Bharatiya Vidya Bhavan's

SARDAR PATEL INSTITUTE OF TECHNOLOGY

Advanced Data Visualization

Experiment no. 10

Submitted To

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Submitted By

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1. Aim:

To design interactive Big Data dashboards in Tableau using datasets from the Education sector, focusing on enrollment rates, academic performance, funding, and demographics, among other factors. This project aims to reveal insights on trends, disparities, and key metrics in education.

2. Procedure Description:

Step-1: Dataset:

You can view the dataset from this link.

Step-2: Description:

Overview: This dataset is used to build dashboards showcasing trends and metrics in the education sector. The data provides insights into enrollment rates, academic performance, funding distribution, and demographic characteristics. It is useful for identifying disparities and understanding how resources impact educational outcomes.

Attributes in the Dataset:

- **Region/Country**: The location where the data is collected.
- **Year**: The year of data collection to track trends over time.
- **Total Enrollments**: The number of students enrolled in educational institutions.
- **Funding Amount**: The total funding allocated for education in a specific region or program.
- **Performance Metrics**: Academic scores, pass rates, or standardized test results.
- **Program Type**: Categories such as primary education, secondary education, higher education, and vocational training.
- **Demographics**: Information about students' age, gender, and socio-economic background.

Key Metrics for Analysis:

- Enrollment numbers and trends by year and region.
- The impact of funding on academic performance and enrollment.
- Performance distribution across different programs and demographics.
- Funding allocation across different sectors within education.

1. Scatter Plot: HDI Rank (2021) vs. Expected Years of Schooling (2021)

Observation:

- This scatter plot shows the relationship between the **Human Development Index (HDI) rank** and **expected years of schooling** for different countries in 2021.
- There is a negative correlation observed in the plot, indicating that countries with higher expected years of schooling generally have better (lower) HDI ranks.
- Most points cluster around expected years of schooling between **10 and 20 years**, with HDI ranks ranging from **1 to 150**.

Analysis:

- The negative trend suggests that educational attainment (represented by the expected years of schooling) is associated with higher development levels. Countries with more education years tend to have higher HDI rankings, reflecting their overall better human development status.
- Outliers or exceptions might indicate countries where the expected schooling does not align well with their HDI rank, suggesting possible disparities due to other HDI components (e.g., income, life expectancy).

2. Bar Chart: Expected Years of Schooling Across Different Countries

Observation:

- This bar chart displays expected years of schooling for a selection of countries.
- Countries like **Argentina** and **Australia** show higher expected years of schooling (close to or above 15 years), while others, like **Afghanistan**, have significantly lower values.

Analysis:

- The differences in the expected years of schooling highlight educational disparities between countries.
- Regions with higher expected schooling likely have better educational infrastructure, more resources allocated to education, and a higher emphasis on educational attainment.
- Conversely, countries with lower expected schooling may face challenges such as economic constraints, political instability, or insufficient educational policies.

3. Treemap: Expected Years of Schooling for All Countries Across Different Years

Observation:

- The treemap represents the distribution of expected years of schooling for countries, categorized visually to show proportionate sizes.
- Countries with more significant expected schooling are displayed as larger blocks, while those with fewer years appear smaller.

Analysis:

- The treemap provides a quick visual understanding of how schooling expectations vary in different regions.
- Larger segments likely represent developed countries with more comprehensive educational systems, whereas smaller segments indicate regions with potential educational shortcomings.
- This plot is useful for comparing the relative emphasis on education across nations at a glance.

4. Pie Chart: Plot Expected Years of Schooling for All Countries Across Different Years

Observation:

- The pie chart breaks down the proportion of expected years of schooling across different regions or countries.
- Each slice corresponds to a country or group of countries, showing their contribution to the overall schooling distribution.

Analysis:

- The pie chart highlights the global distribution of educational attainment by visual proportion. Larger slices represent countries with higher overall expected years, showcasing their educational emphasis.
- It helps identify which regions are contributing most significantly to global education benchmarks.
- This type of visualization, while useful for proportions, might not capture detailed country-specific variations as effectively as the scatter or bar charts.

Overall Insights:

- **General Trends**: Countries with higher expected years of schooling often rank higher on the HDI, reinforcing the connection between education and overall human development.

- **Comparative Analysis**: The bar chart and treemap are effective for comparing individual or grouped countries' education levels.
- **Educational Gaps**: The scatter plot provides insights into countries that may have mismatched HDI and educational metrics, signaling areas where education might be a significant factor influencing HDI.

Recommendations for Further Analysis:

- Overlaying additional indicators like **GDP per capita** or **public education expenditure** could enrich insights and help identify what drives differences in expected schooling.
- Time-series analysis to track changes over multiple years could reveal trends in educational development over time for different regions.