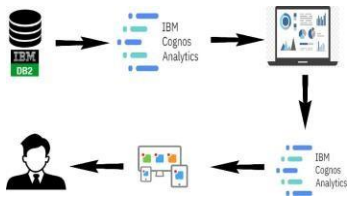
# Unleashing The Potential Of Our Youth: A Student Performance Analysis

A country's growth is strongly measured by the quality of its education system. Education sector, across the globe has witnessed sea change in its functioning. Today it is recognized as an industry and like any other industry it is facing challenges, the major challenges of higher education being decrease in students' success rate and their leaving a course without completion.

Analysing student work is an essential part of teaching. Teachers assign, collect and examine student work all the time to assess student learning and to revise and improve teaching. Ongoing assessment of student learning allows teachers to engage in continuous quality improvement of their courses. Many factors can influence a student's performance, including the influence of the parents' educational background, test preparation and so on.

The dataset contains the marks secured by 1000 students from a school. This project analyses and correlates student performance with different attributes. The analysis aims to understand the influence of important factors such as parental level of education, the status of test preparation course etc. on the performance of the students in the exams.

Technical Architecture:




# Project Flow

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding
  - Specify the business problem
  - Business requirements
  - Literature Survey
  - Social or Business Impact.
- Data Collection & Extraction from Database
  - Collect the dataset,
  - Storing Data in DB2
  - Perform SQL Operations
  - Connect DB2 with Cognos
- Data Preparation
  - Prepare the Data for Visualization

- Data Visualizations
    - No of Unique Visualizations
- Dashboard
    - Responsive and Design of Dashboard
- Story
    - No of Scenes of Story
- Report
    - No of Visualization with detail information
- Performance Testing
    - Amount of Data Rendered to DB2
    - Utilization of Data Filters
    - No of Calculation Fields
    - No of Visualizations/ Graphs
- Web Integration
    - Dashboard, Report and Story embed with UI With Flask
- Project Demonstration & Documentation
    - Record explanation Video for project end to end solution
    - Project Documentation-Step by step project development procedure

# Define Problem / Problem Understanding

A problem statement is a clear and concise description of the issue or challenge that needs to be addressed. It should define the problem in a way that is understandable to stakeholders and provide a basis for developing a solution or course of action.

# Business Requirements

Business requirement of student performance analysis refers to the need of educational institutions or organizations to gather, analyse, and use data on students' academic performance to improve teaching and learning outcomes. This process involves collecting, analysing, and interpreting data on various aspects of student performance such as test scores, attendance, behavioural patterns, and demographic information. The business requirement of student performance analysis is crucial for educational institutions to provide high-quality teaching and learning outcomes and improve student success. The ultimate goal is to gain insights and improve performance through data visualization techniques.

# Literature Survey

A literature survey for Student Performance Analysis involves reviewing academic articles, and other sources related to the analytics of Students Performance. Researchers and practitioners in the field are exploring new methods and tools to improve teaching and learning outcomes and provide more personalized learning experiences for individual students. The analysis can provide a comprehensive understanding of the significance, challenges, and opportunities associated with Student Performance.

# Social Or Business Impact

Social Impact: It have a positive social impact by improving student outcomes, promoting equity in education, and increasing transparency and accountability in the education system.
Business Model/Impact: It have a significant impact on businesses and educational institutions, as it provides valuable insights into student learning and helps improve teaching, increasing efficiency, and promoting competitiveness.

# Data Collection & Extraction From Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

# Understand The Data

Data contains all the meta information regarding the columns described in the CSV files. The name of file is StudentPerformance.csv
**Description for StudentPerformance.csv:**
The file StudentPerformance.csv contains 1000 rows. Each row corresponds to an individual student with details and marks in respective subjects. The columns are:

**Categorical columns are:**
Gender: Male or Female
Race/ethnicity: 5 groups, from group A to group E
Parental level of education: from high school to a master's degree
lunch: free/reduced or standard.

**Numerical Columns are:**
Math score: out of 100
Reading score: out of 100
Writing score: out of 100

# Data Preparation

Data modules are containers that describe data and rules for combining and shaping data to prepare it for analysis and visualization in IBM Cognos Analytics. Data module sources. Data modules can be based on data servers, packages, uploaded files, data sets, and other data modules

# Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

1.https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2Fstudent%2Bperformance%2Banalysis%2FSTUDENT%2BPERFORMANCE%2BSTORY&action=view&sceneId=model00000189b6862d74_00000000&sceneTime=0

2.https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2Fstudent%2Bperformance%2Banalysis%2FSTUDENT%2BPERFORMANCE%2BSTORY&action=view&sceneId=model00000189b6749c72_00000000&sceneTime=0

3.https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2Fstudent%2Bperformance%2Banalysis%2FSTUDENT%2BPERFORMANCE%2BSTORY&action=view&sceneId=model00000189b66095c3_00000003&sceneTime=0

# No Of Unique Visualizations

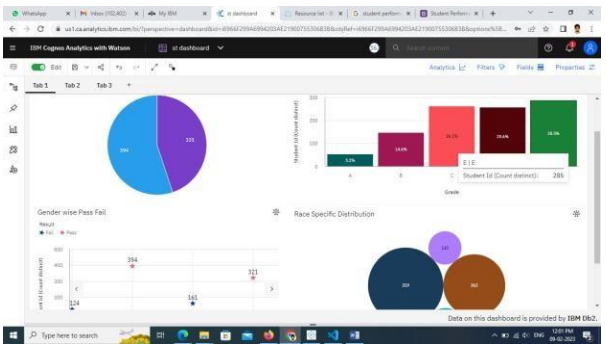
The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the Literacy include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare and analyze students performance base on number of diffrent parameters.

# Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

# Responsive And Design Of Dashboard

The responsiveness and design of a dashboard for Data-Driven insights on Student Performance is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centered design, clear and concise information, interactivity, data-driven approach, accessibility, customization, and security. The goal is to create a dashboard that is user-friendly, interactive, and data-driven, providing actionable insights.

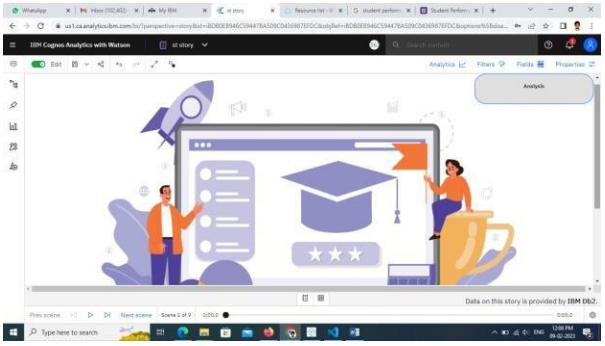


# Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

# No Of Scenes Of Story

The number of scenes in a storyboard for Data-Driven insights on Students Performance will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

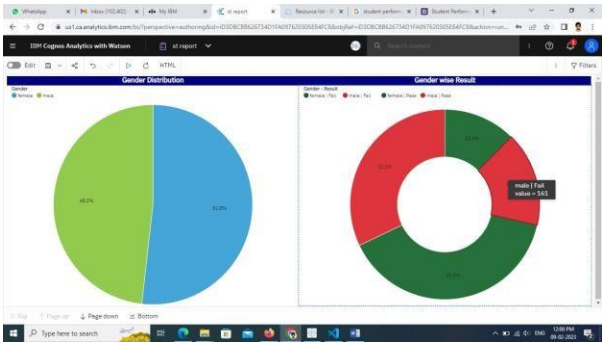



# Report

A report in data analytics typically involves analysing and interpreting data to draw insights and conclusions that can inform business decisions or address research questions. The report usually includes a summary of the data analysis process, including the methods and tools used, as well as the findings and recommendations based on the analysis. The report should begin with an executive summary, which provides a brief overview of the main findings and recommendations. The introduction should provide background information on the problem or research question being addressed and the data sources used.

# No Of Visualization With Detailed Information

When creating a report in Cognos, it is often helpful to include visualizations to help communicate the findings of the analysis.

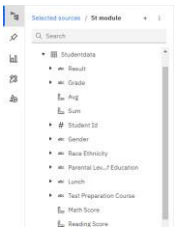



# Amount Of Data Rendered To DB2

The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.

Open the MySQL Workbench, go to the database then click to expand the tables,select the table and click on (i) button to get the information related to table such as column count,table rows etc.

# No Of Calculation Fields



# No Of Visualizations/ Graphs

1. Male Female Pass Ratio
2. Students By Grade
3. Race Specific Distribution
4. Parents Education
5. Test Preparation Effectiveness
6. Grades Based on Preparation Material
7. Race Wise Pass-Fail Ratio

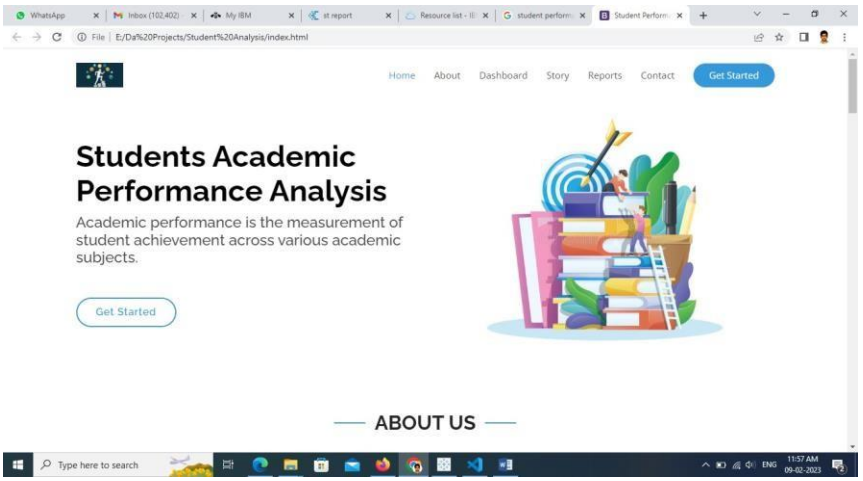
# Web Integration

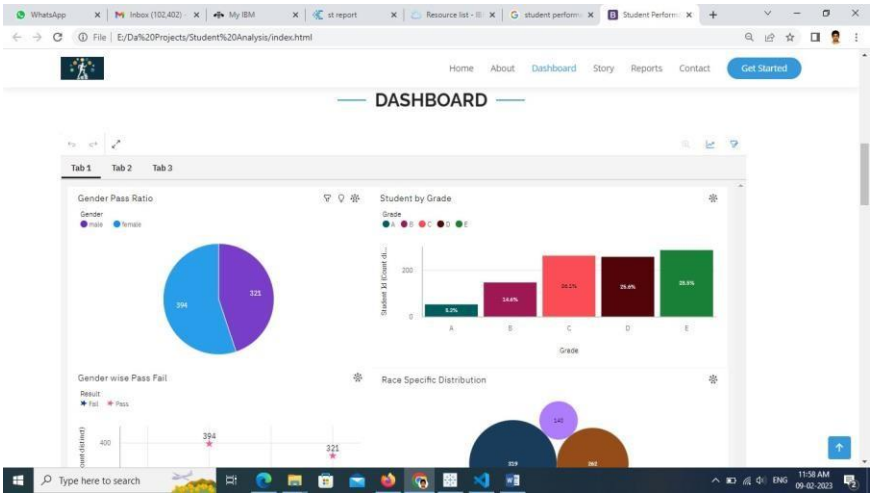
Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

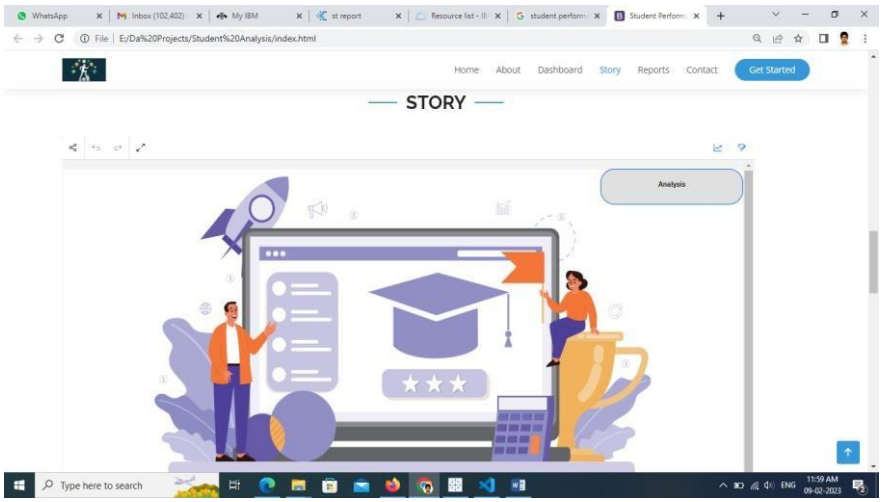
**Publishing dashboard, report & story.**

Step 1: Go to Dashboard, report & /story, click on share button on the top.


# Dashboard, Report And Story Embed With UI With Flask

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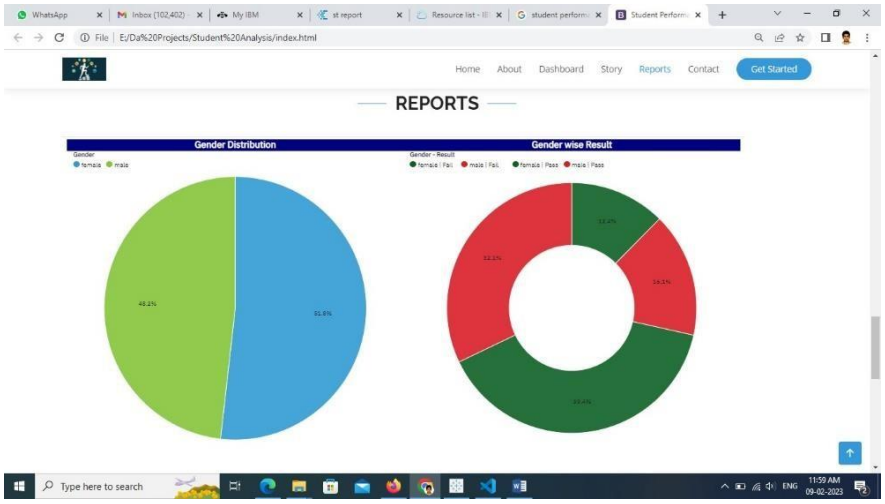
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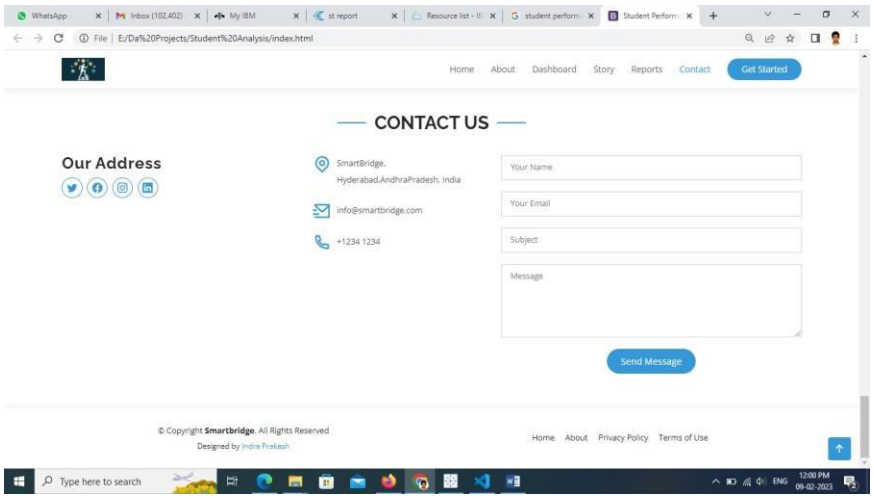
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# Student Performance Dashboard

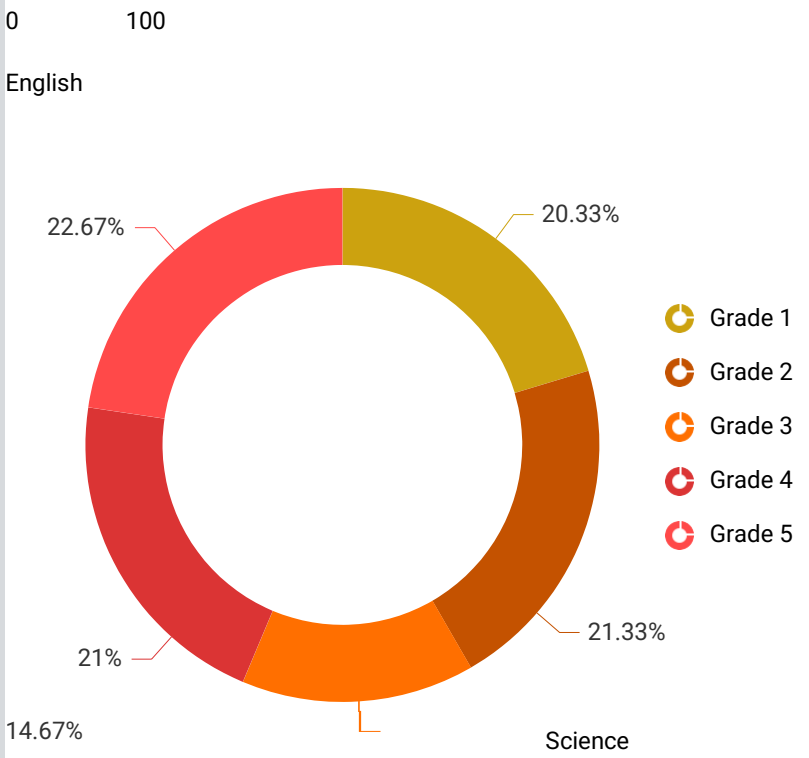
Select Year: All

Select Grade: All

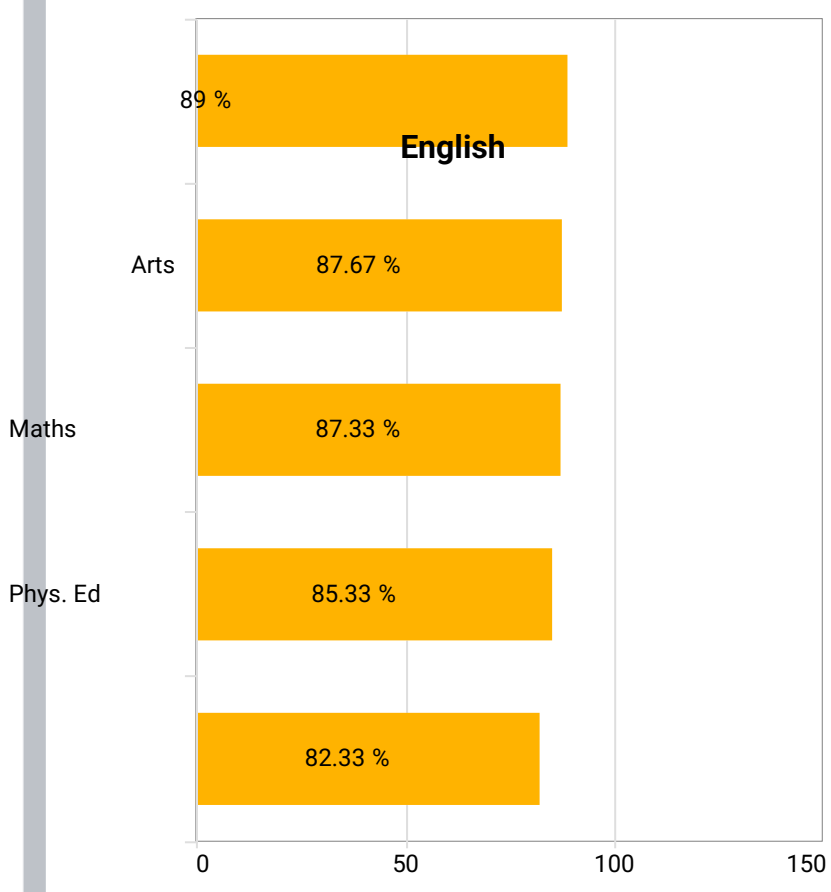
Students: 300

## Students by Grade and Gender

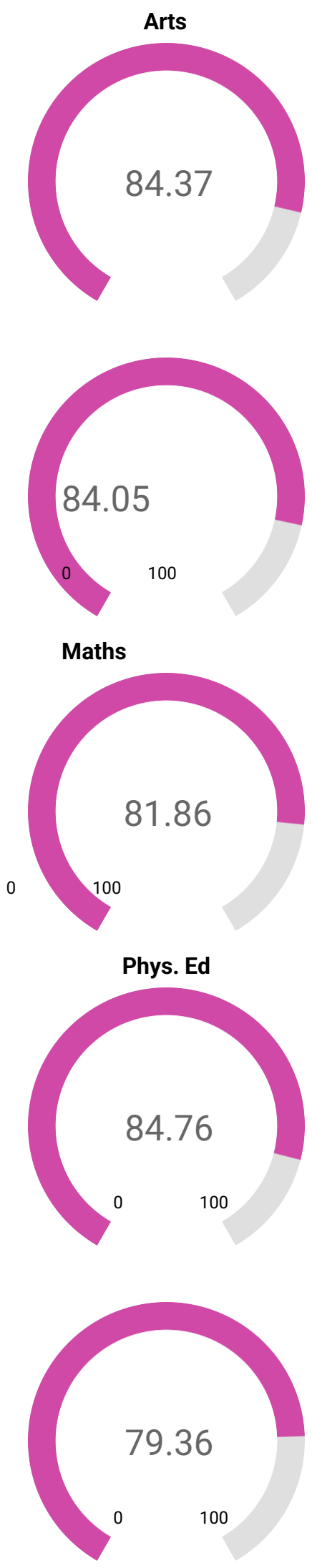
Drill down to show the number of students by gender.



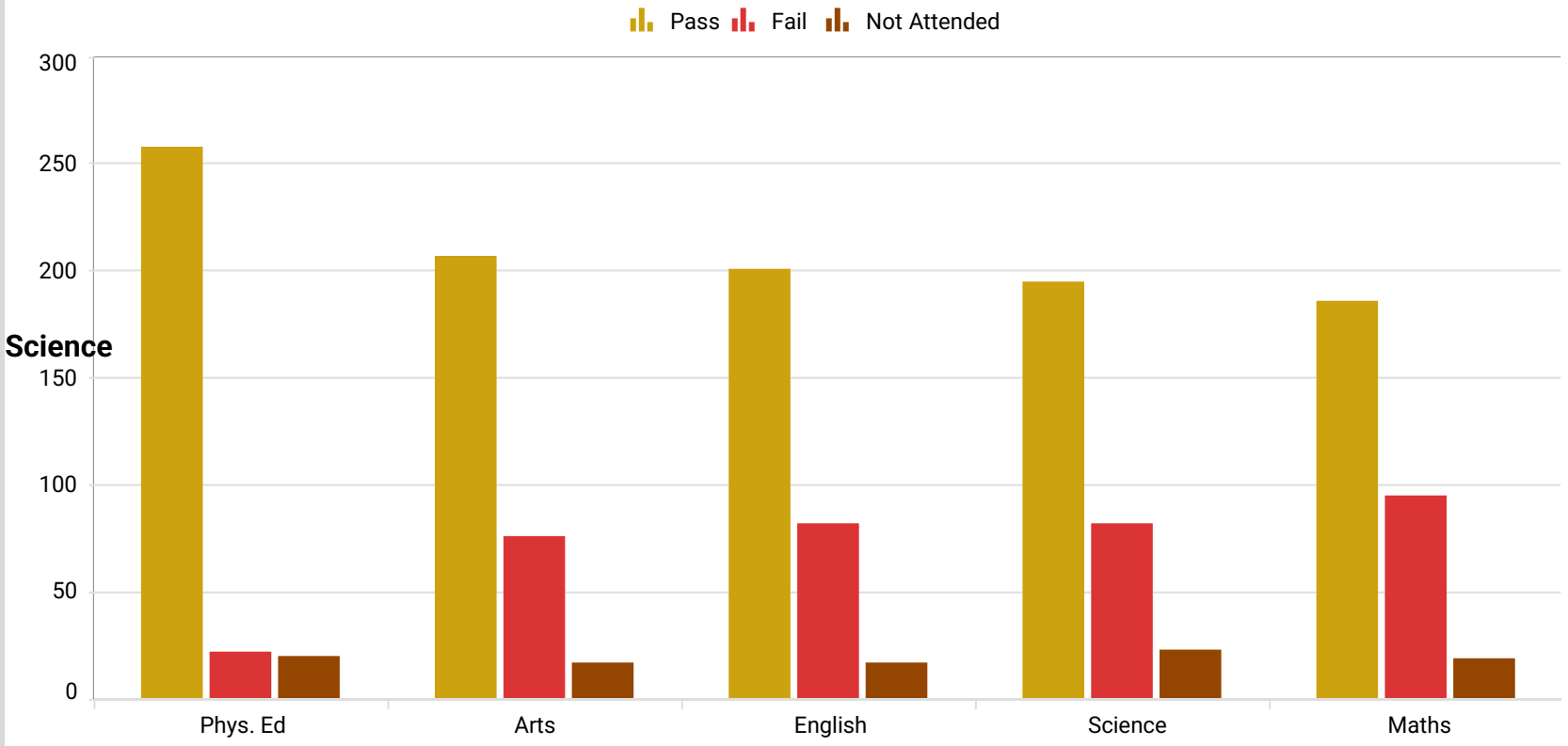

## Student Participation Rate by Branch




## Avg. Subject Score




## Examination Results by Branch




## Academic Details of Students

| Student ID | Student Name | Gender | Grade Name | Average Marks | GPA | Class Participation Rate | Days Absent | Attendance Rate |
|---|---|---|---|---|---|---|---|---|
| 213 | Abby Buckley | Female | Grade 5 | 88.40 % | 3.70 | 80.00 % | 2 | 93.33 % |
| 279 | Abigail Pineda | Female | Grade 2 | 69.40 % | 2.00 | 80.00 % | 2 | 93.33 % |
| 236 | Ada Ochoa | Female | Grade 1 | 87.60 % | 3.70 | 80.00 % | 3 | 90.00 % |
| 59 | Aida Bailey | Female | Grade 2 | 90.00 % | 4.00 | 100.00 % | 0 | 100.00 % |
| 167 | Alba Andrews | Female | Grade 5 | 94.00 % | 4.00 | 100.00 % | 0 | 100.00 % |
| 25 | Alexandra Perkins | Female | Grade 3 | 71.80 % | 2.00 | 80.00 % | 2 | 93.33 % |
| 204 | Alicia Singleton | Female | Grade 5 | 94.00 % | 4.00 | 100.00 % | 0 | 100.00 % |
| 196 | Aline Bean | Female | Grade 5 | 91.00 % | 4.00 | 100.00 % | 0 | 100.00 % |
| 158 | Allie Stuart | Female | Grade 5 | 88.80 % | 3.70 | 100.00 % | 0 | 100.00 % |
| 137 | Althea Harrington | Female | Grade 4 | 93.20 % | 4.00 | 100.00 % | 3 | 90.00 % |
| | | | | | | | | |
| | | | | | | | Average Attendance | **94.08 %** |