Culturally Relevant Pedagogy in Science: *Examples from Nova Scotia*

Dr. Eddia Copeland Solas & Ms. Amira Faulkner

Land and Community Acknowledgement

We gather today in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people, governed by the Peace and Friendship Treaties of 1725. These treaties are living agreements that uphold relationships based on peace, respect, and mutual care.

We also recognize the 400-year history of African Nova Scotian communities, whose resilience, wisdom, and contributions continue to shape and inspire our work.

Acknowledgment is more than words—it is a call to action. A practical commitment means moving beyond recognition into meaningful engagement, support, and advocacy for Indigenous and African Nova Scotian communities. May our work today and beyond reflect these commitments in action.

Outline

- Background and Context
- Research Goals
- Research Questions
- Methodology
- Participant Profiles
- Data analysis
- Framework for Teaching Science to ANS Students
- Conclusion
- Acknowledgements

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Background and Context

Three decades after the publication, in 1994, of the Black Learners Advisory Committee (BLAC) on Education report, Black students are still being underserved in Nova Scotia. The BLAC report's directive—for educators to adopt a sensitive, responsible approach tailored to the unique needs of Black learners—remains unfulfilled.

Culturally Relevant Pedagogy

CRP was first introduced to us by Gloria Ladson-Billings who defined it as pedagogy which leads to:

- **Academic Success**
- **Cultural Competence** (students maintain their cultural integrity while gaining fluency in at least one other culture)
- **Socio-political Critical Consciousness** (students are taught to recognize, critique, and work to change social inequities)

Culturally Responsive Pedagogy

Geneva Gay built on the foundation developed by Ladson-Billings to provide a practical framework for what she calls Culturally Responsive Pedagogy:

- **Cultural Knowledge** (teachers need to spend time getting to know and incorporating into their curriculum the cultural heritages of their students)
- **Caring and Affirming Relationships** (teachers need to form strong relationships with students and their caregivers)
- **Curriculum Content** (teachers need to include diverse cultural perspectives and contributions in the curriculum – moving beyond Eurocentric perspectives)
- **Communication** (teachers need to understand and adapt to students' cultural communication styles)
- **Instructional strategies** (teachers need to use teaching methods that align with the cultural learning styles of their students)

Research Goals

To analyze the pedagogical practices of teachers who are effectively educating African Nova Scotian (ANS) students in science.

Develop a comprehensive framework to equip pre-service and in-service teachers to effectively address and support the unique needs of Black students in science classrooms.

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Research Questions

- How are the pedagogies of teacher participants culturally relevant and responsive to the identities and experiences of African Nova Scotian (ANS) students?
- How do ANS students respond to the pedagogies of teacher participants?
- What relationships do teacher participants have with ANS students and their caregivers?
- What are the classroom experiences of ANS students being taught by teacher participants?

Methodology

Qualitative study:

- Three teacher participants were selected through purposive sampling
- Teacher interviews were done on Teams, transcripted and coded
- Classroom observations were done for each teacher participant
- Focus groups with African Nova Scotian (ANS) students

  - ✓ ***Participant teachers were chosen based on recommendations from students and principal.***
  - ✓ ***Participants all teach at the same school which is very supportive of students of African heritage.***
  - ✓ ***Teachers were identified as being successful with ANS students based on student academic attainment and the quality of the relationships between participants and students.***

Data Analysis

- Iterative Coding — done by researcher and research assistant
- Combination of inductive and deductive coding — initial coding was inductive, from this a list of codes was generated to assist the research assistant in the deductive coding process
- Themes were drawn from the codes generated

List of Codes

- **Code A** - Building Relationships and Connection
- **Code B** - Parental Involvement and Engagement
- **Code C** - High Expectations and Support
- **Code D** - Acknowledging Socioeconomic Factors
- **Code E** - Recognizing and Valuing Cultural Identity
- **Code F** - Continuous Learning and Self-Reflection
- **Code G** - Overcoming Imposter Syndrome and Building Confidence
- **Code H** - Addressing Disparities and Equity
- **Code I** - Differentiated Instruction and Student Choice
- **Code J** - Advocacy and Social Justice

Participant Profiles

- **Delight** – cisgender, Caucasian male; teaches science, math and art; has 10+ years teaching experience, first taught Black students at a private boarding school, entertaining & friendly, excellent relationships with students.
- **Patience** – Caucasian female of European descent, 20 years experience, teaches science & chemistry; very organized, reserved and warm, caring; excellent relationships with students.
- **Blessing** – Caucasian female (mixed Italian and Acadian descent); teaches science and French, has a passion for working with equity-seeking groups, caring, social butterfly; excellent relationships with students.

Summary of Principal Findings

The 3 participants had different teaching styles and classroom behaviours.

However, there were 3 main themes that emerged from the data collected:

- The importance of incorporating ***culturally relevant & responsive teaching practices***.
- The significance of building ***strong relationships*** with ANS students and creating a sense of community in the classroom.
- The importance of setting ***high expectations for students*** while providing the necessary support and scaffolding to help them succeed.

Framework for teaching science to ANS students

Culturally Relevant & Responsive Pedagogy	Building relationships and Community	High expectations and support
- Integrate cultural references in an authentic manner (Use examples, case studies, and materials that reflect the cultural backgrounds of Black students) - Address systemic racism (eg discuss the contributions of overlooked Black scientists and the historical context of their work) - Develop inclusive materials (include materials that include Black scientists and culturally relevant examples)	- Prioritize relationship building (spend time getting to know students individually) - Create a supportive classroom environment (students should feel safe, valued and respected) - Engage with the Black community (connect with families etc. to build trust and understanding)	- Set high expectations (encourage students to strive for excellence) - Provide scaffolding - Use engaging teaching methods (incorporate interactive and hands-on activities & group work)

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Conclusion

Different cultural backgrounds bring unique perspectives, ideas, and approaches to scientific problems. This diversity can lead to more innovative and comprehensive solutions to global problems. The data confirms that if we in (NS, Canada, the world) would like the unique contributions of Black populations in STEMM, then science teachers need to get rid of deficit mindsets towards Blackness (1) build strong relationships with our students, (2) set high expectations for these students and (3) teach with the histories, cultures and lived experiences of the Black community in mind.

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