# MIS-311 - Introduction to Business Analytics

## Part 1: Data Analysis and Insight

I will use Excel to perform **Exploratory Data Analysis (EDA)** on the dataset **Student Performance**

### 1. Data Overview

The **Student Performance** dataset provides information on students' demographic backgrounds and their academic achievements by three subjects: math, reading, and writing. It contains **202 rows** and **8 columns,** each row represents for an individual student.

**Key Variables:**

Race/Ethnicity (object): Different racial groups.

Parental Level of Education (object): The educational background of the student's family.

Math Score (int): Performance in math,

Reading Score (int): Performance in reading

Writing Score (int): Performance in writing skills

### 2. Data Cleaning

I use the **Go to** command (Ctrl + G) in Excel to to find the missing value in dataset.

Results:

- 4 missing values in **average_score** column
- 3 missing values in **parental_level_of_education** column

Solutions:

- Missing values in **average_score** were recalculated using the available component scores (math, reading, and writing), as this variable is derived rather than directly observed.
- Missing values in parental level of education were retained and labeled as "**Unknown**" to avoid introducing bias through arbitrary imputation.
- Finally, I use the Remove Duplicates command to find out 3 duplicate rows and remove it. Now the dataset has 199 rows left.

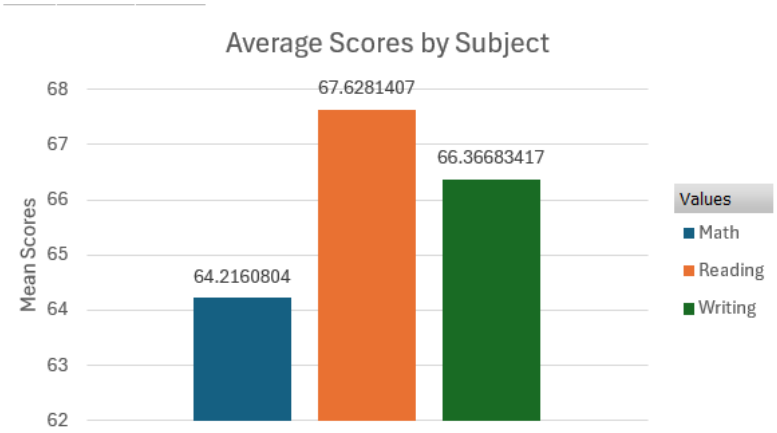
### 3. Descriptive Statistics

I use Data analysis tools in Excel to get **descriptive statistics** for student's score in math, reading, writing, total and average scores.

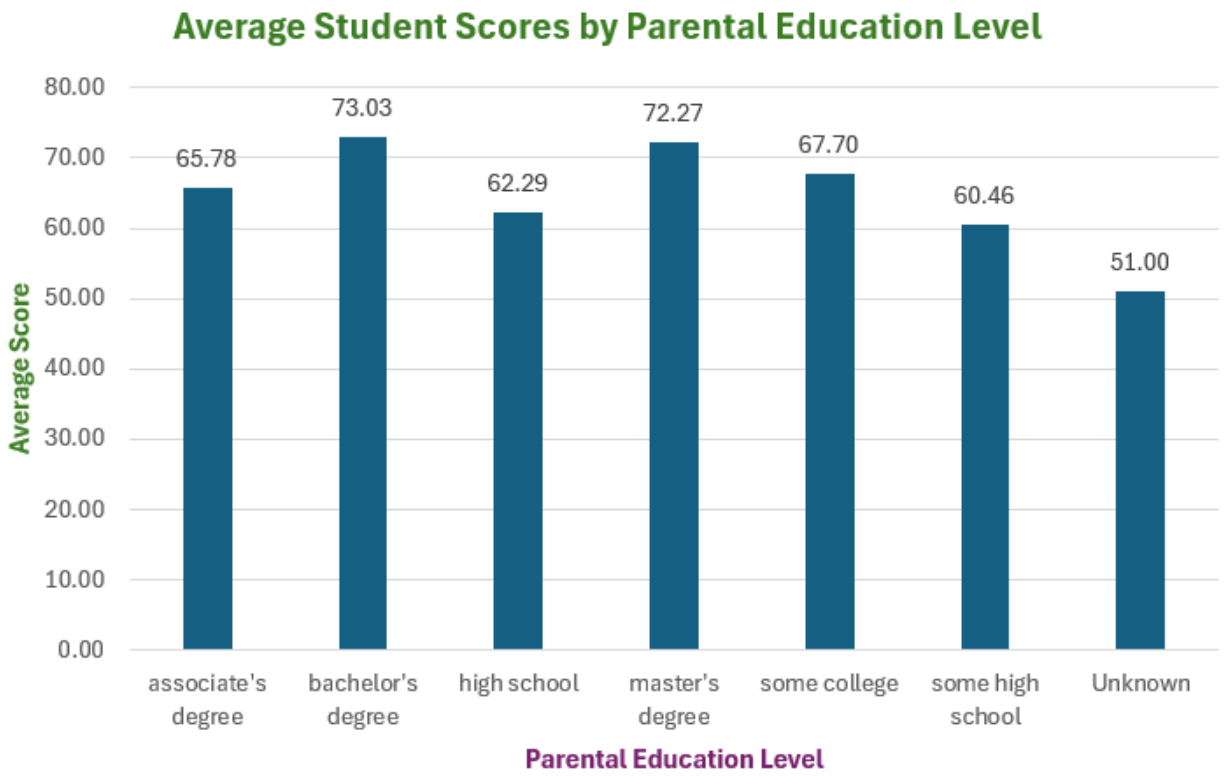
| *math_score* | | *reading_score* | | *writing_score* | | *total_score* | | *average_score* | |
|---|---|---|---|---|---|---|---|---|---|
| Mean | 64.21608 | Mean | 67.62814 | Mean | 66.36683 | Mean | 198.2111 | Mean | 66.07035 |
| Standard E | 1.127361 | Standard E | 1.118896 | Standard E | 1.152591 | Standard E | 3.274682 | Standard E | 1.091561 |
| Median | 65 | Median | 68 | Median | 68 | Median | 199 | Median | 66.33333 |
| Mode | 58 | Mode | 67 | Mode | 74 | Mode | 151 | Mode | 50.33333 |
| Standard D | 15.90339 | Standard D | 15.78397 | Standard D | 16.2593 | Standard D | 46.19508 | Standard D | 15.39836 |
| Sample Va | 252.9177 | Sample Va | 249.1337 | Sample Va | 264.3648 | Sample Va | 2133.986 | Sample Va | 237.1095 |
| Kurtosis | 0.946461 | Kurtosis | -0.14052 | Kurtosis | 0.072614 | Kurtosis | 0.3414 | Kurtosis | 0.3414 |
| Skewness | -0.36683 | Skewness | -0.23144 | Skewness | -0.33338 | Skewness | -0.34874 | Skewness | -0.34874 |
| Range | 100 | Range | 83 | Range | 90 | Range | 272 | Range | 90.66667 |
| Minimum | 0 | Minimum | 17 | Minimum | 10 | Minimum | 27 | Minimum | 9 |
| Maximum | 100 | Maximum | 100 | Maximum | 100 | Maximum | 299 | Maximum | 99.66667 |
| Sum | 12779 | Sum | 13458 | Sum | 13207 | Sum | 39444 | Sum | 13148 |
| Count | 199 | Count | 199 | Count | 199 | Count | 199 | Count | 199 |

From the result, we can see that students scored around 64.22 in math, 67.63 in reading, and 66.37 in writing, showing slightly better performance scores in reading compared to other subjects. Overall, the maximum score is 100 while the minimum is quite low, indicating the wide range of scores. Lastly, the standard deviation of about 15 to 16 shows some variation in student performance.

**Key Insight:**




Descriptive statistics show that students achieve higher average scores in reading and writing compared to mathematics. The lower mean score in mathematics suggests that this subject may pose greater challenges for students. This insight highlights potential gaps in quantitative skills compared to language-based subjects.




Descriptive statistics indicate that students whose parents have higher levels of education tend to achieve higher average scores. A gradual increase in mean scores is observed as parental education level rises. This suggests a potential association between parental educational background and student academic performance.