

Title: World's toughest places to get access to Education.

Introduction:

Education is widely accepted as one of the fundamental resource both for individuals as well as societies. Basic Education in most of the countries is not only perceived as a right, but also as a governments duty- for ensuring access to basic education, while individuals are required to attain minimum level of education as per laws. Education is fundamental to sustainable development, plays a vital role in development and as prominent instruments to reducing poverty, a key driver for improving quality of life, enables a person to be more productive, while also contributing to country's economic and social development. Considering the importance of Education, this report tries to highlight the places where still Education is not on the top priority. The consequence of not having education has direct effect on the personal life as well as on the social environment of the individual. According to United Nations Educational, Scientific and Cultural Organization (UNESCO) it has been stated that one of the 5 children, adolescents, youth in the world is out of school. This report makes an effort to focus on the factors which are affecting to such huge margin of out-of-school rate and also tries to throw some light on the sustainable development growth goal by UNESCO to reduce out-of-school rate and provide healthy conditions for Education.

Dataset:

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is a specialized agency of the United Nations (UN) based in Paris. Their aim is "to contribute to the building of peace, the eradication of poverty, sustainable development and intercultural dialogue through education, the sciences, culture, communication and information". As a part their Sustainable development growth they have collected data from different countries to ensure they are on the right track.

The Data set used for this visualization includes Out of school rate of students at different stages of the education: Primary school, Lower secondary school and Upper secondary school. These levels of education are fundamental building blocks in the career of student, which leads further transformation to higher level of education. The dataset also includes the basic factors (such as Student to Pupil ratio, Access to Drinking Water, Access to Electricity, Access to single sex sanitation) which are affecting the education in their respective regions. To capture the efforts made by UNESCO towards better education opportunities, dataset related to expenditure spent by countries and mean free education provided these countries, are also included.

```
import pandas as pd
import numpy as np

df = pd.read_excel('C:\\Users\\welcome\\Downloads\\Out-of-school rate for children of primary school age.xlsx',header = 3)
df1 = pd.read_excel('C:\\Users\\welcome\\Downloads\\Out-of-school rate for adolescents of lower secondary school age.xlsx',header = 3)
df2 = pd.read_excel('C:\\Users\\welcome\\Downloads\\Out-of-school rate for youth of upper secondary school age.xlsx',header = 3)
```

```

df.drop(to_drop,inplace=True, axis=1)
df.drop(df.index[0],inplace = True )
df.drop(df.columns[[1,8]], axis = 1, inplace=True)
new_names = {'Time':'Country',
              'Unnamed: 3':'2012',
              'Unnamed: 5':'2013',
              'Unnamed: 7':'2014',
              'Unnamed: 9':'2015',
              'Unnamed: 11':'2016',
              'Unnamed: 13':'2017',
              }
df.rename(columns = new_names,inplace=True)
df = df.replace('..',0)
for index,row in df.iterrows():
    if row['2017'] != 0:
        df.loc[(index),('Final')] = row['2017']
    elif row['2016'] != 0:
        df.loc[(index),('Final')] = row['2016']
    elif row['2015'] != 0:
        df.loc[(index),('Final')] = row['2015']
    elif row['2014'] != 0:
        df.loc[(index),('Final')] = row['2014']
    elif row['2013'] != 0:
        df.loc[(index),('Final')] = row['2013']
    else:
        df.loc[(index),('Final')] = row['2012']
df.head(20)

```

```

list = df.Country
df_copy = df1.loc[df1['Country'].isin(list)]
df_copy = df_copy.reset_index()
df_copy.index = df_copy.index + 1
del df_copy['index']
df_copy.head(20)
df1 = df_copy

```

As part of the Data processing and cleaning includes, merging various datasets into single dataset, dropping the unnecessary columns and rows, replacing the dummy strings to null values, finding out the most recent reading for the given country. This dataset is used further used for visualization. The sample head of the dataset is given below:

	Country	2012	2013	2014	2015	2016	2017	Final
1	Afghanistan	0.00000	0.00000	0.00000	37.23000	0.00000	0.00000	37.23000
2	Åland Islands	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	Albania	9.53490	5.63382	3.84070	4.40339	4.34145	2.93825	2.93825
4	Algeria	0.88917	0.00000	0.00000	0.73290	0.76879	0.55707	0.55707
5	American Samoa	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6	Andorra	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	Angola	0.00000	0.00000	0.00000	24.20000	0.00000	0.00000	24.20000
8	Anguilla	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9	Antigua and Barbuda	22.07792	0.00000	22.43789	18.52721	0.00000	0.00000	18.52721
10	Argentina	0.81300	0.64461	0.32553	0.26570	0.65848	0.00000	0.65848

Process:

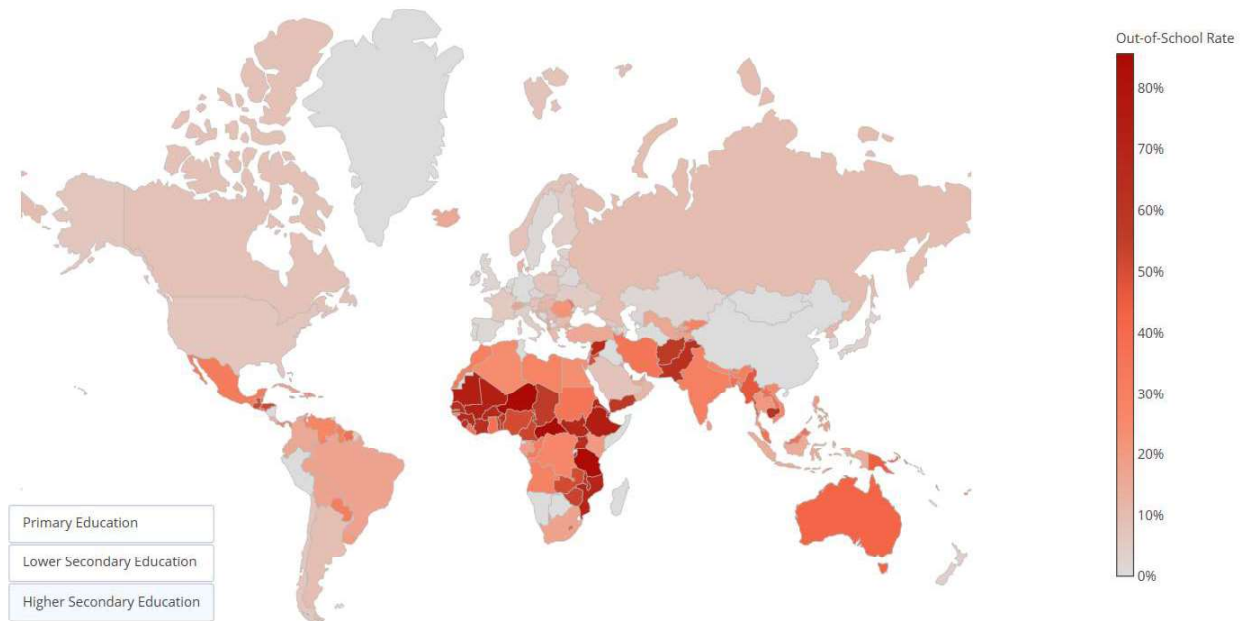
The main objective of this report is to determine the places where quality education is out of reach of public, the factors which are affecting this out-of-reach and the efforts taken at global platform by UNESCO to ensure inclusive and equitable quality education for all by 2030. The details of graphs and libraries used are given below.

- 1. Geographical Plot:** The measurement of out-of-school rate at different places of world can be best made through Geographical plots. Using Choropleth maps with geographical plots makes visualization even more better by highlighting the regions of interest in maps. The color bar at right end gives us clear understanding of the range in which these countries lie.
For creating these geographical plots, I have used Plotly offline graphing tool and Pandas library for data retrieving, cleaning and processing. To view out-of-school rate at different level education I have used buttons representing each level making it easier for the viewers to interpret the maps easily.
- 2. Bar Graph:** To visualize the factors that are affecting the education in different regions of the world I have used sub-plots with bar graph, with each subplot denoting each factor with appropriate color schemes. The interesting fact of bar chart is that our audience already know how to read these graphs and they can instead focus on insights of the data. I have used sub-plots which facilitates audience to compare the values of factors and regions within each other.
- 3. Line Plot:** A line graph has been used to show the majors taken by UNESCO for free and quality education for all by 2030. I have used a line plot to show the expenditures spent by different countries to improve the education system, with the inset line graph is used for conveying the details of where this amount has been used by various countries.

Result:

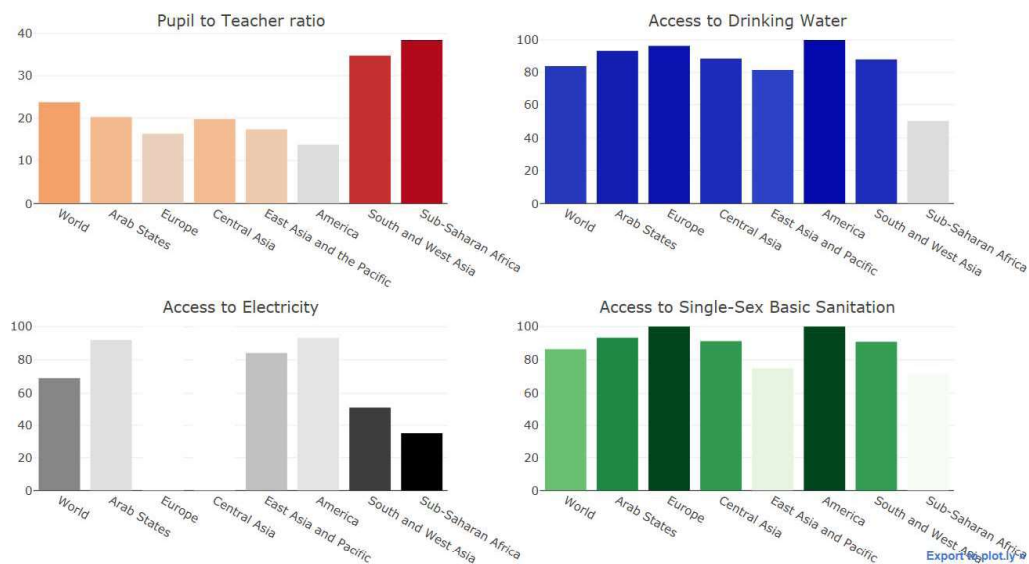
The out-of-school is the number of children of official primary school age who are not enrolled in primary or secondary school, expressed as a percentage of the population of official primary school age. Rate of out-of-school children is a useful measure for comparing the number of children who never attended or dropped out across countries with different population size. Higher the out-of-school rate, greater is the need for interventions to target out-of-school children to achieve the goal of universal primary education. When this disaggregated by geographical and gender, this indicator can identify areas or groups needing the greatest efforts.

Worlds Toughest places to get an Education
Source: UNESCO



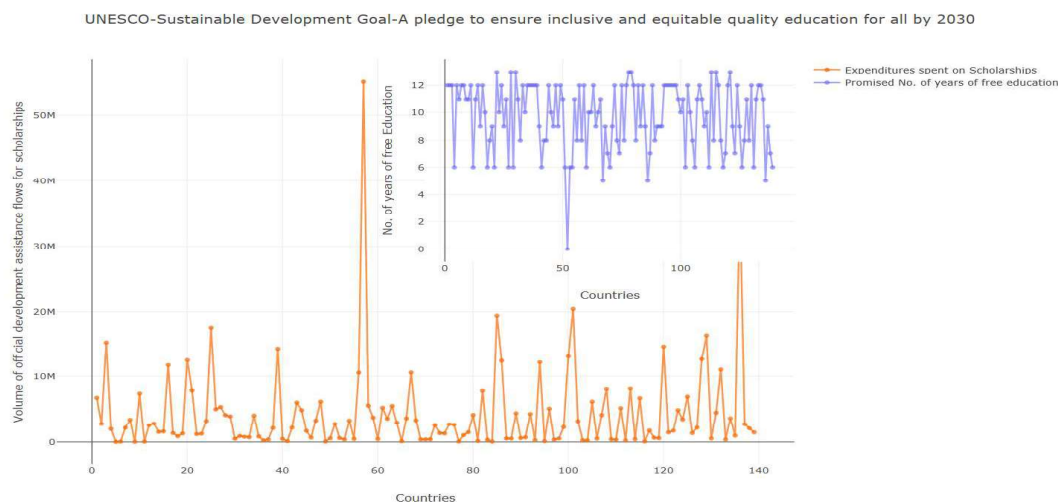
From the above choropleth map, the countries having huge out-of-school rate is clearly visible, the next graph focuses on the factors which are affecting this huge out-of-school rate. Poor classroom conditions can interfere with learning of children. Major factors such as Pupil to teacher ratio is an indicator used for reflecting the capacity of education systems in terms of human resources, Red color have been used to highlight the critical regions.

Factors affecting to Education System



Scarcity of water or not having access to cleaning drinking water can restrict children's going to school. Blue color indicates the availability of fresh water, fader the color indicates low levels of water. Electricity is the fundamental resource for the development of student's career, without electricity Greys have been used to indicate the electricity, meagre the access to electricity darker the shade. Schools without toilets, or shared toilets pose health and safety risk as well as pose hinderance for girls promoting to next higher level of education. Greens have been used to underscore the difference between the regions with high sanitation and low sanitation.

The good news is that UNESCO has taken pledge to provide free education for girls and boys, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. The following graph emphasizes on the volume of official development assistance flows for scholarships and type of study, total expenditure spent by countries. Inset graph gives some more details on the number of free education provided by these countries to reach the target.



Conclusion:

Through this visualization, I tried to put stress on the importance of education in individuals personal and social life by highlighting the places where basic education still neglected or not reached. The factors that are affecting degraded quality of education and people being kept away from the reach. To overcome this barriers and to ensure that each and everyone gets equal opportunities of education, step taken by UNESCO towards sustainable development goal was also highlighted.