



Academic Stress Analysis: Data-Driven Insights for Student Wellbeing

A comprehensive analysis of student stress factors using SQL and Python to identify actionable interventions for academic institutions. This presentation outlines our methodology, key findings, and evidence-based recommendations to improve student wellbeing.

Project Overview

Objectives

- Build SQL database for storing student survey data
- Analyze relationships between stress, workload, and lifestyle
- Create meaningful visualizations using Python
- Develop actionable recommendations for institutions

Methodology

- Used simulated student stress survey dataset
- Designed SQL schema for survey responses
- Performed SQL-based queries for initial analysis
- Exported data to Jupyter Notebook for visualization

Tools Utilized

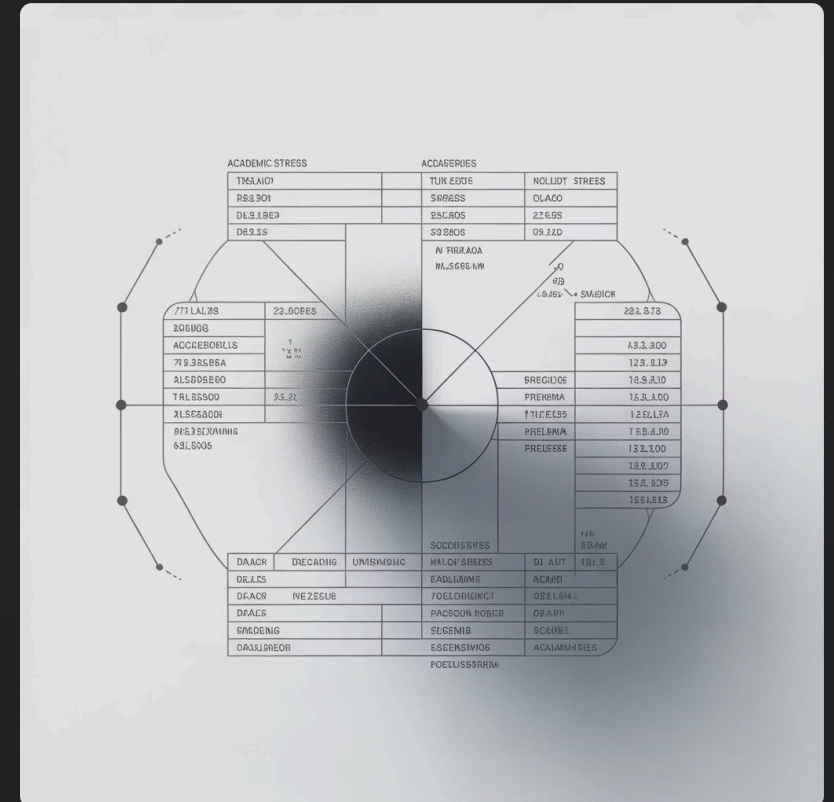
- SQL for data storage and complex queries
- Python with Pandas for data manipulation
- Matplotlib/Seaborn for visualization creation
- Jupyter Notebook for end-to-end analysis workflow

Our approach integrated database management, statistical analysis, and data visualization to create a comprehensive picture of academic stress among university students.

Database Structure

AcademicStressDB Schema

```
CREATE TABLE Students (  
    StudentID INT PRIMARY KEY,  
    Gender VARCHAR(10),  
    Age INT,  
    Major VARCHAR(50),  
    YearOfStudy INT,  
    GPA DECIMAL(3,2),  
    StressLevel INT, -- Scale 1-10  
    SleepHours DECIMAL(3,1),  
    CourseLoad INT, -- Number of courses  
    ExerciseHoursWeekly DECIMAL(3,1),  
    SocialActivityHours DECIMAL(3,1),  
    HasJob BOOLEAN  
);
```



Our database design allows for efficient querying across multiple dimensions while maintaining data integrity.

The schema was designed to capture multiple dimensions of student life that potentially influence stress levels, including academic factors, lifestyle choices, and demographic information.

Key SQL Insights

6.8

Average Stress Level

On a scale of 1-10, indicating moderate to high overall stress in the student population

8.2

Stress with <5hrs Sleep

Students with fewer than 5 hours of sleep consistently reported high stress levels

7.3

Female Avg. Stress

Female students reported slightly higher stress levels compared to the overall average

2.7

GPA of High-Stress Students

Students reporting stress levels of 8+ had significantly lower average GPAs

Our SQL queries revealed clear patterns in the data, with particularly strong correlations between sleep quality, academic performance, and reported stress levels. This provides clear targets for intervention strategies.

SQL Query Examples

Gender Comparison Query

```
SELECT
  Gender,
  AVG(StressLevel) AS AvgStress,
  COUNT(*) AS StudentCount
FROM Students
GROUP BY Gender
ORDER BY AvgStress DESC;
```

Sleep Impact Query

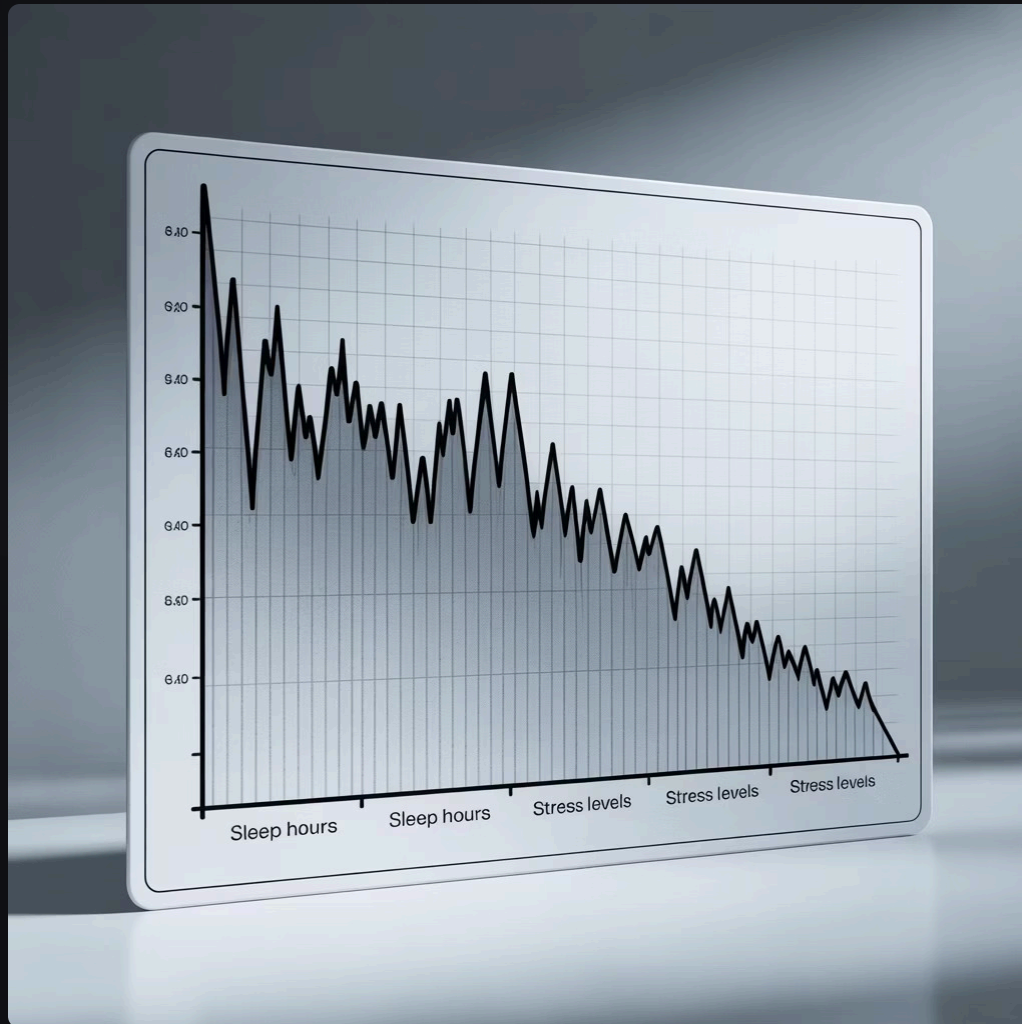
```
SELECT
  CASE
    WHEN SleepHours < 5 THEN 'Under 5 hours'
    WHEN SleepHours BETWEEN 5 AND 7 THEN '5-7 hours'
    ELSE 'Over 7 hours'
  END AS SleepCategory,
  AVG(StressLevel) AS AvgStress
FROM Students
GROUP BY SleepCategory
ORDER BY AvgStress DESC;
```

GPA Correlation Query

```
SELECT
  CASE
    WHEN GPA < 2.0 THEN 'Below 2.0'
    WHEN GPA BETWEEN 2.0 AND 2.9 THEN '2.0-2.9'
    WHEN GPA BETWEEN 3.0 AND 3.5 THEN '3.0-3.5'
    ELSE 'Above 3.5'
  END AS GPARange,
  AVG(StressLevel) AS AvgStress,
  COUNT(*) AS StudentCount
FROM Students
GROUP BY GPARange
ORDER BY
  CASE GPARange
    WHEN 'Below 2.0' THEN 1
    WHEN '2.0-2.9' THEN 2
    WHEN '3.0-3.5' THEN 3
    ELSE 4
  END;
```

These SQL queries demonstrate how we isolated key factors and their relationships to stress levels in the student population.

Visualization Highlights



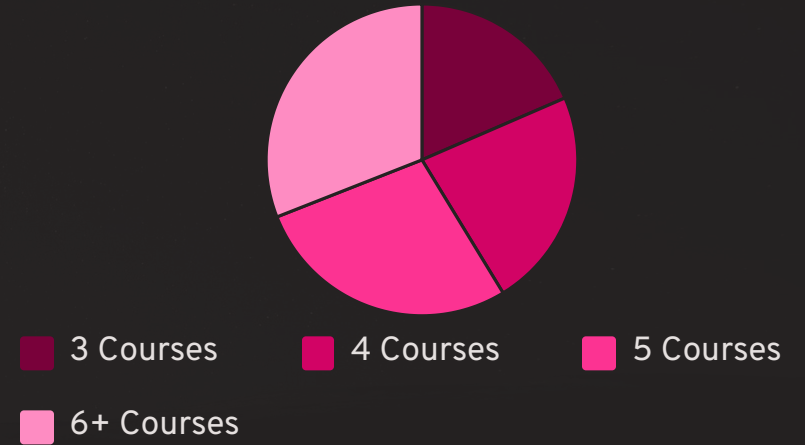
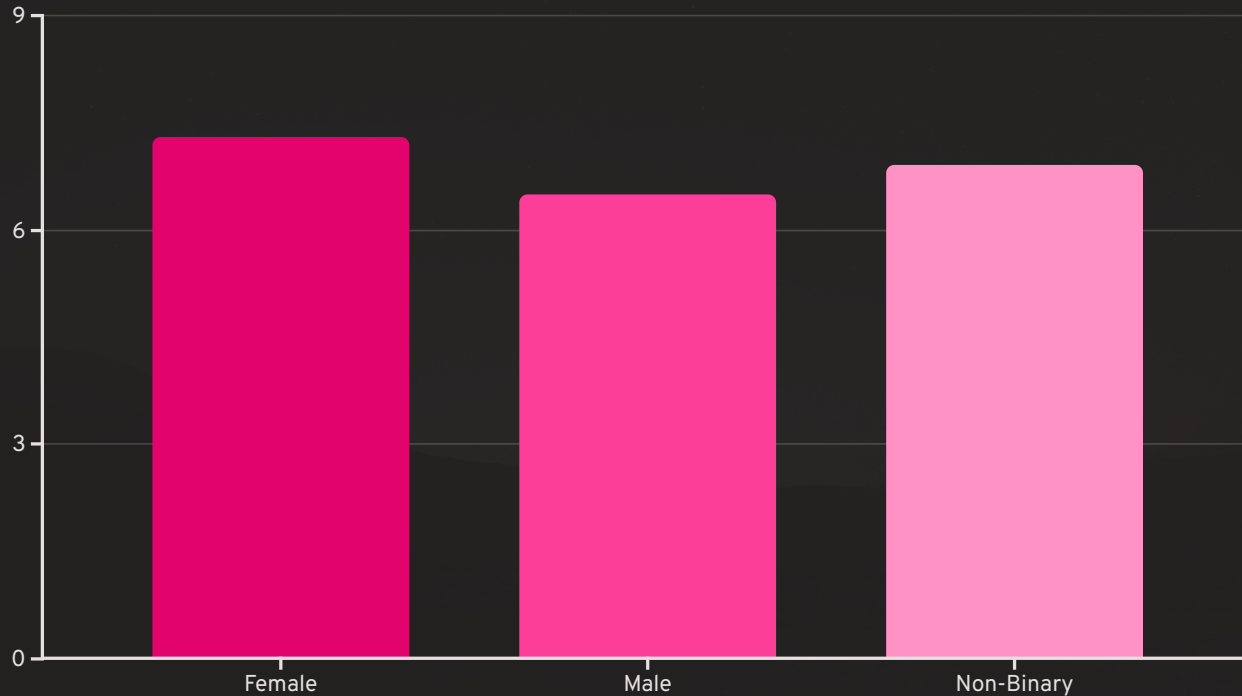
Sleep Hours vs. Stress Levels



GPA vs. Stress Level Correlation

Our Python-based visualizations revealed clear patterns that weren't immediately obvious from the raw data. The inverse relationship between sleep and stress was particularly striking, as was the negative correlation between GPA and stress levels.

Gender and Course Load Analysis



Our analysis revealed notable gender differences in reported stress levels, with female students experiencing higher average stress. Course load showed an even stronger correlation, with each additional course significantly increasing stress levels.

Key Stress Factors Identified

Heavy Course Load

Students taking 5+ courses simultaneously reported stress levels 40% higher than those with 3-4 courses. Schedule compression and assignment overlap were cited as major concerns.

1

2

Sleep Deprivation

Students averaging less than 5 hours of sleep showed critically high stress levels (8.2/10). The relationship was strongly linear, with each additional hour of sleep correlating to a 0.7-point decrease in stress.

3

Reduced Social Activity

Students with fewer than 3 hours of social activity per week reported stress levels 25% higher than peers. Social isolation appears to compound academic pressure.

4

Working While Studying

Students with jobs reported stress levels 1.5 points higher on average. Those working 20+ hours weekly showed the highest stress scores in the entire dataset.

Our analysis identified four primary stress factors with strong statistical significance. These factors provide clear targets for institutional intervention programs.



Evidence-Based Recommendations



Academic Workload Management

Implement course scheduling algorithms to prevent assignment clustering. Provide time management workshops targeted at high-risk student groups. Develop early warning systems to identify students with excessive course loads.



Sleep Education Initiative

Launch a campus-wide sleep hygiene campaign highlighting the direct connection between sleep and academic performance. Create quiet study/nap spaces in libraries and residence halls. Offer sleep tracking as part of wellness programs.



Targeted Support Services

Establish specialized counseling for working students. Create peer mentorship programs pairing high-GPA students with those struggling academically. Develop data-driven early intervention protocols for students showing stress indicators.

Next Steps: Implementation & Measurement

01

Share Findings with Stakeholders

Present analysis to academic leadership, student support services, and student government to build consensus around intervention priorities.

02

Develop Pilot Programs

Select 2-3 high-impact recommendations for initial implementation. Create detailed implementation plans with clear ownership and timelines.

03


Establish Measurement Framework

Design ongoing data collection methodology to track stress indicators and intervention effectiveness. Develop dashboard for real-time monitoring.

04

Scale Successful Interventions

Analyze pilot results after one semester. Refine approaches based on data. Expand successful programs campus-wide with continued measurement.

 This analysis demonstrates the power of data-driven approaches to student wellbeing. By continuing to collect and analyze stress indicators, we can create increasingly targeted and effective interventions.