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Analyzing Key Factors Influencing Student Performance.

Introduction: Student academic performance is influenced by various factors, including study habits, sleep patterns, parental involvement, etc. Understanding these relationships can help parents to help their children, educators and policymakers develop better learning programs, and raise awareness about problems that may influence the student performance. This study aims to explore which factors contribute the most to student success and how different variables interact to shape exam outcomes. The findings could provide valuable insights for improving educational approaches and resource allocation.

Related Works:

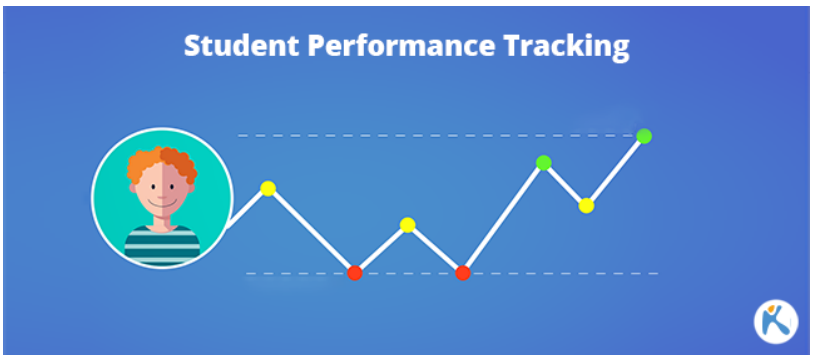
1) **Unraveling the factors shaping academic success**

Cao, W., Gnana Sanga Mithra, S., & B R, A. (2024). Unraveling the factors shaping academic success: A structural equation modeling approach for college students. *Heliyon*, *10*(4), e25775. https://doi.org/10.1016/j.heliyon.2024.e25775

2) **Key factors influencing students' academic performance**

Suleiman, I.B., Okunade, O.A., Dada, E.G. *et al.* Key factors influencing students' academic performance. *Journal of Electrical Systems and Inf Technol* 11, 41 (2024). https://doi.org/10.1186/s43067-024-00166-w

Relevant Images:



Data Description: The dataset contains multiple factors that influence student performance. It consists of 20 variables, such as: study hours, attendance, parental involvement, access to resources, extracurricular activities, sleep hours, previous exam scores, motivation levels, internet access, tutoring sessions, family income, teacher quality, school type, peer influence, physical activity, learning disabilities, parental education level, distance from home, gender, and final exam score. The dataset contains approximately 6,607 records and is sourced from Kaggle and available in CSV format.

Plan for Analysis:

1. **Data Processing:**
    - Handling missing values
    - Normalizing features
2. **Analysis Tasks:**
    - Correlation analysis to determine the strongest predictors of exam scores
    - Clustering students based on their study habits and performance trends
    - Statistical testing to compare performance differences across groups, like school type, gender, income levels.
3. **Visualizations:**
    - **Correlation Heatmap:** Displays relationships between all variables to identify the strongest predictors of student performance.
    - **Box Plot:** Compares exam scores based on different levels of parental involvement and family income.

    - **Scatter Plot:** Examines the relationship between study hours and final exam scores.
    - **Interactive Dashboard:** Allows users to explore different factors affecting performance through dynamic filtering.
4. **Webpage**
    - Creating a webpage following all the requirements

Group Member Responsibilities:

- **Data Cleaning & Preprocessing:** Adil, Druv
- **Exploratory Data Analysis & Visualizations:** Fedor, Druv, Adil
- **Statistical Analysis & Interpretation:** Fedor, Druv, Adil
- **Report Writing & Presentation Preparation:** Adil, Fedor, Druv
- **Webpage creation:** Adil, Druv, Fedor