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(De)Colonized Science: Hopes, Complexities, Tensions, and Frustrations in Seeking to Indigenize Undergraduate Science Education

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A Decade On

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Résumé de l'article

This article is an exploration of our efforts to develop an Indigenous Science Course at Mount Royal University (MRU) located in Mohkinstsis within the Ancestral Lands of the Blackfoot Confederacy the Territory of the Treaty 7 signatories Kainai, Piikani, Siksika, Tsuut'ina, Bearspaw, Chiniki, and Wesley Nations and the Metis Nation Region III. The authors are an Indigenous environmental scientist and recent MRU graduate (Nikita), a settler assistant professor (Collette), and an Indigenous assistant professor (Joshua). We engage here as an enactment of research as ceremony (Wilson, 2008). We draw on Metissage storywork to spark meaning making of our experiences in seeking to contribute to the Indigenization of our University (Archibald, 2008). We believe that the stories we share have the potential to open up interpretive possibilities for those interested in Scholarship of Teaching and Learning as Reconciliation (Hill, 2022) and decolonization and Indigenization of post secondary education more broadly (Battiste, 2013). Through storytelling we endeavor to push for change in sharing the hopes, complexities, tensions, and frustrations we encountered.

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ABSTRACT

This article is an exploration of our efforts to develop an Indigenous science course at Mount Royal University (MRU), located in Mohkinstsis, within the ancestral lands of the Blackfoot Confederacy, the territory of the Treaty 7 signatories: Kainai, Piikani, Siksika, Tsuut'ina, Bearspaw, Chiniki, and Wesley Nations and the Métis Nation Region III. The authors are an Indigenous environmental scientist and recent MRU graduate (Nikita), a settler assistant professor (Collette), and an Indigenous assistant professor (Joshua). We engage here as an enactment of research as ceremony (Wilson, 2008). We draw on Métissage storywork to make meaning of our experiences in seeking to contribute to the Indigenization of our university (Archibald, 2008). We believe that the stories we share have the potential to open up interpretive possibilities for those interested in the Scholarship of Teaching and Learning as Reconciliation (Hill, 2022) and the decolonization and Indigenization of post-secondary education more broadly (Battiste, 2013). Through storytelling we endeavour to push for change in sharing the hopes, complexities, tensions, and frustrations we encountered.

Keywords: Indigenization, Indigenous science, decolonization

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CEREMONY

Land Acknowledgement

This article is an exploration of our efforts to develop an Indigenous science course at Mount Royal University (MRU), located in Mohkinstsis, within the ancestral lands of the Blackfoot Confederacy, the territory of the Treaty 7 signatories: Kainai, Piikani, Siksika, Tsuut'ina, Bearspaw, Chiniki, and Wesley Nations and the Métis Nation Region III.

CONTEXT

In 2015 the Truth and Reconciliation Commission of Canada put forward calls to action that represent a pathway towards reconciliation. In their recent status update, Jewell and Mosby (2022) reported that, of the 94 calls to action, only 13 had been completed, and at the established rate "it would take 42 years, or until 2065, to complete" (p. 5). More work must be done. Universities across Canada have made commitments that recognize and seek to advance their responsibilities to reconciliation (Universities Canada, 2023). MRU's Indigenous Strategic Plan calls for transformative change and among other goals commits to integrate Indigenous pedagogies and ways of knowing into courses. In this context we applied for and received a Teaching and Learning Enhancement Grant with the aim of developing an Indigenous science course to be included within the numeracy and scientific literacy courses at MRU, which students from all programs can chose from to meet degree requirements.

Indigenous scholar Marie Battiste (2013) reminds us that this work occurs within a historical context in which "for more than a century, Indigenous students have been part of a forced assimilation plan—their heritage and knowledge rejected and suppressed, and ignored by the education system" (p. 23). She points to the thoroughly entrenched monopoly of Eurocentric knowledge in education and calls for decolonization to involve interrogating and disrupting this dominance and its taken-for-granted neutrality. Styres et al. (2019) warns that without decolonizing work, attempts to include Indigenous knowledges can become manifestations of "tokenism, voyeurism, and cultural tourism" (p. 40). Battiste (2013) asserts that from critical awareness gained through decolonization Indigenization can begin to transform assimilative frameworks and move towards validating and including Indigenous knowledges and epistemologies alongside Eurocentric knowledges. Louie et al. (2017) share their experiences of seeking to do this work in their university teaching practices and highlight the possibilities and tensions of this work. They demonstrate ways in which the structures and policies of post-secondary education continue to perpetuate colonial legacies of marginalization and oppression. In this paper, we seek to contribute to the decolonization and Indigenization of Canadian universities by sharing and reflecting on our experiences.

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PROTOCOL

We engage here as an enactment of research as ceremony (Wilson, 2008). We draw on Métissage to make meaning of our experiences in seeking to contribute to the Indigenization of our university (Archibald, 2008). The authors are an Indigenous environmental scientist and recent MRU graduate (Nikita), a settler assistant professor (Collette), and an Indigenous assistant professor (Joshua). We use Métissage as a process of interpreting and braiding one's own and others' perspectives to create shared knowledge and reveal something of our collective experience (Hasebe-Ludt et al., 2009). Donald (2012) explains that Métissage, like Métis people, offers the possibility of creating a transcultural space to move beyond binary categories of difference. Through Métissage, we juxtapose our individual voices to highlight difference without essentializing or erasing it, while simultaneously locating points of affinity (Donald, 2012).

To advance our storywork, we drew on the protocol of talking circles (Hanson & Danyluk, 2022) and engaged in a cyclical process of sharing, listening, and reflecting, which was repeated across a series of meetings. This was highly relational and personal work that involved storying and restorying our experience as a group and as individuals. The article below emerged from this process and represents a written synthesis of our talking circles.

Rooted in Styres et al. (2019), we recognize that decolonization is a journey that must involve ongoing efforts to examine and shift our own assumptions, and we attempt to live up to this need for reflexivity. In drawing on an Indigenous research approach (Métissage) and an Indigenous way of coming to know (talking circles) we seek to decolonize our research practice and offer a contribution to the Indigenization of SoTL.

In the forthcoming sections, we welcome the reader into our talking circle by offering four rounds featuring the distinct voices of our team of co-authors presented as a braid. In Round 1 we introduce and locate ourselves and frame our involvement in this project. In Round 2, we share our hopes for the development of an Indigenous science course and the initial steps we undertook. In Round 3, we attend to the tensions and frustrations we experienced. Finally, in Round 4, we reflect on what we learned from the experience and our responsibilities looking forward.

ROUND 1 - INTRODUCTIONS: GATHERING TOGETHER

Nikita

Tansi, my name is Nikita Kahpeaysewat (she/they). I am an environmental scientist, Indigenous researcher, and powwow dancer. I am a Nehiyaw (Plains Cree) person, born and raised on Moosomin First Nation in Saskatchewan of Treaty

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6 Territory.

My cultural identity has been modeled by my family and community as they taught me about the inherent responsibilities, as a Nehiyaw person, to the land, animals, community, and leadership. Both my Nehiyaw and Western perspectives bridged the importance of taking care of Mother Earth, which led me to pursue an environmental science degree.

I have studied environmental science at MRU where my research focus was on water quality in Indigenous communities, environmental inequality, and traditional ecological knowledge. I passionately advocate that Indigenous ways of knowing and Western science are equally valid knowledge sources and both approaches can be used together to protect and preserve the environment.

I met Collette in my second year of university while I was teaching a Powwow Fit class. She expressed an interest in Indigenous science and what that could look like within a university. In my own reflections, I felt an Indigenous science course was very much needed. As the only Indigenous person in my science program, I was often the teacher to my peers and instructors who hadn't done the work to educate themselves on the true history of Kkkanada (Snotty Nose Rez Kids, 2017). This is a responsibility often imposed on Indigenous students in colonial institutions. Throughout my academic journey, I thought, "How can we talk about the land without first acknowledging and including Indigenous folks in national, provincial, and regional decision-making processes, policies, and programs?" In that exclusion came my motivation to bring an Indigenous course to life.

Collette

I am a white settler colonial woman born and raised in Edmonton (Treaty 6). My parents were both born in Edmonton, but our ancestry is of mixed French, Irish, German, and English descent. As an academic, I am a mathematician and an educator. As a mathematician, I believed that mathematics as a discipline originated in Greece and that worthwhile mathematics involved generalizing beyond the specific. In 2002, I started working as a sessional instructor, teaching mathematics courses at MRU, and my beliefs about what constituted mathematics permeated my pedagogical practices.

In 2017, I started teaching a foundational numeracy and scientific literacy course, which is part of the General Education requirement for students at our liberal arts university. Through my reconciliation work, I started to recognize the colonized nature of my discipline and attempted to weave those ideas into the course. This was very rudimentary and mostly involved acknowledging that this was a Western science course, and other forms of science exist, but not going beyond that. The second time I taught the course, an Indigenous woman came to talk to me about the struggles she was having. In particular, she was forced to take

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the course as part of her degree requirements, but her worldview and understanding of science were not being represented. That conversation stayed with me and lived within me as a call to do better.

I reached out to Nikita because she was the only Indigenous scientist that I knew. At that time (and still now) there were no Indigenous scientists as faculty at MRU. We started to talk about the idea of bringing Indigenous science perspectives into a foundational numeracy and scientific literacy course. We have now worked on the project for multiple years, and through that time I have recognized how thoroughly my thoughts are colonized.

Through the work, I've realized that for the past twenty years I've been engaging in continuing colonization by presenting mathematics (and science) as a monolith that comes from Eurocentric perspectives. This realization came with a lot of pain, but also a drive to change and do better. As a white settler, I believe that I need to do the work that leads towards reconciliation and, as an academic, I need to be part of shining light on truth. But this space is fraught with tension. I am a white settler with a deeply colonized mind. I constantly question my place in doing this work and whether someone else should be doing it. I fear that I'll make mistakes and that those mistakes will cause harm. I want to do good work but am uncertain what that looks like.

Joshua

When I received an email from Collette asking me if I'd be willing to contribute to the design of a General Education course with a focus on Indigenous science, I felt compelled to get involved. I am a member of the Métis Nation of Alberta, and my ancestors trace back to the historic Red River Métis community and to European settler communities. As one of few Indigenous faculty members, I feel a responsibility to contribute to including Indigenous perspectives in our university in as many ways as possible. That said, the requests for me to do this work far exceed the time I have available. In this case, I chose to get involved in the project to support an Indigenous student and a settler colleague in their leadership of this work. While I was keen to support Nikita and Collette, I came into this project with an awareness of the complexities of the road ahead, learned through seeking to create an ethical space to include Indigenous perspectives in my teaching (Crawford et al., 2022), collaborating with colleagues to include Indigenous perspectives throughout a university program (Hill et al., in press), and working with school and school system leaders to support Indigenization in K-12 schools (Hill, 2022). Later in this story circle, I reflect back on how benumbed and complicit these past experiences made me within this work.

ROUND 2 - HOPE, COMPLEXITIES, STARTING A FIRE

Collette

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When Nikita and I started this project, we planned to create modules on Indigenous science that could be used in numeracy and scientific literacy courses offered as part of the General Education requirements at our liberal arts university. For example, we wanted a module that introduced students to Indigenous medicine, and it could be "dropped into" any such course. We began developing the modules but quickly realized that the design decision had significant unexpected consequences. Specifically, "dropping in" Indigenous science into a Western science course would likely mean that students would seek to understand the content from a Eurocentric perspective. Thus, students would likely interpret the content as an Indigenous perspective on Western science. The unintended consequence then would be the reinforcement of Western science as "the" science and the assertion that Indigenous people engaged in a (lesser) version of that science. This negated our goal of challenging preconceived notions of science being a monolith and presenting Indigenous science as parallel to and equally valid as Western science. Based on this, we realized that we needed to create a whole course on Indigenous science. It was very freeing as we were no longer thinking about how to fit Indigenous science into a Western course, but instead could imagine a course that truly centred Indigenous science.

This work was also important for my own process of reconciliation. In particular, it helped me realize my own unconscious bias of interpreting science through a Eurocentric lens. Similar to the concern we had about "dropping in" Indigenous science into a Western science course, I unintentionally attempted to force the ideas into the framework of Western science. For example, I would rework what I learned about Indigenous science to fit within my understanding of how the Western scientific method works, which would negate Indigenous scientific methodologies. These attempts to force Western perspectives onto what Indigenous people have accomplished and continue to accomplish was me engaging in white supremacy. Since I've had this realization, I've been actively working to question myself when I do this. I certainly haven't eliminated these deeply ingrained beliefs, but, by engaging in developing this course and examining my own beliefs, I've become more aware of my ingrained white supremacy and am doing the work to acknowledge this.

Nikita

Through the Iniskim Centre (an Indigenous support centre at MRU), I attended multiple international conferences for Indigenous science students, professionals, and institutions. It was here that I came across aspiring Indigenous scientists and knowledge keepers like Randy Herrmann, dr. linda manyguns, Dr. Leonzo Barreno, and many more, who had been working within the Indigenous and Western science space specifically on the Two-Eyed Seeing approach (Bartlett et al., 2012). What I have learned from the ones before me is that Indigenous knowledge has always been scientific in nature. Some of our knowledge has been collected through thousands of years of observation, theories, and experiments, which has resulted in

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knowing what medicines to harvest and use during certain times of the year by watching where the animals would gather and what plants they would consume. It is a source of knowledge that has often been downplayed within Western science, never truly getting the credit it deserves. However, Western science is built upon Indigenous knowledge. If you took our course, you would know that.

When we first began to present our ideas to other faculty members about what an Indigenous science course would look like at MRU, we were met with mixed reactions. Folks from the math and science wings had questions about the legitimacy of this new science course. Others were curious about the type of content that would be taught and rightfully so. However, we had imagined that the course would be centred organically around oral teachings from local community Elders, knowledge keepers, and other Indigenous scientists. We wanted the community to have autonomy over the knowledge that would be shared in the course, and we wanted the knowledge to come from folks who have been doing this work their entire lives. I did not want the design of this course to be fixed, set, and placed within a tiny box of what the university thought Indigenous science should look and sound like. In order to bring this idea to actuality, we needed guidance on the process. Up until this point, I had never created a lesson plan, Western or Indigenous, and Collette, although experienced, hadn't created an Indigenous course either. When Josh Hill entered the conversation, grounded in his Métis heritage, ways of knowing, and connection to community, we began to visualize how we could enhance the students' experiences in the classroom so they would not only absorb this information but embody it within their lives afterwards.

Joshua

I believe it is of utmost importance that an Indigenous science course not only includes Indigenous knowledge, but also creates an ethical space for students to engage with Indigenous knowledge (Ermine, 2007). The design of most university courses is underpinned by a Eurocentric conceptualization of knowledge as fixed, discoverable, and existing independent of the knower (Davis et al., 2015). Knowledge is thought of differently from an Indigenous point of view. Knowledge exists in relationships, interconnecting what is known with the knower, the natural world, story, community, ceremony, and culture (Kovach, 2009). It doesn't make sense from an Indigenous perspective to dole out information for students to memorize and represent on a multiple-choice test. Furthermore, when Indigenous knowledges are taken up through Eurocentric teaching practices, an assimilative effect occurs (Louie et al., 2017). This practice is so common in the university it is embodied in the language people use when they talk about "infusing" or "incorporating" Indigenous knowledge (Donald, 2012). With an eye on disrupting this colonial narrative, I worked with Nikita to consider how we might draw on Indigenous ways of coming to know within the design of the course. Nikita worked to reframe how knowledge was presented to students in the course by creating video recordings of Elder storytelling. We designed for students to interact with

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knowledge in a way that better aligned with Indigenous perspectives by creating assignments that asked students to learn from the land (Cajete & Pueblo, 2010) and to engage in story circles (Hanson & Danyluk, 2022). Interconnected with this we recognized a need to shift the assessment and grading frameworks in the course. We sought to move away from practices that position the instructor as evaluator of how students represent information. We planned for student self-assessment and processes of instructor and student negotiation (Louie et al., 2017). Throughout this design work, we struggled with the university structures that we were required to work within to have the course approved. The course proposal template, the course outline template, and the curriculum approval process are underpinned by a Eurocentric conceptualization of knowledge. As a team we were willing to navigate these structures to find flexible ways to make our vision for the course viable, and we hoped that those in decision-making roles would help us find flexibility within these structures. Unfortunately, this hope was misplaced.

ROUND 3 - TENSIONS, FRUSTRATIONS, BURNING IT DOWN

Nikita

Originally, Collette and I had hoped for the course to be a foundational course, which would ensure all MRU students had an opportunity to take it. We knew if it was anything less, it would fall through the cracks and be forgotten about. We also understood the significant experience and value it would bring to all students, faculty, and staff at MRU. I mentioned earlier that I didn't want this content to be confined in a tiny box. However, since the course title had "science" in it, the university thought we meant Western science and so a long list of requirements showed up at our door. A very optimistic Collette filled out the course application and sent it off. We were soon met with more questions and requirements to consider, the first being the question of who would teach this course and in which department. The folks in the Faculty of Science and Technology didn't have any Indigenous scientists, which speaks to a bigger and more serious issue at the university. Another issue was that we centred our knowledge gathering for the course from our interviews with Indigenous scientists, Elders and knowledge keepers. Through our best efforts to try work within the university's policy requirements, we often left those meetings feeling frustrated and exhausted. We would discuss our ideas with faculty and staff, get the go-ahead, apply, and then be met with, "Actually, no, I don't like the way you structured that. Try again." After more than two years of trying to establish this course, we have concluded that MRU is not ready for Indigenization as their policies and systems remain inflexible and their willingness to push forward this work remains performative.

Collette

From blind ignorance to active hostility, we've experienced it all in the creation of this course. Based on MRU's Indigenous Strategic Plan, I thought creating an

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Indigenous science course would be lauded and the process to create it well defined. Instead, we ran into barriers at every step. For me personally, the hardest barrier has been the confrontation with my colleagues' assumptions of what science is. Though most of my colleagues appeared to believe that reconciliation was important, it was seen as work to be done in history and literature classes but not in science courses. This was driven home for me when we went through the process of finding an appropriate space for the course within the General Education program at MRU. Though many of the discussions with colleagues were presented as guidance and help in the process of creating the course, I often felt like I was talking to a wall built on assumptions and biases. To illustrate, one suggestion was to have the course count for students as a humanities course rather than a science course. I strongly disagreed with this suggestion as it would undercut the goals of the course, which was to present Indigenous science as equally valid to Western science, but also (and more importantly) because the suggestion highlights the insidiousness of cognitive imperialism, which is a "form of cognitive manipulation used in social and education systems to disclaim other knowledge systems and values … [and] it is integral to replacing one knowledge system with another knowledge system" (Battiste, 2017, para. 1). From my colleagues' perspective, I'm sure they thought they were being helpful and "removing" barriers by suggesting an easier path. But it was cognitive imperialism raising its ugly head by denying the validity of Indigenous science.

We were left with creating a new course at MRU, which, because of internal deadlines, involved creating a proposal for a completely new course in a six-week period. To create the proposal, we needed to create a course outline. As Nikita mentioned above, we didn't want the course to fit into a tiny box. Yet that's what a course outline is. As per MRU's policy, the course outline has to include a course description, required materials, assessment types and weights, learning outcomes, a class schedule, etc. When the content of the course is being determined by Elders and knowledge keepers, depending on the knowledge they choose to share, how do you fit that in a course outline? When the pedagogy is based on Indigenous epistemologies, how can you state what the assessments look like ahead of time? How do you describe this course in a way that reflects its purpose in a meaningful way in a three- to four-sentence course description?

I am struck again by how much this work cost me in terms of time, energy, and emotion. The frustration and rage fueled the work, but it also left me drained. Working with Josh and Nikita has been an amazing experience that has brought me so much joy and growth. But working within an institution that has an Indigenous Strategic Plan that provides no avenue to achieve the goals and instead leaves structural barriers at every step is exhausting. I've almost given up so many times. I've cried so many times. I've wanted to pull my hair out. I'm lucky that I found Nikita and Josh to work with. Without them, I wouldn't have gotten far on this project, and I wouldn't have survived these barriers.

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Joshua

Our university has made strong pronouncements regarding Indigenizing the university. Central to this work is the university's Indigenous Strategic Plan, which makes explicit commitments to including Indigenous pedagogies and ways of knowing (Mount Royal University, 2016). I believe the Indigenous science course we sought to create represents exactly what the Indigenous Strategic Plan commits us to do as a collective. Yet despite this, rather than feeling supported, what we encountered were platitudes about the importance of the work, tacit reinforcement of the barriers, and kindly recommendations to seek support from someone else. As the process wore on, Nikita and Collette became disappointed and frustrated. I felt increasingly disempowered.

ROUND 4 - CLOSING/OPENING: RISING FROM THE ASHES

Collette

At the time of writing, we have made progress. With the help of the Coordinator of Indigenous Studies, it looks like the course may be offered in the upcoming academic year as an Indigenous Studies course. However, within this context it will not be designated as a foundational course, which was the original intent. As we look ahead, I see my responsibility as ensuring that the course gets recognized as a science course and doing the administrative work to ensure that happens. I also am excited about potentially contributing to the creation of a follow-up series of Indigenous science courses that could build on this introductory course. Thus, a further responsibility is to continue to work with interested faculty to continue to build Indigenous science at MRU.

Joshua

Gaudry and Lorenz (2018) identify that Indigenization of the university requires substantial structural change in addition to including more Indigenous peoples. I hope that in sharing our experience we have underscored the need for structural change in order to create space for Indigenization work to take place. Furthermore, I hope that in vulnerably reflecting on my experience I have made visible the "predictable costs" and "burnout" Indigenous faculty members experience in this work (Louie, 2019, p. 810). I often tell myself that by working within the system I am contributing to change from within. I story slow progress as incremental steps, amelioration, on a pathway to transformation. In reflecting on this experience, I have come to restory this self-narrative and am more aware of the ways I am complicit and jaded as I repeatedly struggle to create meaningful change against what feels like inflexible, dominant, and oppressive barriers.

Nikita

Going forward, I carry with me the inherent responsibilities as a Nehiyaw person

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to the land, animals, and community, and in leadership. I will continue to advocate that Indigenous ways of knowing are and have always been scientific in nature. Maybe this experience will make the road a little less steep for the next Indigenous scientists.

Recently, the Department of Indigenous Studies at MRU has graciously decided to spearhead our course to completion. It almost felt disappointing that our more than two years of effort would have been stuck in limbo. Out of all the folks we talked to at MRU, it took another Indigenous woman to carry forth this work. Although I am grateful, it doesn't change the barriers she will have to face from the university. This doesn't change the university's colonial systems, policies, and programs to make the journey better for other Indigenous scholars. It is also not a sustainable system for Indigenous folks to constantly take on more responsibility, often working off the sides of their desks. Going forward, I hope our experiences can provide insight into the gaps within MRU's Indigenous Strategic Plan. I hope MRU hires more Indigenous scholars to reduce the burnout on faculty, staff, and students. In a place of learning, I hope that the next Indigenous Strategic Plan moves from performative plans to meaningful change.

AUTHOR BIOGRAPHIES

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Joshua Hill is an Assistant Professor in the Department of Education at Mount Royal University. Through his teaching, service, and scholarship Dr. Hill seeks to create the conditions to (re)story education as a journey towards agency, wonder, and expansive awareness of oneself-in-the-world.

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