Comprehensive Analytical Report: The Interplay of Student Habits and Academic Performance

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Data Source: Kaggle – Student Habits and Performance Dataset

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1. Executive Summary

This report presents an in-depth analysis of the relationship between student lifestyle habits and academic performance. Using a dataset of 1,000 students, we examined how factors such as study habits, digital consumption, sleep, attendance, mental health, and socio-economic background influence exam scores. Key findings reveal that **consistent study hours, high attendance, adequate sleep, and limited screen time** are the strongest predictors of academic success. Students who maintain balanced routines perform significantly better than those with irregular or excessive habits. The report also identifies at-risk student groups and provides actionable recommendations for educators and students.

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2. Introduction and Background

Academic success is influenced by a combination of intellectual, behavioral, and environmental factors. In the digital age, students face increasing distractions from social media, streaming platforms, and part-time jobs, which can negatively impact their academic performance. This study leverages data analytics to move beyond anecdotal evidence and provide data-driven insights into how students can optimize their daily routines for better academic outcomes.

Data Source:
The dataset used in this analysis is publicly available on Kaggle under the title "Student Habits and Performance Dataset." It contains 1,000 records with 16 variables, including study hours, attendance, sleep duration, screen time, mental health rating, and exam scores.

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3. Problem Statement

Many students struggle to achieve their academic potential despite putting in considerable effort. Common issues include:

Inconsistency between study hours and exam results
Excessive screen time reducing focus and retention
Poor attendance and sleep habits undermining academic performance
Lack of awareness about the impact of lifestyle choices on learning

This report aims to identify the key factors that contribute to academic success and provide evidence-based recommendations for improvement.

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4. Research Objectives

i. To analyze the correlation between study hours, attendance, and exam scores.
ii. To evaluate the impact of screen time (social media and Netflix) on academic performance.
iii. To assess the influence of mental health, extracurricular activities, and part-time work on student outcomes.
iv. To identify at-risk student groups based on habit patterns.
v. To provide actionable insights for students, educators, and institutions.

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5. Methodology

We used **Python** for data analysis, with libraries including **Pandas**, **NumPy**, **Matplotlib**, and **Seaborn**. The analytical process included

- Data cleaning and preprocessing
- Descriptive and inferential statistics
- Correlation analysis
- Data visualization (scatter plots, heatmaps, bar charts, pie charts)
- Risk group segmentation using clustering techniques

All visualizations were created to support the findings and enhance interpretability.

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6. Key Findings

6.1 Study Hours and Attendance Are Critical

The analysis confirms that **study hours** and **attendance** are the strongest predictors of exam scores. Students who study **5+ hours daily** and maintain **attendance above 90%** consistently achieve scores above 85%.

Chart Reference: study_hours_vs_exam_score.png shows a positive correlation between study hours and exam scores.
Chart Reference: attendance_vs_exam_score.png illustrates how higher attendance correlates with higher exam performance.

6.2 Screen Time Negatively Impacts Performance

Excessive screen time (social media + Netflix) is linked to lower exam scores. Students with **more than 4 hours of daily screen time** scored on average **15% lower** than those with less than 2 hours

Chart Reference: social_media_hours_vs_exam_score.png shows a declining trend in scores as social media hours increase.
Chart Reference: screen_time_distribution.png displays the distribution of screen time among students.

6.3 Sleep and Mental Health Matter

Students who slept **6–8 hours per night** and reported **higher mental health ratings (7–10)** performed significantly better. Mental well-being is also positively influenced by participation in extracurricular activities.

Chart Reference: mental_health_vs_exam_score.png demonstrates the positive relationship between mental health and exam scores.
Chart Reference: extracurricular_vs_mental_health.png shows that students involved in extracurriculars report better mental health.

6.4 Socio-Economic and Environmental Factors

Internet quality affects performance: students with "Good" internet scored higher than those with "Poor" internet (internet_quality_vs_exam_score.png).
Parental education level is correlated with student success, with higher parental education linked to better outcomes.
Part-time work slightly lowers average scores (part_time_job_vs_exam_score.png), likely due to reduced study time.

6.5 Risk Group Analysis

Using clustering, students were segmented into **At Risk** and **Not At Risk** groups.
Approximately **29.3%** of students were classified as "Not At Risk," while **70.7%** were "At Risk" based on habit patterns.

Chart Reference: risk_group_distribution.png shows the proportion of students in each risk category.
Chart Reference: exam_score_distribution_by_risk_group.png illustrates score distribution across risk groups.

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7. Visual Insights Summary

- **Daily Time Allocation:** On average, students spend **45.1%** of their day sleeping, **30.2%** on screens, and only **24.7%** studying (daily_time_allocation.png).
- **Attendance and Study Interaction:** A heatmap (attendance_study_vs_exam_score.png) shows that high attendance combined with moderate-to-high study hours yields the best exam results.
- **Risk vs. Performance:** At-risk students consistently score below 70%, while not-at-risk students score above 80% (academic_risk_vs_exam_score.png).

8. Recommendations

For Students:

i. Aim for **4–6 hours of daily study** with consistent scheduling.
ii. Maintain **attendance above 90%**.
iii. Limit **total screen time to under 3 hours per day**.
iv. Prioritize **6–8 hours of sleep** nightly.
v. Engage in **extracurricular activities** to support mental health.

For Educators:

i. Use **attendance and screen time data** to identify at-risk students early.
ii. Promote **digital wellness workshops**.
iii. Encourage **balanced schedules** that include study, rest, and recreation.
iv. Provide **resources for students with poor internet access**.

For Institutions:

i. Implement **predictive analytics models** to flag at-risk students.
ii. Develop **support programs** focusing on mental health and time management.
iii. Foster **parental involvement** through awareness sessions.

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9. Conclusion

Academic performance is a holistic outcome influenced by study habits, lifestyle choices, and environmental factors. This report provides clear evidence that **balanced routines lead to better results**. By adopting data-informed strategies, students can improve their performance, and educators can better support their academic journeys.

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10. Future Research Directions

i. Integrate **real-time tracking** of student habits via mobile apps or wearables.
ii. Apply **machine learning models** for early prediction of academic risk.
iii. Expand the dataset to include **cross-cultural and longitudinal studies**.
iv. Investigate the **impact of COVID-19** on digital habits and academic performance.

References:

Kaggle Dataset: Student Habits and Performance Dataset
Pandas Documentation – https://pandas.pydata.org/
Seaborn Visualization Gallery – https://seaborn.pydata.org/