

# Identifying the predictors of mathematics anxiety and performance in Canada: An educational data mining approach

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## Abstract

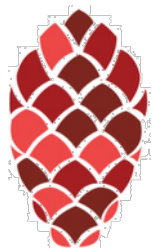
Over the last decade, Canadian students have exhibited insubstantial improvements in mathematical scores compared to other countries as indicated by large-scale educational assessments such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS). In relation to students' mathematical performance, math anxiety - the feeling of fear or nervousness when performing math-related tasks - was found as an associated factor. However, no previous study has explored math performance and math anxiety, specifically among Albertan students. We present a work-in-progress that identifies significant predictors of math performance and math anxiety among Canadian and Albertan students, using the PISA 2018 and TIMSS 2019 datasets. This study has three phases: first, a list of predictors will be selected from the data set based on existing theories regarding students' math performance and math anxiety. The initial list of predictors will be presented to domain experts (i.e., math teachers) for refinement based on their practical experience. A predictive model for math performance and math anxiety will be developed with Educational Data Mining techniques in the second phase. Results from the model will be presented to the domain experts for their inputs as the qualitative component, and variable importance metrics of the model will be consulted for the quantitative component. Findings from both components will be integrated consulted with the domain experts to derive actionable recommendations that would inform various stakeholders (e.g., educators, school districts, and Alberta Education) of ways to improve math performance in Alberta students.

## Key points:

A list of malleable predictors to students' math performance and math anxiety can be found based on theory-based variable selection and expert-driven variable selection.

Such variables can be developed as parts of machine learning models that predict students' math anxiety and math performance.

The model can be extracted for qualitative inputs from domain experts and quantitative metrics;



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