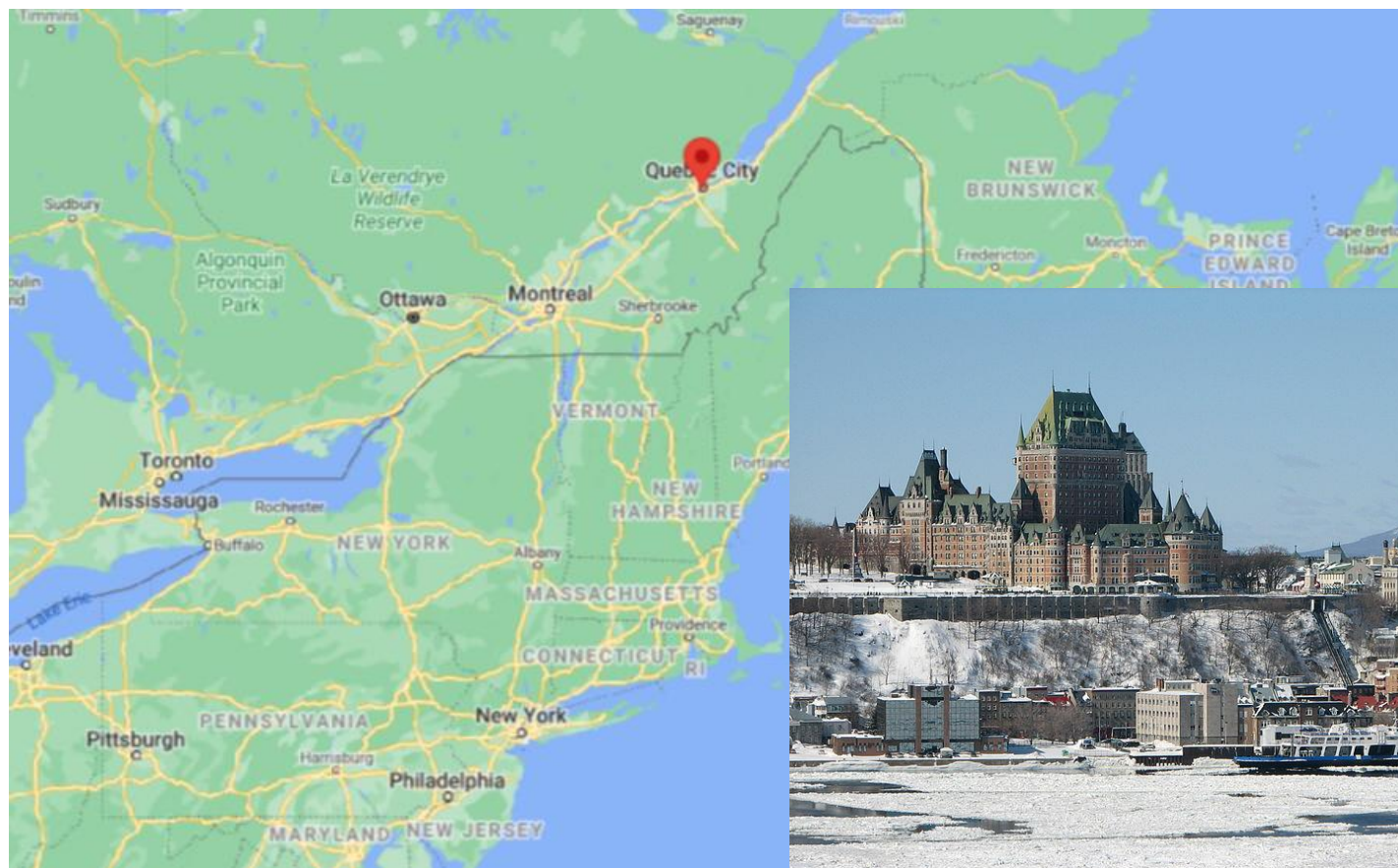


Evaluating statistical knowledge and skills of future teachers through teaching activities



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STT-2902 Statistical Modeling

- About 20 students
- All future mathematics HS teachers
- 2nd and last required statistics course

My thoughts

- A HUGE responsibility!
- A potential for high impact

My plan

- Learn about statistics teaching in HS
- Model good teaching of statistics
- **Create experiential learning activities specific to future teachers**



Project Statement

In teams of 4 or 5, prepare an activity which could be used in a High School classroom to address a “learning outcome” of the Quebec Education Program.

Statistics	Sec. I and II	Sec. III	CST		TS		S	
			Sec. IV	Sec. V	Sec. IV	Sec. V	Sec. IV	Sec. V
Conducting a sample survey, poll or census (population, sample)	X							
Organizing the data gathered and analyzing information	X							
Sources of bias	X							
Sampling methods: simple random, systematic	X							
Sampling methods: stratified, cluster		X						
Qualitative variable and discrete or continuous quantitative variable	X							
Tables, graphs (bar graph, broken-line graph, circle graph)	X							
Table of condensed data, table with data grouped into classes		X						
Histogram and box-and-whisker plot		X						
Stem-and-leaf diagram			X					
Statistical measures: range (minimum value, maximum value), arithmetic mean	X							
Measures of central tendency: mode, median, weighted mean		X						
Measure of position: percentile			X					
Measures of dispersion: range of each part of a box-and-whisker plot, interquartile range		X						
Measure of dispersion: mean deviation			X		X			
Measure of dispersion: standard deviation					X			
Scatter plot (comparing experimental and theoretical data): related to the study of linear and rational functions		X						
Scatter plot: modelling experimental data using curves related to the functional models under study					X	X		X
Linear correlation: correlation coefficient (quantitative appraisal) and regression line			X		X		X	
Correlations other than linear: analyzing statistical data using correlation coefficients and curves related to the functional models under study (intuitive approach)					X	X		



By the end of secondary school, students are aware of the variability of samples as well as the limitations and constraints associated with population sampling.

Students will learn that statistical processing has provided information on the increasing life expectancy of humans and that statistics is now used to make decisions related to politics, government, the economy, the environment and other fields.

Why do we say that statistics can be made to say anything?

**THE PROMPTS-
Excerpts from the Quebec
Education Program**

Using statistical concepts, students may, for example, draw conclusions or make informed decisions based on the results of a statistical report.

To analyze and compare distributions, they observe their shape and use the appropriate measures of central tendency and of dispersion.

In the Cultural, Social and Technical option, students continue to learn about descriptive statistics and begin to make intuitive inferences.



3 steps

1. Students submit a **plan** of their activity, on which I offer feedback.
2. We **test** the activity in our classroom, and all students provide feedback.
3. Students submit a final **report** including
 1. all details to reproduce the activity
 2. two homework and exam questions to test the “learning outcome” of interest.



Pros

- The students (and I) enjoyed the project.
- The project forced them to more deeply understand statistical concepts.
- The students left the class with ideas to use when they'll teach statistics.

Warnings

- Without standardized format, the reports are of varying quality.
- Grading can be a little bit tricky.





CRITERIA	SCORE
DOCUMENT	
The learning activity is directly related to the chosen topic and highlights the statistical concepts identified in the topic. It allows for rich and complex reflection on these concepts; it is not limited to a superficial presentation.	/5
Statistical information and explanations in the document are accurate and clearly presented. Accurate and appropriate statistical vocabulary is used.	/5
The assignment and exam questions are statistically correct and related to the chosen topic and learning activity. They require a deep understanding of the concepts and tools used.	/5
The document contains all the information needed for another teacher to do the activity.	/5
PARTICIPATION	
The activity should engage students and get them thinking about statistical concepts. The grade for this criterion will be based on an evaluation by other students in the course.	/5
Total	/25

Scale : Yes = 5 To a large extent = 4 Partially = 3 More or less = 2 Not really = 1 No = 0



Grading focusses on statistical knowledge and skills.

But the project has students think about and prepare for the teaching of statistics.



Some other activities used in class

- Working with HS textbooks

Students solve questions, grade each other's answers and think critically about the questions themselves.
- Explaining in simple terms

Students also conduct a data analysis project in the course, and they must create a report in which they explain their process and results in such a way that HS students could understand (c.f. intuitive inference).
- Practicing oral problem solving and explanations

For example, a short discussion on a newspaper article which involves content from the statistics curriculum.

