World University Ranking --with detailed metrics

--By looking into the world university rankings and the metrics behind, we aim to help upcoming college applicants to choose their preferred colleges and help colleges find ways to improve.

Member: Ziyi Gao, Shimin Liang, Binxing Li, Yuxin Tang

1. Business Backgrounds

Student Perspective

-- Help potential college applicants determine which country and university to apply according to the metrics for each school.

School Perspective

-- Understand metric scores behind the college's ranking, and determine where to improve for a better ranking in the future.
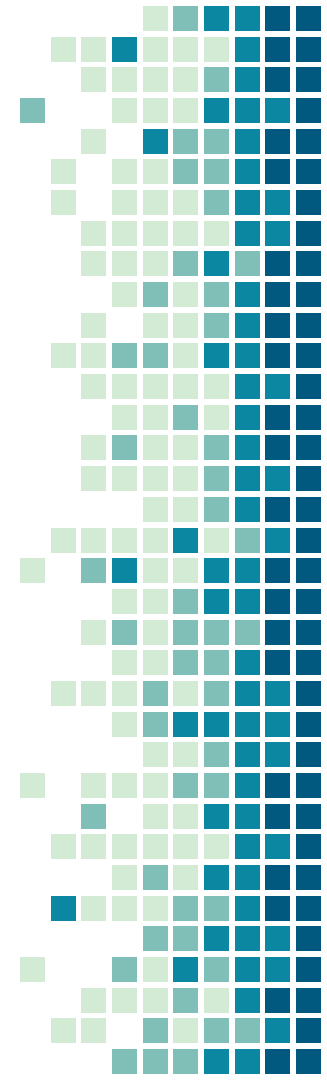
# 2. Exploratory Data Analysis (EDA)

2-1 Datasets

(1)

world_rank	university_name	country	teaching	international	research	citations
1	Harvard University	United States of America	99.7	72.4	98.7	98.8
2	California Institute of Technology	United States of America	97.7	54.6	98	99.9

income	total_score	num_students	student_staff_ratio	international_students	female_male_ratio	year
34.5	96.1	20,152	8.9	25%	null	2011
83.7	96	2,243	6.9	27%	33 : 67	2011

(2)

Country	Year	Public spending on tertiary education(% of GDP)
United States of America	2011	1.069639
United States of America	2012	1.042084
United States of America	2013	0.9472973

4

# 2-2. Country & Number of Universities (2016)
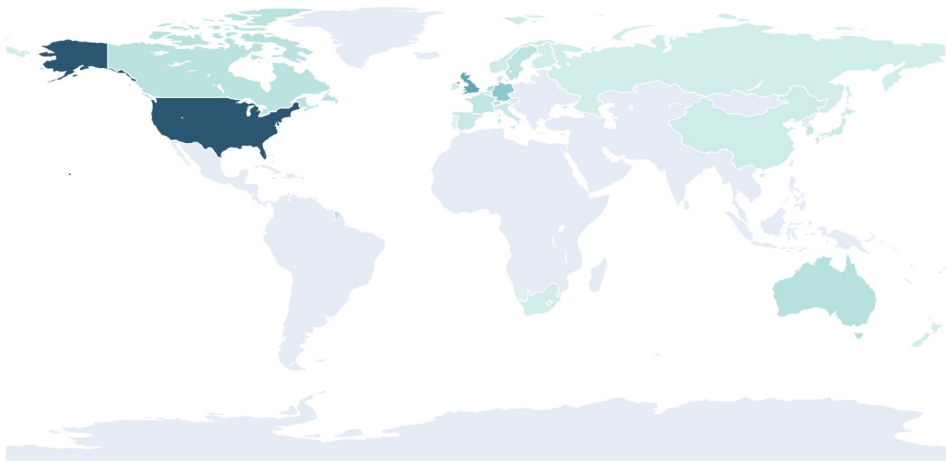
--United States has the highest number of Top ranking universities

--Some European Countries also have several high ranking universities

--By comparing with other year's result, we can find the trend's minor changes annually

Distribution of top 200 ranking universities in 2016

# 2-2. Country & Number & Expenditure of Universities
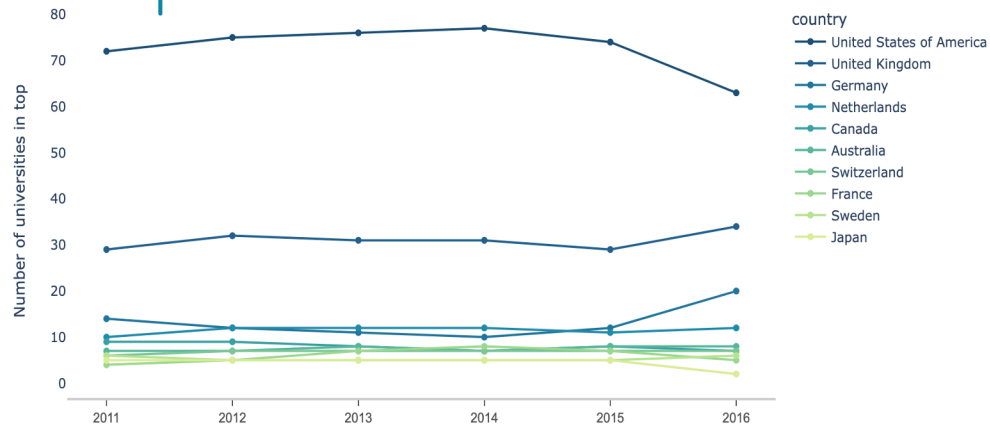
We selected Top 10 countries who have highest number universities on list for further data exploration

-- United States kept its top ranking with the highest number of top ranking universities consecutively, but the number slightly decreased in 2016
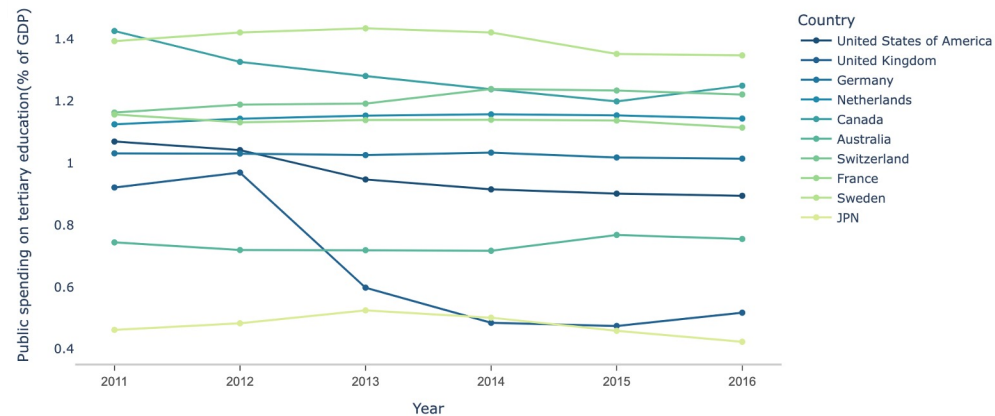
-- By comparing with the expenditure, we can see the relationship between the expenditure and the number of top ranking universities is not strong.

# 2-3. Top 10 Countries' Universities' Ranking Distribution (2016)
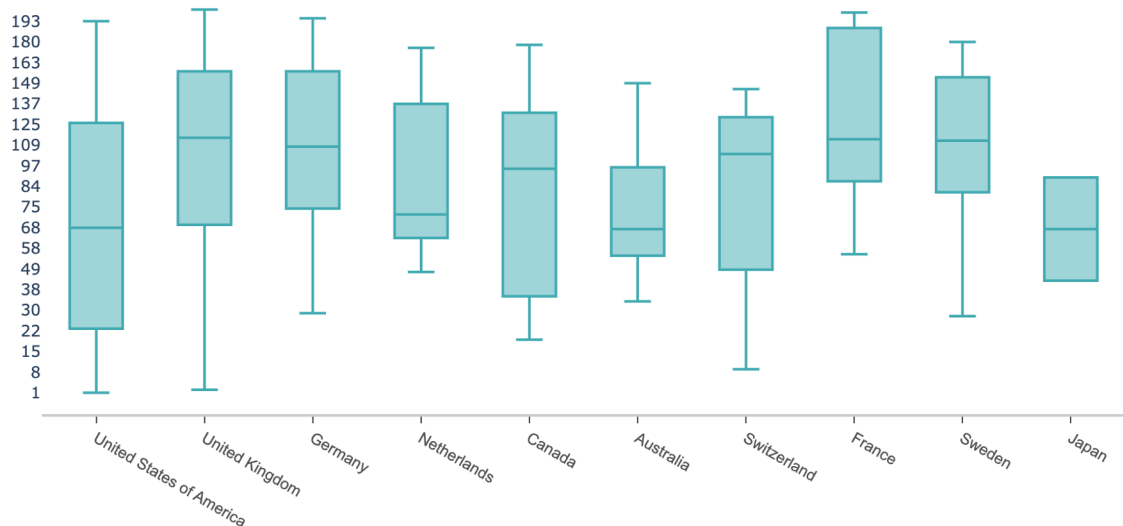
-- United States and United Kingdom both have high range of rankings comparing to other countries

-- Although Japan does not have many universities included, their ranked universities are more highly ranked.

2-4. Score Metrics Description

	Count	Mean	Std	Min	25%	50%	75%	Max
Teaching	1201.0	50.730808	16.912699	15.9	38.300	47.5	60.2	99.7
International	1192.0	59.478523	21.209330	14.8	42.175	59.5	77.7	100.0
Research	1201.0	52.252040	19.661541	13.1	37.100	48.5	64.7	99.4
Citations	1201.0	76.928726	15.535493	8.6	66.700	78.8	89.2	100.0
Income	1061.0	54.230914	22.722593	24.2	36.300	45.8	68.2	100.0

-- These are the detailed statistics of the metrics used for the ranking.
   (200 schools for 6 years)
-- The distributions for all 4 metrics are all roughly symmetrical.
-- The citation scores are higher than the others.
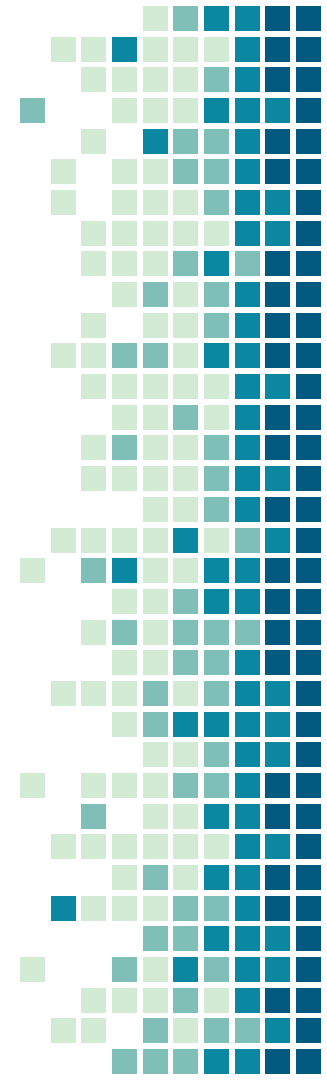
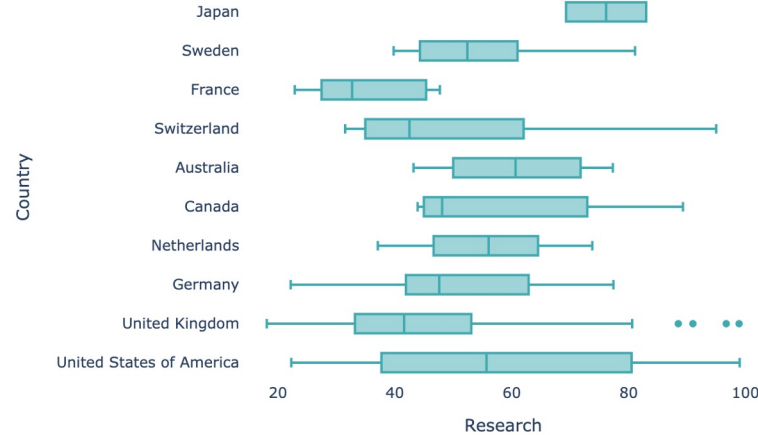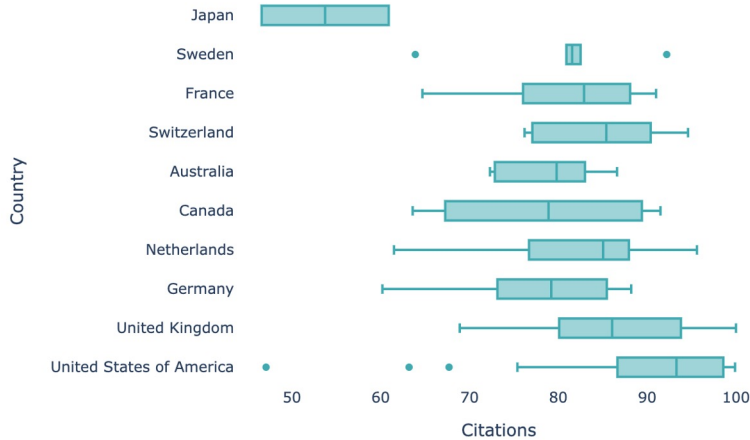# 2-5. Top 10 Countries' Metrics Distribution (2016)
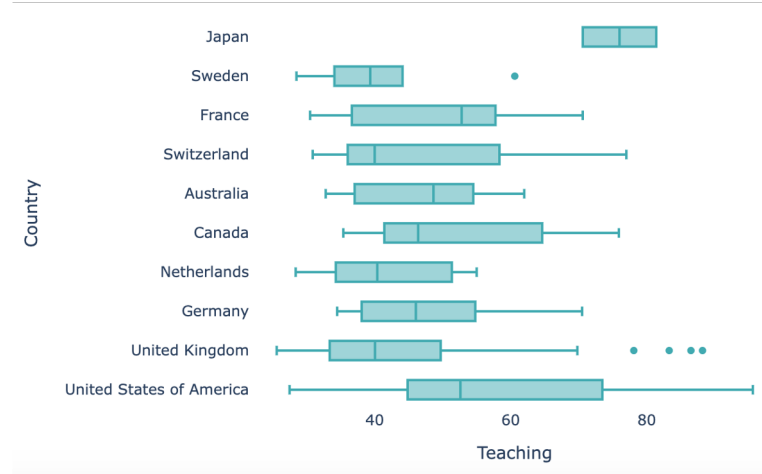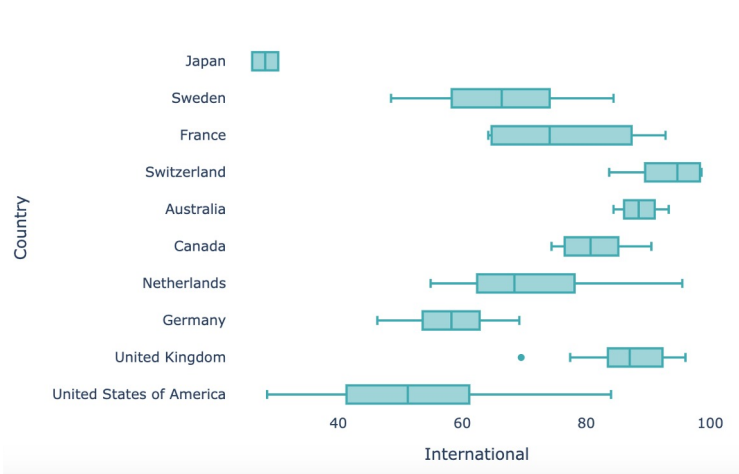
These are the detailed metric distribution (International and Teaching) in top 10 countries.
International: Situations between countries are more varied compared to other metrics.
Teaching: Except Japan who has very high teaching score, most countries' teaching scores are similar.

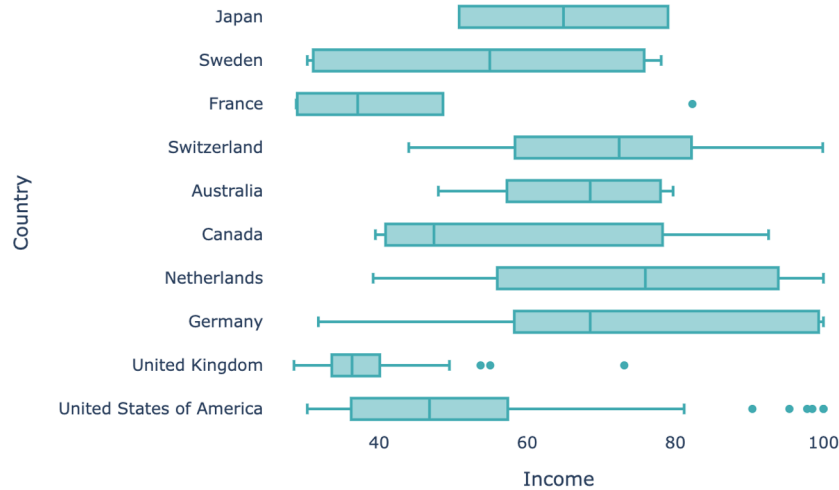# 2-5. Top 10 Countries' Metrics Distribution (2016)

These are the detailed metric distribution (Citations and Research) in top 10 countries.

Citations: Except Japan who has comparatively low scores, citations scores for other countries are more similar

Reach: Research score are more varied between countries, and United States' scores has the highest range from 20 to almost 100.

# 2-5. Top 10 Countries' Metrics Distribution (2016)

These are the detailed metric distribution (Income) in top 10 countries.
Income: The income distribution is also varied across countries. However, European countries such as Netherlands, Germany, Switzerland all have higher maximum and average income score comparing to other countries.

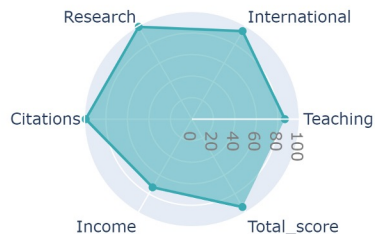# 2-6. Top 10 Universities' Metrics (2016)

1 California Institute of Technology
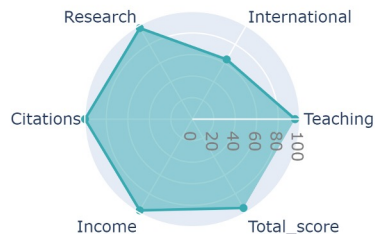
2 University of Oxford

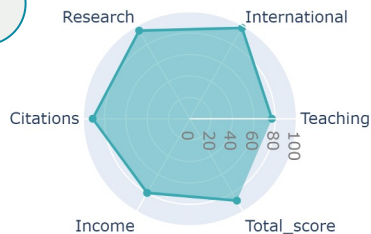**9** Swiss Federal Institute of Technology Zurich

10 University of Chicago

-- Higher ranking universities have higher metrics scores on all the 5 metrics.

--California Institute of Technology (Top 1) have almost full score on research, citation, teaching, and income.

-- University of Chicago (10th) have relatively lower scores on the 5 metrics.

3. Dashboard

3-1. Overview

World University Ranking
Helping Students and Schools to Embrace a Better Future

Overview	Countries	Universities

2011 · 2012 · 2013 · 2014 · 2015 · 2016
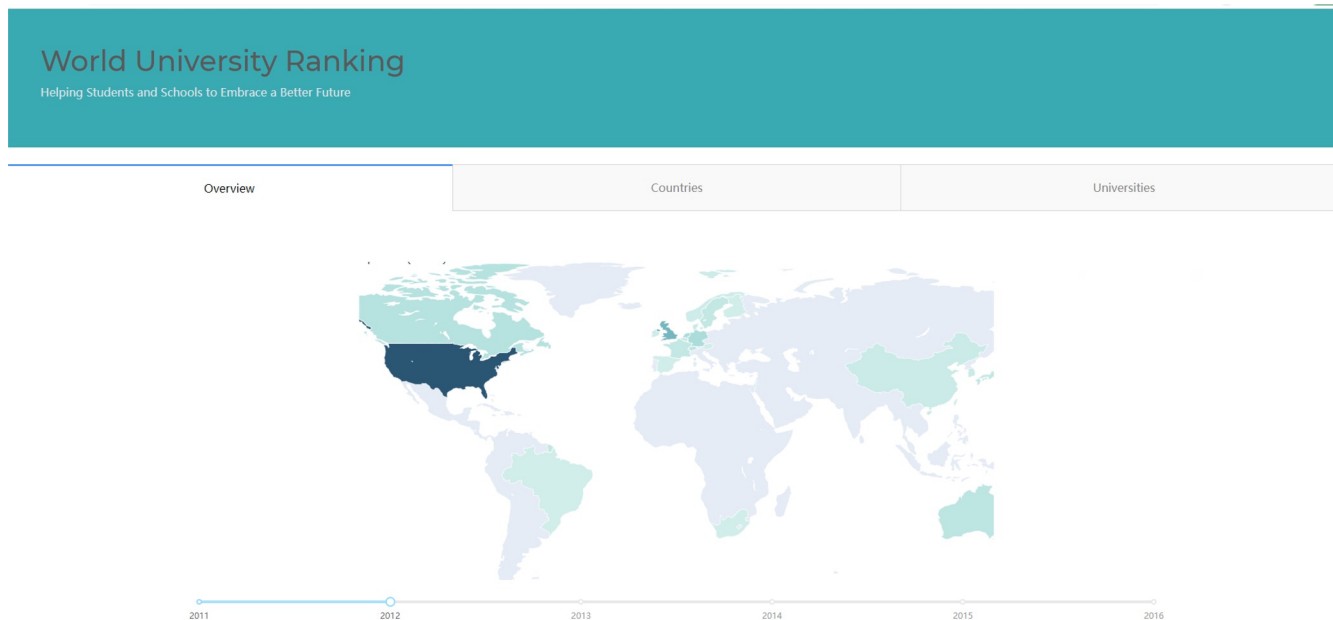
After choosing the year on the slider, a map will show how many universities a country have on list.

The overview tab mainly helps students to have a big picture of places to apply. For example, North America has most number of schools listed on the ranking and the ranks are more concentrated in higher ranks.

14

3-1. Overview

Top 200 Universities' Distribution in Continents (2012)
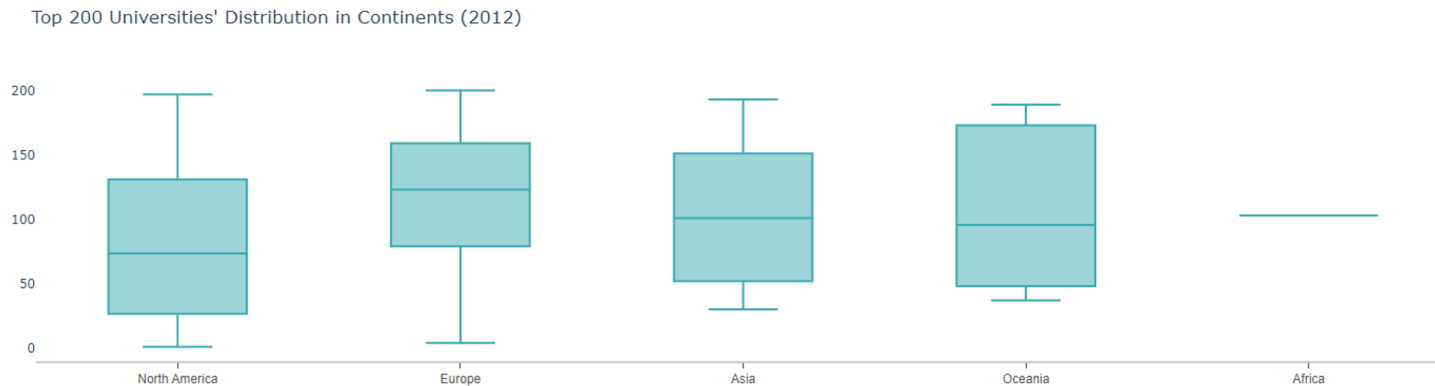
With the year selected for map, box plot showing the ranking distribution of the universities in each continent will be updated.
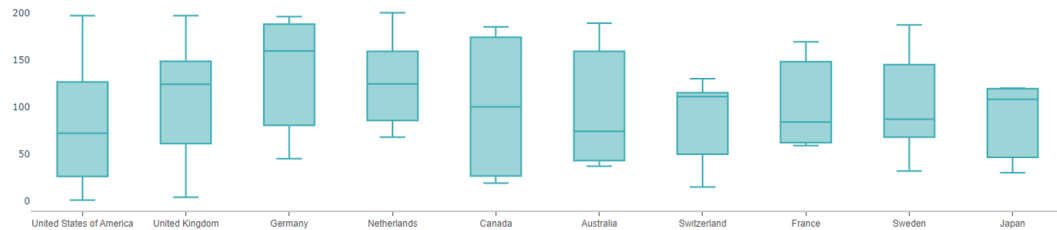
3-2. Country
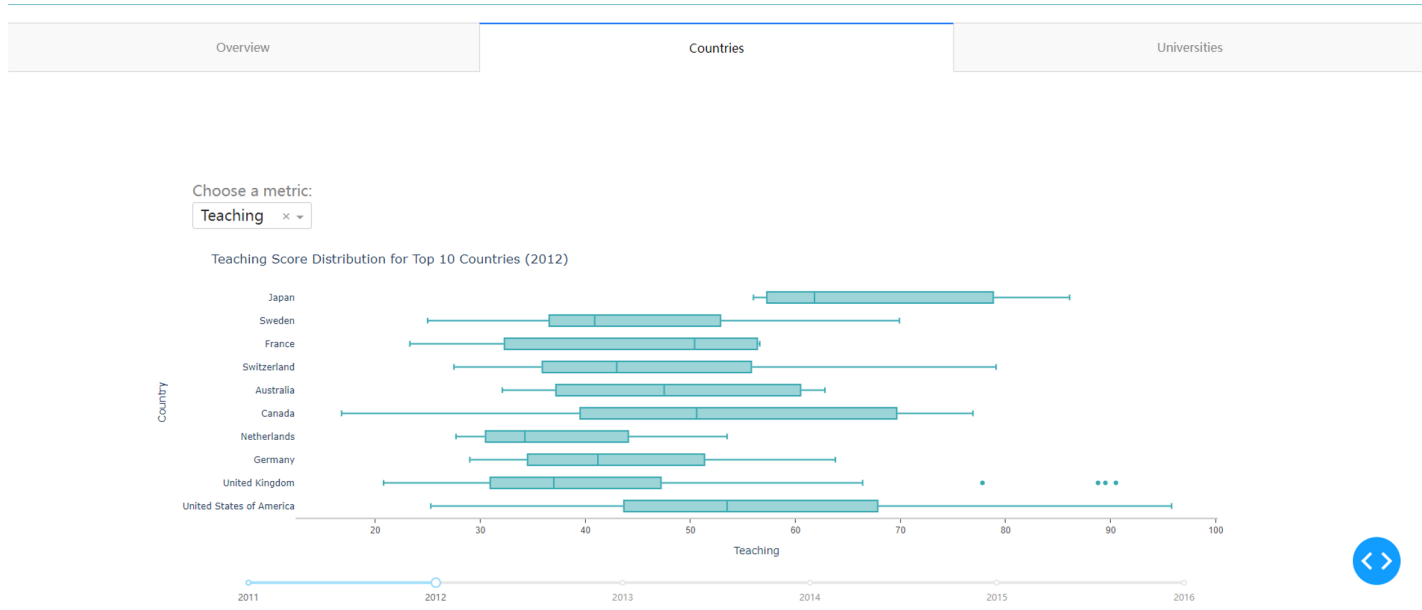
Shows each year's metric's distribution for top 10 countries

The country tab mainly helps students to know which country to apply according to country's universities ranking and their preferences of the metrics. The tab also helps schools to have big picture about their countries' universities' overall performance and the relationship between their country's educational level and public expenditure.
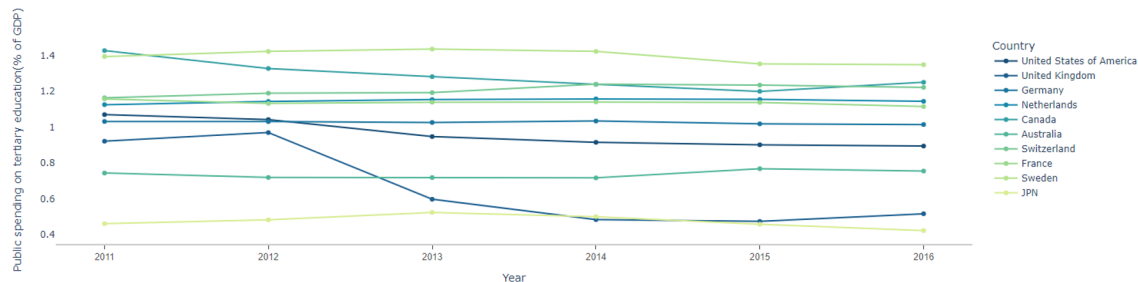
3-2. Country

Top 200 Universities Distribution in Top 10 Countries (2012)

Shows top 10 country's universities ranking distribution

Public Spending on Tertiary Education (% of GDP)

Shows top 10 country's public expenditure changes

3-3. Universities

After selecting year, the year's world top 10 universities' metrics will be shown for comparison.

The universities tab mainly helps students to select which universities to apply according to the detailed metrics and historical ranking. It also helps universities to know where they should improve further to have better ranking in the future.

3-3. Universities

Choose a country:

United States of America × ▾

Top 200 Universities in United States of America (2012)

World_rank	University_name	Teaching	International	Research	Citations	Income	Total_score
1	California Institute of Technology	95.7	56	98.2	99.9	97	94.8
2	Harvard University	95.8	67.5	97.4	99.8	35.9	93.9
2	Stanford University	94.8	57.2	98.9	99.8	63.8	93.9
5	Princeton University	91.5	49.6	99.1	100	81	92.9
7	Massachusetts Institute of Technology	92.7	79.2	87.4	100	94.4	92.3
9	University of Chicago	89.4	58.8	90.8	99.4	null	90.2
10	University of California, Berkeley	82.8	50.4	99.4	99.4	62.5	89.8

Choose a University:

Stanford University × ▾

Stanford University's Ranking Overtime

-- After selecting year and country, all universities are listed with detailed metrics
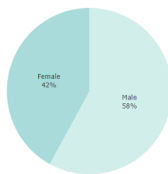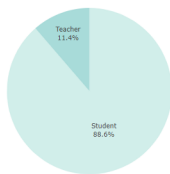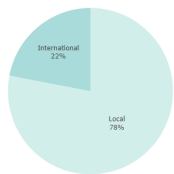
-- After selecting year, country, and university, other metrics such as teacher student ratio will be shown
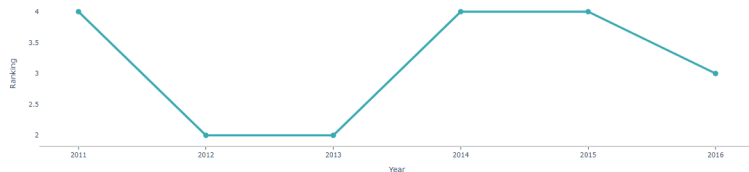
--Lastly, the selected university's historical rank will be shown

19

4. References

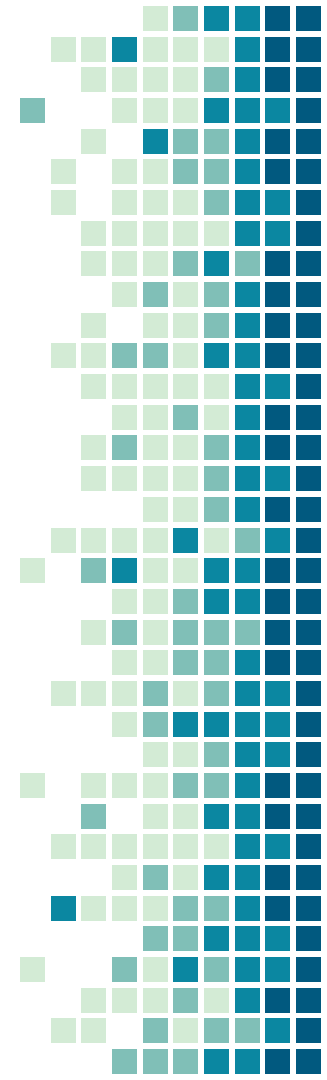University Ranking Dataset:
https://www.kaggle.com/gpreda/world-university-rankings-advanced-analysis/data

Expenditure Dataset:
https://data.oecd.org/eduresource/public-spending-on-education.htm#indicator-chart

Thank You!