Student performance data.

Business problem:

A secondary school wants to improve their students' final exam performance. To help support this goal, they have collected student data from the local area to identify trends and patterns that are associated with high or low academic performance.

Objective:

Analyse the data to determine the factors that are associated with student performance and provide actionable insights to help support academic improvements.
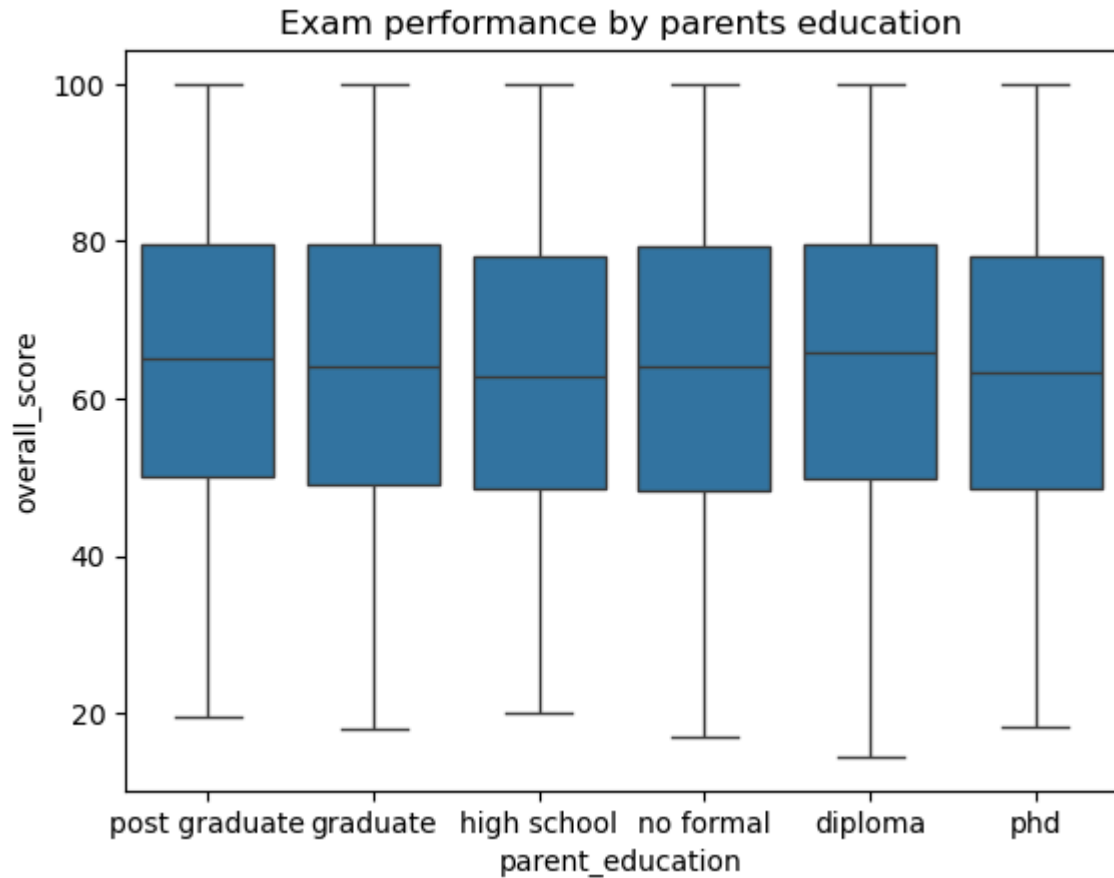
Key questions:

- Is there an association between parents' education level and student exam performance?
- How do study hours relate to student grades?
- Are there observable differences in academic performance between students with and without internet access?
- Which study methods are associated with higher average exam scores?
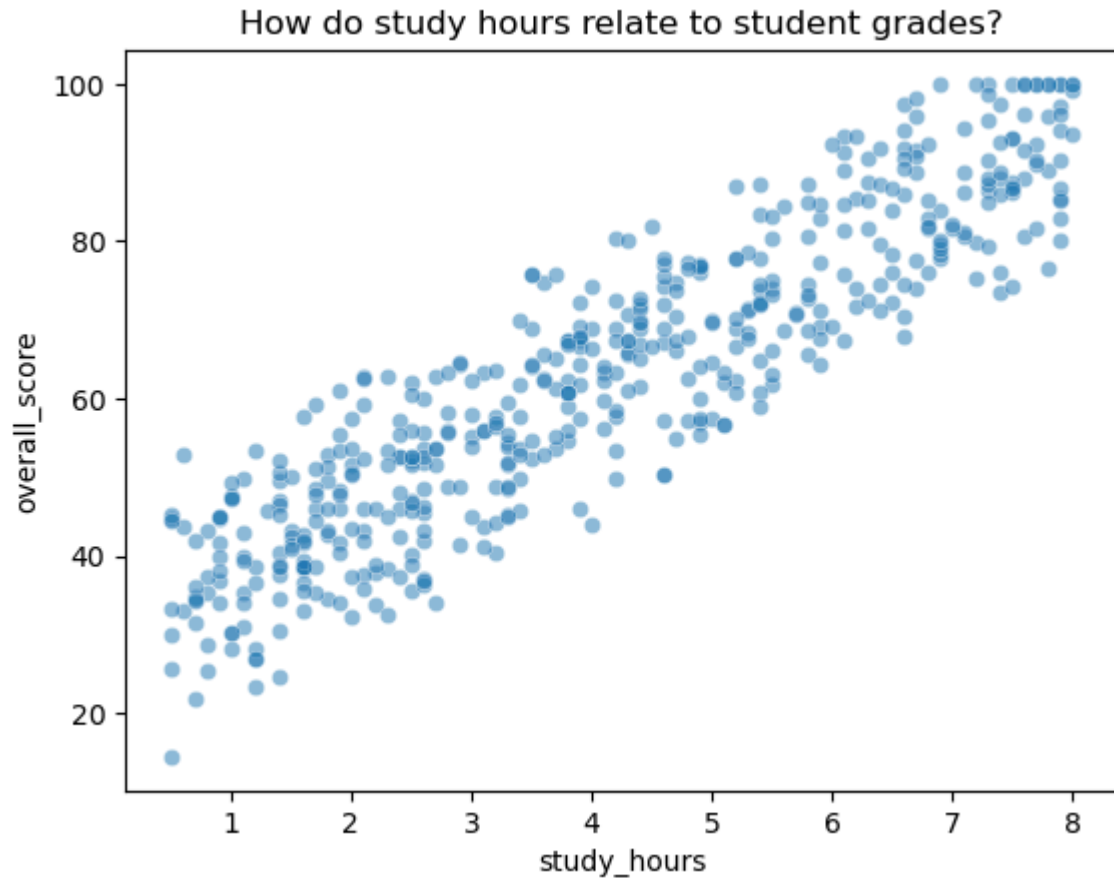
Key findings:

Q1) Is there an association between parents' education level and student exam performance?

Based on the analysis, there is no strong association between parents' education level and student exam performance. While students whose parents hold a PhD show a slightly higher lower bound of exam scores, the overall score distributions overlap substantially across all education levels. As a result, the observed differences are modest and not large enough to inform targeted decision-making.

Exam performance by parents education

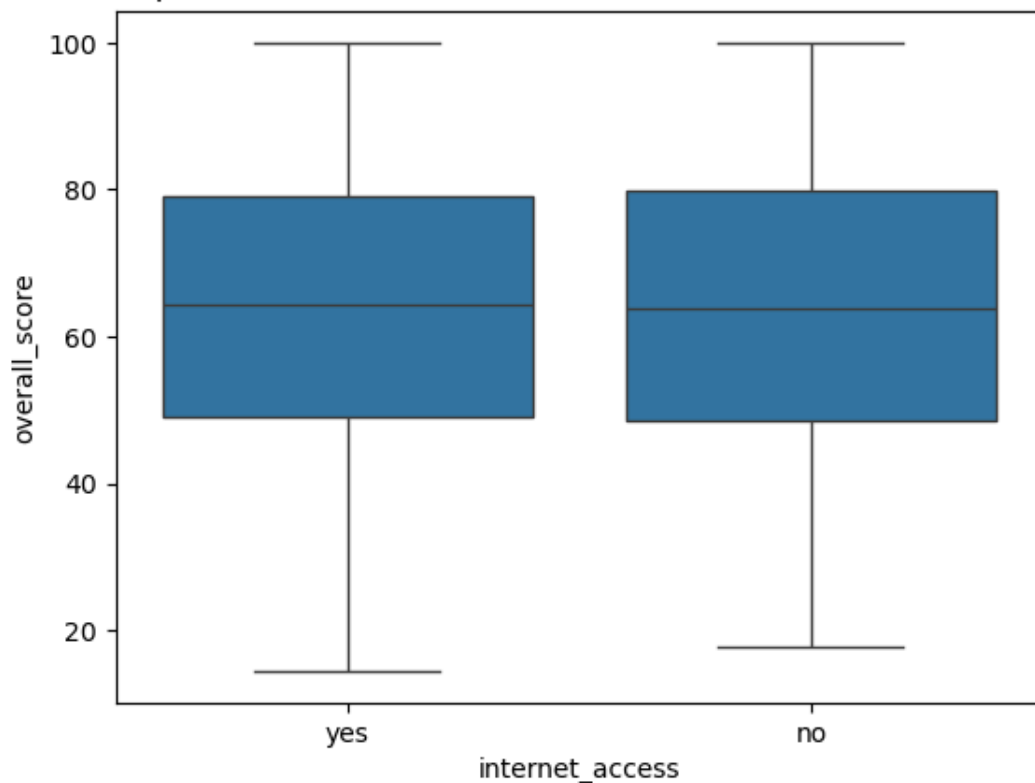Q2) How do study hours relate to student grades?

The analysis shows a strong positive association between study hours and overall exam performance. Students who spent more time studying tended to achieve higher exam scores, with score variability decreasing as study time increased. Among the factors examined, study hours exhibited the most pronounced relationship with student performance.

How do study hours relate to student grades?

Q3) Are there observable differences in academic performance between students with and without internet access?

Students with internet access show slightly higher average and median exam scores compared to those without access. However, the difference is small, and the performance distributions overlap substantially, indicating that internet access alone does not strongly differentiate academic performance.
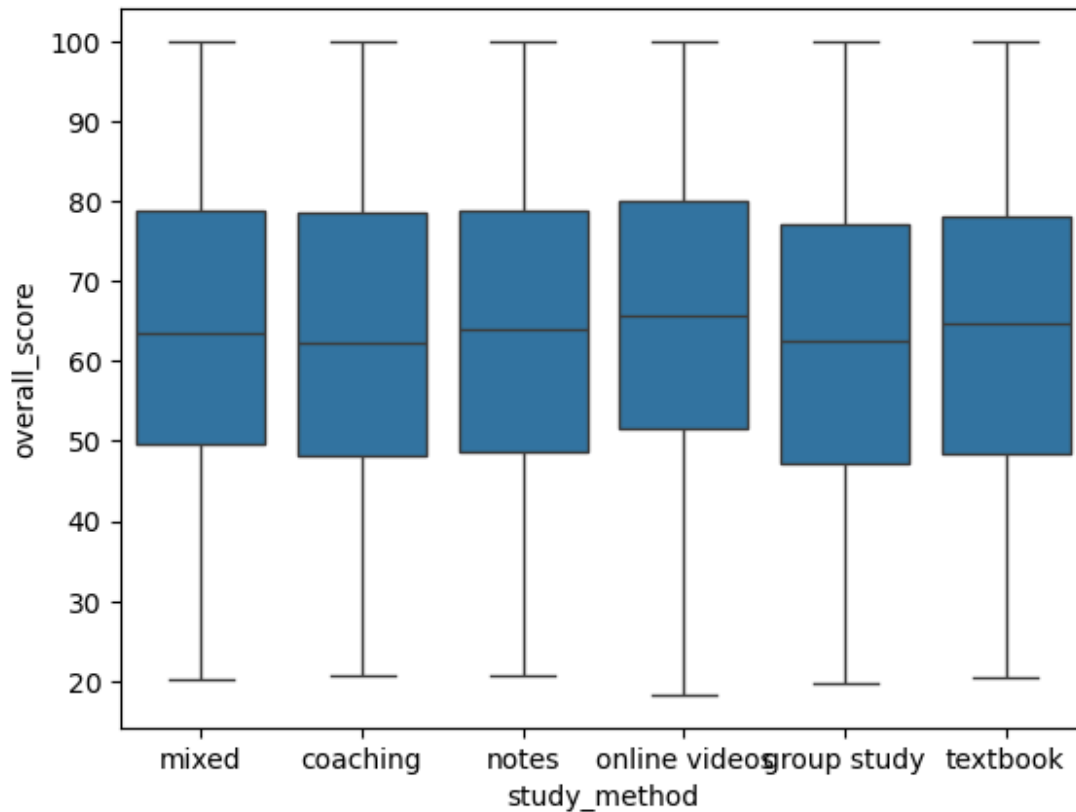
academic performance between students with and without internet access

Q4) Which study methods are associated with higher average exam scores?

The analysis shows only minor differences in average and median exam scores across study methods, with substantial overlap in score distributions. No single study method clearly outperforms the others, suggesting that effectiveness may vary by individual learning preferences rather than one universally superior approach.

Which study methods are associated with higher average exam scores

Recommendation:

Since the study hours show the strongest association with academic performance the school should focus on helping students develop effective study routines. The school could also try implementing extra classes after school to help students who might struggle studying at home. Furthermore, they can also help students who cannot access the internet at home by partnering with the local library and giving students free or discounted memberships.