

Activity 3: Cluster Interpretation Document

1. Introduction

This document provides a detailed interpretation of student segments identified through machine learning clustering and rule-based logic. The segmentation is based on a composite **Student Risk Index (SRI)**, which integrates academic performance, wellbeing, productivity, and career readiness.

2. Segmentation Framework

The student population was analyzed using four key pillars:

- **Academic Performance Score (APS):** Based on GPA, attendance, and assignment completion.
- **Wellbeing & Wellness Score (WWS):** Derived from stress levels, sleep hours, and mental wellbeing.
- **Productivity & Time Management Score (PTMS):** Calculated from productivity scores, distraction levels, and assignment completion.
- **Career Readiness Score (CRS):** Based on career clarity, skill readiness, and engagement.

3. Cluster Profiles & Insights

Cluster A: At-Risk Students (Red Category)

- **SRI Range:** < 50.
- **Characteristics:** This group shows critically low scores across all pillars. They often have high stress levels and poor sleep (low WWS), which correlates with their low academic output (low APS).
- **Key Example:** Student **S109** has an SRI of **35.805**, indicating an urgent need for intervention.
- **Population:** Approximately **11.8%** of the student body.

Cluster B: Struggling Students (Yellow Category)

- **SRI Range:** 50 – 65.
- **Characteristics:** These students are "on the fence." While they may have moderate academic scores, their wellbeing or productivity scores are often declining. They are at risk of falling into the "Red" category without support.
- **Key Example:** Student **S046** with an SRI of **59.110**.
- **Population:** This is the largest segment, comprising **58.18%** of students.

Cluster C: Stable Performers (Blue Category)

- **SRI Range:** 65 – 80.

- **Characteristics:** Generally high-performing and well-balanced students. However, individuals in this group with low **Career Readiness Scores (CRS)** are identified as "**Career-Confused**," requiring professional guidance despite their academic success.
- **Key Example:** Student **S094** with an SRI of **68.535**.
- **Population:** Approximately **20.9%** of students.

Cluster D: High Performers (Green Category)

- **SRI Range:** ≥ 80 .
- **Characteristics:** Exceptional students who maintain high scores in academics, wellness, and career preparation. They exhibit low stress and high engagement.
- **Key Example:** Student **S084** with a high SRI of **84.875**.
- **Population:** Approximately **9.1%** of students.

4. Conclusion

The clustering analysis reveals that while the majority of students are in a moderate "Yellow" zone, a significant portion (approx. 12%) requires immediate clinical or academic intervention. The "Blue" category contains hidden "Career-Confused" students who may be academically strong but lack professional direction.

Name : Apeksha Kashyap

AI/ML Internship Jan/Feb