Vietnamese Graduation Exam Analytics

Student Name: Dat Tran
Student ID: BJ24DSYU08

Proof of Work:
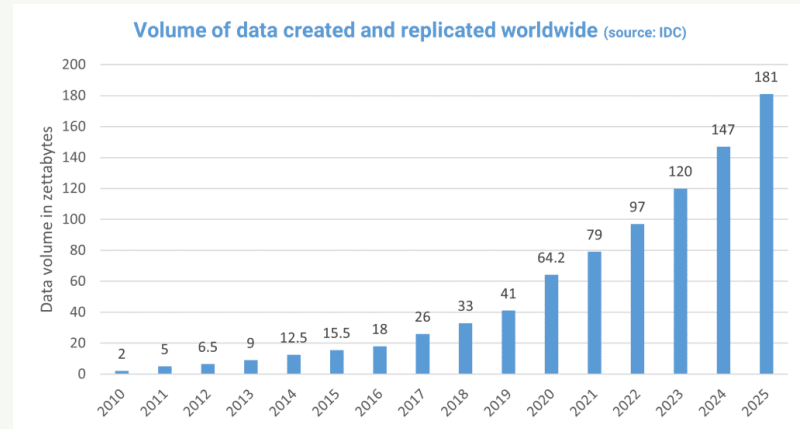https://github.com/sydneycally-inclane-2812/data_vis_uni2024

Importance of Data

The amount of data produced worldwide is *increasing exponentially* every year.

- **40%** of companies use **Big Data Analytics**
- **44%** use **data-driven** decisions making
- **90%** believe data is **important** to business

We offer a **great course** for a **promising field**, in a **rapidly growing economy**; how do we make the most of our efforts?

Optimize the curriculum, find inspiring educators and **empowering the right student.**

Volume of data created and replicated worldwide (source: IDC)

Data volume in zettabytes

2010	2
2011	5
2012	6.5
2013	9
2014	12.5
2015	15.5
2016	18
2017	26
2018	33
2019	41
2020	64.2
2021	79
2022	97
2023	120
2024	147
2025	181

Source: QuantHub

Vietnamese migrants are becoming **larger and larger contributors** to the Australian economy.

Vietnam has a comprehensive, SAT-like national examination which result is used by all domestic universities.

Percentage change in median wage from 2016 to 2021

Country	Percentage change
China	60.7%
Korea	53.56%
Thailand	46.33%
Singapore	38.05%
Indonesia	32.11%
India	29.3%
Malaysia	24.83%
US	22.6%
Vietnam	22.59%
Philippines	20.38%
UK	14.99%

Can that be a good indicator of promising talents for our program?

Context

Overview of Vietnamese HS Graduation Test:

- Usually occurs over **2 days** in July

- Taken by **12th graders** or anyone who wishes to be enrolled into a **tertiary education** institute

- 3 compulsory subjects: **Math**, **Vietnamese Literature** and **2nd language** (typically English)

  Choose 1 in 2 groups:

  - Natural Sciences (**Biology**, **Physics**, **Chemistry**)

  - Social Sciences (**History**, **Geography**, **Civics**)

- All tests are **Multiple Choice**, except for Vietnamese Literature

- To graduate, all subjects must be taken, none has scores <= 1 and the average must be >= 5

In 2024, after nine years of implementation, the test was administered in this format **for the final time.**

People who wants to go to university and have been studying for this format has **one last attempt**, so the number of test takers saw a **substantial increase**.

Business Questions

We are looking to verify:

- The quality of Vietnamese students are gradually increasing to meet our standards, especially STEM subjects

- The test is **standardized** and **stable over multiple years,** so student's results are representative of their ability.

We will use data visualizations to find out:

- How much the **distribution** changes?

- Which subjects significantly **improved/declined**?

- How many students don't meet the **graduation criteria**? **Where** are they?

- How do scores vary by **region**?

- Is there **correlation** between **STEM subject scores**?

- How does **COVID-19** affect 2021?

- How different is **2024** is from the previous years, considering the change in test format?

- How can we further our **admission campaigns** in Vietnam with this findings?

# Number of Students and Percentage of Graduates by Year

- The number of test takers **increases** year by year, but 2024 saw an increase by as much as **the previous two combined**.

- The graduation rate also inclined rapidly, indicating an increase in **learner's quality**.

Number of Students and Percentage of Graduates by Year
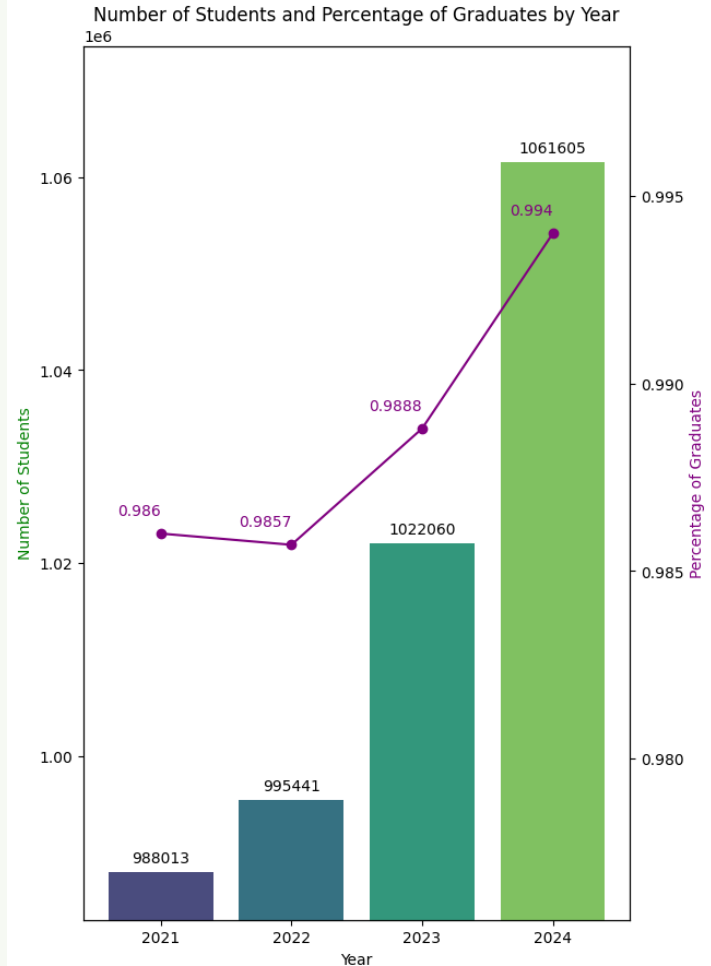
Score Distribution:
STEM vs Social Science

- The distribution of 9 subjects, over 4 years, are shown in the adjacent graphic.

- Results mostly follow **normal distribution** centered at the middle of the scale, showing **effective classification**.

- Despite being the last year, results of 2024 (in red) **does not deviate much** from previous year, except for a **small bump** for Literature and Geography
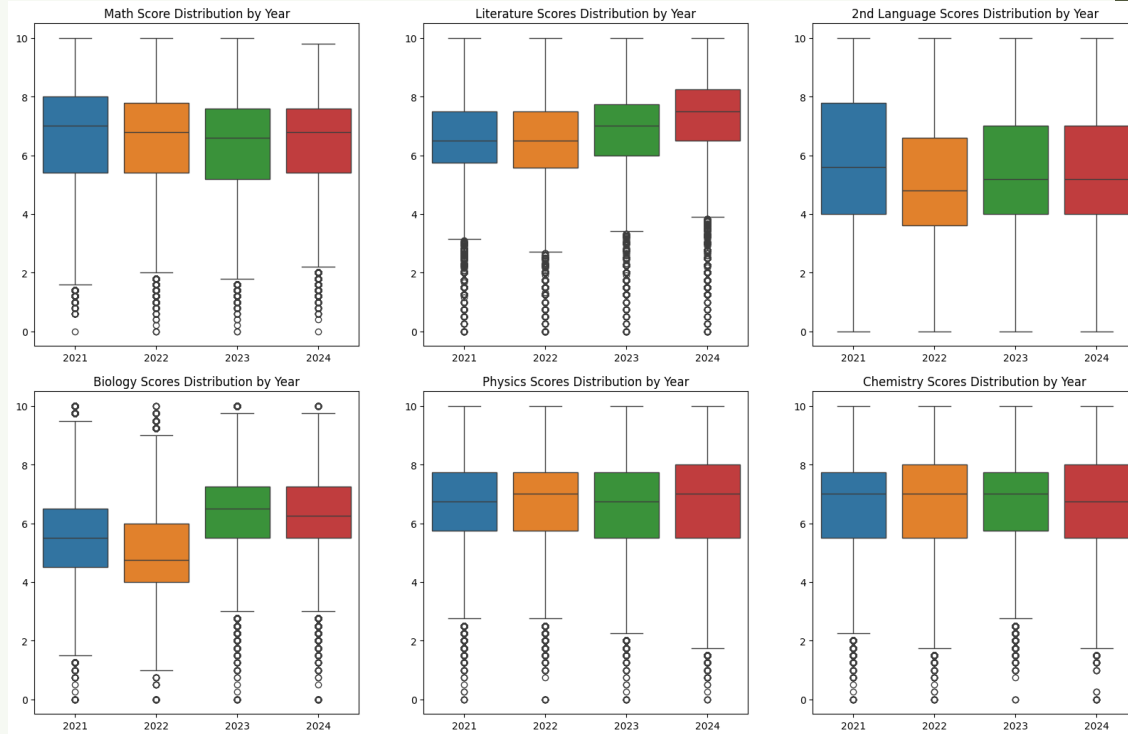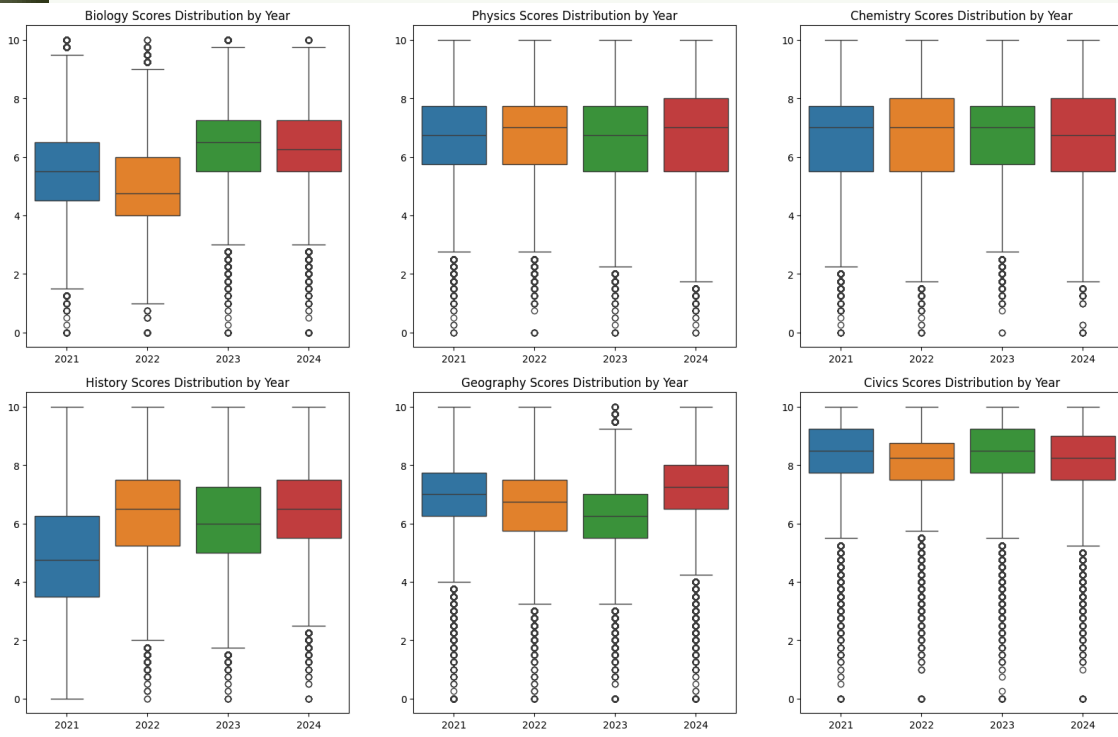
- Performance of the STEM subject tests (1st row) is also **more consistent** than social science (2nd row), indicating more **reliable** testing and results.

STEM Score Correlation

- Throughout the four years, the correlation between STEM subject scores stay **relatively unchanged**.

- **Math, Physics and Chemistry** all show significance correlation.

- **Chemistry and Biology** are also correlated

- This can be explained by:

  - STEM students would usually be interested in all four.

  - Universities often use Math, Physics and Chemistry scores for admission.

  - Chemistry and Biology is another combination for medicine schools.
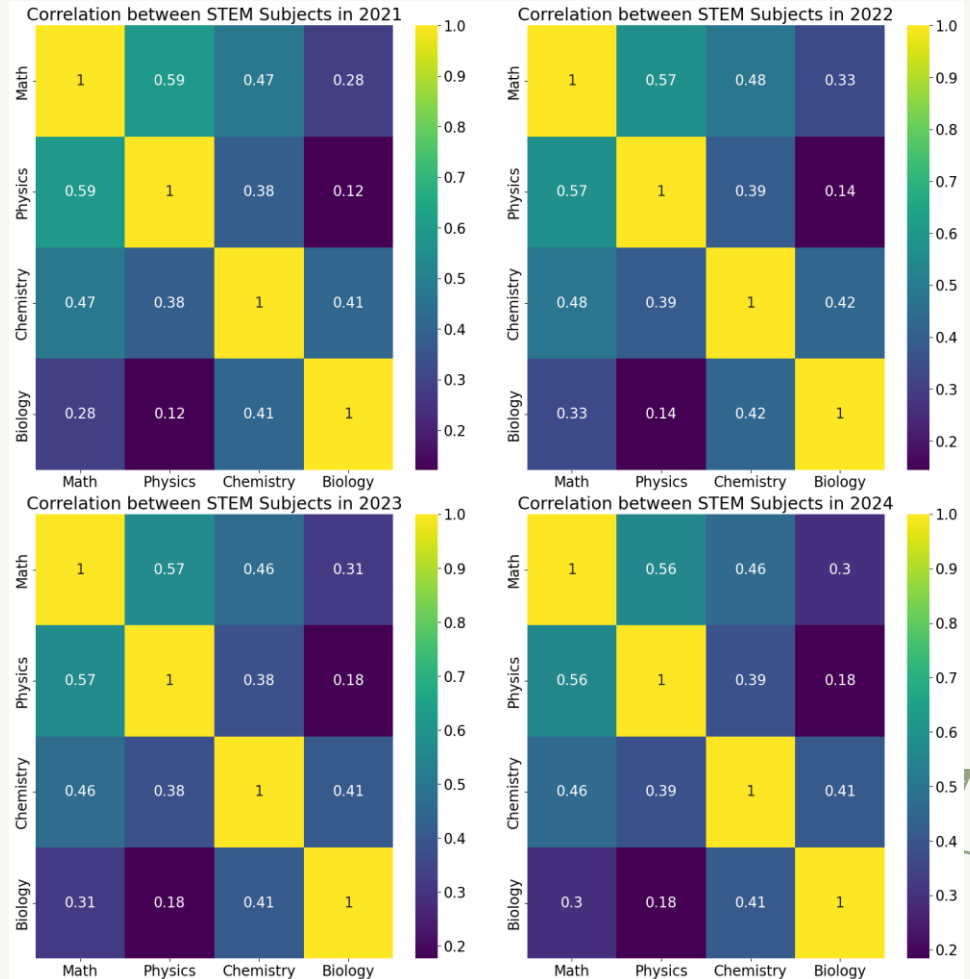
Average Score by Year

- The **mean score** of each STEM subjects maintained **relatively stable**, except for 2022 after COVID-19 (overly ambitious test makers)
- The last two years has **mostly stabilized**
- Social science scores, in contrast, has larger range and more fluctuation.

Vietnamese education put more effort into education and evaluation for STEM subjects.

Average STEM Scores by Year

Average Social Science Scores by Year
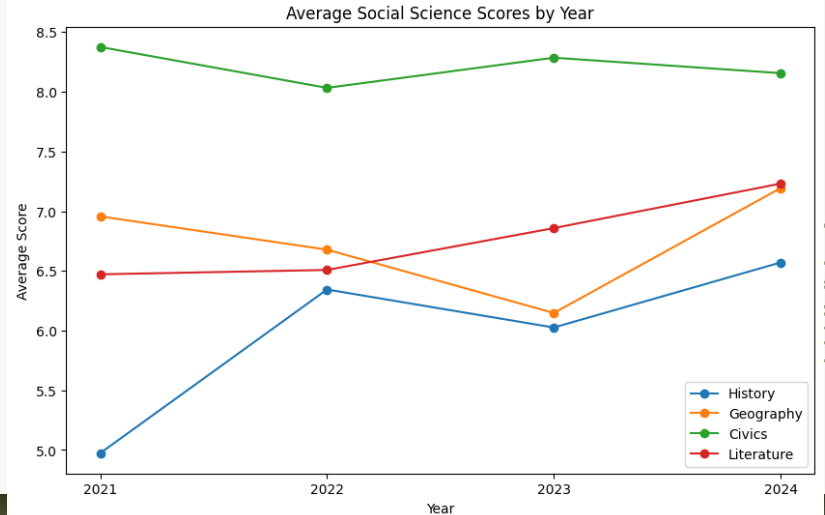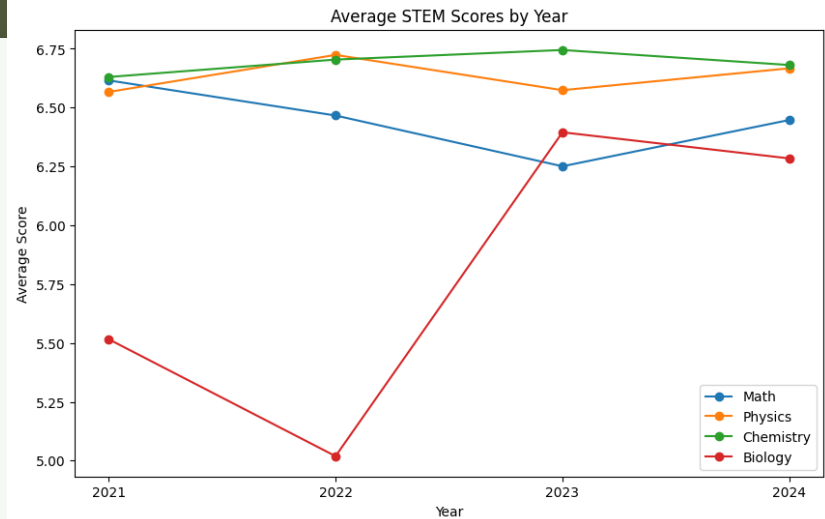
Under–performing provinces

This is the number of students that failed the exam, grouped by region in 2021.

All subsequent years are **almost identical.**

Most regions are similar, but 1 and 2 are the two major metropolitans of Vietnam, Ho Chi Minh City and Hanoi, so the number of drop-outs also scale up.

Provinces with the highest # of failing student:

	Count	Proper_loc_name
0	47136	Hà Nội
1	26582	Hồ Chí Minh
2	25808	Thanh Hóa
3	22678	Nghệ An
4	15696	Đồng Nai
5	12517	Đắk Lắk
6	11385	Hải Dương
7	11291	Thái Bình
8	9971	Hà Tĩnh
9	9728	Hải Phòng

Number of Students who failed the exam in 2021 by Province
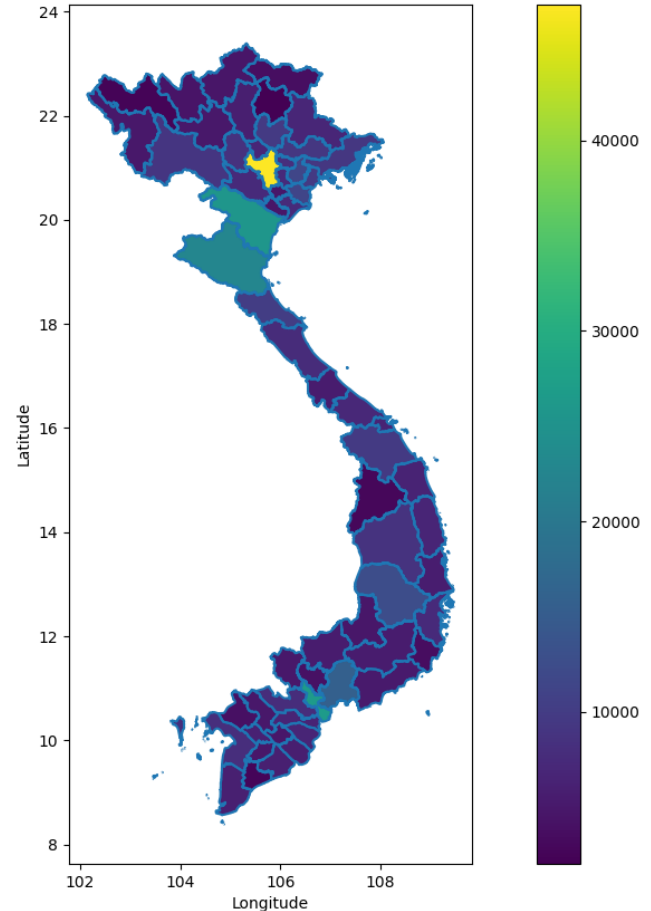
Provinces with least failing students

Looking at the other end of the spectrum, the provinces **consistently** having the **lowest** number of failing students are:

- 6: Cao Bang
- 7: Lai Chau
- 11: Bac Kan
- 27: Ninh Binh
- 36: Kon Tum
- 44: Binh Duong
- 45: Ninh Thuan
- 60: Bac Lieu
- 64: Hau Giang

Except for 44, 45, 27, most are the poorer regions of Vietnam.
The ones going through hardships are the hardest working ones. *Maybe we can help empower them?*
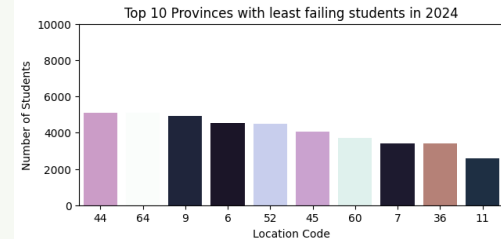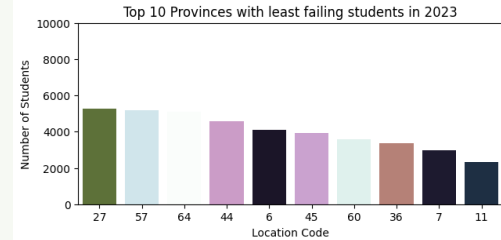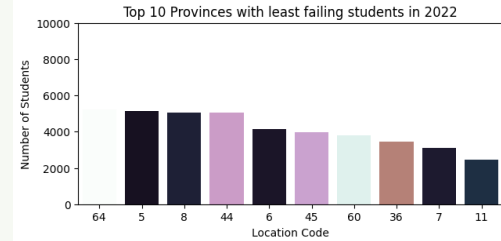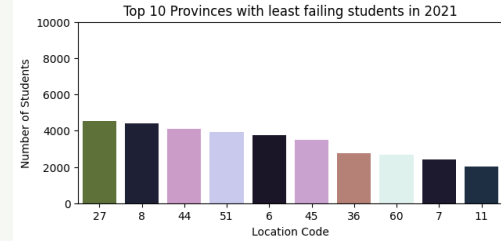

Same color, same province.

STEM Score Distribution Across Regions

- The cumulative STEM subjects' score between regions, surprisingly, are **similarly distributed**.

- This might be because different regions prioritize different subjects (due to cultural influences), but the accumulated differences **cancel out**.

- However, a different story is told with the Math score.

Cumulative STEM Score Distribution between Top 10 and Bottom 10 Economy Provinces
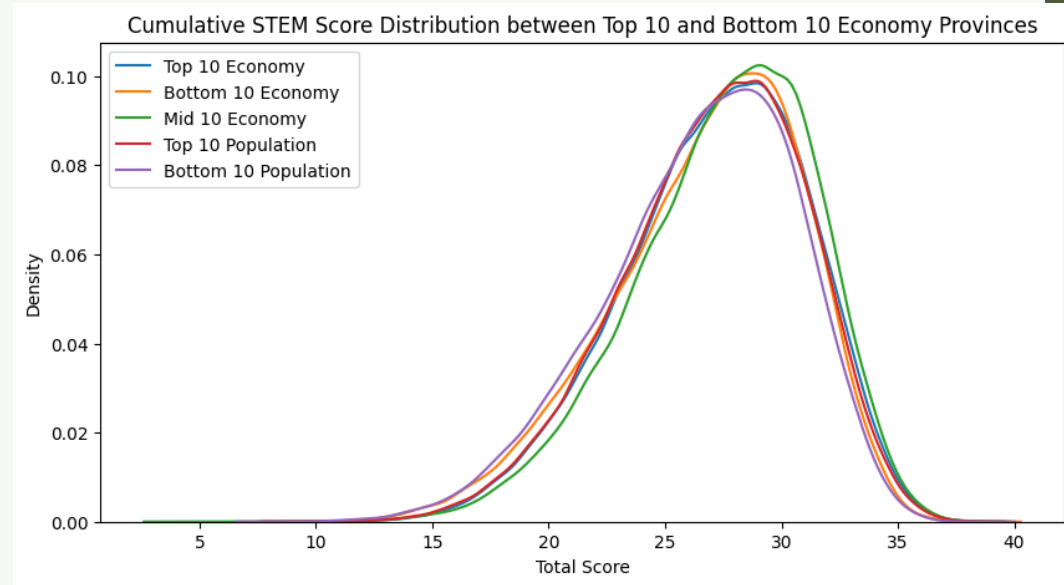
STEM Score Distribution Across Regions

- The math scores reflects **in order** the **top, middle and bottom** economically provinces of Vietnam.

- Note that the top has the **sharpest point**, indicating that a **larger portion** of students from **top earning** cities got good scores.

- From a **population** point of view, the 10 largest cities has many more high scorers, and the bottom 10 is more spread out and peaking almost 2 points lower.

- We want to aim to appeal to the **top 75th percentile** for our institute, a balance between target size and performance.

Scores vary significantly between economic and population regions of Vietnam

Cumulative STEM Score Distribution between Top 10, Middle 10 and Bottom 10 Economy Provinces
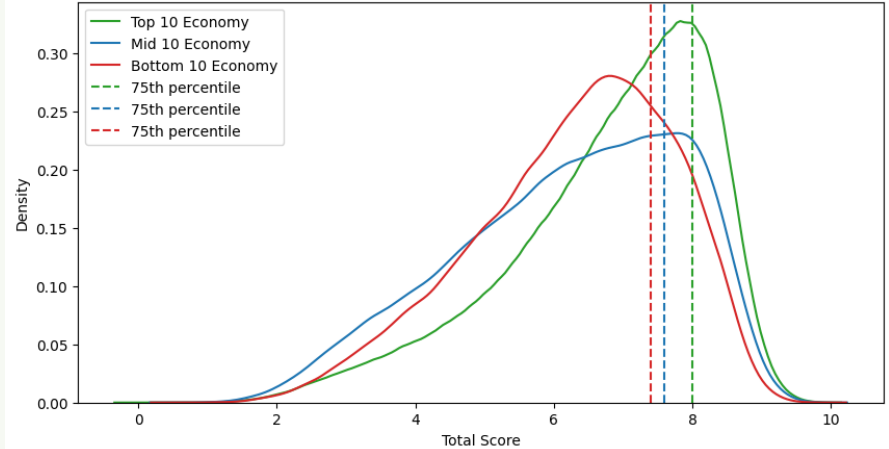
Cumulative STEM Score Distribution between Top 10 and Bottom 10 Population Provinces
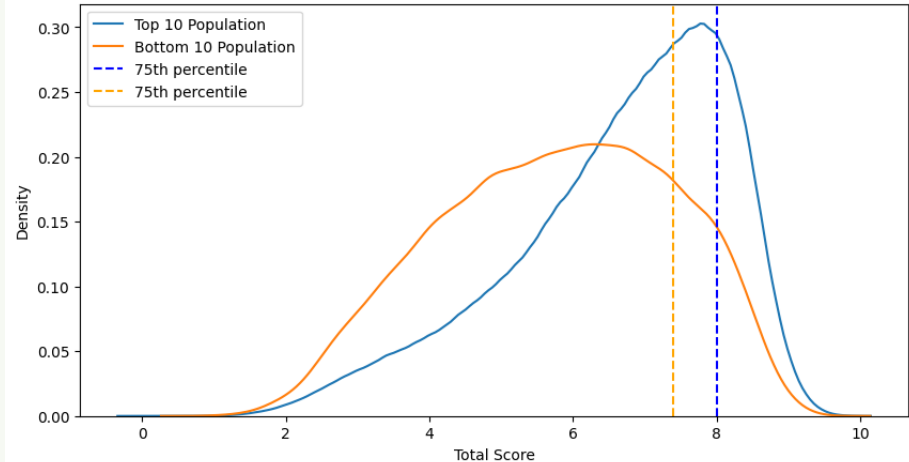
04

Conclusion

From the perspective of this presentation,
you are the **admission officer** for the BDS course of SP Jain.

Conclusion

The Vietnamese graduation test **is fully comprehensive, stable** and provide a **reasonable baseline** to assess a student's performance.

Vietnamese people place heavy emphasis on **STEM education**.

Students are usually **all rounders** for these subjects but **focuses** on ones that gets them into University.

Vietnamese students' performance **vary wildly** between **economic** and **population** regions, but **cumulative performance** is **similar** throughout Vietnam.

Regions with **lower economies** have **less** people failing the exam. **Major citie**s, where education is more accessible, saw **more** failing people.

Scores should be interpreted **in context.**

Recommendations

**Based on the insights,
here are my recommendations for the
institute:**

- The Vietnamese Graduation Exam results should be available as an **additional metric** for admission. **Collaboration** with Vietnamese **top high school** in major economic hubs can also bring a stream of successful applicant, but **do not overlook** applicants from **other areas**

- When using exam results, the **region** in which the applicant resides is also important for a **holistic evaluation**.

- It is also important to continuously improve **academic standards**, **curriculum** and **resources** to attract talented individuals.