quo. Sometimes defined as resistance research, emancipatory research, or decolonizing research — our research (re)presents the multiple journeys in which we live and come to know. Emerging Indigenous research methodological approaches are centring Indigenous ways of knowing, being and doing, to privilege Indigenous voices that have been suppressed through colonization (Battiste & Henderson, 2000; Blair, 2015; Kovach, 2009; Martin, 2003).

In this paper, Melitta and Kori examine the intricate weaving of Western methodologies with Indigenous knowledges that evoke the agency of two emerging Indigenous researchers (from Australia and Canada) and how these actions weave a path of reconciliation between their diverse disciplines despite the seemingly dichotomous knowledge systems they are challenged to work within. They discuss the creative and radical Indigenous methodological approaches developed and enacted within our PhDs. The authors extend their previous yarning circle shared in 2019 (Czuy & Hogarth, 2019), where the innovative approach of metalogue was used (Bateson, 1972), providing insights into the epistemological, ontological and axiological principles that inform their emerging Indigenous approaches to research. While aspects of metalogue remain evident within this paper, we look to enhance our applications by drawing on the examples of Four Arrows (2008); and, in doing so, produce a pseudo virtual reality space created through our imaginings. Here, Melitta and Kori continue their work of circling the square, chipping away at the corners to form a circle (Czuy & Hogarth, 2019).

This paper looks to push further the boundaries of metalogue (Bateson, 1972; Four Arrows, 2008). This paper seeks to present a transcript of Melitta and Kori's interactions as panellists at a conference forum presenting in a virtual reality space. A computer program or form of Artificial Intelligence, known as *EH-EYE*, acts as the Chair of the Panel. The "audience" exists in the panellists' minds' eye where the two nations are brought together into a harmonious space. As with metalogue, where the conversation and interaction of the social actors are co-generated, this virtual space is also cogenerated. Much like the writing process of this paper, the vast distances between Melitta and Kori are being addressed within a technological space.

Through online discussions throughout 2019, Melitta and Kori discussed the possibilities of seeing each other face to face again and the various barriers faced for this to come to fruition. Technologies have created a space to maintain collegial discussions and writing. As a result, the idea of presenting together and how and what that could look like was explored with enthusiasm. This conversation acted as the driving idea to consider the possibilities and limitations of a virtual reality space. The usual barriers of land-based seminars seemed irrelevant in the virtual reality space as barriers such as insurance, travel, accessibility, time, risk assessments, and so forth were no longer relevant.

Further to the considerations discussed above, the differences in terms of reference and differing lived experiences within our Indigeneity needed further discussions. This was because while the metaloguing sections allow individual voice (Bateson, 1972; Four Arrows, 2008), our voices are silenced in these contextual introductory spaces, and there is a need for the collective voice. While such issues could be resolved, a compromise was necessary at times. These conversations have not been shared in this paper but are worth noting to address any misconceptions of a shared sense of identity or Indigeneity.

However, the excitement of a 'solution,' there was a need to remain connected to Country, Land, and Spirit and privilege one's Indigeneity. But how were the authors to represent both their Countries? How can they speak to their spiritual connection to the land, the animals, the trees? How can they privilege Indigenous ways of knowing, being, and doing? It is anticipated

that as this paper progresses, these very questions may be answered or solutions proffered. The following section sets the scene and describes the panellists view of the virtual reality space to enable and entice the reader to also enter the space.

SCENE 1: The Minds' Eye View of the Virtual Reality Space

This evening gathering occurs as the sun hovers somewhere between dusk and night. The sun sits somewhere above and below the horizon line, floating behind the landscape as it protrudes out of the land telling its own story of longevity. The darkness is slowly enveloping the final rays of the day, and so the firepits begin to be lit by the firekeepers. As the wood crackles, embers escape to dance amongst the burgeoning dark skies. The silence that occurs as day turns to night is breached by the sounds of the land. The sacred fires are here to symbolize connection, gathering, and home — audience members, those with two legs and four, feathers, scales, roots, and leaves begin to gather.

BUFFALO makes a face as MUSKRAT tries to take a place on the log. MUSKRAT doesn't want to argue and takes a place in the back eyeing up the wooden blocks — “Projects for later?!!” A slight breeze tickles and burrows through the leaves of EUCALYPTUS and BIRCH trees. The familiar laugh of KOOKABURRA echoes throughout the growing crowd. Defying gravity amongst the needles of the spruce, CHICKADEES chirp the tune of their namesake, calling their relatives to gather and learn. Circling overhead is Melitta's ancestor, EMU, with their wings stretched wide. For in her Dreaming, EMU can and always has been able to fly (see Hogarth, 2018b). Silent prayers and songs are heard in the wind — *“Thank you to our firekeepers who keep the sacred flames burning.”*

A hush comes over the audience as the last glimpses of sunlight dissipate and fires become the main source of light until the WOLF TRAIL (Milky Way) and spirits of the AURORA reveal themselves. The evening gathering is about to begin with all eyes, senses and spirits turning towards the holograms standing within the central fire. A voice comes from beyond.

Act 1: Acknowledgement of Land and Country

Unknown Voiceover

Depending on whose lens you are viewing through, certain aspects of Land and Country are more pronounced. From a colonial Australia lens, the virtual space is a reflection reminiscent of the lands in which Melitta grew up. The soil is a rich brown in colour, reminding those who care to notice the story of the lands. The lands are abundant with grasses that sing their subtle song as the wind passes through their long strands. A small creek sits in the background, for it has been many a year since enough rains have fallen to bring it to life. A slight drizzle the evening before has allowed for the smell of eucalypt, lemon myrtle, and wattle flowers to waft across the breeze. In the distance, you can see Boobarran Ngummin, otherwise known as the Bunya Mountains, a significant site where Aboriginal peoples once gathered. The majestic Bunya pines tower and stand guard welcoming those who enter this space. The land is Aboriginal — a deliberate act of resistance to ignore the colonized space but of a time before. In this virtual space, we return to a time or seek a space where our Aboriginality and connection to

Country is privileged. There is no need for explanation nor explication, but it is taken as is. The interconnectivity of the land, the animals, nature and the authors are understood through our connections with one another. We speak a common language and move together with a common goal.

From Turtle Island, the created virtual space is reflective of the lands Kori knows as familiar; the prairies and mountains of Northern and Western Canada, Turtle Island. Called in are the ancestors from the North, the aurora, the dancing spirits that transcend the sky, cosmos, and land. The sounds and smells of cracking sheets of river ice, the silence yet spiritual cacophony of the aurora, and the sense of home created by a winter fire that ground both spirit and this virtual space. The fire colours reflect crisp summer sunrises and fragrant wildflowers, while medicinal grasses of the prairies present their gifts through medicines of stories, songs, healing, and relations. Called in are the healing spirits of the mountains of *Îyârhe* Nakoda Territory. Sleeping Buffalo Mountain rests at the confluence of the winds and corridors of the four directions, an ancient gathering place for reconnection with body, mind, spirit, emotion, and ancestors (Powderface, S, recognized Elder from the *Îyârhe* Nakoda Nation, Treaty 7, Oral teaching from Indigenous Wisdom Gathering, personal communication, April 11-14, 2019). Stories of this mountain are again being shared after being hidden for safekeeping from colonization, tokenism, and translation. It is also important to recognize the animals who were also caretakers of these lands. Living within the circle of reciprocity and respect, animals worked together to thrive by teaching and learning from each other. Animals and land and relation to the cosmos have much to teach through passed-on stories from Elders, ancestors in ceremony, and personal experience.

This space allows for a rekindling of connections with the ancestors as stories begin again to swirl amongst the snow and looming chinook winds, dancing amongst disrupted stories and histories, healing through truth. Place and story connect us, as does this virtual space.

Act 2: The Conference Proceedings

The AUDIENCE settles in around the fires. LYREBIRD begins to sing while displaying her opulent feathertails dancing to her own tune. EASTERN WHIPBIRD sounds out his two-part “whip cracks” in unison. EAGLE ruffles its feathers to gather everyone’s attention. The voice from beyond introduces themselves as our host for the evening, Artificial Intelligence [AI] who goes by EH-EYE. EH-EYE clears their throat. A silence engulfs the crowd.

EH-EYE:

The idea for this conference was created by Melitta and Kori, with its formatting originally inspired from a previous article written together using metalogue, a methodological writing technique that allows multiple voices to retain their uniqueness while collaborating and engaging with ideas that are reflexive and evolving (Adams et al., 2008). But a recent discovery of Four Arrow’s *An Authentic Dissertation: Alternative ways of knowing, research, and representation* (2008), allowed them to weave together multiple perspectives and experiences but through an Indigenous worldview lens.

Thank you all for coming here today.

The AUDIENCE applauds.

EH-EYE:

Let's begin with an introduction from both Melitta and Kori.

The AUDIENCE applauds with vigour. BEAVER perks its head out of the water in curiosity, as does PLATYPUS.

KORI:

How gorgeous is this virtual space? It's like what I would imagine it would have been like before colonization!

Uncomfortable laughter can be heard coming from RAVEN and CROW. DINGO howls in approval.

MELITTA:

It's exactly how I imagined it to be. In my mind's eye, this is a space we all belong to. It is exciting to see how we can take back and speak to a world we once belonged to and seek to find in today's world.

KORI:

Yes, I agree; this gathering is allowing us to create an open and welcoming space without judgement or resistance.

KORI pauses and inhales the cleansing crisp post-dusk air.

It is a pleasure to be in this space with all of you, although virtual; it allows us to reconnect with those connections and relationships that have been lost through colonization and (re)member the significance of "all my relations."

Although I assisted in creating this virtual space with the land I am trying to thrive on now, I was actually born in Northern Canada, on Treaty 8, in Cree territory. Although my status card says Métis, I recently have understood that these matrilineal roots are actually Cree and English. The ongoing references to "half breed" in my generation's past seems to have melted into a piece of plastic supposed to represent my "status" but actually is a reflection of a deeply racist history. In better understanding this seemingly lost Cree history, I have reconnected with lost ancestors through ceremony and was recently gifted the name Mikho Pihe sew (Red Thunder) from a Cree Elder.

MELITTA:

I am a Kamilaroi woman whose cultural lands and heritage is found in the South-West of the state now known as Queensland. Much like Kori, my identity is bound and intertwined with the draconic policies of colonial Australia. Born in Meanjin on the Turrabul and Yuggera peoples' lands, I was raised on the lands of the Bigambul peoples, whose family lines also align with my great-great grandfather, Jack Noble. However, this knowledge was kept from me from birth. Adopted out to a non-Indigenous family at 21 days old, my Aboriginality was kept secret from me, resulting from a closed adoption policy. It was not until later, through the ancestors' interventions, that I was found, and I learnt I was not Greek as my parents had been told, but Aboriginal.

I have never been to my traditional lands. Still, I have both lived and worked on the lands where my Great-Grandmother and Great-Grandfather (in Aboriginal ways — those old people were the brother and sister-in-law of my Great-Grandmother) were relocated in 1927 (see Forde, 1990). There is an internal desire to return to the Country soon to simply "sit" but a hesitation as well, knowing the emotional energy required and paid when it does occur. So, for now, this virtual reality space provides an opportunity to amalgamate my memories and unconscious recall of a land I have never visited but have been given insights from my ancestors through dreaming. We would like to thank everyone for being here. You all represent many different worldviews that challenge us and teach us.

KORI:

Like the tricksters, whose mistakes teach us and allow us to grow and live within the circle!

The RAVEN, DINGO, and COYOTE exchange mischievous looks.

KORI:

Thank you, EH-EYE, or should I thank the programmer(s)? Who are they? Oh, let me guess...

Act 3: Introducing the research studies

EH-EYE acts a bit awkward at the comment but wants to move the attention from themselves and the questioning of their presence within the space.

EH-EYE (hurriedly asks):

You both decided not to use traditional methodologies with your doctorate dissertations. Can you explain why?

MELITTA (turns to face KORI and rolls her eyes):

Be careful, Kori! As a discourse analyst, the very definition of what EH-EYE is meaning by "traditional" needs to be provided to be able to answer this question definitively. It is indeed a loaded gun being placed to trick us into already defining ourselves as "different" from the "norm."

EH-EYE:

No! Please! No ill will was intended. A definition is indeed necessary, and I apologize for my ambiguity. By “traditional,” I meant traditional in academic institutions, where knowledge has been housed and validated by empirical methods.

KORI:

I would like to say that I used a “traditional” methodology, the sweetgrass braid, a methodology used by many Indigenous cultures for thousands of years to symbolize community and respective relationships, as taught to me by Kainai Elder Casey Eagle Speaker.

Four CHICKADEES fly down to listen. There is an uncomfortable movement within the AUDIENCE as the Indigenous animals and plants lean closer, recognizing a shift in the temperature.

KORI:

For me, academic methodologies and methods are restrictive and reductive and focus strictly on mental knowledge. Using Indigenous methodologies allow for multiple worldviews to work together and for mental knowledge to be supported alongside knowledge from the physical (the body and senses), the emotional, and the spiritual (interventions and guidance from the ancestors) (Eagle Speaker, C. Elder from the Kainai Nation, Treaty 7, Oral teachings, personal communication, October 8, 2019).

MELITTA (nodding in agreement):

I agree in part with what you have said, Kori. I, too, found the Western methodologies restrictive.

For me, I recognized a gap in the Western methodological approach, Critical Discourse Analysis. Here, I found that the champions of CDA, as Critical Discourse Analysis is often referred to as, were White non-Indigenous peoples such as Fairclough (2015), Wodak (Wodak & Meyer, 2009), van Dijk (1993), and so forth, whose analyses of discourses and their influence in being informed by and informing societal and institutional structures came from an outsider’s perspective, moreover, a white lens. That is, our analytical investigations differ because when *we* analyze discourses we are informed by our lived experiences, knowledges, and understandings from both inside and outside.

EH-EYE (raises an eyebrow and then turns head slightly to left with a quizzical look):

But wait, what are you suggesting!? I am finding it hard to compute. Like, Kori, isn’t your research about mathematics? How can mathematics be physical, emotional, or spiritual?

KORI:

Mathematics has been driven by domination and perpetuation of a worldview dependent upon methodologies, epistemologies, and ontologies that are objective, static, and purposefully

void of culture and abstracted from the human experience (Stavrou & Miller, 2017). This universal/standard mathematics (and science) has become unquestionable, thereby becoming the gatekeeper for defining what knowledge is rational and logical, while subsequently defining what knowledge is “pseudo”—soft and more subjective (Snively & Corsiglia, 2001). As mathematics abstracted the experiential, the cultural, and human for the hard, logical, and inherently Eurocentric defined subject, it segregated and discounted an Indigenous way of knowing mathematics. I came about my research topic when I saw a graphic of a body-tally counting system out of Papua New Guinea. EH-EYE, can we bring up this image?

EH-EYE presses a button to their left on a screen. An image of a person with various numbers (Figure 1) attached is made visible to AUDIENCE.

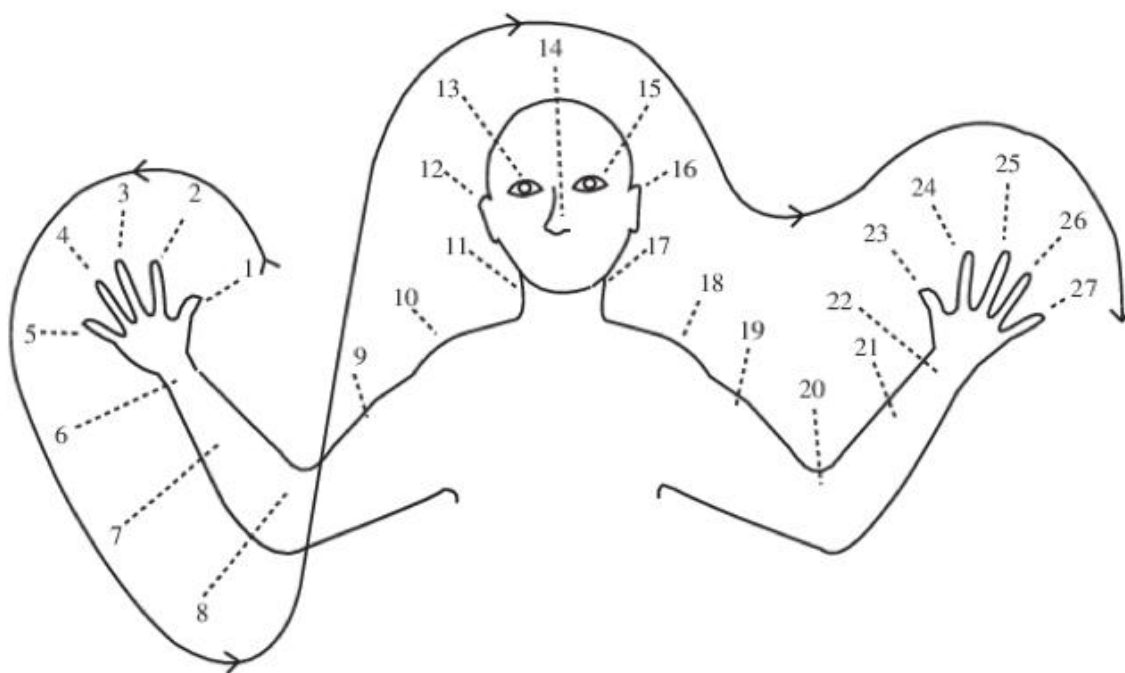


Figure 1. From Saxe, 1981, p. 307

The SABE (bigfoot), standing proud amongst the CEDAR, began to imitate the numbers on its body, nodding in agreement and understanding.

KORI:

Hai hai, thank you. This image made me think back to how I learned mathematics in school; abstract, based on memorization. I wasn't allowed to use my fingers to count, and it didn't seem to be related to anything in my world outside of the math classroom. Leafgren (2001) stated that school overtly separates the student from nature, each other, and their own body, especially in the math classroom. As I researched more, I thought about how learning numbers

through my body could have changed how I learned by creating connections between math and my senses. What if my elbows were always the numbers 8 and 20? How would that have changed my understanding of those numbers, understanding of my elbows, or how would it have changed how I understood how those numbers relate to each other, because each elbow is related?! I remember being asked in my candidacy exam how this could be practically used in the classroom.

MELITTA nods in agreeance as she looks at the image.

KORI:

This question made me think for a moment. Then I realized that the counting systems were as varied in Papua New Guinea as their languages, each community having a slightly different approach, some using only the right or left half of their body, some using body parts from their head down to their belly button or toes (as interpreted from Saxe, 1981, and Wassman & Dasen 1994). Trade, and therefore relationships, were vital to these communities. Thus knowledge of the differences, sometimes subtle, between community counting systems was important in translating between systems of counting for the trade of commodities and knowings. For example, the graphic shown here is a counting system based in 27, but could be trading with a community with a system based in 28 with the addition of their mouth as number 15. Being able to translate between these systems is a skill, of which could be related to the grade 3 math classroom, where students have to learn to tell time, a skill difficult for many students to grasp as it involves translating between different number systems, base 60, 24, and 12.

EH-EYE:

I see you nodding at what is being said, Melitta. Would you like to share?

MELITTA:

I love how Kori speaks of mathematics and, in this instance, the mere act of counting as a language. Despite coming from very different disciplines — English/discourses and Maths — and yet, the intricacies and interrelationality in our work and our ways of doing continue to be located in the weirdest of places.

Policy informs my life, education, identity and so forth. As a result, policy became my subject for analysis. My research study grew out of my Master of Research (Education) (Hogarth, 2015). In my Master's, I had critically analyzed the then-current Indigenous education policy, the Aboriginal and Torres Strait Islander Education Action Plan 2010-2014 (MCEECDYA, 2011) using Fairclough's Critical Discourse Analysis framework (2001). In that instance, I saw the gaps in CDA as a methodological approach for me. I wanted to centre Indigenous voices, and Indigenous lived experiences.

KORI clicks her fingers in agreeance. EMU stretches her neck in pride.

MELITTA:

That rather than Indigenous students being the subject of the study and further perpetuating the deficit discourses when speaking about Indigenous student educational attainment when measured against the coloniser's standards of excellence, I wanted to make the coloniser the subject and investigate just how they are "working" towards addressing the inequities prevalent in education — flipping the focus.

There is always so much talk about addressing the inequities in education and seeking ways to address the educational attainment of Indigenous kids. Still, as a classroom teacher for almost 20 years, I saw that this was just talking. Quite often, the ideas and rhetoric espoused in political discourses were not shared nor enacted. But this had all become normalized within society to the extent that when the same results were reported year in and year out with no notable progress, it was never questioned or queried but seemed to be becoming an expectation. There needed to be ways to counter this.

Language has always been a passion of mine. It's the power to manipulate, inform, explain, and then have the ability to affect people's moods and/or actions — language is just so powerful. With that in mind, it was essential to show the discursive trickery — how policy has the ability to say one thing but mean another or say nothing at all. Policy gives the illusion of action and a desire to effect change but as Fairclough's framework asks: "Does the social order 'need' the problem?" (Fairclough, 2001, p. 238).

As you can see, our lived experiences within society or even within the classroom have informed our phenomena for study.

For me, the policy has informed my identity, but it was only through the ancestors' interventions that I was able to come to know the truth and begin to make the alignments to the perceived déjà vu moments in my life. Only then did things begin making sense.

EH-EYE:

Interesting. Your work, Melitta, derives from a lived experience that I have not had, and it is difficult to compute. However, I would think that it is like my relationship with my programmer who determines my personality and so forth. However, I can relate to Kori's interests in Mathematics because I believe it is like working between binary and other number systems.

MELITTA:

It is interesting to see how you are trying to centre yourself here, EH-EYE. We are talking about our experiences and our research, yet you still seek to focus on your own experiences. So often, this is our experience — that our stories must always be questioned or brought back, so the colonizer is the focus.

Act 4: Interventions of the ancestors

Three GREEN TREE FROGS begin "warking" in support, acknowledging what they see is happening while HOOP PINES shiver to readjust their rings, loosening their built-up tension. EH-EYE shifts their weight and adjusts their tie while looking slightly unnerved.

EH-EYE:

Apologies again. I am afraid my programming has positioned me from a dominant colonizer lens. Shall we continue and, hopefully, I will not put my foot in it again. You have both said you were using Indigenous methodologies. Where does that fit into your research?

KORI:

As I read through these studies from the early '80s in Papua New Guinea, they seemed so disconnected from the culture that was being studied. As common at that time, researchers and anthropologists went into communities to study on and about cultures. They took words and phrases and stories and then interpreted them into their conception of knowledge. I couldn't help but ask, what did the community get from the research? Linda Tuhiwai Smith (1999), a Māori scholar, stated that research has become such a dirty word within Indigenous communities because knowledge has been taken and commodified, reciprocity was never taken into account, leaving communities worse off than before, with knowledge removed, resources taken, stories exploited and commodified. Smith (1999) wanted to support research with the community, where everyone benefits, respect and reciprocity of knowledge and stories are ethical, and community is front and centre.

MELITTA is seen to be clicking her fingers in agreement. EH-EYE listens intently but is uncomfortable, wanting to interrupt but unsure just how to do this.

KORI:

There is power, hierarchy, and dominance that universal, standard mathematics has created for itself (Aikenhead, 2001; Cajete, 1999; Sterenberg, 2013). A worldview of math put itself at the pinnacle, discounting any other mathematical system as inferior to it, almost even discounting them as wrong (Snively & Corsiglia, 2001). As I began to open my mind and heart to understanding mathematics in multiple ways, I realized mathematical pedagogy of abstraction and memorization is a process that forcibly removes the human, spiritual, sensory, and community aspects of mathematics. All of a sudden, my belly button reconnects with my previously abstracted understanding of the number 30 with my body, my senses, and with the spirit and stories of my matrilineal ancestors. This (re)connection, sparked by coming across non-standard counting systems from across the globe, guided me to reconnect with the knowings of my ancestors on Turtle Island and opened up my previously narrow worldview of mathematics...prompting me to question it. This questioning led me on a journey of inferiority and moments of impostor syndrome. I knew something else, something cultural within these seemingly absolute mathematical truths, all of which seemed to push me into questioning myself, my learned "truths," and these seemingly static mathematical ideas. This brought me to use Indigenous methodologies of the sweetgrass braid to bring together multiple ways of knowing through community and openness concepts.

RAVEN hops onto the TURTLE. The animals collectively react; witnessing and understanding the coming together of a trickster with a disrupted truth.

EH-EYE:

I don't want to interrupt, but I have seen Melitta nodding her head in agreement, and I am left wondering how there can be synergies in your ways when you work in such disparate fields? You also used an Indigenous methodological approach in your research, Melitta. Is this correct?

MELITTA:

Much like Kori hinted at just before when looking at the removal of the "human" when looking further into number and its representation in Papua New Guinea, I found an uncomfortableness in my Master of Research (Hogarth, 2015) where the primary focus of the methodological approach was on the Western methodology and in turn, removing myself from the work, removing the "human." Or at least, that is how it felt after the fact and reflecting on that process. In my Ph.D. (Hogarth, 2018a), I knew I had to rectify that situation.

I began hinting at this when I spoke about the lack of Indigenous voice in Critical Discourse Analysis (Fairclough, 2015) before; however, it was more than just that! I knew CDA was not enough for me. I wanted my research to reflect myself, and in doing so, I knew that I needed to centre Indigenous epistemologies, ontologies, and axiologies. Further readings of Indigenous academics such as Rigney (1999), Smith (1999), Battiste (2000) and so forth had me recognize this was missing in my Master of Education (Hogarth, 2015). While I had drawn on Rigney's Indigenous Research Principles and Nakata's Indigenous Standpoint Theory (2007) within that study, the primary informing approach was CDA. I was determined that in the Ph.D., the Indigenous worldview would be centred.

EH-EYE:

And how did you do that using Indigenous methodologies?

MELITTA:

I recognized that within each layer of Fairclough's CDA (2015) analytical framework, I was always looking through an Indigenous lens. My lived experiences, beliefs, and understandings of the world — otherwise known as members' resources — were consistently informing and forming my interpretations of the text. That is, my Indigeneity and myself were embedded in the analysis.

I intentionally search for Indigenous texts, and it was through an intervention of the ancestors that I was introduced to The Coolangatta Statement on Indigenous peoples' rights in education (Morgan et al., 2006). The fact that I just happened to be sitting in the audience of a conference presentation when there was an off-hand comment made in response to a question asked at the end by one of the presenters mentioning the "Coolangatta Statement"

and something or someone in my head saying “What’s that?! Be sure to check it out.” *I had no idea what it was or what* its actual name was, but I was determined to find out. So much so that later that evening in a hotel room, I was searching databases and doing random web searches.

Without the intervention of the ancestors, my study would have been very different. The Coolangatta Statement on Indigenous peoples’ rights in education (Morgan et al., 2006) became the lens through which I analyzed the National Aboriginal and Torres Strait Islander Education Strategy (Education Council, 2015). It became the guiding document.

EH-EYE leans forward to gain MELITTA’s attention halting the conversation.

EH-EYE:

Something I am noting within both your responses is that there seems to be another force that drives your work — a type of spirituality that guides your choice of phenomenon, your direction in research and so forth. Can you share a bit more about that as it is something foreign to me! It does not compute!

EH-EYE chuckles at their joke. Some random bursts of laughter are heard within the AUDIENCE that resemble the cackle of COYOTE. MELITTA and KORI both look out to the audience in the direction of the laughter but cannot spot the individual as the shadows from the fires hides their identity.

KORI:

Like what Melitta stated, spirit also guided me. My ancestors led me on a path to reconnect with my Indigenous roots, which in turn allowed me to experience mathematics and science through an Indigenous way of knowing with Elders and through ceremony. I paid close attention to my intuition, dreams, moments of déjà vu; they became moments of guidance and knowledge. I had to find or create a methodology to allow these worldviews to weave together, without hierarchy or dominance of one worldview over another.

MELITTA:

Within my study, there were several interventions. There was the guiding document, but there was also the formation of the conceptual framework of Indigenous Critical Discourse Analysis itself. The methodological approach was different in that I feel as though it was the ancestors who helped me shape and form the conceptual framework for Indigenous Critical Discourse Analysis (Hogarth, 2018a). Perhaps here, it would be easier if EH-EYE would bring up the framework?

EH-EYE presses a button, and the image (Figure 2) is made available for the audience to view (Hogarth, 2018a, p. xxxvii; p. 167).

The AUDIENCE listens and experiences silently. STARS begin falling, marking the night skies.

MELITTA (turns to look at EMU):

I acknowledge that I am here today because of them.

EMU spreads her wings and stretches her neck, nodding her head toward Melitta in recognition. BUFFALO stands proud at a distance. Its breath is just loud enough for everyone to notice — rhythmic, relational, and respectful. A few audience members become uncomfortable with the BUFFALO's presence, continuously peering over their shoulders.

KORI (speaking to BUFFALO while touching her heart in respect):

Tanisi, relative.

KORI pauses for a moment.

KORI:

Alongside Elder Eagle Speaker, we came up with the sweetgrass braid as my methodology. Casey taught me that sweetgrass represents community, each strand coming together to become stronger together than apart. This process allows for each strand to retain its individuality, supporting and being supported by its community, and being allowed to find and use its gifts while making mistakes along the way (Czuy & Eagle Speaker, 2019). These three strands of the braid represent three ways of knowing in general, but more specifically, mathematics. Indigenous way of knowing, the first strand, symbolises knowing from the land, Elders, and community. The second sweetgrass strand represents personal ways of knowing, using our memories and experiences, alongside our bodies, senses and spirit to come to know and (re)connect with the mathematical stories as explored by the first strand, Indigenous knowings. Once these first two strands are truly explored and understood, we can begin to braid in the third strand, Universal standard mathematics, where connections (similarities and differences) can be made between Indigenous and personal ways of knowing with the standard mathematics (Czuy & Eagle Speaker, 1999). This process critically engages initially with the first two strands, which have been disrupted and colonized, bringing equity to learning mathematics. This braid allows for an understanding of mathematics in multiple ways, holistically, humanly, and authentically.

Bringing in this sense of community and personal connectivity to mathematics is genuinely an act of reconciliation. As Melitta mentioned, it allows for multiple experiences and beliefs to inform and interpret. What perspectives, innovations, or a-ha moments are we missing if only a singular worldview, as disconnected from what makes us human (culture, language, experiences, innovation, spirit, curiosity), is supported as valid? Using only rational, objective methods for my research would have left out the understandings I received from dwelling upon the spiritual knowledge and guidance as gifted through ceremony, moments of intuition or *déjà vu*, and dreams. Holmes (2000) described the importance of deeper connections made

through knowledge passed on through spirit, ancestors, and ceremony, a connection I can attest through by paying close attention to these non-standard and subjective methods of knowing within my research.

A roll of THUNDER echoes in the distance. KORI takes a breath to acknowledge her ancestors the THUNDER family.

KORI:

The thunder reminds us of not only the disruption of order but also the connectivity of all. As energy builds up, it creates an imbalance, sparking an event, a release of built-up energy, a bolt of vibration that disrupts and calls together. It is a call to action, sometimes a call to harvest or ceremony, or sometimes a call to something greater, a paradigm shift.

As we move into this new century, divisive politics are separating communities. Still, acts of reconciliation, like using Indigenous methodologies, have the potential to (re)connect spirits, relationships, and openness to the new. I have to hope for these (re)connections, (re)conciliation, (re)conciliACTION; it is a radical hope for the seven generations in the future.

EH-EYE:

This subjective way of knowing is difficult for me to process. Perhaps at this stage, we should open the floor for questions from the audience? Audience members are invited to send their questions via the monitors now being made available.

Act 5: Questions and answers

The AUDIENCE jostle around. Some of the participants shift in their seats while others make their way to the monitors. A solitary DING can be heard ring out in the night air. This is shortly followed by random BEEPS and DINGS, which can be heard as the questions are collated.

EH-EYE:

Thank you. Our first question from the audience is from LYREBIRD, who asks, “Why is creating or writing ‘outside of the box’ critiqued as being done with less rigour? Why is it often positioned as if we are just doing things a different way to be different?” Would either of the panellists like to respond?

MELITTA:

I would like an opportunity to respond to that one.

EH-EYE nods as MELITTA turns to face the audience.

MELITTA:

And thank you, LYREBIRD, for bringing this up. I believe it is crucial that we do consistently seek to find new ways to (re)present ourselves — as an act of resistance. We have found our voice, and it is important not to conform. I don't want to be the same and write like Others. I purposefully look to go outside the box. Is it without rigour? No — it is bound within Indigenous knowledges, informed by our epistemologies, ontologies, and axiologies. I refuse to enter the arena when the power of our knowledges is questioned. How often do we as Indigenous peoples consistently face the feedback and critique of the Other? Anyone who has submitted to a mainstream journal will know what I am talking about here.

CICADA buzzes, starting an orchestra of melodic tunes throughout the audience.

MELITTA:

The Other becomes the gatekeeper determining who can and cannot publish and whose knowledges are important and valued. These very barriers act as motivators for me to keep on going and continue pushing the boundaries. So, in a way, yes! Yes, I am doing things to be different but with purpose. To resist the status quo and to disrupt. I don't actively protest, but I do this through intellectual activism (Hill Collins, 2013).

KORI:

Absolutely. It is not about *just being different*, but about not conforming, and that being okay. Four Arrows (2008) positioned his book on alternative dissertations around guiding students (and their committees) in working around the limitations of academic writing to allow creativity and the (creative) human aspect of research to be accepted as rigorous, legitimate, and credible ways of representing graduate research. Saying that, I still get push back with academic journals and professors, stating my writing is too narrative and without structure.

EH-EYE:

We have a question here from HOOP PINE, who asks, “What is reconciliation within the academy and within Indigenous methodologies? Or moreover, how do we reconcile this?”

THUNDER begins to rumble in the nearby mountains.

KORI:

The academy has successfully functioned within its borders and gates, thrived in segregation and moments of ignorance, and has done so over centuries. No matter how many intentions to act on calls from the Truth and Reconciliation Commission (2015), guest speakers, inclusive panels, or add-ons to the syllabus, change will still be an idea. A moment of disruption and discomfort has first to happen. It will call to order, break open the built-up wall of “truth,” to open minds and hearts to that which has been buried, hidden, and discounted.

LIGHTNING strikes. KORI jumps and giggles in response to the coincidence.

MELITTA:

In colonial Australia, there has been many calls for truth-telling. There is a need to acknowledge the past and no longer whitewash history (Referendum Council, 2017). Perhaps it is a global action throughout Indigenous communities as we seek to find our place within the tertiary institutions.

EH-EYE:

Another interesting question here! This one comes from RAVEN: “Why do we have to ‘weave’ non-Indigenous methodologies into Indigenous methodologies? Is it to validate our approaches? Can’t they stand alone?”

KORI:

Yes, they have to be given space and trust to stand alone.

This is a question and a problem within ethno[mathematics]. I have witnessed teachers excited to learn how to weave Indigenous knowings within mathematics. In the next breath, they get caught up in universal math connections, immediately forgetting the story’s roots. As Doolittle (2006) mentioned, a tipi is not just a cone; a discussion took place around 3-D shapes being taught through the token symbol of a tipi, simplified into a perfect mathematical shape. The tipi has significant Indigenous methodological and storied roots, with the shape representing the womb and each pole a sacred teaching. The shape differs based on the land it is on. The four-pole tipi on Blackfoot territory is closer to the ground to anchor it through the harsh Plains winds (Crowshoe, R., recognized Elder from the Piikani Nation, Treaty 7, Oral teaching on tipi building committee sessions, personal communication, July 4, 2018). Here, angles are not just angles but represent generations of experience as passed on through story and apprenticeship. The stories of the tipi as a womb and the teachings that connect with the poles vary between communities and families. They represent the respect of protocol and reciprocity that runs deep within Indigenous ways of knowing.

The depth of mathematical knowledge within Indigenous stories is apparent, but has to be taught as independent of the universal/standard mathematics to retain integrity and authenticity. The understanding and connections made by the participants allow for the weaving together of multiple worldviews.

BUFFALO stands its ground.

EH-EYE:

The following question comes from DINGO: “In your discussions, you have shared how Western methodologies have been used to validate your methodological approaches. Where is the dignity in having to validate Indigenous methodologies through Western methodologies? Why not simply use an Indigenous methodology?”

I think that question has been asked and answered. Shall we move to the next question? The next...

MELITTA raises her hand to gain EH-EYE's attention.

MELITTA:

I would like to answer that question. While I recognise that you want to give all participants the opportunity to engage and while, predominantly the question has been answered in our previous response, is it not up to us to decide whether it is necessary to answer the question rather than silencing us?

EH-EYE raises their eyebrows and looks a bit ashamed but also aghast at this. MELITTA turns to the audience and begins to respond without an answer from EH-EYE.

MELITTA:

I would have loved to use an Indigenous methodology throughout my thesis, but I could not find one that provided me with what I needed. I could not find an Indigenous methodology that focuses on the use of language and discourses and how these are informed and formed by our lived experiences and so forth. This is not a reflection on Indigenous methodologies but highlights how new Indigenous peoples are in the tertiary space. The idea of selecting components of Western and Indigenous methodologies to suit my study enabled me to design and test a methodological approach that drew on several theories. And so, I think there is dignity in such an approach — the purpose is not to validate the Indigenous methodologies used but to build on the work of those who came before us. There is dignity and pride in that.

KORI:

My experience was very similar to Melitta's. I was inspired by existing Indigenous methodologies but found that I needed to create something with Elder Eagle Speaker. I felt it needed to be personal to me and my experiences. The sweetgrass braid reflected methodologies from D'Ambrosio (2001), Kimmerer (2013), and Smith (1999) while connecting to my relationship with Elder Eagle Speaker and my connection to the act of braiding and the sweetgrass medicine.

EH-EYE:

This question comes in from ECHIDNA and is addressed to you, Melitta. The question is, "Why do you refer to your methodological approach as Indigenous Critical Discourse Analysis? Isn't it just Critical Discourse Analysis through an Indigenous lens?"

DINGO cackles. An uneasy silence has come over the audience. The fires begin to spit as a log breaks sending embers into the dark sky.

MELITTA (looks to the sky):

It is okay. I have been asked this question before, and it will not be the last time.

MELITTA brings her eyes down to the audience and sits to the front of the chair.

MELITTA:

The short answer is that Indigenous Critical Discourse Analysis (Hogarth, 2018a) does more than just bring an Indigenous lens to Critical Discourse Analysis (Fairclough, 2015). It centres the Indigenous worldview, our ontologies, axiologies and epistemologies. In doing so, the *insider* analytical lens, as opposed to the *outsider* lens used by others using Critical Discourse Analysis is privileged. I have had minimal application opportunities in applying Indigenous Critical Discourse Analysis thus far, and so there may be limitations I have not yet discovered. But in saying that, this is the very reason I refer to Indigenous Critical Discourse Analysis as a methodological approach. There are no claims to it being anything else but a means by which to analyse data.

The AURORA has settled behind the horizon, passing on its responsibility of light to the WOLF TRAIL.

EH-EYE:

Thank you for all the questions, and thank you to our speakers Melitta and Kori. It seems time is up.

KORI:

Colonial time...

EH-EYE:

I am curious about what that means, but the program is only set to run on pre-determined time parameters.

MELITTA and KORI exchange mischievous looks.

EH-EYE:

It seems this was a success; what do you both think?

MELITTA:

Yes! Interestingly, this project occurs in this time and space when land-based conferences face the challenge of physical presence in the *real world*. I dare say that the ancestors have somewhat intervened again and allowed us to be their enactors! And it is always a pleasure to spend time with and create with Kori.

KORI:

It was great to finally collaborate in a collective space with Melitta, but having the ancestors join us within a space representing both of our lands is truly a gift. I am grateful.

Kinanâskomitin.

A SHOOTING STAR arcs above as the fires begin to dim. In the silence, you can hear MELITTA and KORI take in a deep breath...

About the Authors

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References

- Adams, J., Luitel, B. C., Afonso, E., & Taylor, P. C. (2008). A cogenerative inquiry using postcolonial theory to envisage culturally inclusive science education. *Cultural Studies of Science Education*, 3(4), 999-1019.
- Aikenhead, G. (2001). Integrating Western and Aboriginal sciences: Cross-cultural science teaching. *Research in Science Education*, (31)3, 337-355.
- Bateson, G. (1972). *Steps to an ecology of mind*. Bantam Books.
- Battiste, M. A. (2000). *Reclaiming Indigenous voice and vision*. UBC Press.
- Battiste, M., & Henderson, J. Y. (2000). *Protecting Indigenous knowledges and heritages*. UBC Press.
- Blair, N. (2015). *Privileging Australian Indigenous knowledge: Sweet potatoes, spiders, waterlilys and brick walls*. Common Ground Publishing.

- Cajete, G. (1999). *Igniting the spark: An Indigenous science education model*. Kivaki Press.
- Cole, P. (2006). *Coyote raven go canoeing: Coming home to the village*. McGill-Queen's University Press.
- Crowshoe, R. (p.c., 2018) Recognized Elder from the Piikani Nation, Treaty 7. Oral stories from tipi building committee sessions. Teachings on Treaty 7, University of Calgary, Alberta, Canada.
- Czuy, K. (2021). Dear big S Science. *Cultural Studies of Science Education*. <https://doi.org/10.1007/s11422-020-09983-7>
- Czuy, K., & Hogarth, M. (2019). Circling the square: Indigenising the dissertation. *Emerging Perspectives: Interdisciplinary Graduate Research in Education and Psychology*, 3(1), 1-16.
- Czuy, K., & Eagle Speaker, C. (2019). Critical braiding approach to ethno(mathematics). M. A. Peters (Ed.), *Encyclopedia of Educational Philosophy and Theory*. https://doi.org/10.1007/978-981-287-532-7_648-2
- D'Ambrosio, U. (2001). *Ethnomathematics: Link between traditions and modernity*. Sense Publishers.
- Doolittle, E. (2006). *Mathematics as medicine*. Plenary lecture delivered at U. Calgary, 2006. In Liljedahl (Ed.), 2006 Proceedings of the Canadian Mathematics Education Study Group.
- Eagle Speaker, C. Recognized Elder of the Kainai Nation, Treaty 7. (p.c., 2019). Oral Teachings- October 8, 2019. Teachings on Treaty 7, Calgary, Alberta, Canada.
- Education Council. (2015). National Aboriginal and Torres Strait Islander Education Strategy 2015. http://www.educationcouncil.edu.au/site/DefaultSite/filesystem/documents/ATSI%20documents/NATSI_EducationStrategy_v3.pdf
- Fairclough, N. (2001). The discourse of New Labour: Critical discourse analysis. In M. Wetherell, S. Taylor & S. Yates (Eds.), *Discourse as data: A guide for analysis* (pp. 229-266). SAGE.
- Fairclough, N. (2015). *Language and power* (3rd ed.). Longman.
- Forde, T. (1990). *Confinement and control: a history of Woorabinda Aboriginal Community 1927-1990*. Honours Thesis, School of History, Philosophy, Religion, and Classics, University of Queensland. <https://espace.library.uq.edu.au/view/UQ:266148>
- Four Arrows. (2008). *The authentic dissertation: Alternative ways of knowing, research and representation*. Routledge.
- Hill Collins, P. (2013). *On intellectual activism*. Temple University Press.
- Hogarth, M. (2015). *A critical analysis of the Aboriginal and Torres Strait Islander Education Action Plan*. Masters of Education (Research) (Unpublished). Queensland University of Technology. Retrieved from <https://eprints.qut.edu.au/89754>
- Hogarth, M. (2017). Speaking back to the deficit discourses: A theoretical and methodological approach. *Australian Education Researcher*, 44 (1), 21-34.
- Hogarth, M. (2018a). *Addressing the rights of Indigenous peoples: A critical analysis of Indigenous education policy*. PhD Thesis (Unpublished). Queensland University of Technology. Retrieved from <https://eprints.qut.edu.au/118573/>
- Hogarth, M. (2018b). I am the emu. *Cultural and Pedagogical Inquiry*, 10(2), 61-63. <http://dx.doi.org/10.18733/cpi29445>
- Hogarth, M. (2019). Y is standard oostralin english da onlii meens of kommunikashun: Kountaring White man privileg in da kurrikulum. *English in Australia*, 54(1), 5-11.

- Holmes, L. (2000). Heart knowledge, blood memory, and the voice of the land: Implications of research among Hawaiian Elders. In G. S. Dei, B. Hall & D. Rosenberg (Eds.), *Indigenous knowledges in global contexts: Multiple readings of our worlds*, (pp. 37-53). University of Toronto Press.
- Kimmerer, R. W. (2013). *Braiding sweetgrass: Indigenous wisdom, scientific knowledge, and the teachings of plants*. Milkweed.
- Kovach, M. (2009). *Indigenous methodologies: Characteristics, conversations, and contexts*. University of Toronto Press.
- Leafgren, S. (2011). Hands at your side: The severing of body and mind in the elementary school. *Journal for Curriculum Theorizing*, 27(2), 35-50.
- Martin, K. (2003). Ways of knowing, being and doing: A theoretical framework and methods for Indigenous and Indigenist re-search. *Journal of Australian Studies*, 27(76), 203-214.
- Ministerial Council for Education, Early Childhood Development and Youth Affairs [MCEECDYA]. (2011). *Aboriginal and Torres Strait Islander Education Action Plan (2010-2014)*. Retrieved from http://www.educationcouncil.edu.au/site/DefaultSite/filesystem/documents/ATSI%20documents/ATSIEAP_web_version_final.pdf
- Morgan, B., West, E. G., Nakata, M., Hall, K., Swisher, K., Ahenakew, F., . . . Blair, N. (2006). The Coolangatta Statement on Indigenous Peoples' Rights in Education. In P. Read, G. Meyers, & B. Reece (Eds.), *What good condition?: Reflections on an Australian Aboriginal Treaty 1986-2006* (pp. 229-236). ANU E Press.
- Nakata, M. (2007). *Disciplining the savages: Savaging the disciplines*. Aboriginal Studies Press.
- Nga Hine Pukorero. (2019). *Untitled, speech*. Word — The Front Line Slam: Inter-High School Spoken Word Poetry Slam, 2018 Grand Slam winners, Auckland, New Zealand. Accessed from <https://www.youtube.com/watch?v=GiUivy62SCE>
- Powderface, S., Recognised Elder of the Îyârhe Nakoda Nation (p.c., 2019). Indigenous Wisdom Gathering. April, 11-14, 2019. Teachings on Treaty 7, Banff, Alberta, Canada.
- Referendum Council. (2017). *Uluru Statement from the Heart*. Retrieved from https://www.referendumcouncil.org.au/sites/default/files/201705/Uluru_Statement_From_The_Heart_0.PDF
- Rigney, L. (1999). Internationalization of an Indigenous anticolonial cultural critique of research methodologies: A guide to Indigenist Research Methodology and its principles. *Wicazo sa review*, 14, 109-121.
- Saxe, G. (1981). Body parts as numerals: A developmental analysis of numeration among the Oksapmin in Papua New Guinea. *Child Psychology*, 52(1), 306-316.
- Smith, L. T. (1999). *Decolonizing methodologies: Research and Indigenous Peoples*. University of Otago Press.
- Snively, G., & Corsiglia, J. (2001). Discovering Indigenous science: Implications for science education. *Science education*, 85(1), 6-34.
- Stavrou, S., & Miller, D. (2017). Miscalculations: Anti-oppressive and decolonizing discourses in Indigenous mathematics education. *Canadian Journal of Education*, 40(3), 92-122.
- Sterenberg, G. (2013). Considering Indigenous knowledges and mathematics curriculum. *Canadian Journal of Science, Mathematics and Technology Education*, 13, 18-32.
- Truth and Reconciliation of Canada (NCTR) (2015). *Truth and reconciliation: Calls to action*. Retrieved from http://nctr.ca/assets/reports/Calls_to_Action_English2.pdf

- Van Dijk, T. A. (1993). Principles of critical discourse analysis. *Discourse & society*, 4(2), 249-283.
- Wassmann, J. & Dasen, P. (1994). Yupno number system and counting. *Journal of Cross-Cultural Psychology*, 25(1), 78-94.
- Wodak, R., & Meyer, M. (2009). Critical discourse analysis: History, agenda, theory and methodology. *Methods of Critical Discourse Analysis*, 2, 1-33.