Education Statistics Visualization

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BASIC INFO

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Project Repository- https://github.com/magsheer/education-statistics-visualization

BACKGROUND AND MOTIVATION

When we started looking for project ideas, we came across many that seemed interesting but these did not have good datasets, for example, visualizing black friday shopping trends across various age groups and cities. We could not find an appropriate dataset for it.

Later we started looking for datasets that seemed interesting and we came across the Education statistics dataset by World Bank. This dataset has indicators that describe literacy rate, enrolment rate, illiterate population across education levels (primary/ secondary/ tertiary), age groups and gender. We decided to use this dataset as education can be associated with various parameters such as a country's economic growth, crime rate etc. We also wanted to draw parallels between the economic state of the country (low income vs high income) and education rate to understand the factors influencing the latter over the years.

PROJECT OBJECTIVES

We have wish to try and answer a set of questions as a part of our analysis through our data visualization. The primary questions being:

- How indicators such as literacy rate among males/females, illiterate population etc, have changed in countries over the last five decades

- Which are the most literate/illiterate age groups
- What's the highest level of education in specific countries
- Does the income of the country impact its literacy rate

As mentioned earlier, education can be related to various factors that influence our society. Visualizing such a dataset might help analyze the impact education has, on the growth of a country/region. In more developing countries, it would be beneficial to see the gender parity in education and whether it is moving towards equality in education.

DATA & DATA PROCESSING

We got out dataset from https://datacatalog.worldbank.org/dataset/education-statistics, The World Bank's Data Catalog.

The dataset includes multiple files and is quite large. It consists of over 4,000 internationally comparable indicators that describe education access, progression, completion, literacy, teachers, population, and expenditures. We do not intend to use all of them for the purpose of this project as this might cause a lag in the webpage. We plan to use indicators that fall under the three essential categories: gender, age group and education level. This will allow us to effectively visualize the Gender Parity Index, highest level of education obtained across regions/countries and drop out rate amongst different age groups with respect to the economic state of the country. We also intend to show a global trend by comparing country statistics with the global data.

Since the data we want to use for this visualization is scattered over multiple files, we need to extract only the data we require depending on the indicators, region and countries. We plan on doing this using Python or Javascript.

VISUALIZATION DESIGN

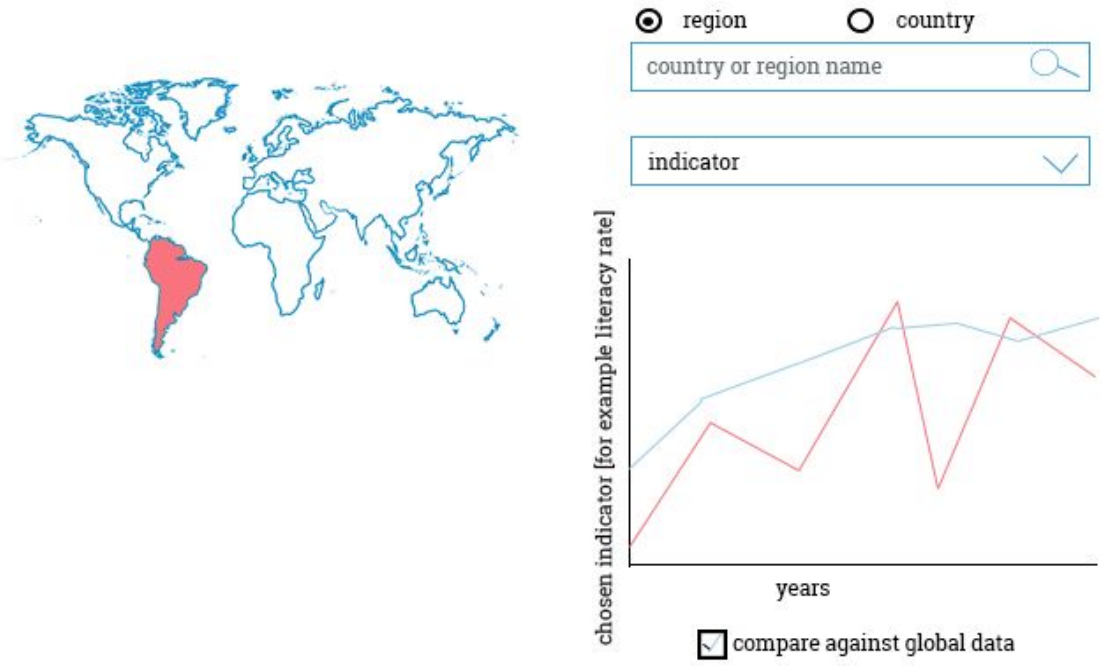
Prototype 1

We used some ideas from the assignment 4 for our first prototype. The features include:

Alternative 1:

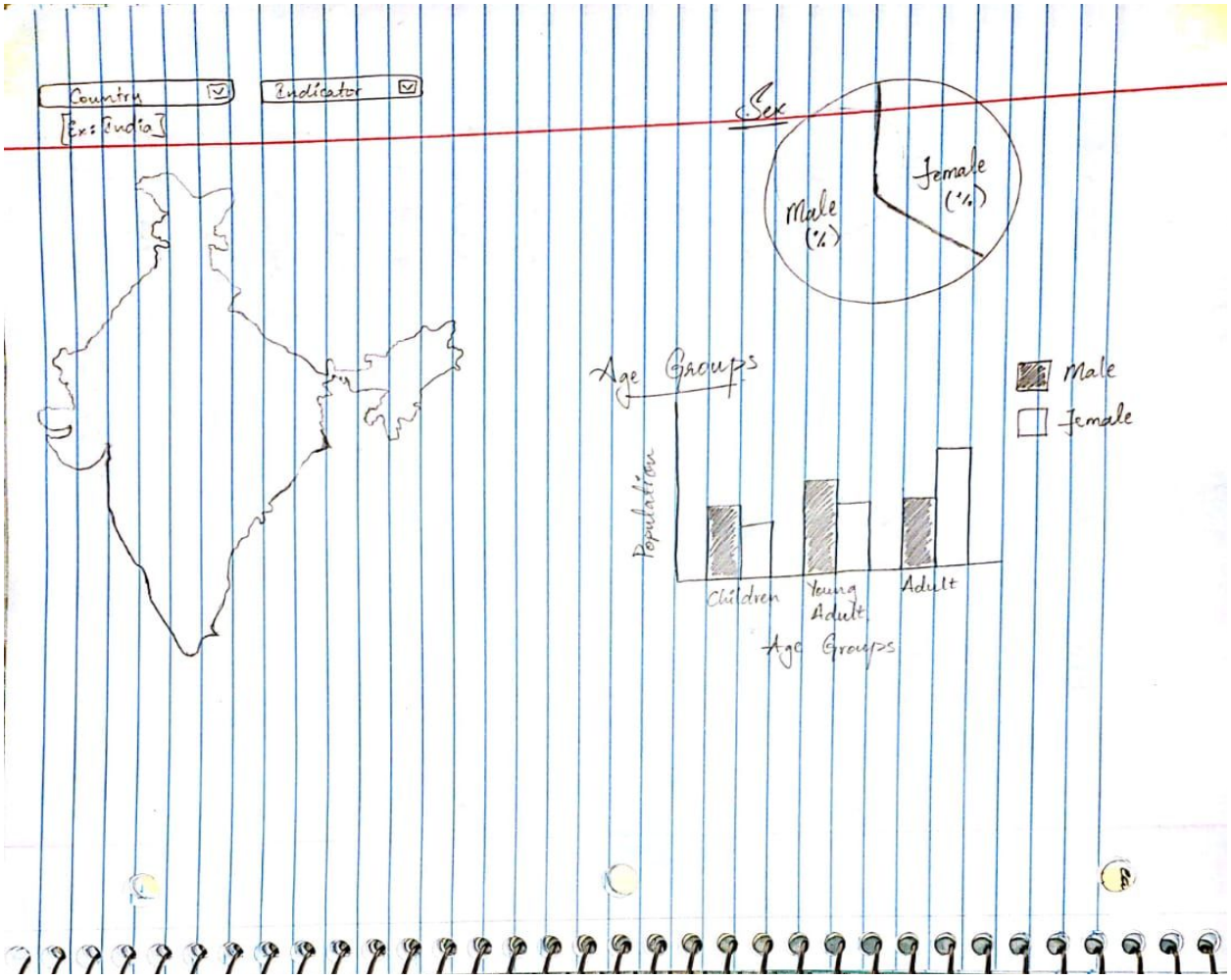
- Select whether a region or country has to be visualized using the radio buttons
- Select the particular country/region using the map or typing it in
- Select the indicator to observe the trend over years

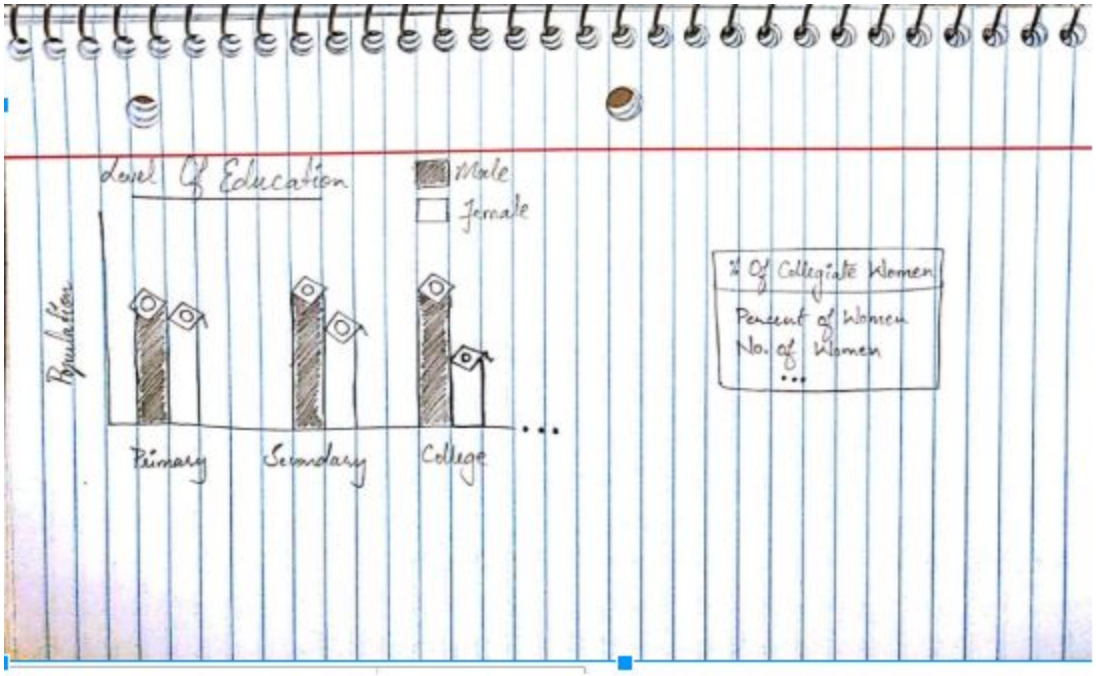
- Check the compare option to compare the global and country/region specific trends.



Alternative 2:

- Select the country you want visualize the data for
- Select a single indicator from the provided dropdown
- Based on the country and indicator selected, the visualization will show, the trend for the particular indicator for last five decades.
- For example, choosing India as the country and sex as the indicator, we show a pie chart with the ratios since there are only two values whereas selecting India as the country and education level as the indicator, will show adjacent bar charts.
- On clicking the bars or sections, details will be shown

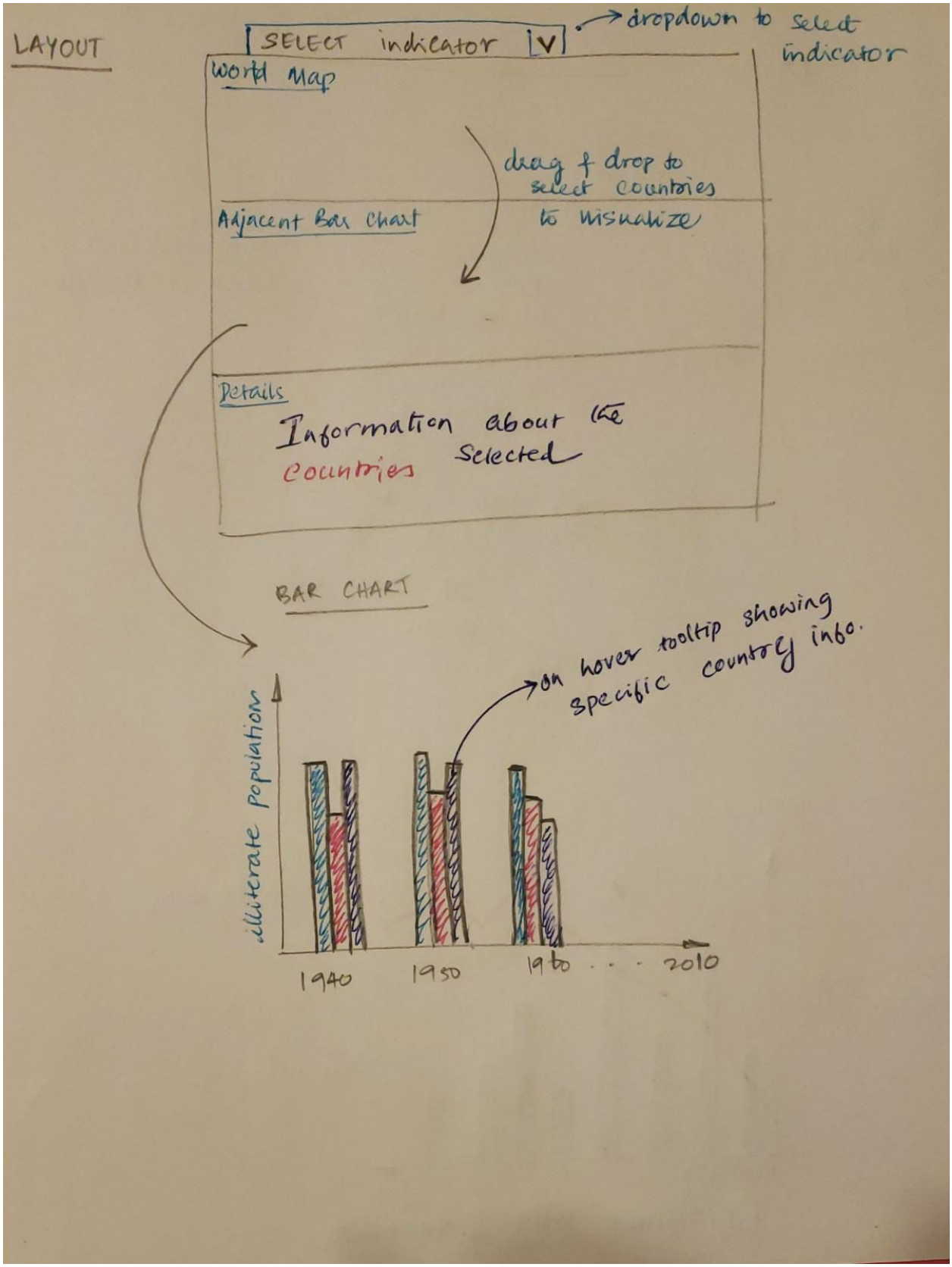

Country
[Ex: India]
Indicator
Sex
Male (%)
Female (%)
Age Groups
Population
Male
Female
Children
Young Adult
Adult
Age Groups



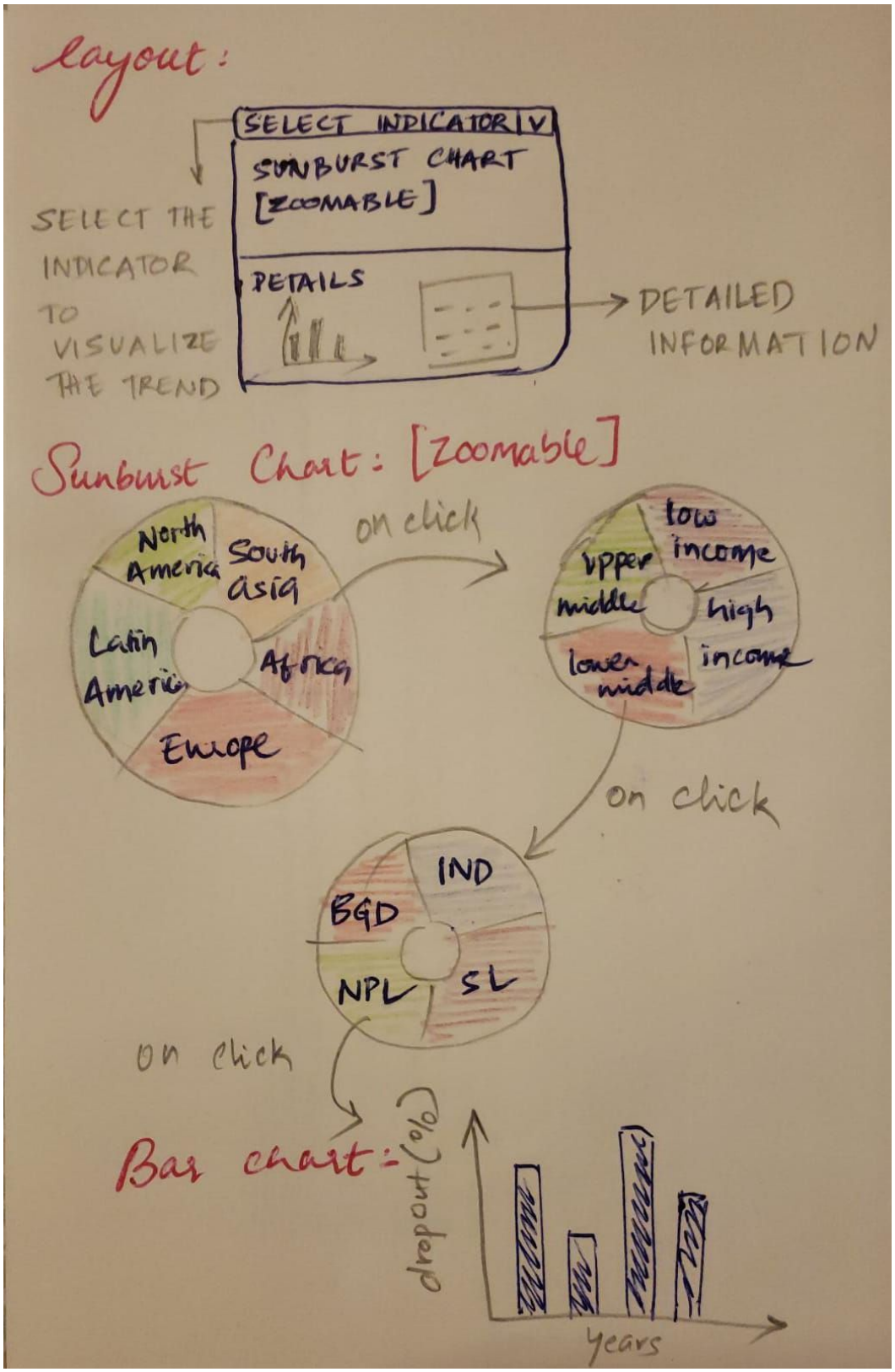
Prototype 2

Compare indicators for all years among countries

- World Map that lets you drag and drop countries (max 5) from it to the side pane
- Bar chart with adjacent bars showing the trend for each country
- Select the indicator to observe the trend over years


LAYOUT
SELECT indicator V
dropdown to select indicator
World Map
drag & drop to select countries to visualize
Adjacent Bar chart
Details
Information about the selected countries
BAR CHART
on hover tooltip showing specific country info.
illiterate population
1940
1950
1960 . . .
2010

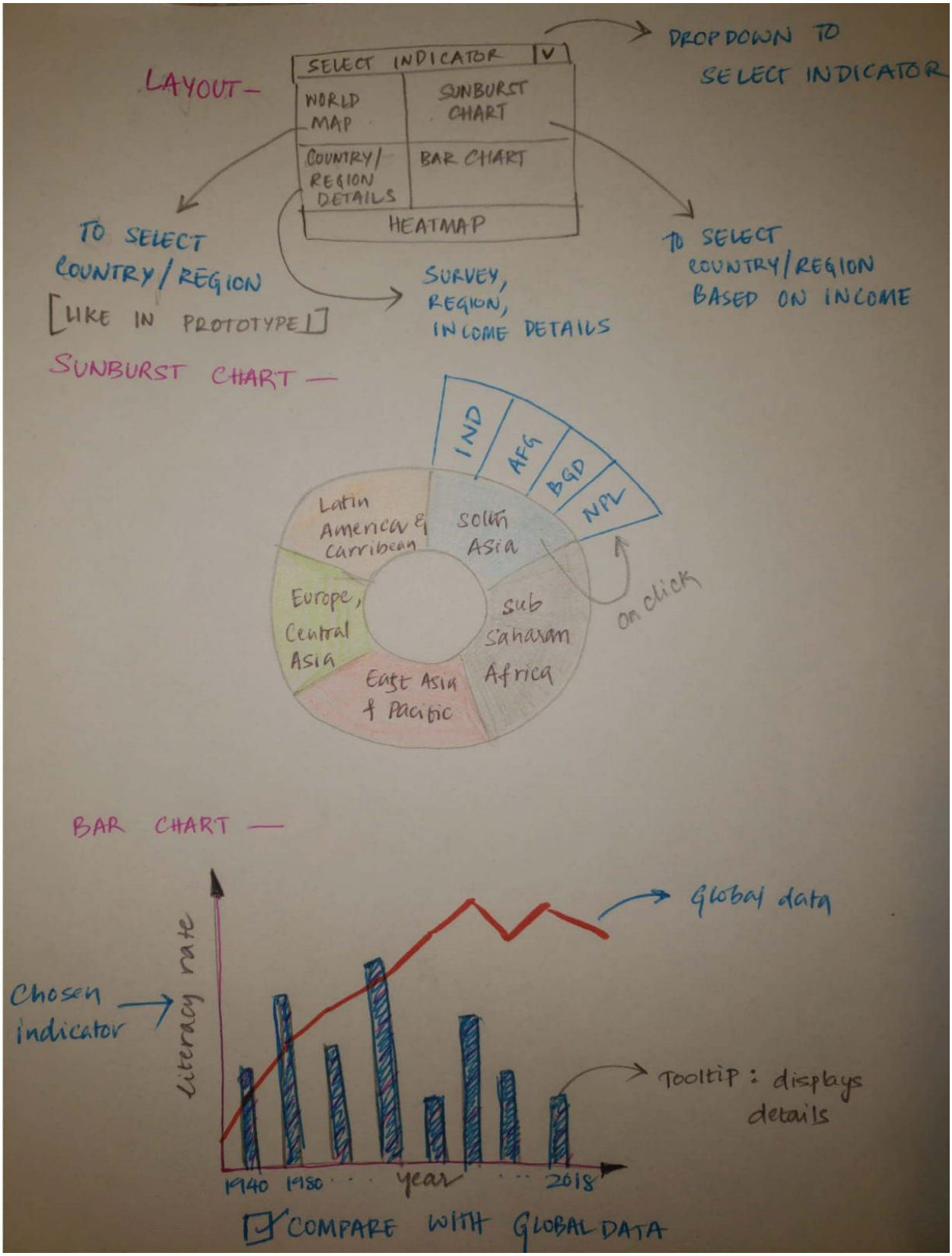
Prototype 3

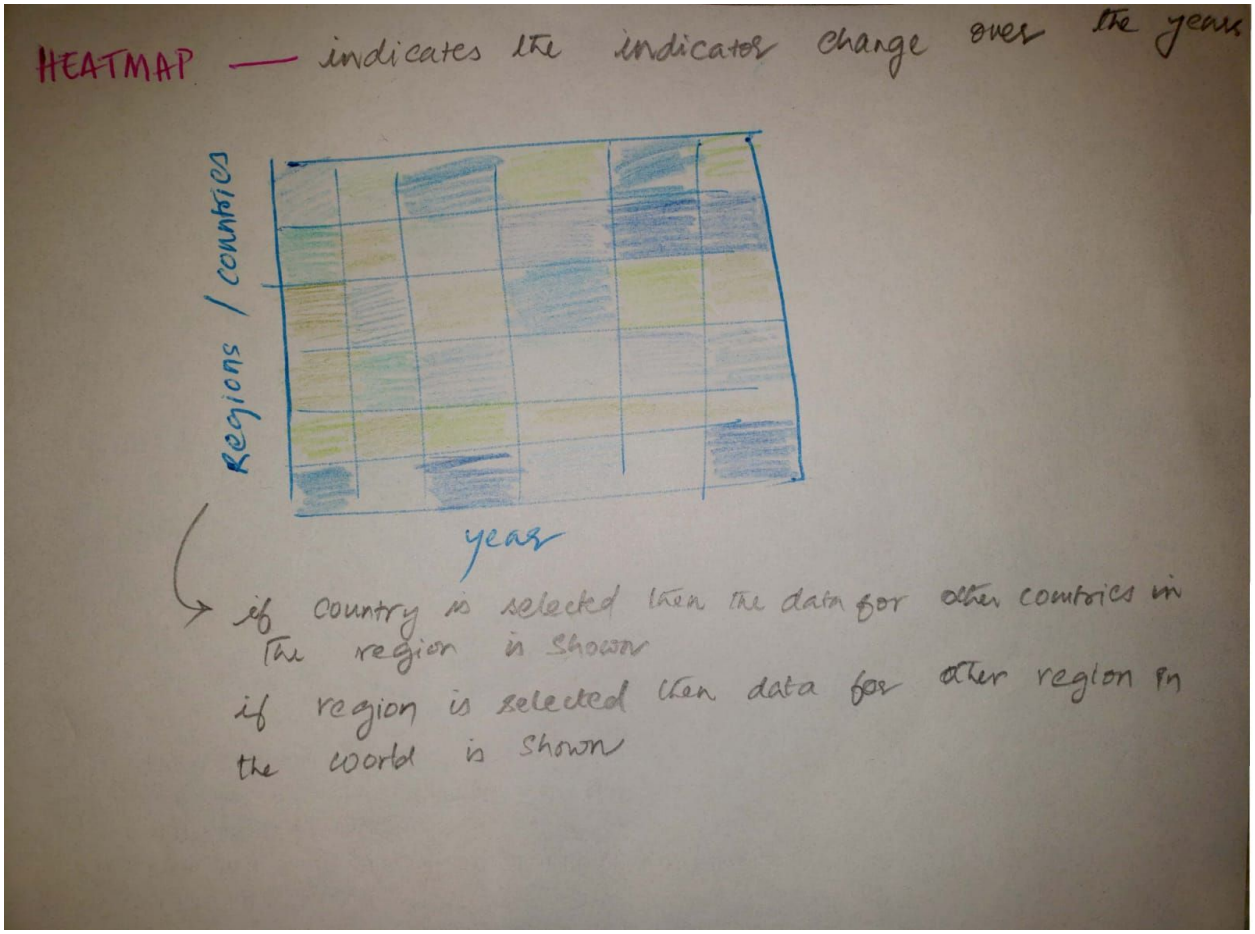

layout:
SELECT INDICATOR
SUNBURST CHART [ZOOMABLE]
DETAILS
SELECT THE INDICATOR TO VISUALIZE THE TREND
DETAILED INFORMATION
Sunburst Chart: [zoomable]
North America
South asia
Latin America
Africa
Europe
on click
low income
upper middle
high income
lower middle
on click
IND
BGD
NPL
SL
on click
Bar chart:
dropout (%)
years

Final Design

We picked up aspects from each of the prototypes that will help us tell the story and visualize education statistics trend.

- World Map that is colored based on the regions such as Sub Saharan Africa, East Asia & Pacific etc
- Sunburst chart with distortion that displays hierarchical data. First level of the hierarchy is represented by regions which drill down to countries, with the World being the innermost circle at the top of the hierarchy
- Bar chart that shows the trend for the selected indicator over the last 5 decades
- Select the region/country that you want to visualize the trend for
- Select the indicator to observe the trend over years
- Check the compare option to compare the global and country/region specific trends with a Line Chart.


LAYOUT –
SELECT INDICATOR
WORLD MAP
SUNBURST CHART
COUNTRY/ REGION DETAILS
BAR CHART
HEATMAP
DROPDOWN TO SELECT INDICATOR
TO SELECT COUNTRY/REGION
[LIKE IN PROTOTYPE]
SURVEY, REGION, INCOME DETAILS
TO SELECT COUNTRY/REGION BASED ON INCOME
SUNBURST CHART –
IND
AFG
BGD
NPL
Latin America & Carribean
South Asia
Europe, Central Asia
East Asia & Pacific
sub Saharan Africa
on click
BAR CHART –
Chosen indicator
Literacy rate
Global data
Tooltip : displays details
1940
1980
year
2018
COMPARE WITH GLOBAL DATA



MUST-HAVE FEATURES

- Being able to visualize data region-wise and country-wise for at least 5 indicators
- Being able to compare the trend for a particular country with the world data
- Sunburst chart or the world map to select a country with ease

OPTIONAL FEATURES

Heat Map that shows :

- How a selected country compares over countries in the same region as the selected country?
- How a selected region compares with the other regions in the world?

PROJECT SCHEDULE

Week 1 [Oct 29 - Nov 4]

- Do the data processing required for the visualization
- Host the project on github
- Significant work done on getting a working prototype

Week 2 [Nov 5 - Nov 11]

- Have the working prototype ready

Week 3 [Nov 12 - Nov 18]

- Work on incomplete functionalities of the prototype
- Have the basic visualizations working without any glitches

Week 4 [Nov 19 - Nov 26]

- Enhance the visualizations
- Add rest of the planned functionalities
- Fix bugs

Week 5 [Nov 26 - Nov 30]

- Test the visualization
- If there is time, add more extra features and work on making the project better