<u>Final Idea</u>
This research seeks to determine the multidimensional effect that alcohol consumption has on students in secondary schools, affecting them from performance in class to the many other activities they engage in, and their preparedness for life after school.This paper tries to dismantle the complex interactions between the lifestyles of students and the outcomes in education and beyond using a carefully elaborated dataset related to two Portuguese school institutions. The dataset measures characteristics including grades, demographic information, data on social and school-related features, and very specific data related to alcohol consumption. student lifestyles and their outcomes in education and beyond.

<u>Motivations</u>
The motivation for this research stems from the recognition of the rampant nature of alcohol consumption as a part of student life, impacting to a varied extent individual and collective student experiences. Far from turning a blind eye to this reality, on the contrary, the paper seeks to fully understand the effects. This understanding is very critical for various reasons:
- Educational Insights: Educators and administrators can get the insights into the correlation of alcohol with regard to academics for putting up more focused interferences and support systems for aid of students, who may be at risk, due to lifestyle choices.
- Holistic Development: Awareness of how drinking is associated with participation in extracurricular activities can help to understand the total development and well-being of students. Activities out of class are significant for the development of skills and social interaction and mental health, and therefore, it is important to find barriers to involvement.
- Preparations for Future Success: The period after school but prior to the next stages of life—higher education, vocational training, or just going into work—is so crucial. It shows in what way alcohol drinking may be able to influence how prepared students are for these transitions—a valuable information on practice within guidance and counseling.
- Policy and prevention: Research results would be useful in guiding the policy of the school and also the strategies of preventative education, hence reducing the repercussions associated with alcohol consumption and promoting a safe and healthy lifestyle among students.
- Break Taboos: This research assists in breaking the taboo and in dealing openly and scientifically with the issue of alcohol consumption and promotes open debate about the lifestyle of a student, fosters open communication between students, educators, and parents.

<u>Questions/Analysis and Models</u>
Independent Variables (Explanatory Variables):
● **Alcohol Consumption**: Dalc (workday alcohol consumption) and Walc (weekend alcohol consumption) are direct measures of alcohol intake.
● **Stress-Related Factors**: Could be inferred from variables such as health (current health status), absences (number of school absences), and potentially failures (number of past class failures).
● **Demographic and Socioeconomic Factors**:

- age: Age of the student.
- sex: Gender of the student.
- famsize: Family size.
- Pstatus: Parent's cohabitation status.
- Medu and Fedu: Mother's and father's education level.
- Mjob and Fjob: Mother's and father's job.
- guardian: Student's guardian.
- **School-Related Features**:
  - studytime: Weekly study time.
  - schoolsup: Extra educational support.
  - famsup: Family educational support.
  - paid: Extra paid classes within the course subject.
  - activities: Extracurricular activities.
  - nursery: Attended nursery school.
  - higher: Wants to take higher education.
  - internet: Internet access at home.
  - romantic: In a romantic relationship.
  - famrel: Quality of family relationships.
  - freetime: Free time after school.
  - goout: Going out with friends.

Dependent Variables (Outcome Variables):
- **Academic Performance**: Final grades (G3) in Mathematics and Portuguese subjects are the primary outcome of interest.
- **Engagement in Extracurricular Activities**: While not directly measurable with a single variable from the dataset, activities could serve as a proxy, or a composite measure may need to be created based on available data.

Questions and Associated Models

How does alcohol consumption (during weekdays and weekends) directly affect students' final grades in Mathematics and Portuguese?
- Linear Regression to quantify the relationship, controlling for demographic and socioeconomic factors.

Can we predict the final grades (G3) of students in Mathematics and Portuguese based on their alcohol consumption, while accounting for stress-related factors and school-related features?
- Random Forest to predict grades and assess the importance of alcohol consumption relative to other factors like study time, health status, and absences.

Is there a correlation between students' engagement in extracurricular activities and their alcohol consumption patterns, considering demographic and family background variables?
- Logistic Regression to predict the likelihood of participating in extracurricular activities based on alcohol consumption and demographic variables.

What are the key predictors of a student's decision to pursue higher education, and how significant is the impact of alcohol consumption compared to academic performance and family support?

- Gradient Boosting to predict the intention for higher education (higher) and evaluate the feature importance of alcohol consumption.

How do lifestyle and personal choices (such as internet use, going out with friends, and being in a romantic relationship) interact with alcohol consumption in influencing academic performance?

- Decision Tree Classifier to explore the interactions and identify patterns that significantly affect grades.

Can we classify students into different risk groups based on their alcohol consumption levels and predict their final grades, taking into account the comprehensive profile including stress factors, family environment, and school engagement?

- SVM (Support Vector Machine) for classification based on a holistic set of variables to identify students at risk of lower academic achievement.

What is the relative importance of weekday vs. weekend alcohol consumption in predicting students' health status, and how does this relate to their academic performance?

- Random Forest Regression to assess the impact of Dalc and Walc on health and indirectly on G3, with feature importance analysis to understand the weight of each variable.