

1. Introduction and Motivation

The purpose of this study is to investigate which mentor and mentoring factors have a meaningful impact on student retention at the Coachify coaching platform.

The main goal is to identify potential improvements in mentor practices to enhance student engagement and retention rates, which ultimately would improve the platform's profitability and effectiveness.

2. Data Collection and Preprocessing

The data were collected from two sources:

- The Coachify student database, which included student enrollment information (mentor assignment, membership start month, dropout month).
- A survey administered to **30 mentors**, gathering data about their weekly call frequency, average call duration, messaging habits, and primary communication format (video or voice).

Data Cleaning Steps:

- Students who initially purchased long-term packages were excluded to avoid bias towards artificially high retention.
- Mentors with **fewer than 3 students** were excluded to reduce statistical noise.
- Mentor and student names were anonymized.
- Weekly survey responses were multiplied by 4 to approximate **monthly** activity levels.

The cleaned dataset included **22 mentors** and approximately **116 students**.

3. Retention Metric Definition

Retention was defined as **the transition from the 1st month to the 2nd month**.

- **Pass Rate** = (Number of students continuing to 2nd month) / (Total number of students)

This metric was used because:

- It captures early-stage student engagement, which is critical in subscription-based models.
- It provides a clear, binary outcome (continued/dropped) ideal for statistical comparison.

4. Research Questions

The analysis aimed to answer the following research questions:

No.	Research Question
RQ1	Does the mentor's YKS ranking affect student retention?
RQ2	Does the primary communication format (video or voice) impact student retention?
RQ3	Is there a relationship between the average call duration and student retention?
RQ4	Does the frequency of weekly calls affect retention?
RQ5	Does the frequency of sending progress monitoring messages affect retention?
RQ6	Does the number of weekly communication days correlate with student retention?

5. Methodology

Two levels of analysis were conducted:

- **Mentor-Based Analysis:**
Each mentor was treated as one data point (n=22).
Pass Rate was compared against mentor attributes.
- **Student-Based Analysis:**
Each student was treated as one data point (n≈116).
Student pass/fail outcomes were compared against their assigned mentor's characteristics.

Statistical methods used:

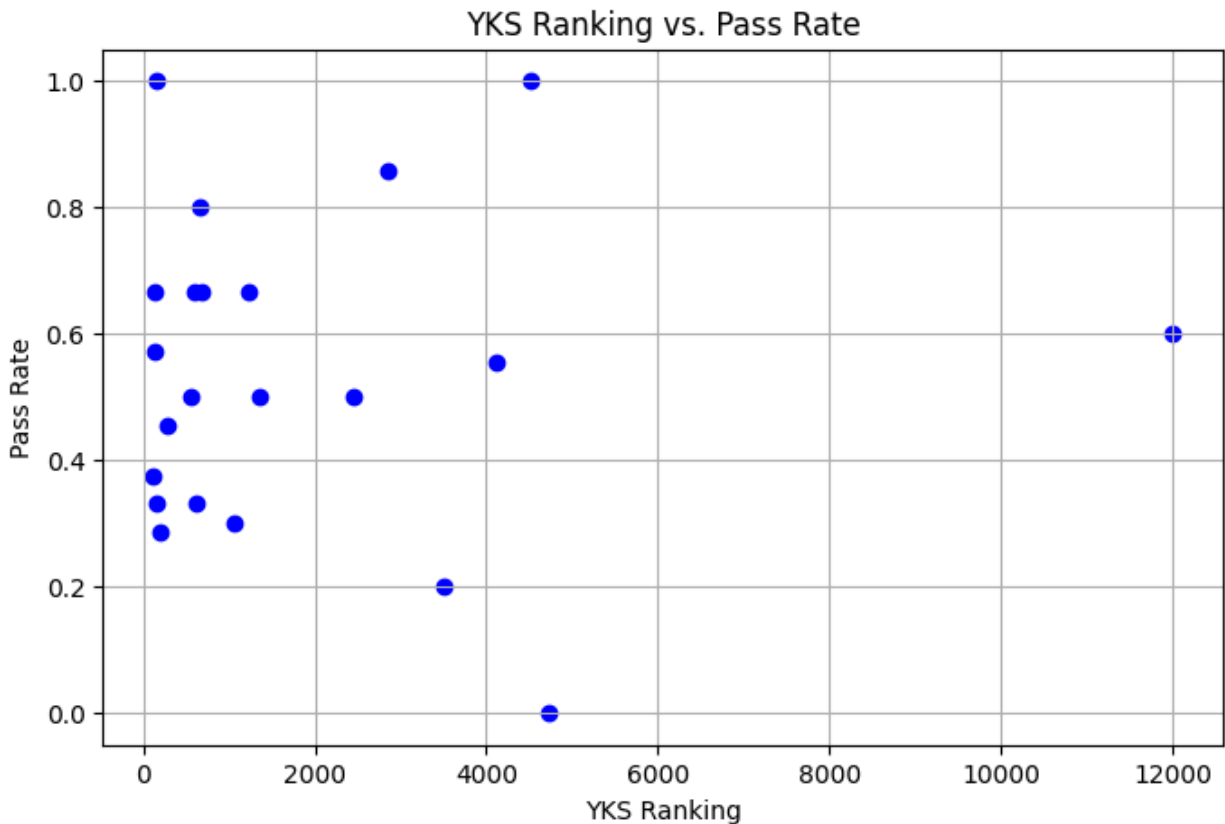
- Pearson Correlation (for continuous variables)
- Independent Samples t-test (for categorical variables)
- Bar plots, boxplots, and stacked bar plots for visualization

All methods were consistent with the techniques covered during coursework.

6. Findings

6.1 Mentor-Based Findings

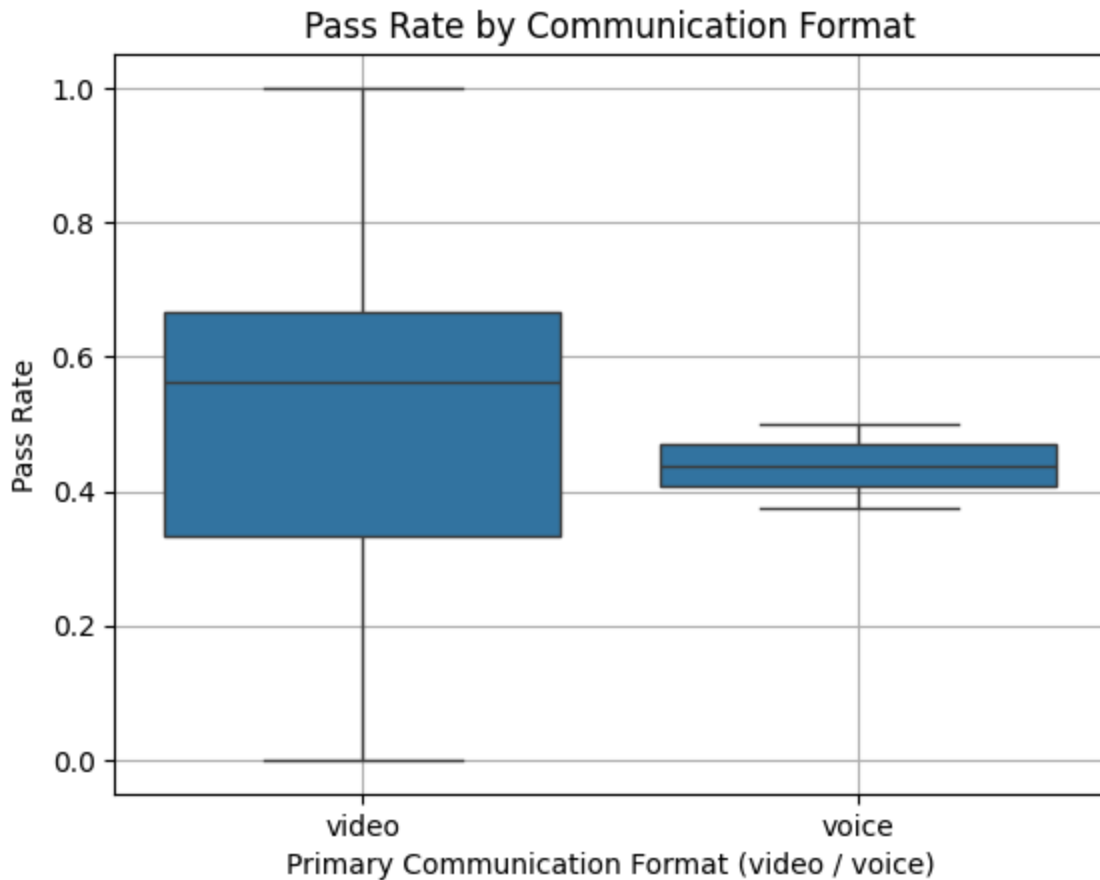
6.1.1 Effect of Mentor YKS Ranking on Student Retention



(Graph 1: Scatter Plot - YKS Ranking vs Pass Rate)

No significant relationship was found between mentors' YKS ranking and the student pass rate. The Pearson correlation was $r = 0.000$ with a **p-value = 0.999**, indicating no linear relationship. Thus, a mentor's national exam ranking does not seem to influence students' short-term retention.

6.1.2 Impact of Communication Format (Video/Voice) on Retention

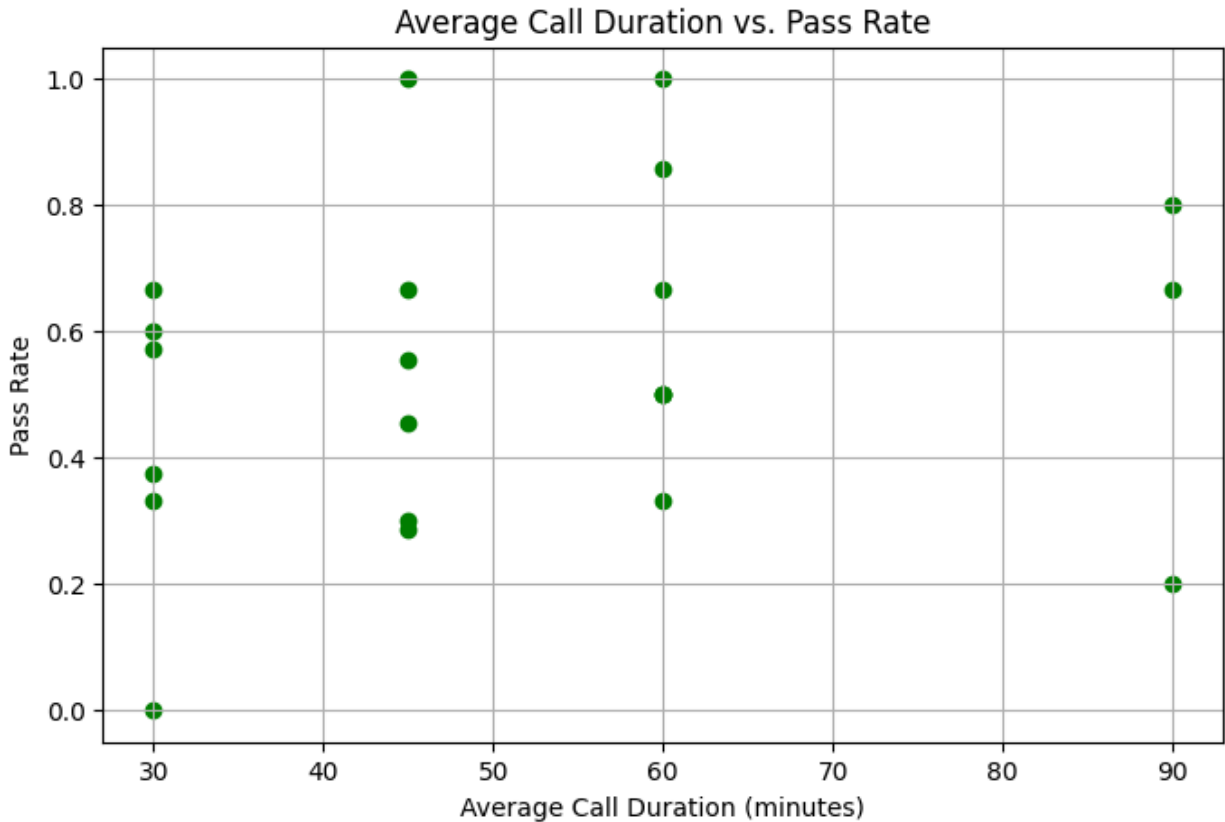


(Graph 2: Boxplot - Communication Format vs Pass Rate)

The comparison between mentors who primarily used video calls and those who used voice calls showed no statistically significant difference in pass rates.

The t-test results were $t = 1.293$ and $p\text{-value} = 0.278$, suggesting that the communication method does not have a meaningful impact on student retention.

6.1.3 Relation Between Average Call Duration and Retention

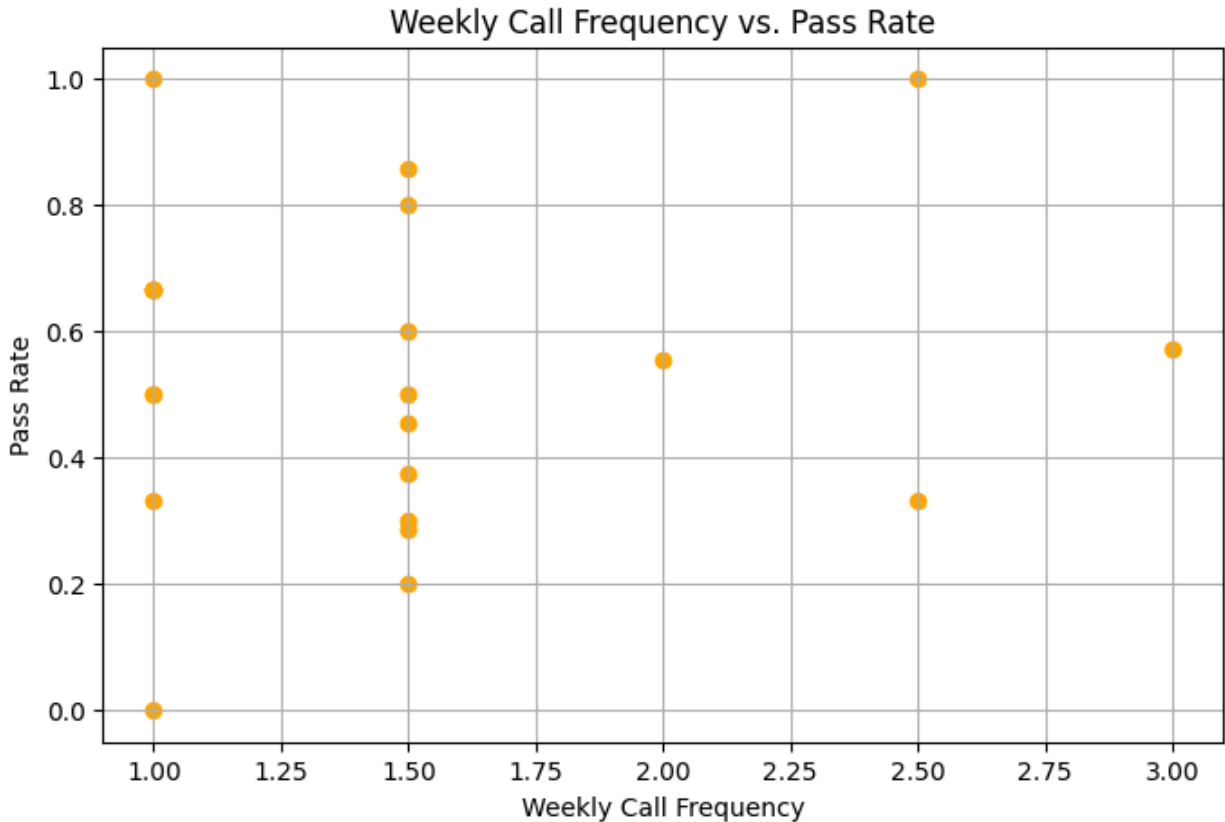


(Graph 3: Scatter Plot - Average Call Duration vs Pass Rate)

No significant correlation was found between the average call duration and the student pass rate.

The Pearson correlation coefficient was $r = 0.210$ with a **p-value = 0.3487**, indicating a weak and non-significant relationship.

6.1.4 Effect of Weekly Call Frequency on Retention



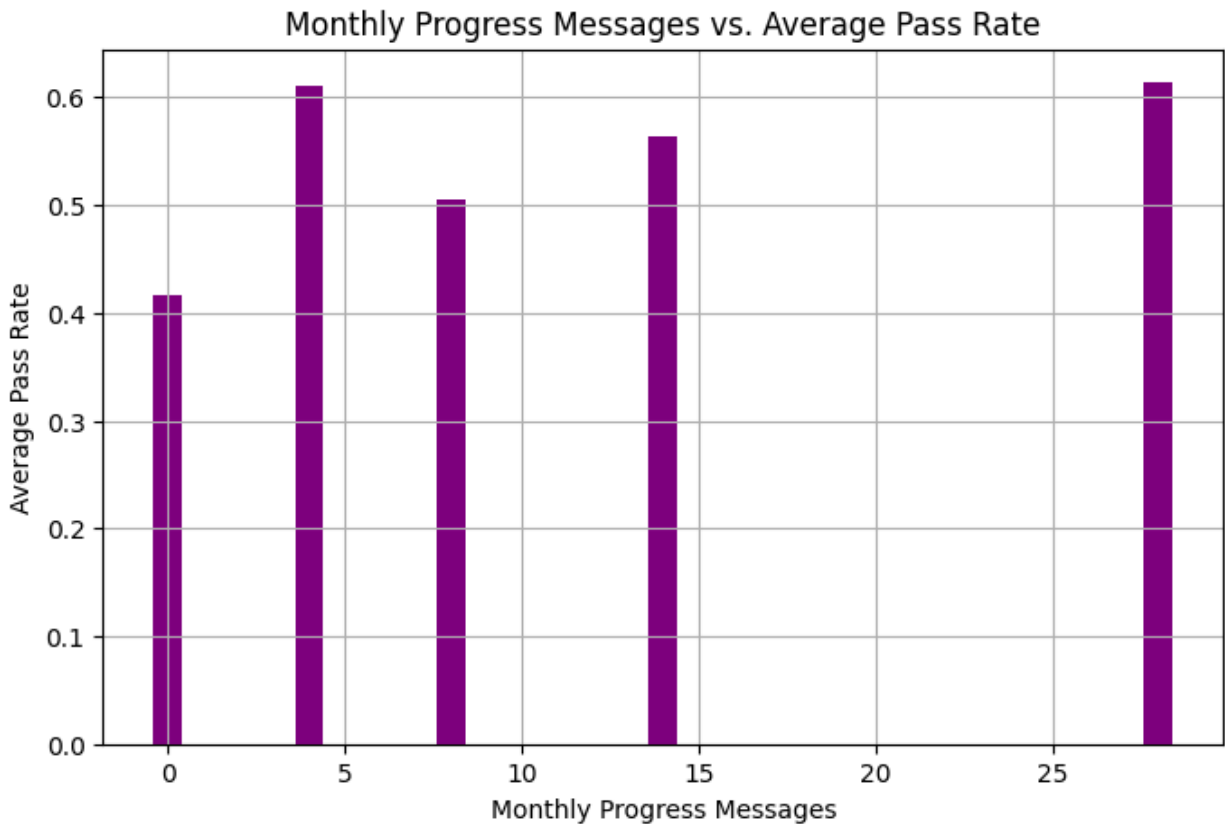
(Graph 4: Scatter Plot - Weekly Call Frequency vs Pass Rate)

Weekly call frequency showed no significant correlation with pass rates.

The Pearson correlation was $r = 0.080$ and the **p-value = 0.7244**.

This result suggests that calling students more often does not necessarily increase the likelihood of their retention.

6.1.5 Effect of Monthly Progress Messages on Retention

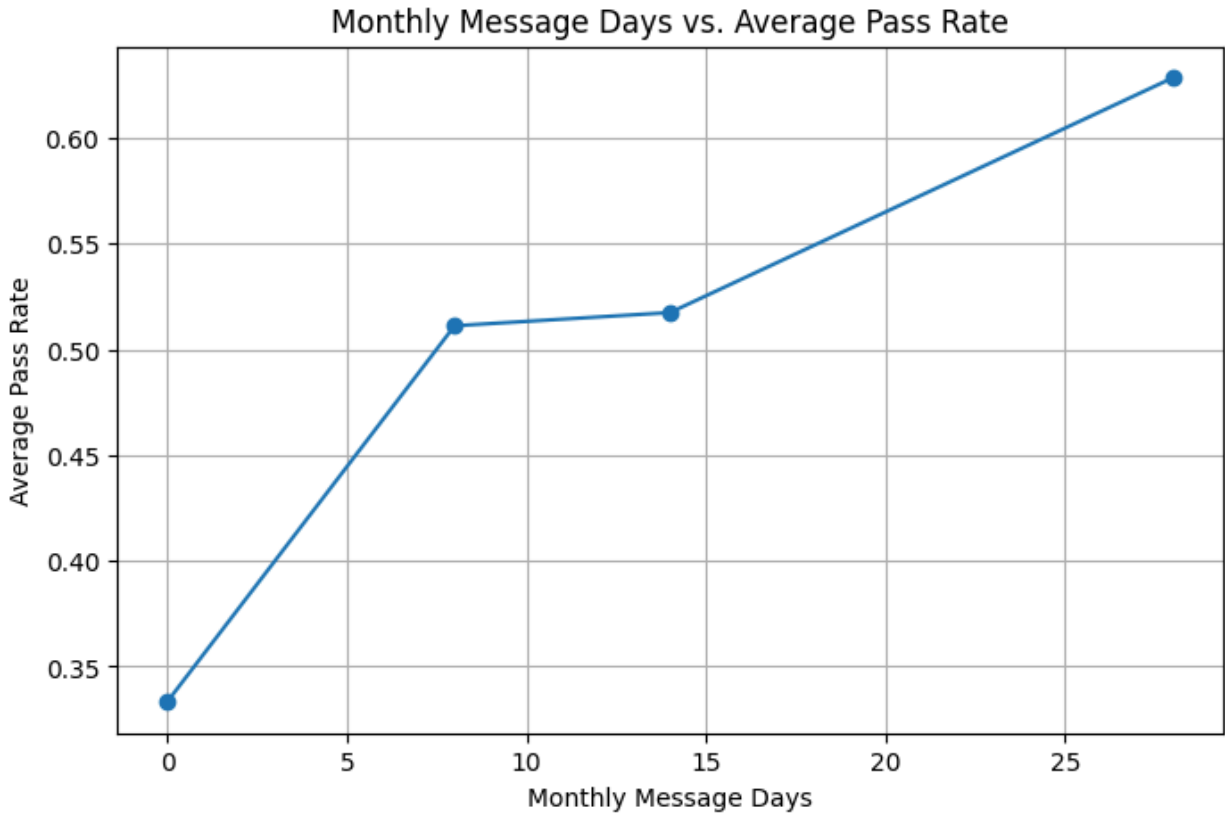


(Graph 5: Scatter Plot - Monthly Progress Messages vs Pass Rate)

There was no statistically significant relationship between the number of monthly progress messages sent and the student pass rate.

The Pearson correlation was $r = 0.163$ with a $p\text{-value} = 0.468$.

6.1.6 Impact of Monthly Message Days on Retention

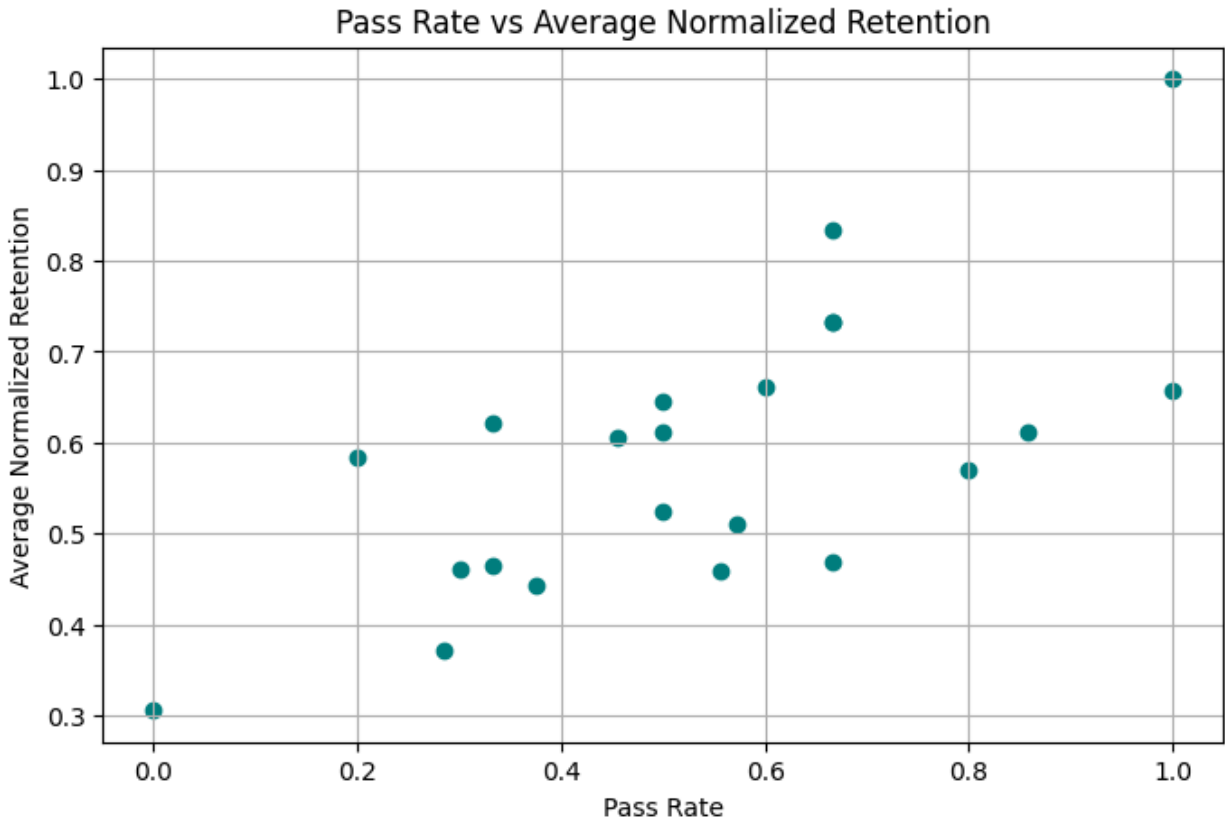


(Graph 6: Scatter Plot - Monthly Message Days vs Pass Rate)

Similarly, no significant relationship was found between the number of days mentors communicated with students via messaging and the student pass rate.

The Pearson correlation was $r = 0.256$ with a $p\text{-value} = 0.251$.

6.1.7 Relationship Between Pass Rate and Average Normalized Retention



(Graph 7: Scatter Plot - Pass Rate vs Average Normalized Retention)

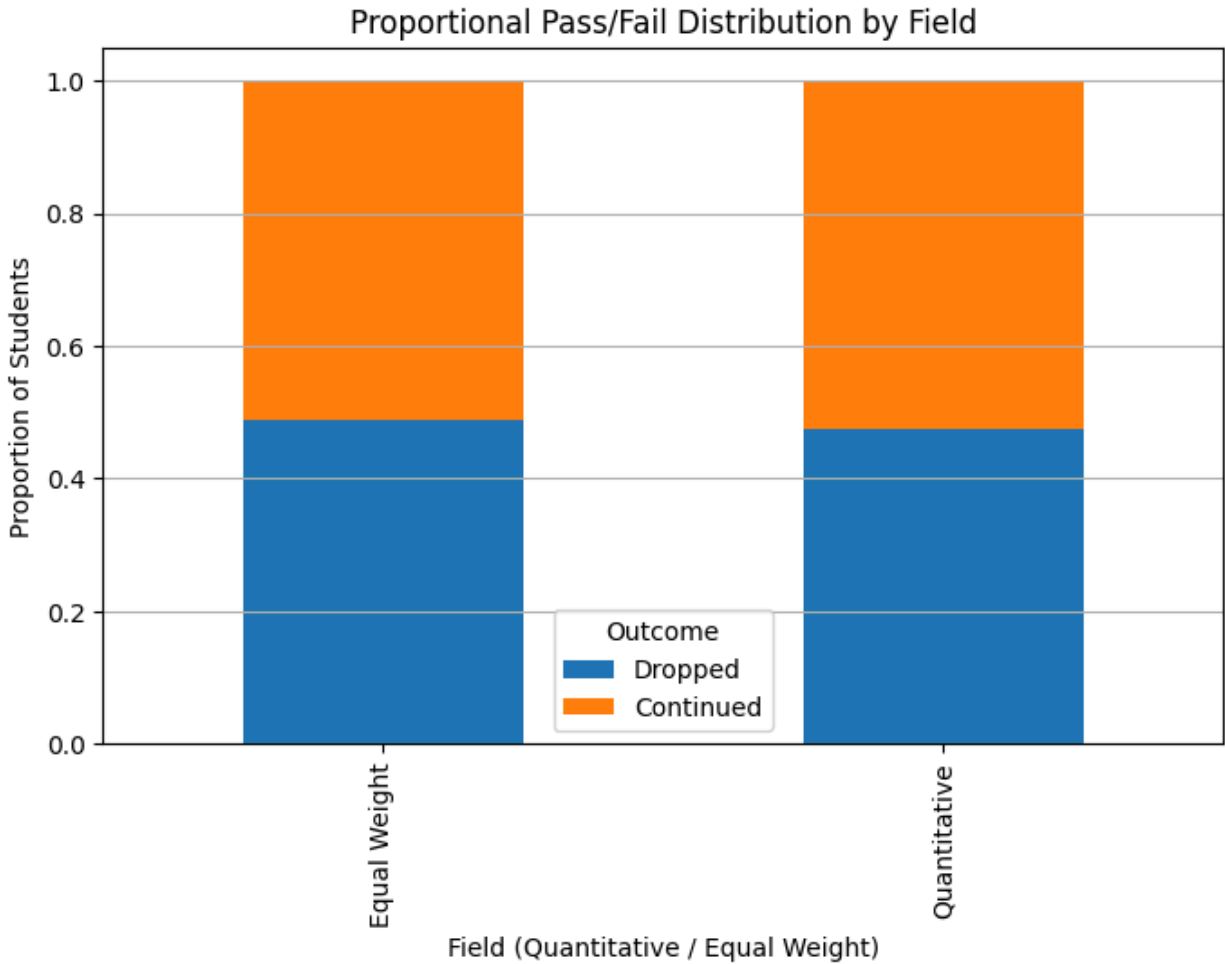
A **strong positive correlation** was found between the Pass Rate and the Average Normalized Retention.

The Pearson correlation was $r = 0.681$ with a **p-value = 0.0005**, indicating a statistically significant and meaningful relationship.

This result validates the reliability of Pass Rate as a measure of student retention performance.

6.2 Student-Based Findings

6.2.1 Mentor Field (Quantitative vs Equal Weight) vs Student Retention

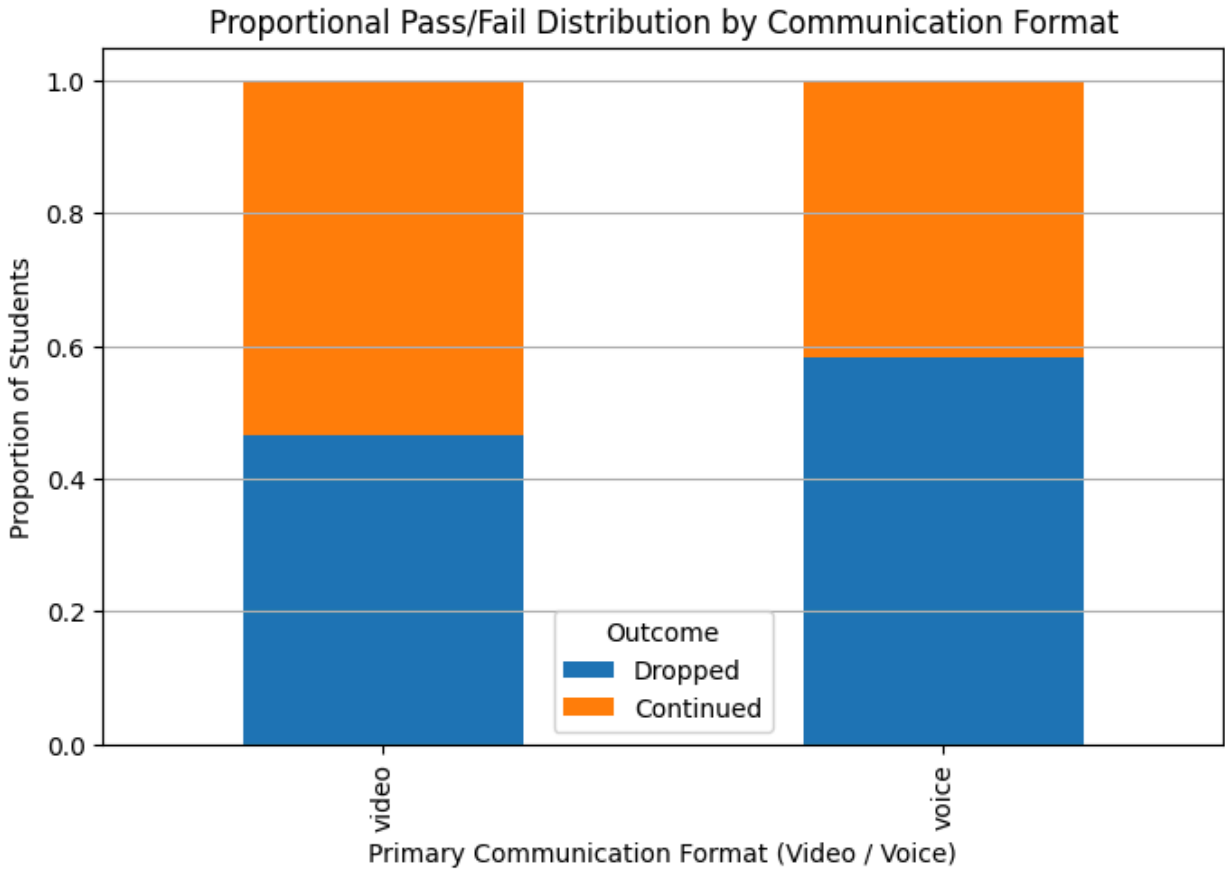


(Graph 8: Proportional Stacked Bar Plot - Field vs Pass Rate)

No significant difference was found in pass rates between students assigned to mentors from the Quantitative or Equal Weight fields.

Visual inspection of the proportional bar plot confirmed the similarity between groups, and statistical tests supported the lack of a meaningful difference.

6.2.2 Communication Format (Video vs Voice) vs Student Retention

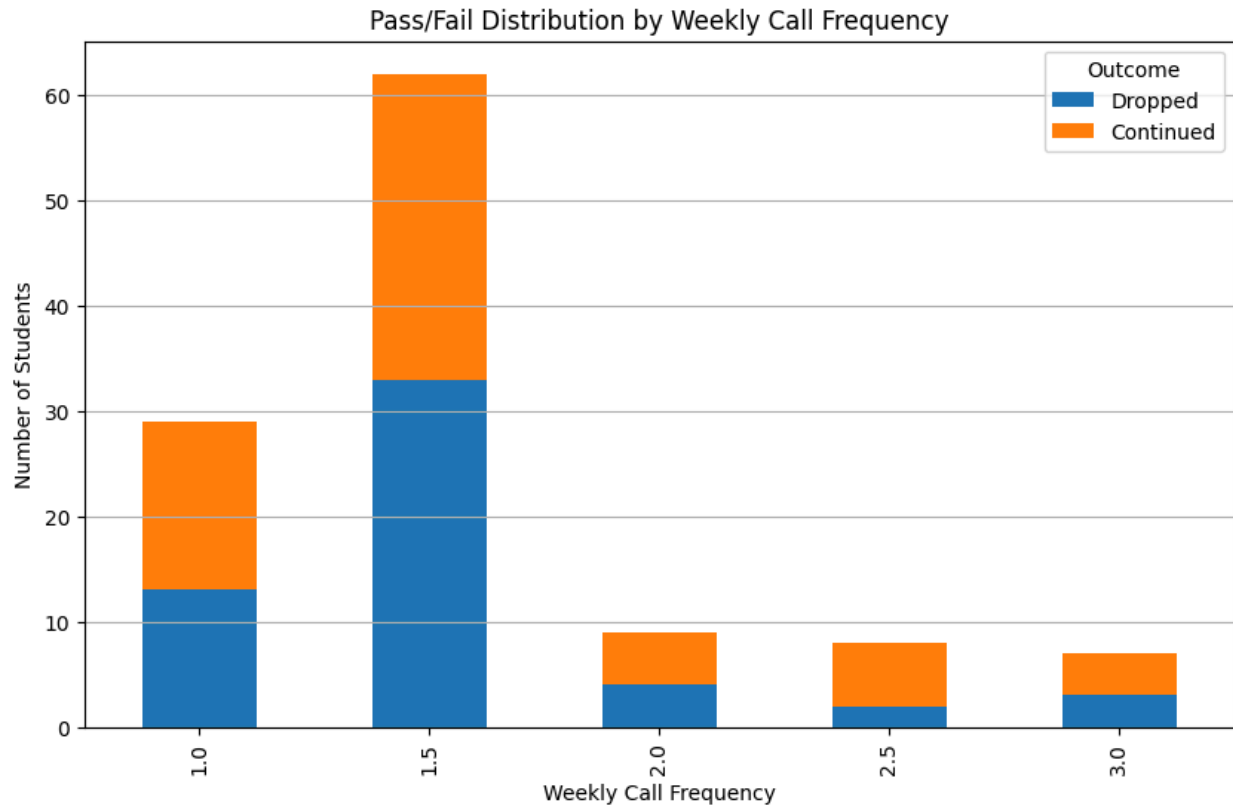


(Graph 9: Proportional Stacked Bar Plot - Communication Format vs Pass Rate)

There was no meaningful difference in student pass rates based on whether the mentor used primarily video or voice communication.

The proportional distribution between pass and fail students remained similar across both groups.

6.2.3 Weekly Call Frequency vs Student Retention

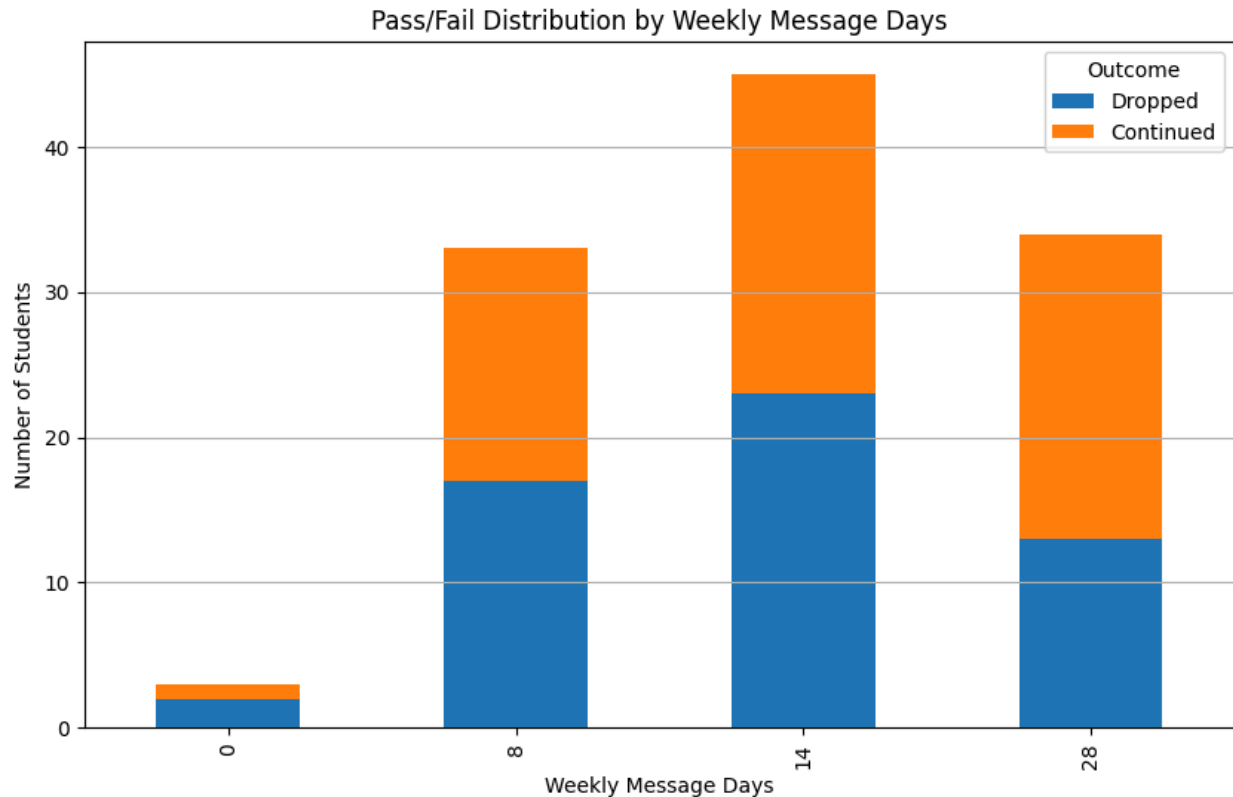


(Graph 10: Stacked Bar Plot - Weekly Call Frequency vs Pass/Fail Counts)

When analyzing the number of weekly calls, no clear trend was observed where higher call frequency led to higher student retention.

Both low and moderate call frequencies had a mixture of passing and failing students, and no strong pattern was visible.

6.2.4 Weekly Message Days vs Student Retention



(Graph 11: Stacked Bar Plot - Weekly Message Days vs Pass/Fail Counts)

Similarly, the number of days mentors and students exchanged messages did not show a strong pattern with retention.

While students with more frequent communication tended to have slightly higher pass rates, the relationship was not strong or statistically significant.

7. General Conclusion

No statistically significant direct relationship was found between mentor practices or background and student retention after one month.

This suggests that **early student engagement may be influenced more by internal student factors** (such as motivation) rather than mentor characteristics.

However, the strong correlation between Pass Rate and Average Normalized Retention validates the reliability of the Pass Rate as a primary metric for measuring retention performance.

Future studies could explore student-based factors more deeply or use a larger sample size to increase the statistical power of the analysis.

