Dataset Link -

Name : Darshit Bhagtani
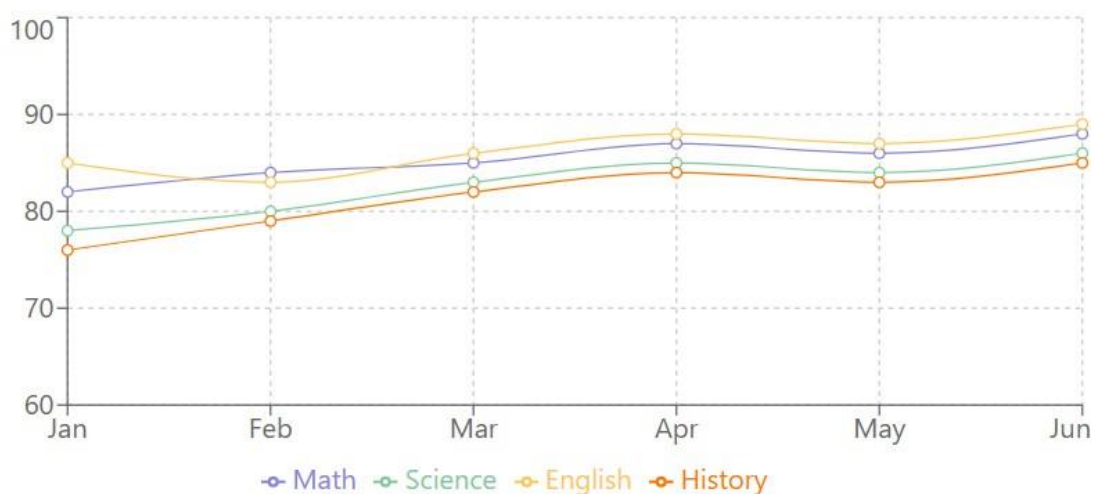**UID** : 2021700006
Batch : ADV
Topic : Design a Dashboard using a dataset on Education Sector

**Visualisations :**

The line chart visualizes student performance across four core subjects (Math, Science, English, History) over six months. Each subject is represented by a distinct colored line, making it easy to track subject-wise progress. The y-axis ranges from 60-100 to focus on the relevant grade range. Notable features include the steady improvement in Math scores from 82 to 88, and consistently high English performance. The intersecting lines help identify patterns like Science and History following similar trajectories. The visualization effectively shows both individual subject trends and cross-subject comparisons.

Enrollment Distribution by Grade and Gender
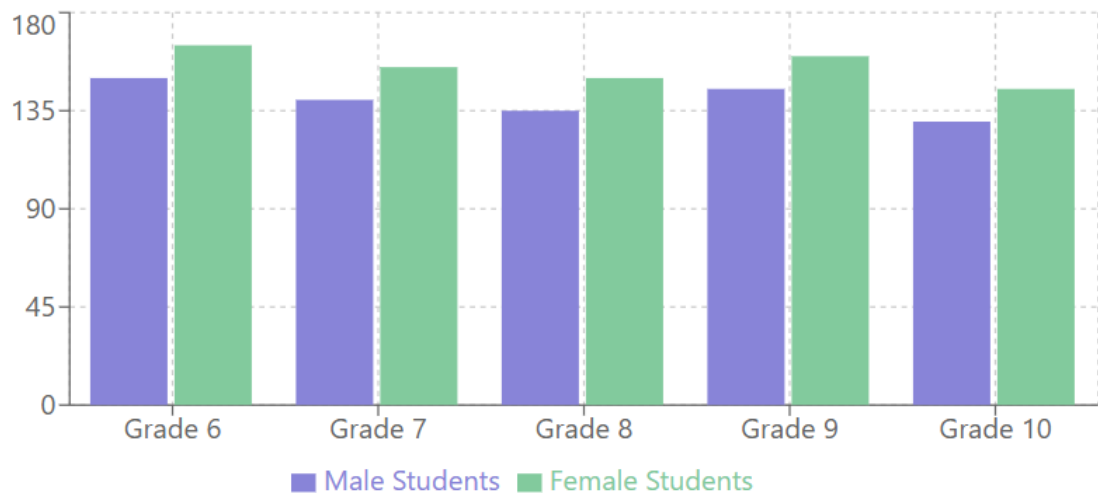
This grouped bar chart displays student enrollment data across grades 6-10, segregated by gender. Each grade has two bars: blue representing male students and green representing female students. The visualization reveals consistently higher female enrollment across all grades, with the largest gender gap in Grade 6 (165 females vs 150 males). The chart also shows a slight decline in overall enrollment in higher grades, with Grade 10 having the lowest total enrollment. This helps administrators track gender diversity and grade-wise retention.

Resource Allocation
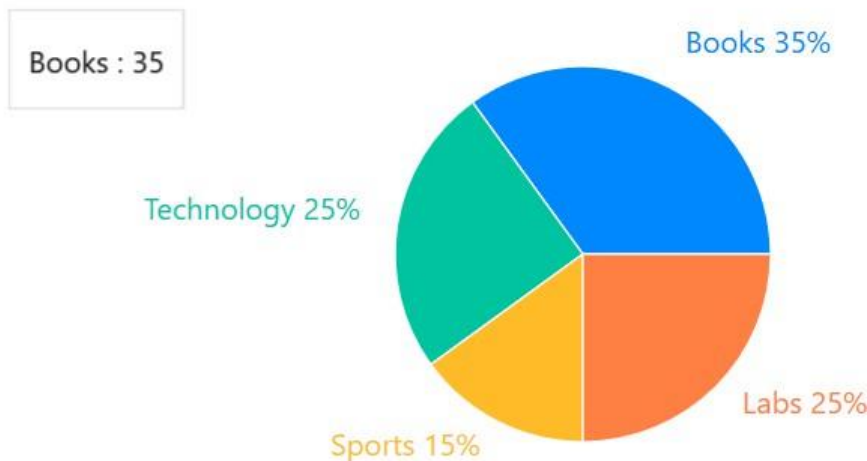
The pie chart illustrates the distribution of educational resources across four major categories: Books (35%), Technology (25%), Labs (25%), and Sports (15%). Each sector is distinguished by a unique color and includes percentage labels for quick

reference. The visualization emphasizes the priority given to traditional learning materials (Books) while showing equal allocation between Technology and Labs. The smaller Sports segment indicates potential areas for resource rebalancing. This chart helps stakeholders quickly grasp resource distribution patterns.

**Student Skills Assessment Comparison**
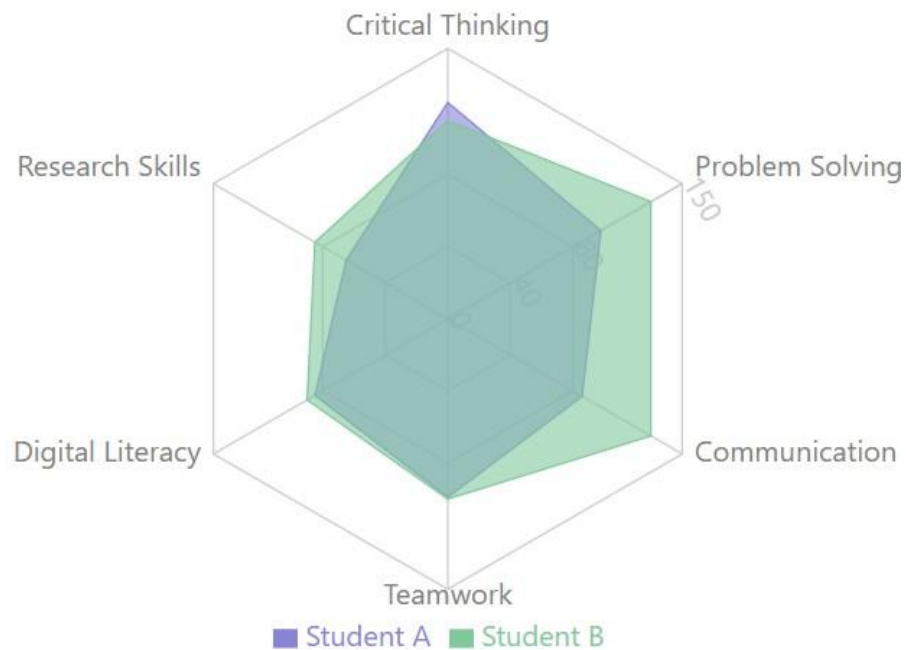
This hexagonal radar chart compares student competencies across six essential 21st-century skills. The visualization plots two students (A and B) simultaneously, creating overlapping polygons that make strengths and weaknesses immediately apparent. Students are evaluated on Critical Thinking, Problem Solving, Communication, Teamwork, Digital Literacy, and Research Skills, with scores ranging from 0-150. Student B shows particular strength in Communication and Problem Solving (130/150), while Student A excels in Critical Thinking (120/150). The chart's design allows for quick identification of skill gaps and comparative analysis, making it valuable for personalized learning plans and skill development tracking.

Study Hours vs Performance Analysis
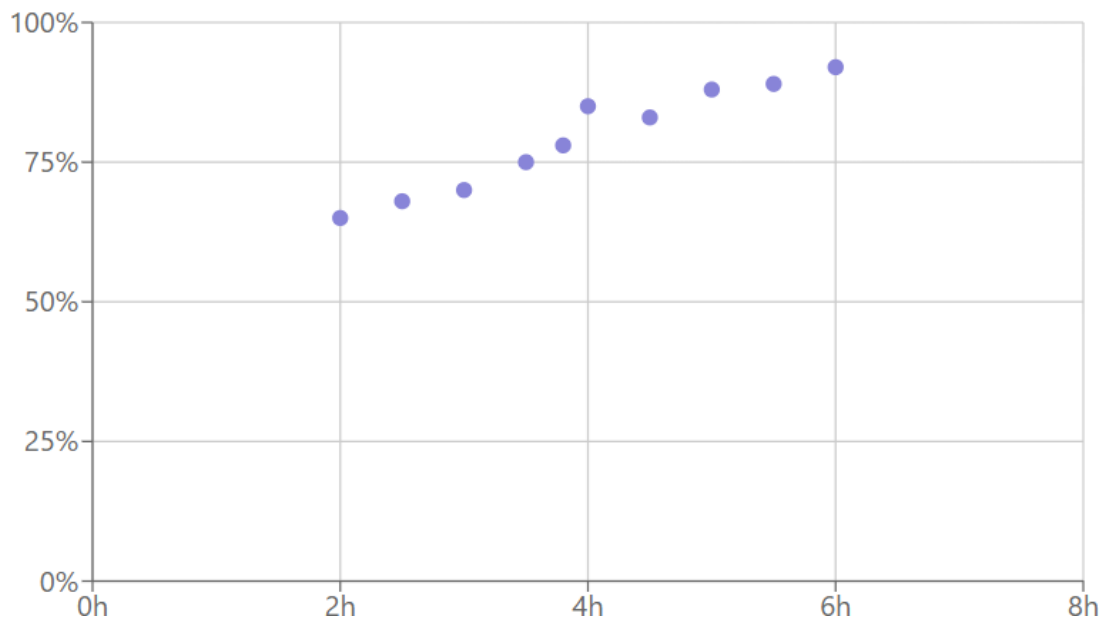
This scatter plot reveals the relationship between study hours (x-axis) and academic performance (y-axis). Each point represents an individual student's data, creating a pattern that demonstrates the correlation between time invested and academic achievement. The visualization shows a general upward trend, indicating that more study hours typically lead to better performance. The cluster of points between 4-6 study hours showing scores of 85-92% suggests an optimal study duration. The spread of points also reveals that some students achieve high scores with fewer study hours, highlighting varying learning efficiencies.

# Attendance, Performance & Activities Correlation
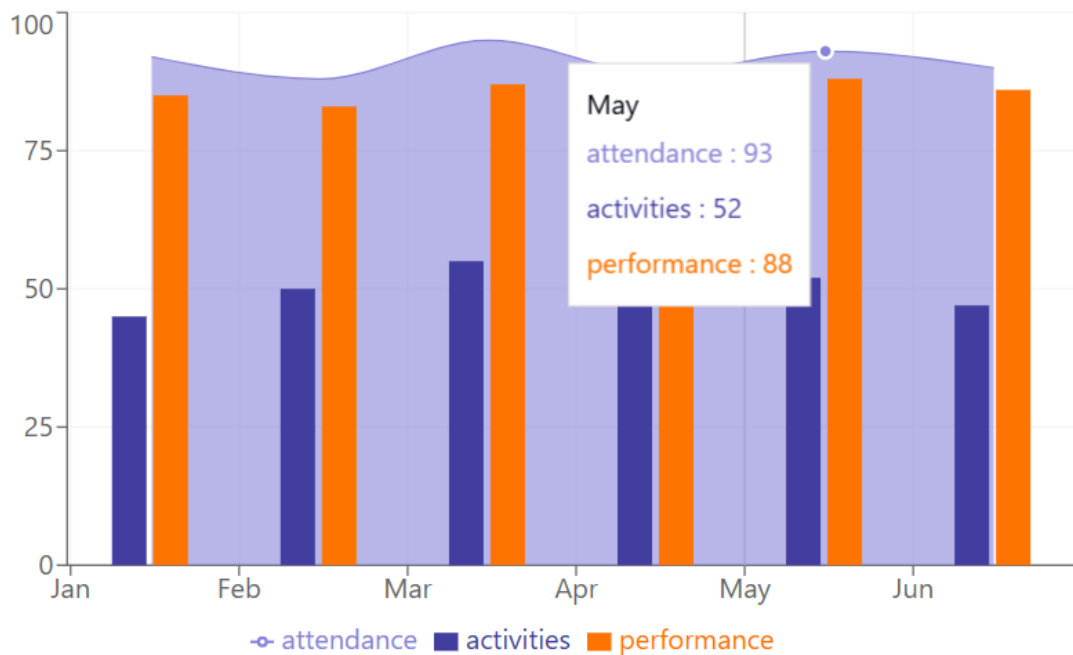
This sophisticated multi-metric visualization combines three key educational indicators: attendance (area chart), performance (bars), and extracurricular activities (bars). The x-axis tracks months while the y-axis shows percentages/counts. The overlapping visualization reveals how attendance patterns (shown by the flowing area chart) correlate with academic performance and participation in activities. March shows peak attendance (95%) corresponding with high performance (87%) and maximum activity participation (55 activities). The composed nature of the chart allows educators to identify months where all three metrics align positively or negatively, helping in strategic planning and intervention.

Library Resource Distribution
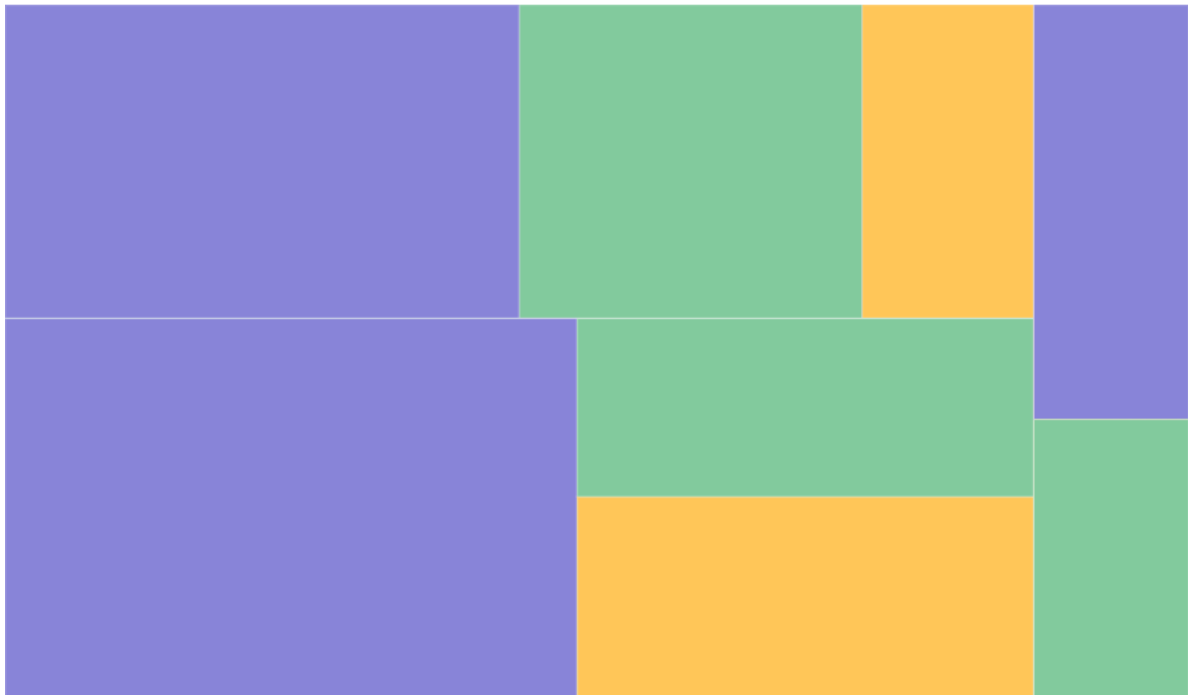
The treemap provides a hierarchical visualization of library resource utilization, with nested rectangles representing different resource categories and their usage levels. The size of each rectangle corresponds to the resource's usage or availability. The visualization is divided into three main categories: Digital, Physical, and Multimedia resources. Physical books dominate the space (4000 units), followed by E-books (3000 units). The color intensity variations help distinguish between resource types, while the nested structure shows the relationship between main categories and subcategories. This helps library administrators optimize resource allocation and identify underutilized materials.

24-Hour Student Engagement Patterns
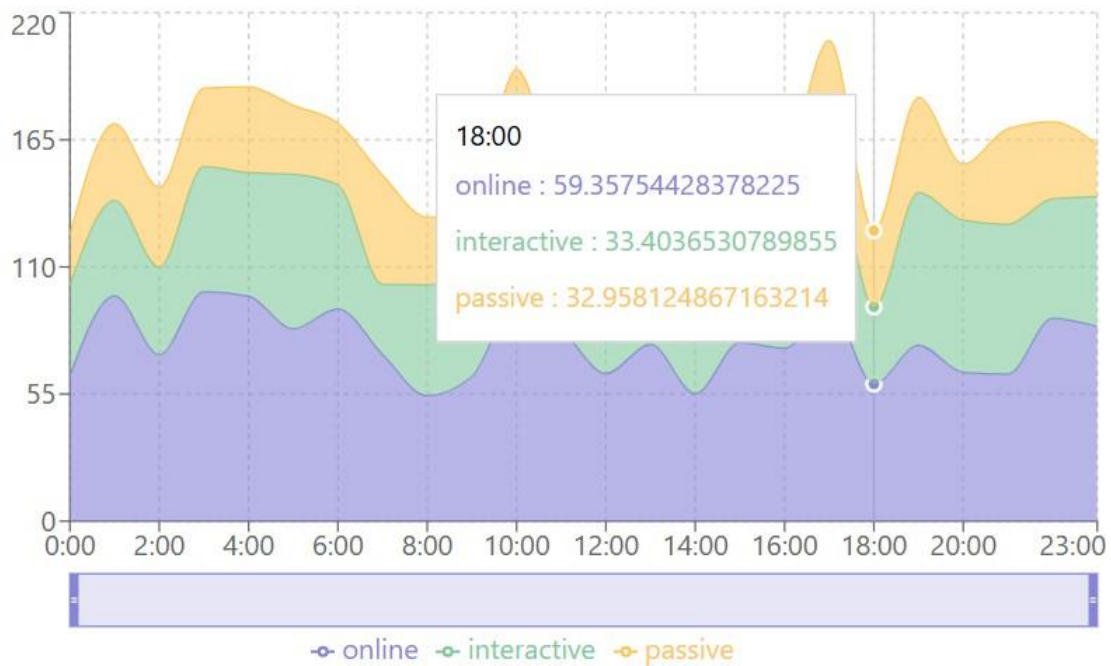
Shows engagement levels throughout the day
Three types of engagement tracked:

- Online presence (top layer)
- Interactive participation (middle layer)
- Passive learning (bottom layer)

Interactive brush component for zooming into specific time periods. Helps identify peak learning hours and engagement patterns

Conclusion :

The visualizations in the Big Data Dashboard for the education sector reveal key trends in student performance, resource allocation, and demographic impacts. Insights highlight areas for improvement, enabling data-driven decisions to enhance educational outcomes and optimize resource distribution across schools and districts.