

# Identifying the Gaps in University Coverage in Toronto

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March 25, 2020

## 1. Introduction

### 1.1. Background

Toronto has been consistently ranked as one of the top student cities in the world (11<sup>th</sup> in 2019, 13<sup>th</sup> in 2018, 11<sup>th</sup> in 2017)<sup>1</sup>. There are four universities in Toronto, namely Ryerson University, University of Toronto, York University, and Trent University<sup>2</sup>. Data shows that there are around 180,000 students studying at these universities<sup>3</sup>. Of the four universities mentioned, only Trent University is situated outside the city of Toronto.

In 2016, statistics show that 54% of Canadians aged 25 to 64 have a college or university diploma, which ranks first among the Organisation for Economic Co-Operation and Development (OECD) countries<sup>4</sup>. Census data shows that there are 245,605 people aged 18 to 25 in Toronto<sup>5</sup>. Multiplying the percentage of Canadians in college with the number of potential students in Toronto, there are roughly 132,000 people in college and 135,000 people who are not in college.

### 1.2. Problem

Ideally 100% of people would have the option of tertiary education, but they may be constrained by factors such as cost or distance. This project aims to determine the ideal locations

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<sup>1</sup> <https://www.topuniversities.com/city-rankings/2019>

<sup>2</sup> <https://studyabroad.shiksha.com/top-universities-in-toronto-articlepage-1533>

<sup>3</sup> <https://ocul.on.ca/populations>

<sup>4</sup> <https://www150.statcan.gc.ca/n1/daily-quotidien/171129/dq171129a-eng.htm>

<sup>5</sup> <https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3520005&Geo2=PR&Code2=35&Data=Count&SearchText=Toronto&SearchType=Begin&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=3520005>

for new universities or satellite campuses in Toronto that serve the neighborhoods which may be too far from the existing universities while accounting for the total population of neighborhoods<sup>6</sup>.

### **1.3. Interest**

It would be of interest to Ontario's Ministry of Training, Colleges, and Universities to see in what areas of Toronto – the most populous city in Ontario – have limited access to universities, and therefore the province can create new public universities in the target areas. It would also be of interest to private universities who are interested in creating satellite campuses in Toronto to serve a greater population of students. Finally, it would be of interest to the youth of Toronto who may be looking to take up tertiary education but the current universities may be far away from them.

## **2. Data Acquisition and Cleaning**

### **2.1. Data Sources**

FourSquare, a technological company which uses a massive database of accurate location data, will be utilized to determine the locations and distances of universities in Toronto. Data for the total population of neighborhoods will be sourced from the census of Statistics Canada.

A post on medium.com by A Gordon was also used for information on the boundaries of Toronto neighborhoods and conversion to a Choropleth map<sup>7</sup>.

### **2.2. Data Cleaning**

The total population of each postal code was first tallied and placed in a dataframe.

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<sup>6</sup> <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Table.cfm?Lang=Eng&T=1201&SR=1&S=22&O=A&RPP=9999&PR=0>

<sup>7</sup> <https://medium.com/dataexplorations/generating-geojson-file-for-toronto-fsas-9b478a059f04>

A problem was encountered when trying to determine the universities near Toronto, wherein most of the results shown were within 1,000 meters from the center of Toronto whereas York University was more than 16,000 meters from the center. As such, a separate search was performed to include York University.

After data cleaning, there were 103 neighborhoods and 6 features, namely Postal Code, Borough, Neighborhood, Average Income, Latitude, and Longitude.

The three universities contained 16 features, namely Name, Categories, Address CC (Country Code), City, Country, Cross Street, Distance from Toronto center, LabeledLatLngs, Latitude, Longitude, Neighborhood, Postal Code, Province, and ID.

Finally, a choropleth map was created using the postal codes as boundaries. The scale runs from yellow to red, where yellow means less residents and red mean more residents. Universities were added to the map and are marked by a green marker.

