STUDENT PERFORMANCE ANALYSIS DASHBOARD

A POWER BI PROJECT EXPLORING WHAT DRIVES ACADEMIC SUCCESS

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INTRODUCTION

As someone who works as a tutor, I've always been curious about what makes some students consistently excel while others, despite effort, struggle to meet expectations. I've seen bright kids fall behind due to factors that often go unnoticed—home environment, study habits, and access to resources. This project gave me the chance to explore that curiosity through data.

Using the Portuguese Student Performance Dataset from the UCI Machine Learning Repository, I created a multi-page Power BI dashboard that examines the impact of personal, academic, and social factors on student performance over time. The result is an interactive and insightful tool that reflects both my analytical skills and my deep interest in education equity and outcomes.

PROJECT **OBJECTIVE**

The goal was to explore how different factors affect a student's academic performance from the first grade (G1) to the final grade (G3) of the school year. I wanted to:

- Identify early warning signs of underperformance
- Track how interventions and support systems (like paid tutoring or family support) shift student trajectories
- Compare outcomes between two different schools (Gabriel Pereira and Mousinho da Silveira)
- Translate findings into actionable insights for educators and policymakers

DATASET **SUMMARY**

- Source: UCI Machine Learning Repository
- Focus: Portuguese subject performance
- Sample Size: 395 students
- Target Variable: G3 (Final grade)
- Features:
- Demographics (age, gender, urban/rural)
- Family background (parental education and job, family size)
- Academic context (failures, absences, study time)
- Support systems (extra paid classes, family support, internet access)

MY **PROCESS**

Data Understanding & Cleaning

I started by exploring the dataset's structure and content, mapping out binary, categorical, and continuous features. Since no values were missing, I could move straight into preprocessing:

- Recoded values (e.g., yes/no, U/R) into readable labels
- Binned continuous variables like study time and age
- Ensured proper data types for analysis in Power BI

Building in Power BI

I modelled the data using DAX measures for averages, counts, and percentage breakdowns. I then built three dashboard pages for G1, G2, and G3—each offering:

- KPI panels (Average, Min, Max per grade)
- Bar/Donut charts for categorical comparisons (e.g., Mjob, famsup, internet)
- Scatterplots for trends like absences vs. grade
- Matrix tables to analyse the effect of parent education
- I also integrated interactive slicers (e.g., by school) so that users can filter the dashboards and explore how patterns shift between student groups.

Dashboard

MY **PROCESS CONT.**

Comparative Deep Dive: GP vs MS

I used bookmarks and filters to compare performance between Gabriel Pereira (GP) and Mousinho da Silveira (MS) students. This added a storytelling layer—revealing how location or school environment may mediate the impact of broader factors like internet access or parental education.

KEY **INSIGHTS**

Internet Access

Students with internet access consistently performed 1–1.5 points higher than those without—especially visible at G3. This confirms the digital divide's real impact, even in traditional classroom settings.

Student by G1 and internet

Student by G2 and internet

Student by G3 and internet
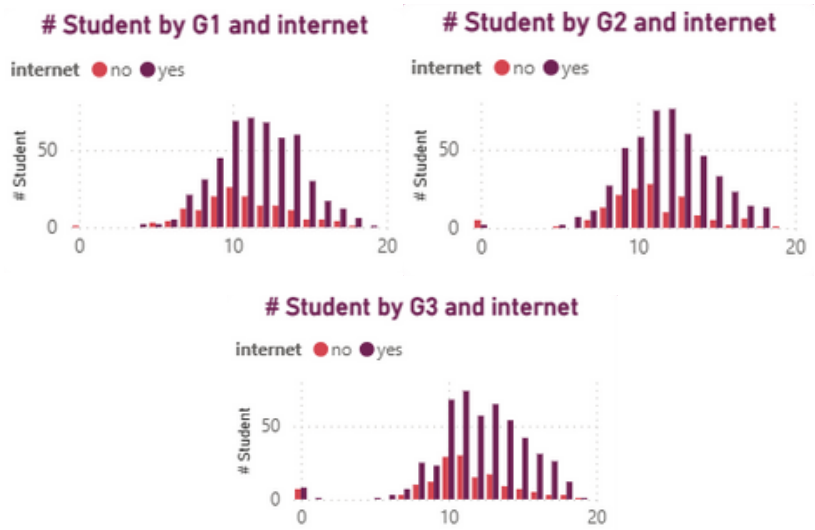
Absenteeism

By G3, absences had a sharp negative correlation with grades. Students with more than 10 absences fell behind by ~2 full points. Early tracking of attendance could be a critical intervention point.

absences and G3
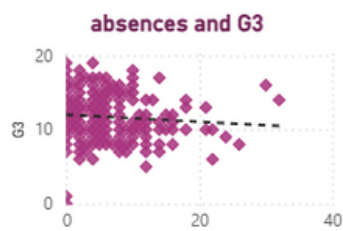
Parental Education

A student whose mother had higher education (Medu = 4) scored, on average, 1.5 points higher than one whose mother had no formal education. The effect was consistent across all three grade periods.

School Comparison (GP vs MS)

- GP students had higher averages across all grade levels, more consistent growth, and greater benefit from paid classes and support systems.
- MS students showed more volatility and lower average scores—suggesting school environment, resource allocation, or teaching style differences.

👩‍🏫 WHY THIS PROJECT **MATTERS TO ME**

As a tutor, I often see the human side of what this data shows:

- A child struggling silently because they don't have a quiet place to study
- A parent who wants to help but doesn't understand the subject matter
- A student improving dramatically just from 30 minutes of structured support a week

This dashboard bridges my on-the-ground experience with data-driven evidence. It proves what many of us know intuitively: achievement isn't just about ability—it's about environment, access, and early intervention.
Doing this project helped me realize how powerful data can be in shaping more equitable, informed, and impactful decisions—whether in education, policy, or business

OUTCOME **& LEARNINGS**

- Built an end-to-end dashboard using Power BI: including modelling, DAX measures, bookmarks, slicers, and custom visuals
- Designed with stakeholders in mind: clear layout, clean storytelling, and filterable insights for different audiences
- Deepened my understanding of real-world challenges in education from a data perspective
- Demonstrated a strong analytical mindset, with the ability to interpret not just numbers, but human behaviour behind them

FINAL **THOUGHT**

Whether I'm tutoring one student or analysing 395, I always want to understand why outcomes differ and how we can bridge those gaps. This project is a reflection of that mindset, combining human insight with technical analysis to make data meaningful.

Thank you for taking the time to read this. I'd love to bring this same level of thought, clarity, and care to your team.