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## MASTER OF APPLIED COMPUTING

## COMP 8157 ADVANCED DATABASE TOPICS

## **PROJECT PROPOSAL**

### **GOAL 4: QUALITY EDUCATION**

**Addressing Educational Disparities: Assessing the Gap for Indigenous Community**

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## Abstract

This paper proposal aims to address the continual disparities in education in Canada faced by Indigenous students by utilization of exhaustive inspection and analysis of Indigenous Data Management. The influence of a diverse range of factors such as historical trauma, socio-economic challenges, cultural limitations, prejudice, and a lack of support networks resulted in high dropout rates among Indigenous students. The underlying concern falls in the persistent inequality in terms of resource allocation and funding to their schools and communities, limiting the opportunity to effective education [1]. Our management system proposes a distinctive solution through creating a detailed system which is going to include tailored data collections using non-relational databases that will account for cultural identity, language proficiency, and community involvement, offering an integrated knowledge of students' experiences and challenges. Offering the incorporation of Indigenous data governance principles, assuring ownership and control to the community over the data. The paper aspires to empower Indigenous societies, enhance educational equity, and assist in closing the educational gap for Indigenous students in Canada [2] [3].

## Problem Description

Native communities (Indigenous people) in Canada have much higher dropout rates than non-Aboriginal communities (non-indigenous people). A few factors contribute to this issue, counting authentic and intergenerational impacts, financial imbalance, social marginalization, segregation, need of back systems, and geographic boundaries. These components limit the access to quality education for Indigenous students, lowering educational achievement to a minimum compared to general citizens of Canada [4] [6].

Post-secondary education (PSE), a recognized treaty right for Indigenous students. Nonetheless, the legacy of colonialism, residential schools, racism, and insufficient funding barricades and limits the access to the treaty right of PSE. Indigenous students above 16,000 in Ontario enrolls to public colleges and universities which is almost half of the post-secondary students in Canada. However, the inadequacy of funding and access difficulty in Ontario results in a prominent disparity in the field of education [5].

Even though there have been multiple efforts to distribute culturally relevant educational curriculum through significant institutes by Indigenous communities, these students face substantial underfunding, and they also face the shortage of necessary infrastructure and services. There is a need to refine the practices to teach Indigenous students by non-Indigenous institutions [7]. Moreover, these institutes need to incorporate Indigenous history, cultures and perspectives including tackling racism and marginalization.

It is extremely essential to address funding disparities and improve serving practice in non-Indigenous institutions which is how we can ensure equitable access to effective post-secondary education and provide substantial funding for Indigenous Institutes. Single funding approaches presently in Canada are not sufficient for ongoing programs and services. Enough funding is a necessity in promoting culturally relevant and equitable education for Indigenous students [8[ [9].

Our paper will address these core issues, which includes insufficient funding, disconnection of culture, discrimination, and lack of support systems for Indigenous communities, working towards assessment and analysis of quality education for Indigenous students and reducing the educational gap between Indigenous and non-Indigenous populations.

## Motivation

A profound knowledge of past injustices and current hardships experienced by Indigenous communities serves as the driving force behind efforts to overcome the lack of cultural responsiveness in Canada's mainstream educational system and promote educational equity for Indigenous children. Every kid needs an education that represents their cultural identity and fosters their entire well-being, and this motivation is fueled by a desire for justice, fairness, and reconciliation [10 [11].

Empathy is a key component of this drive which can be understood better if we can relate to their experiences. We understand the value of a learning environment that recognizes Indigenous cultures, languages, and history to validate their identities. Empathy drives us to recognize the suffering brought on by past wrongdoings like the residential school system, which forcefully tore Indigenous children away from their family, culture, and languages. These policies' generational effects still have an influence on Indigenous kids today causing them to feel excluded and disengaged from learning [11].

A dedication to rapprochement, decolonization, and developing respectful connections with Indigenous communities is the driving force behind efforts to overcome the education system's lack of cultural awareness. The past and current marginalization of Indigenous knowledge systems, languages, and histories is acknowledged and must be addressed. We strive to restore the pride, self-respect, and dignity of Indigenous kids by promoting cultural responsiveness. By incorporating this information into the curriculum, we empower Indigenous kids and enhance the learning opportunities for all students and fostering respect and intercultural understanding [1 2].

In addition to being a question of fairness, addressing the lack of cultural responsiveness in the traditional educational system and fostering educational equity are crucial first steps towards attaining social justice. Indigenous knowledge systems integration and the provision of culturally appropriate curricula can improve the educational experience and foster a feeling of pride among Indigenous students [13].

Additionally, key efforts towards leveling the playing field include investing in infrastructure, upgrading educational facilities, and assuring access to required resources. This involves ensuring that schools in Indigenous areas have appropriate financing, the required technical tools, and skilled instructors who can recognize and solve the issues encountered by Indigenous kids. Finally addressing the differences in educational possibilities for them is a commitment to social justice and compassion. We can build a more fair and inclusive society where everyone, regardless of background, has an equal chance to achieve and prosper by integrating cultural responsiveness and advancing educational equity [10] [14].

## Solution statement/technology

To address the educational disparities faced by Indigenous students and to promote evidence-based decision-making, a model would be created for which we can use a NoSQL Database, such as MongoDB or any other generic NoSQL database. Here are some of the main characteristics and features of this solution.

**Customized Data Fields:** A database schema will be designed which will have a customized set of data fields that capture pertinent data unique to Indigenous students, including cultural identity, language proficiency, community involvement, Name, Age, Gender, type of educational institute (govt. or private), and other such relevant fields can be included.

**Indigenous Data Governance:** The model would adhere to the concepts of Indigenous data sovereignty and self-determination, respect for community protocols, and assurance that Indigenous communities retain ownership and control of the data. Authentication and authorization mechanisms provided by the chosen NoSQL database can be used to enforce data governance policies.

**Data Integration and Reporting:** The proposed model would combine information from various sources, including educational institutions, governmental bodies, and community-based organizations, to produce a comprehensive picture of Indigenous students' educational experiences. The flexibility of the chosen NoSQL database's document model will facilitate easy integration of data from different sources. Customizable reports and visualizations can be generated using the features provided by the selected NoSQL database.

**Cultural and Contextual Indicators:** For evaluating the success of educational initiatives and programs for Indigenous students, the model would incorporate culturally relevant indicators like ethnicity and language. We will store and query this information to evaluate the success of educational initiatives and programs.

**Longitudinal Tracking and Early Intervention:** The model would make it easier to track Indigenous students' academic development over time, from early education to higher education. It would be able to spot early indicators of potential difficulties or disparities, enabling prompt support and interventions to guarantee students' success and stop educational gaps from widening. The selected NoSQL database can be used to track and analyze students' academic progress over time.

**Date Privacy and Security:** The sensitive data of Indigenous students will be protected using appropriate security measures. Depending on the chosen NoSQL database, features such as encryption-at-rest and encryption-in-transit can be utilized to ensure data privacy and security.

The Model's implementation calls for close coordination with Indigenous communities, adherence to ethical principles, and observance of data privacy laws. To support their right to self-determination and advance educational equity for Indigenous students, it would give Indigenous communities the power to gather, manage, and use data in these ways. a statement or piece of technology that is used for implementation.

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