Introducing TEK into the secondary school system

***Sanda Miletovic**, York University, Toronto, Canada*

Abstract

This paper explores the integration of Traditional Ecological Knowledge (TEK) into secondary school curricula to enhance ecological literacy, cultural diversity, and sustainability education. TEK, rooted in Indigenous practices and place-based understanding, offers a relational approach to environmental stewardship, contrasting with the objective framework of Scientific Ecological Knowledge (SEK). Despite its potential, barriers such as insufficient teacher training and cultural sensitivity hinder implementation. This paper argues that TEK can foster critical thinking, strengthen Indigenous students' cultural identity, and promote cross-cultural awareness among non-Indigenous learners. By proposing hybrid pedagogical models combining TEK and SEK and drawing on Canada's Truth and Reconciliation Commission's Calls to Action (TRC, 2015), it advocates for experiential, community-based learning. While specific case studies on TEK integration are limited, this paper offers practical strategies for educators in Ontario and Canada to incorporate TEK, fostering sustainable practices and reconciliation.

Keywords: *TEK (Traditional Ecological Knowledge), SEK (Scientific Ecological Knowledge), Indigenous knowledges, Environmental Sustainability Education, Secondary School system*

Sanda Miletovic: Second year PhD student in the Faculty of Education. My interests include Environmental Sustainability Education, Decolonial Education, Anarchist pedagogies, to name a few. I can be reached at: smiletov@yorku.ca

 ISSN: 2816-9344

Introduction: Reawakening Our Connection to the Land

In today's secondary schools, the absence of sustainability education and Indigenous perspectives, particularly Traditional Ecological Knowledge (TEK), creates a significant gap in fostering ecological literacy and cultural inclusivity. TEK (developed over generations by Indigenous communities), encompasses practices, beliefs, and knowledge that emphasize sustainable resource management and a profound connection to the environment (Kimmerer, 2018, p. 22). As Daniel Shilling (2018) notes, sustainability remains a complex concept, prompting questions about what should be sustained, for what purpose, and by whose authority (Shilling, 2018, p. 3). Integrating TEK into secondary education addresses these questions by grounding learning in place-based, relational knowledge systems that contrast with the Eurocentric, reductionist approaches of Scientific Ecological Knowledge (SEK).

This paper argues that TEK integration can transform education by achieving three key objectives: enhancing environmental education through Indigenous perspectives, promoting cultural inclusivity and reconciliation, and countering Eurocentric biases inherent in SEK. For Indigenous students, TEK foreground identity fostering a sense of belonging and improving engagement in science education (Cajete, 2018, p. 15). For non-Indigenous students, it builds cross-cultural understanding by dismantling stereotypes and fostering respect for diverse worldviews. Aligned with Canada's Truth and Reconciliation Commission's Calls to Action (TRC, 2015), TEK integration supports reconciliation by centering Indigenous knowledge in formal education systems, addressing historical exclusion. Despite challenges such as limited teacher training and cultural sensitivity, TEK offers a path toward ecological resilience and sustainable practices, addressing the urgent climate crisis through Indigenous wisdom.

Defining TEK and Related Concepts

Traditional Ecological Knowledge (TEK) refers to the cumulative skills, practices, and beliefs developed by Indigenous and local communities through generations of interaction with their environments. It emphasizes stewardship, sustainable resource management, and a relational approach to ecosystems, often guided by cultural and spiritual values (Kimmerer, 2018, p. 22). TEK is inherently place-specific, relying on direct observation, oral traditions, and collective experience, in contrast to the universal, objective framework of Scientific Ecological Knowledge (SEK). While SEK employs formal methodologies and advanced technology, TEK utilizes traditional tools and lived experiences, fostering a holistic connection to the land (Shilling, 2018, p. 10).

To clarify related concepts, land-based pedagogy and place-based learning require definition. **Land-based pedagogy** involves experiential learning tied to specific landscapes, emphasizing cultural and ecological connections, often rooted in Indigenous worldviews (Wildcat et al., 2014, p. 2). **Place-based learning** is a broader educational approach that uses local environments as a context for learning. It is applicable to any community, and not necessarily Indigenous-specific (Sobel, 2004, p. 7). TEK is a subset of land-based pedagogy, specifically grounded in Indigenous knowledge systems, prioritizing spiritual and relational connections to the environment. As for SEK, it is a whole separate concept that prioritizes Western scientific knowledge and relies heavily on objectivity and empiricism.

TEK and SEK: Complementary Yet Contrasting Approaches

Building on the definition of TEK, this section compares it with SEK to highlight their complementary potential. TEK and SEK share a foundation in observing nature and gathering

empirical evidence, yet their methodologies and worldviews diverge significantly. TEK is relational and emphasizes interconnectedness and survival within specific ecosystems, while SEK prioritizes objectivity and universal applicability to all existing ecosystems (Kimmerer, 2018, p. 21). SEK's alignment with Western scientific paradigms often marginalizes Indigenous perspectives, perpetuating Eurocentric biases and supporting systems like global capitalism that prioritize profit over ecological balance (Shilling, 2018, p. 10). For instance, SEK-driven agricultural models may advocate monoculture for efficiency, while TEK promotes polyculture to maintain soil health and biodiversity, as seen in Indigenous three-sisters planting systems (corn, beans, squash).

Integrating TEK into secondary curricula counters these biases by fostering critical thinking and cultural awareness. For Indigenous students, it validates their cultural heritage, addressing historical exclusion from science education and improving retention rates (Cajete, 2018, p. 15). For non-Indigenous students, it dismantles stereotypes, fostering cross-cultural competence and aligning with Canada's reconciliation efforts (TRC, 2015). By teaching concepts like "we are all related," TEK helps students understand ecosystems holistically, beyond the fragmented models of SEK. For example, a lesson on wetland ecosystems could integrate TEK by exploring Indigenous stories about water spirits alongside SEK's hydrological data, creating a richer understanding of environmental interconnectedness.

Alignment with Canada's Truth and Reconciliation Commission

The integration of TEK aligns directly with Canada's Truth and Reconciliation Commission's Calls to Action (TRC, 2015), particularly those addressing education. Call to Action 62 calls for integrating Indigenous knowledge and teaching methods into curricula to promote reconciliation and address the legacy of residential schools (TRC, 2015, p. 7). TEK

integration fulfills this by centering Indigenous perspectives, validating cultural identities, and fostering mutual respect among students. Additionally, Call to Action 63 emphasizes teacher training to incorporate Indigenous knowledge, ensuring educators are equipped to teach TEK authentically (TRC, 2015, p. 8). This alignment supports reconciliation by acknowledging historical harms and promoting Indigenous-led education.

A critical question arises: who decides how TEK is taught? Indigenous communities must lead this process to ensure authenticity and cultural sensitivity. Collaboration with elders, knowledge keepers, and Indigenous organizations is essential to co-create curricula that reflect local TEK practices and avoid appropriation. For example, in Ontario, partnerships with First Nations, Métis, and Inuit communities can guide the development of TEK-based lessons, ensuring they respect community protocols and oral traditions (Cajete, 2018, p. 12). This collaborative approach not only aligns with TRC goals but also empowers Indigenous communities to shape educational narratives.

Barriers to Implementation: Overcoming Systemic Challenges

Despite its alignment with reconciliation goals, integrating TEK faces significant barriers. Many educators lack training in Indigenous knowledge systems, leading to discomfort or unfamiliarity with TEK (Cajete, 2018, p. 10). Without proper professional development, teachers may risk superficial integration that fails to respect TEK's depth. Cultural sensitivity is paramount; appropriating TEK without community consent can lead to ethical violations and mistrust with Indigenous elders (Kimmerer, 2018, p. 30). For example, using sacred Indigenous stories out of context will offend communities propagate cultural appropriation, and feed into damaging stereotypes. Modernization, formal education systems, and monotheistic influences

further threaten TEK's preservation (Cajete, 2018, p. 12). For example, in urban schools, limited access to Indigenous elders or local ecosystems complicates place-based learning.

Overcoming these barriers requires robust teacher training programs, partnerships with Indigenous communities, and curriculum flexibility. Policy support, such as funding for Indigenous-led educational initiatives, is critical to ensure authentic integration. The next section proposes practical strategies to address these challenges in Ontario and Canada.

Pedagogical Approaches: Crafting a Two-Way Science

To overcome these barriers, educators can adopt hybrid models that blend TEK with SEK, creating a "two-way science" approach that emphasizes experiential, place-based learning (Kimmerer, 2018, p. 31). This approach encourages students to engage with local environments through hands-on activities and cultural collaboration. In Ontario, where diverse ecosystems and Indigenous communities coexist, TEK can be integrated imaginatively to decolonize education. For example, a biology class in Toronto could partner with the Mississaugas of the Credit First Nation to explore traditional plant uses in High Park, combining TEK with SEK's botanical classifications. Similarly, in Northern Ontario, schools could collaborate with Cree or Anishinaabe elders to teach sustainable fishing practices alongside water quality testing, fostering ecological and cultural literacy.

The following table outlines practical strategies for TEK integration, offering a visual guide for educators with clear formatting for readability:

Table 1 *Strategy, Description, Ontario Context*

Strategy	Description	Example in Ontario Context
Field-Based Learning	Guided exploration of local ecosystems with Indigenous elders to learn TEK practices.	Students visit one of the Great Lakes wetlands with Anishinaabe elders to study traditional harvesting and water quality testing.
Community Collaboration	Partnerships with Indigenous communities for workshops or co-created projects.	A school in Ottawa collaborates with Algonquin communities to create a traditional medicine garden.
Storytelling and Literature	Use Indigenous narratives to teach TEK themes, engaging diverse learners.	Incorporate Richard Wagamese's *Indian Horse* to explore land connections in a Grade 10 English class.
Project-Based Learning	Assign projects combining TEK and SEK, such as ecological studies or plant surveys.	Students in Thunder Bay research traditional Anishinaabe uses of birch alongside scientific properties.

These strategies prioritize participation, demonstration, and community involvement, contrasting with traditional classroom settings of compliance and individual success. Collaboration with Indigenous organizations ensures cultural relevance, while flexible curricula allow for co-creation of knowledge, supporting reconciliation and sustainability goals.

Addressing the Gap: The Need for Case Studies

While TEK integration is gaining traction, specific case studies in secondary schools remain scarce. In Canada, initiatives like EcoSchools Canada incorporate elements of TEK in environmental education, promoting climate action through activities like schoolyard gardening

(EcoSchools Canada, 2025). However, explicit applications in secondary curricula are limited. A 2025 study of Ontario's Grades 7 and 8 science curricula note efforts to infuse TEK, such as lessons on Indigenous fire management, but implementation remains inconsistent due to teacher training gaps (TEK in Canadian Curriculum, 2025). This scarcity underscores the need for scalable models, such as pilot programs in Indigenous communities, to document successful TEK integration. The next section will expand on TEK'S global reach and what lessons can be learned there.

Expanding TEK's Reach: Lessons from Global Contexts

Global examples of Indigenous knowledge integration offer valuable lessons for Canada. In Aotearoa (colonially known as New Zealand), the Māori concept of *kaitiakitanga* (guardianship of the environment) is integrated into curricula, with students participating in restoration projects guided by Māori elders (Smith, 2020, p. 45). These initiatives have been met with enthusiasm, as students report heightened environmental awareness and cultural pride, particularly among Māori youth, who feel validated by seeing their knowledge in formal education (Smith, 2020, p. 47). However, some educators initially resisted due to unfamiliarity with *kaitiakitanga*, requiring professional development to build confidence and competence (Smith, 2020, p. 48). In Australia, Aboriginal bushfire management techniques are taught alongside fire ecology principles (Pascoe, 2019, p. 67). This approach has been praised for its practical impact on wildfire prevention, earning support from environmental agencies, but logistical challenges, such as coordinating with remote Aboriginal communities, have limited scalability (Pascoe, 2019, p. 70). Canadian efforts, such as British Columbia's inclusion of Indigenous perspectives such as collaborative decision-making agreements show promise but lack consistency. Adapting these global models, with attention to community collaboration and

teacher training, could enhance TEK integration in Ontario, for example, by developing province-wide programs that pair Indigenous elders with science teachers to co-teach ecology units. Moreover, this next section will underline the benefits of TEK and how it fosters resilience and reconciliation.

Benefits of TEK: Fostering Resilience and Reconciliation

Integrating TEK yields multifaceted benefits. For Indigenous students, it validates cultural identity, countering historical exclusion and improving STEM engagement, where only 1.2% of Canadian university STEM graduates identified as Indigenous in 2023 (Statistics Canada, 2023). For all students, TEK enhances environmental awareness through sustainable practices like rotational harvesting (Kimmerer, 2018, p. 30). TEK also fosters resilience against climate change, as seen in Aboriginal fire management practices (Pascoe, 2019, p. 67). By centering Indigenous knowledge, TEK supports reconciliation, reducing Eurocentric biases and promoting cross-cultural dialogue (TRC, 2015).

Conclusion: A Transformative Path Forward

Reawakening Indigenous land practices through TEK is an ethical and ecological imperative. By prioritizing relational connections to nature, TEK offers a counterpoint to Western scientific approaches, emphasizing ecological restraint and sustainability (Kimmerer, 2018, p. 33). Educators must advocate for curriculum reform, collaborate with Indigenous communities, and engage in experiential learning to embed TEK authentically. Drawing on global examples, such as New Zealand's *kaitiakitanga*, can strengthen Canadian efforts by providing an example for resource management and integration of Indigenous rights and

knowledge into environmental policy. This paper calls for a transformative shift where TEK and SEK converge to create a sustainable, inclusive future.

References

Cajete, G. (2018). *Native Science and Sustaining Indigenous Communities*. In *Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability* (pp. 15–26). Cambridge University Press.

Canadian Environmental Assessment Agency. (2025). *Considering Aboriginal traditional knowledge in environmental assessments conducted under the Canadian Environmental Assessment Act, 2012*. https://www.canada.ca/en/environmental-assessment-agency/programs/aboriginal-consultation/considering-aboriginal-traditional-knowledge-environmental-assessments-conducted-under-canadian-environmental-assessment-act-2012.html

EcoSchools Canada. (2025). *EcoSchools Canada*. https://ecoschools.ca/

Kimmerer, R. (2018). *Mishkos Kenomagwen, the Lessons of Grass: Restoring Reciprocity with the Good Green Earth*. In *Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability* (pp. 27–56). Cambridge University Press.

Pascoe, B. (2019). *Dark Emu: Aboriginal Australia and the Birth of Agriculture*. Magabala Books.

Shilling, D. (2018). *Introduction: The Soul of Sustainability*. In *Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability* (pp. 3–14). Cambridge University Press.

Smith, L. T. (2020). *Decolonizing Methodologies: Research and Indigenous Peoples*. Zed Books.

Sobel, D. (2004). *Place-Based Education: Connecting Classrooms and Communities*. Orion Society.

Statistics Canada. (2023). *Postsecondary graduates by Indigenous identity and field of study*. https://www.statcan.gc.ca

Truth and Reconciliation Commission of Canada (TRC). (2015). *Calls to Action*. http://trc.ca/assets/pdf/Calls_to_Action_English2.pdf

Wildcat, M., McDonald, M., Irlbacher-Fox, S., & Coulthard, G. (2014). *Learning from the land: Indigenous land-based pedagogy and relationality*. Decolonization: Indigeneity, Education & Society, 3(3), 1–15.

List of Figures