

Milestone 2

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Prototype : [Link](#)

Project goal :

Exploring global education through interactive visuals to uncover the diversity and disparities within school systems across various landscapes.

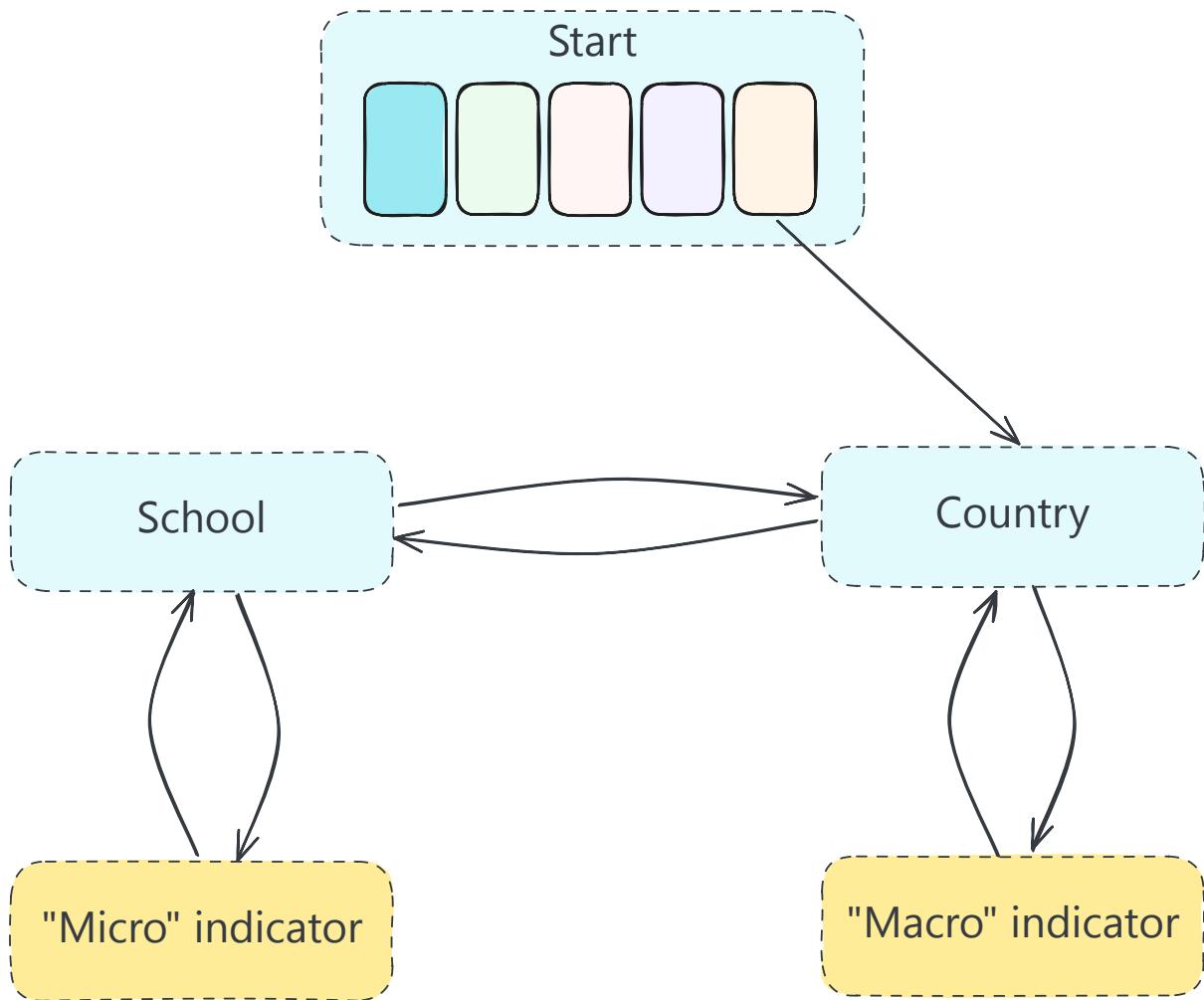
1. Objectives of the visualisation

In order to highlight the disparities between different schools, we wanted a visualisation allowing the user to :

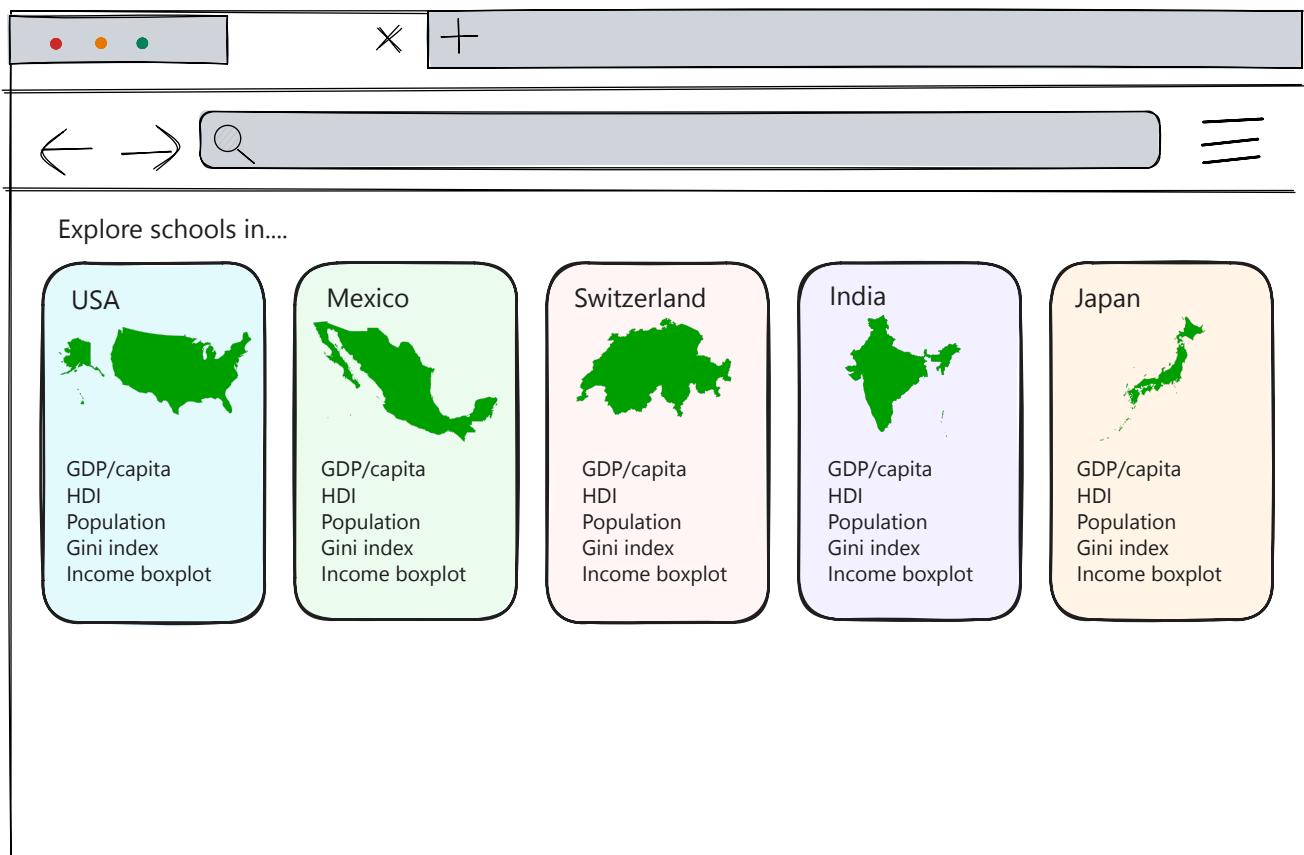
1. Explore many indicators, on different scales, highlighting either the differences or some possible causes of those differences between schools or school systems.
2. Discover quickly disparities within the world or within a same country
3. Discover links between indicators and/or school conditions

2. The visualisation

The project will allow users to create their own infinite story, navigating between school systems (i.e. countries) or individual schools (+/- 3 per countries) by selecting indicators (either "macro", so by country, or "micro", so by school). The previous steps in the story will be kept, allowing the user to visualise its whole travel.



On opening, the website will display 5 countries, their map and some generic information about the countries:



Once the user has selected a country, it displays a card with more information about the selected country, and on the map of the country, the different schools for which we have

information:

The screenshot shows a web-based application interface. At the top, there is a header bar with three dots (red, orange, green) on the left, a close button (X) and a plus sign (+) on the right, and a search bar with a magnifying glass icon. Below the header, the text "Explore schools in...." is displayed. Five cards represent different countries: USA (light blue), Mexico (light green), Switzerland (light purple), India (light pink), and Japan (light orange). Each card features a map of the country and a list of metrics: GDP/capita, HDI, Population, Gini index, and Income boxplot. A large central box is titled "Schools in USA". It contains a map of the United States with three marked locations: "A. Capone School, Chicago" (marked with a purple dot), "J. Biden School, NY" (marked with a purple dot), and "D. Tromp School, FL" (marked with a purple dot). To the right of the map is a bar chart titled "Enrolment figures" with three bars labeled "Boys" (green), "Girls" (blue), and "Total" (yellow). In the bottom right corner of this box, there is a list of metrics: GDP/capita, HDI, Population, Gini index, and Income boxplot. On the left side of the main box, there is a callout box with the title "Drop out rates" containing a line graph with "age" on the x-axis and an upward-pointing arrow on the y-axis.

The user can then either select an indicator (for example the enrolment figures) and compare the results for this indicator between the countries, or click on a school and see the profile of this school:





Explore schools in....

USA

GDP/capita
HDI
Population
Gini index
Income boxplot

Mexico

GDP/capita
HDI
Population
Gini index
Income boxplot

Switzerland

GDP/capita
HDI
Population
Gini index
Income boxplot

India

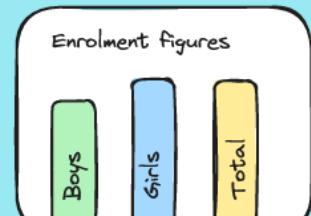
GDP/capita
HDI
Population
Gini index
Income boxplot

Japan

GDP/capita
HDI
Population
Gini index
Income boxplot

Schools in USA

Click on a school or data to explore more !



GDP/capita
HDI
Population
Gini index
Income boxplot

Government expenditure on education
% of public schools
literacy rate
mean number of years in school
PISA score

Drop out rates



J.Biden School, NY A school in the US

500\$/year

Subjects :
- 2nd language
- History
- Music



Canteen



Classroom



Sport room

10 students/class

cost of house
in the neighborhood
\$6m



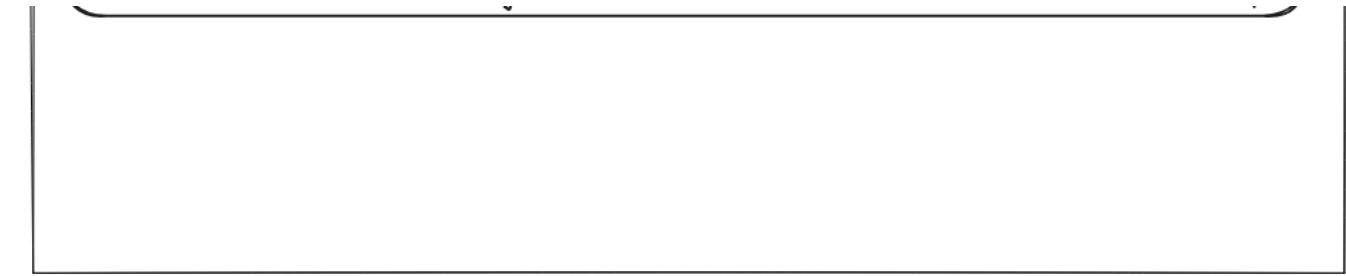
Satellite image



Science class



Infirmery



From this, the user could for example click on a numeric value to compare this "micro" indicator with the corresponding values for other schools, then click on the value of a school to see the page of a new school:

J.Biden School, NY A school in the US

500\$/year

10 students/class

Subjects :
- 2nd language
- History
- Music

Canteen

Classroom

Sport room

cost of house in the neighborhood \$6m

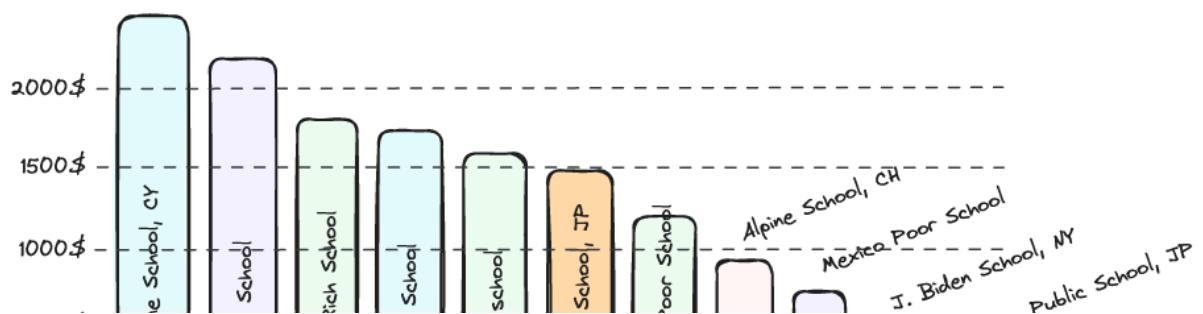
Satellite image

Science class

Infirmery

This section displays various images and details about the school's facilities and costs. It includes a canteen, classroom, sport room, satellite image, science class, and infirmary. A note indicates the cost of a house in the neighborhood is \$6 million.

Cost of school for parents, per year



Emperor School, Tokyo A school in JAPAN

1500\$/year

16 students/class

Subjects :

- 2nd language
- History
- Music

Canteen

Classroom

Sport room

Satellite image

Science class

Infirmery

cost of house in the neighborhood
\$3m

The user can also click on an image of a facility to compare the facilities of different schools :

Cost of school for parents, per year

School	Cost (\$)
A. Capone School, CR	2200
New Delhi School	2000
Mexico Rich School	1800
D.Tromp School	1700
Tijuana School	1500
Emperor School, JP	1500
Mexico Poor School	1200
Alpine School, CH	900
Bumbai School	800
J. Biden School, NY	700
Kyoto Public School, JP	400



Emperor School, Tokyo A school in JAPAN

1500\$/year

- Subjects :
- 2nd language
 - History
 - Music



Canteen

16 students/class



Classroom



Sport room

cost of house
in the neighborhood
\$3m



Satellite image



Science class



Infirmary

Canteens



J. Biden School, NY, US



Emperor School, Tokyo, JP



Alpine School, VD, CH



J. Biden School, NY, US



Bumbai School, India



D. Tromp School, FL, US

3. The implementation

In order to implement the visualisation, the project can be broken down into several independent blocs :

1. General website behaviour, data management

2. Country blocs and associated visualisation
3. School blocs and associated visualisation
4. "Macro" visualisations (indicators over countries)
5. "Micro" visualisations (indicators over schools)
6. Picture visualisation

Additionnal features that could be added if time permit have also been identified :

- Keeping track of which schools/countries have been visited to highlight them
- Allow additional filtering in the data (e.g. by genre or by age) if we have the data for it

4. Tools from the course we might use

We want to use several visualizations techniques that we have seen in class to make sure we can communicate in an effective way the macro and micro statistics and give our users a good 'feel' of how diverse the experience of education is across the world. From Lecture 4, we learned about D3.js, which will be a useful tool for creating dynamic data visualizations. We plan to use D3.js to create basic visualizations such as bar charts, which will help us display macro statistics like dropout rates, literacy rates, and teacher-student ratios across different countries. These visualizations will be very important for highlighting the disparities and commonalities among the countries.

We will also use techniques from Lecture 5, where we explored time series and area charts. We are thinking we might implement multiple area charts with dropdown options, which would allow users to select different countries and / or indicators. This dynamic updating of the visualization will show specific data that will help with the representation of trends over time in educational statistics like enrollment rates, for example.

During Lecture 6, we saw interactive plots, which can significantly improve the user engagement by showing more 'depth' interacting with the data. From this lecture, we want to try to adapt an interactive color histogram to show educational data distributions, which could be data like the range of student performance scores within schools, if we optionally manage to find data like this.

From lecture 8 we were introduced to map visualizations, which will be very useful to provide geographical context to our data. By employing CSV, JSON as the ones shown in the course (for Switzerland), and we might also use KML files to create layers, and all together we will create detailed maps that show variables such as average income and school density in a specific area or different areas. This could, for example, include a visual comparison of urban versus rural educational resources, or different parts of a city, to help with the geographical understanding of educational disparities.

5. Pieces to implement for Core visualization

As for the core visualization components of our project, the primary focus is to ensure that users gain a comprehensive understanding of what education looks like in our chosen countries. To achieve this, we will design visual cards for each country, displaying key statistics such as GDP, literacy rates, and educational expenditure. These cards will be interactive, allowing users to engage with the data through simple numeric displays or bar charts created with D3.js. Another important component will be the detailed statistics card that appears when a country is selected. This card will show two types of plots like histograms and time series, or other data. Histograms could display distributions like student performance or resource allocation, while time series could illustrate trends like changes in enrollment rates or gov. educational spending. Both types of data presentation could be implemented using D3.js, with interactive elements that would allow users to explore different parts of the data by hovering or clicking. When selecting specific schools from the country map, a micro data visualization will be displayed. This would include pictures of the school facilities with statistics like student-teacher ratios or extracurricular activity offerings, if we optionally manage to get the data, combining HTML and CSS for the layout with D3.js for the data integration.

6. Other ideas

We also have several creative ideas to improve the visualizations. Like a global or regional heat map to display the density or quality of schools worldwide or by region, zoomable city maps to offer more localized view before diving into micro-level data, and interactive hint bubbles to prompt critical thinking about the data. These features will be developed using a combination of JavaScript, D3.js, and other mapping libraries such as Leaflet, depending on the specific needs of each visualization or maybe we will use Angular. Putting all of this together using the tools and techniques from class, we aim to create an enjoyable, interactive visualization project that not only informs but also motivates users to explore global educational disparities and diversity.