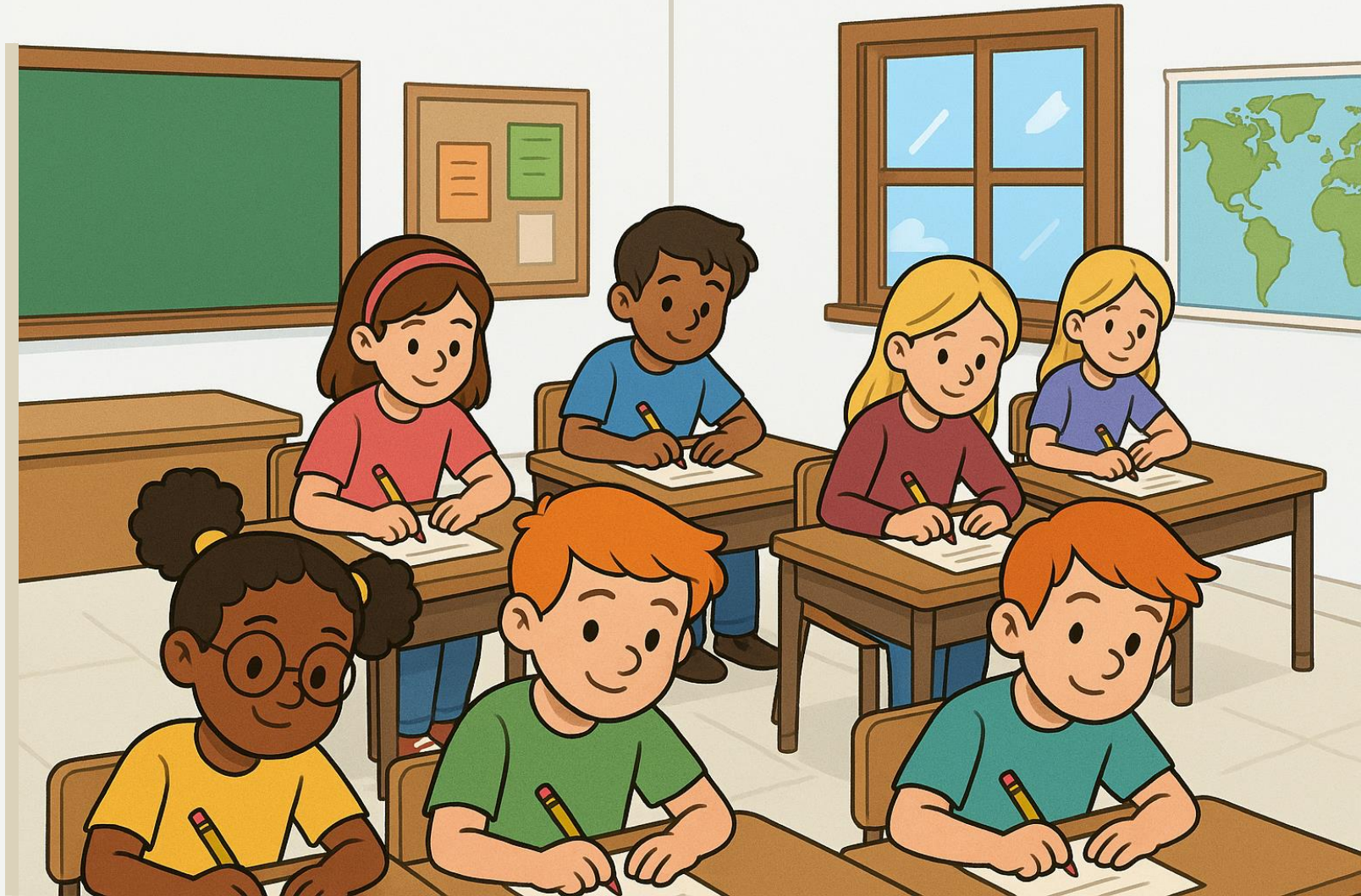
Student Performance Analysis & Visualization



Comparison between **pre & post student assessments** in an 8-week school program

May 2025

Program Overview

This analysis **summarizes** student outcomes from an 8-week educational program.

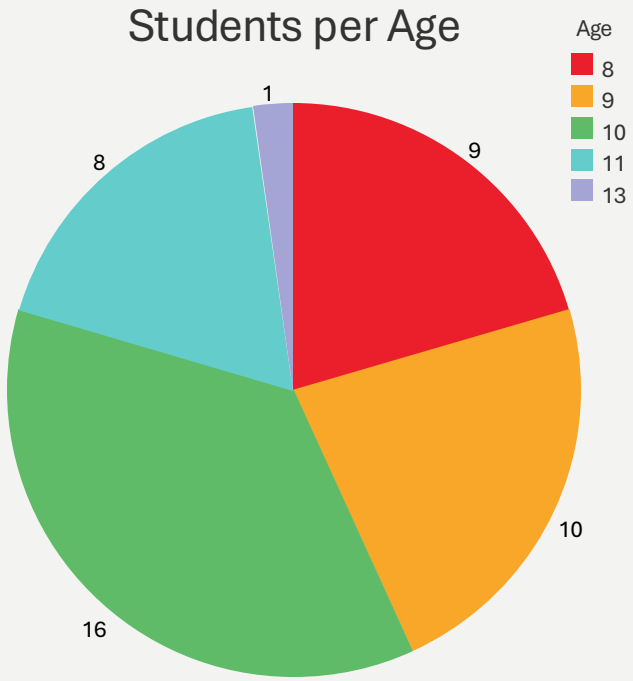
Data includes student scores, attendance, site location, grade, and age.

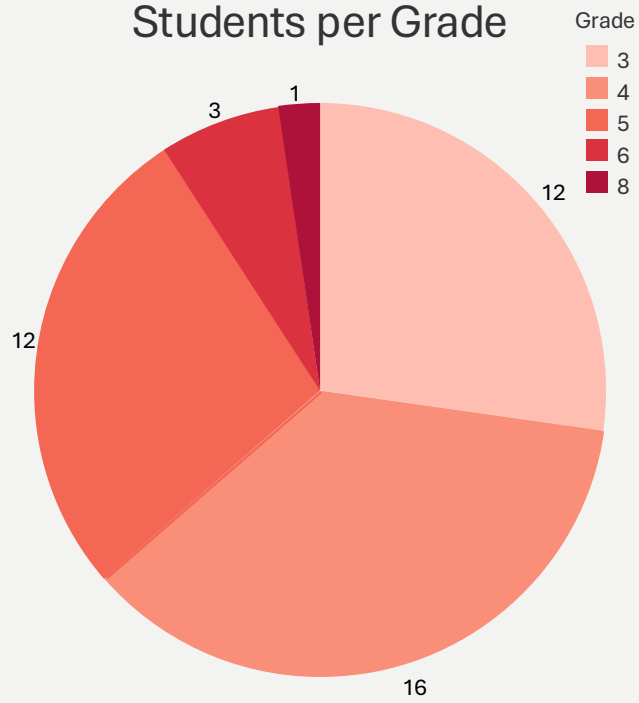
It **compares** initial vs. final evaluations to assess improvement in performance.

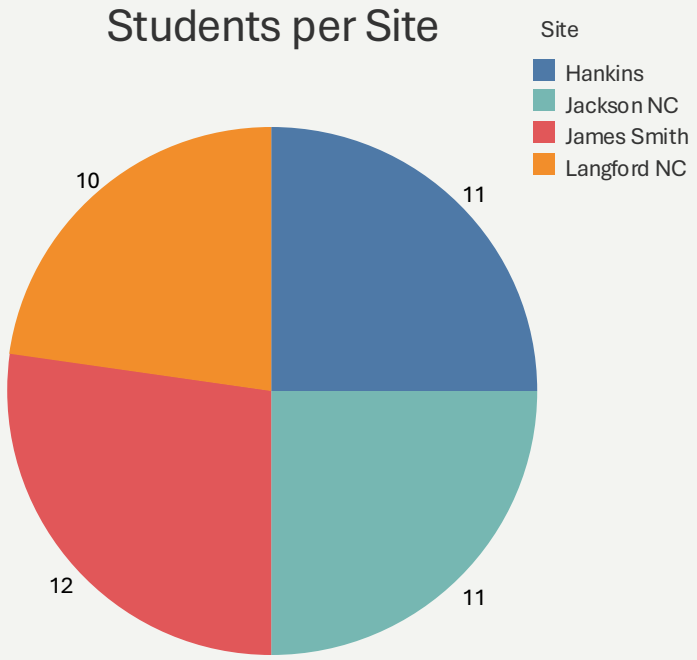
The **aim** is to identify learning gains and patterns across different groups of students.

Dataset Overview

Student Demographics







Total students: 44

Age distribution spans 8 to 13 years, mostly clustered between ages 8-11, with age 10 being the most common.

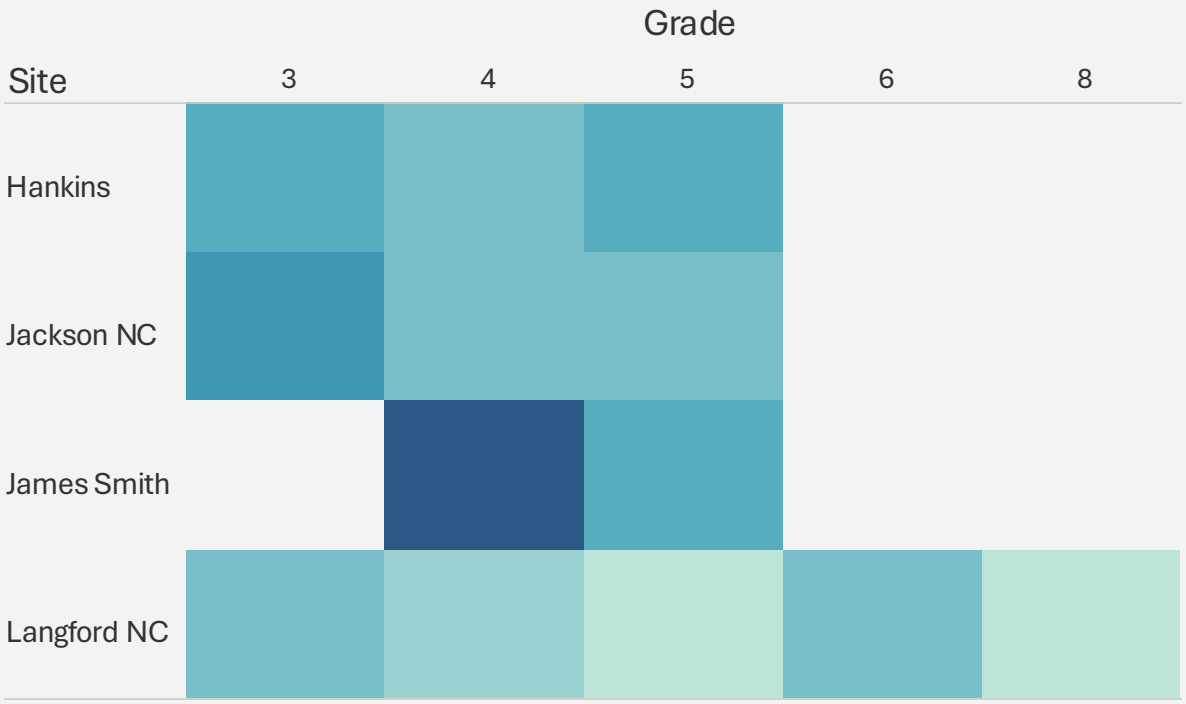
Grade levels range from Grade 3 to Grade 8, with Grades 3, 4 and 5 most represented.

Students come from 4 different **sites**, approximately evenly distributed, with James Smith contributing the most.

Distribution Across Age, Grades & Site

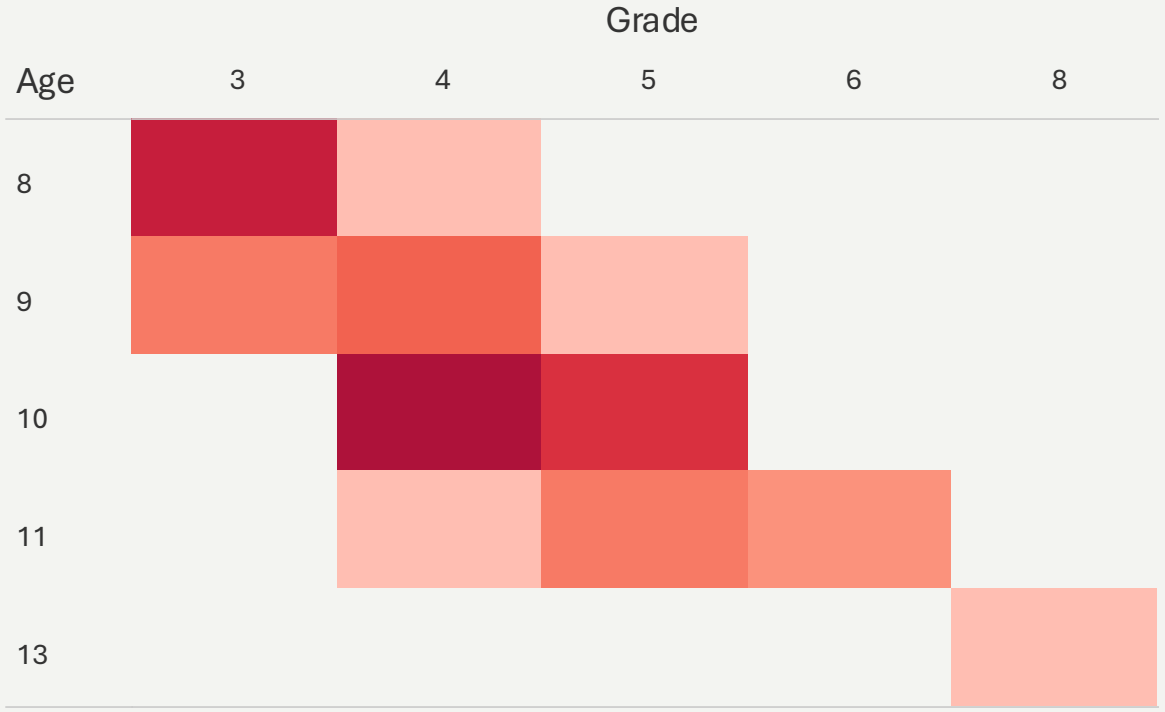
Based on a sample of 44 students across 4 sites.

Site vs Grade



- All four sites contribute students mainly to Grades 3-5.
- James Smith has only Grades 4 and 5, with a most in Grade 4.
- Langford NC covers the widest range (Grades 3-8).

Age vs Grade

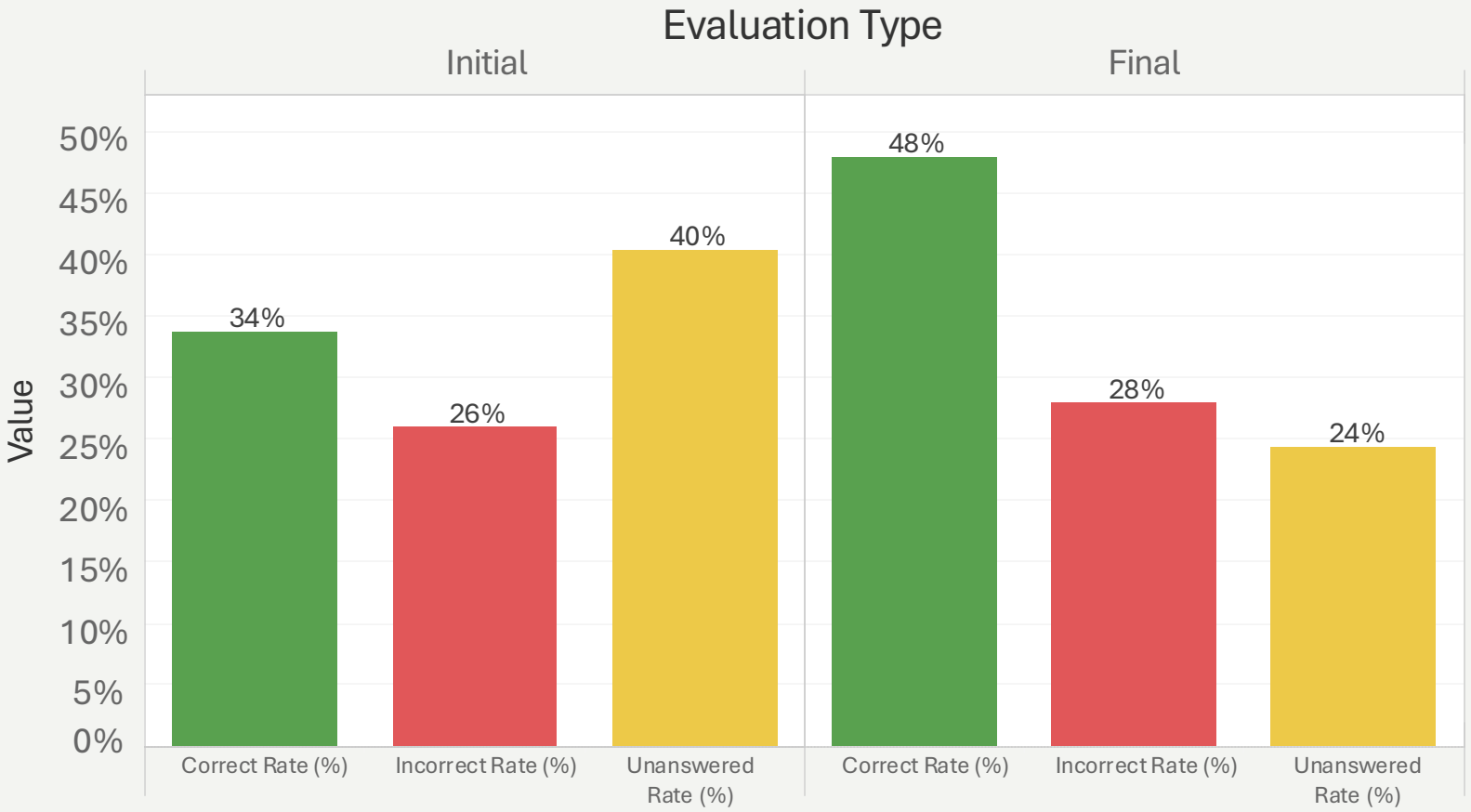


- The age–grade distribution follows the expected pattern.
- Most students are ages 9 and 10,primarily enrolled in Grades 3–5.
- Despite the small sample, trends show logical, age-appropriate progression.

Results & Observations

Overall Improvement

***Correct** Rates, **Incorrect** Rates, **Unanswered** Rates between Initial and Final Assessment*



Measure Names

- Correct Rate (%)
- Incorrect Rate (%)
- Unanswered Rate (%)

Percentage points Change

Final Evaluation

14%
2%
-16%

Relative Improvement

Final Evaluation

42%
7%
-40%

Correct Rate

- Improved from 34% → 48%
- Absolute gain: +14 percentage points
- Relative improvement: +42%
- Interpretation: **Strong post-program learning gains.**

Incorrect Rate

- Remained relatively stable (26% → 28%)
- Interpretation: Students maintained a **consistent effort in attempting answers** instead of leaving questions blank.

Unanswered Rate

- Dropped from 40% → 24%
- Absolute decrease: -16 percentage points
- Relative reduction: -40%
- Interpretation: Suggests **higher confidence and engagement.**

Detailed Score Distribution

*Student scores **before** and **after***

Initial Evaluation:

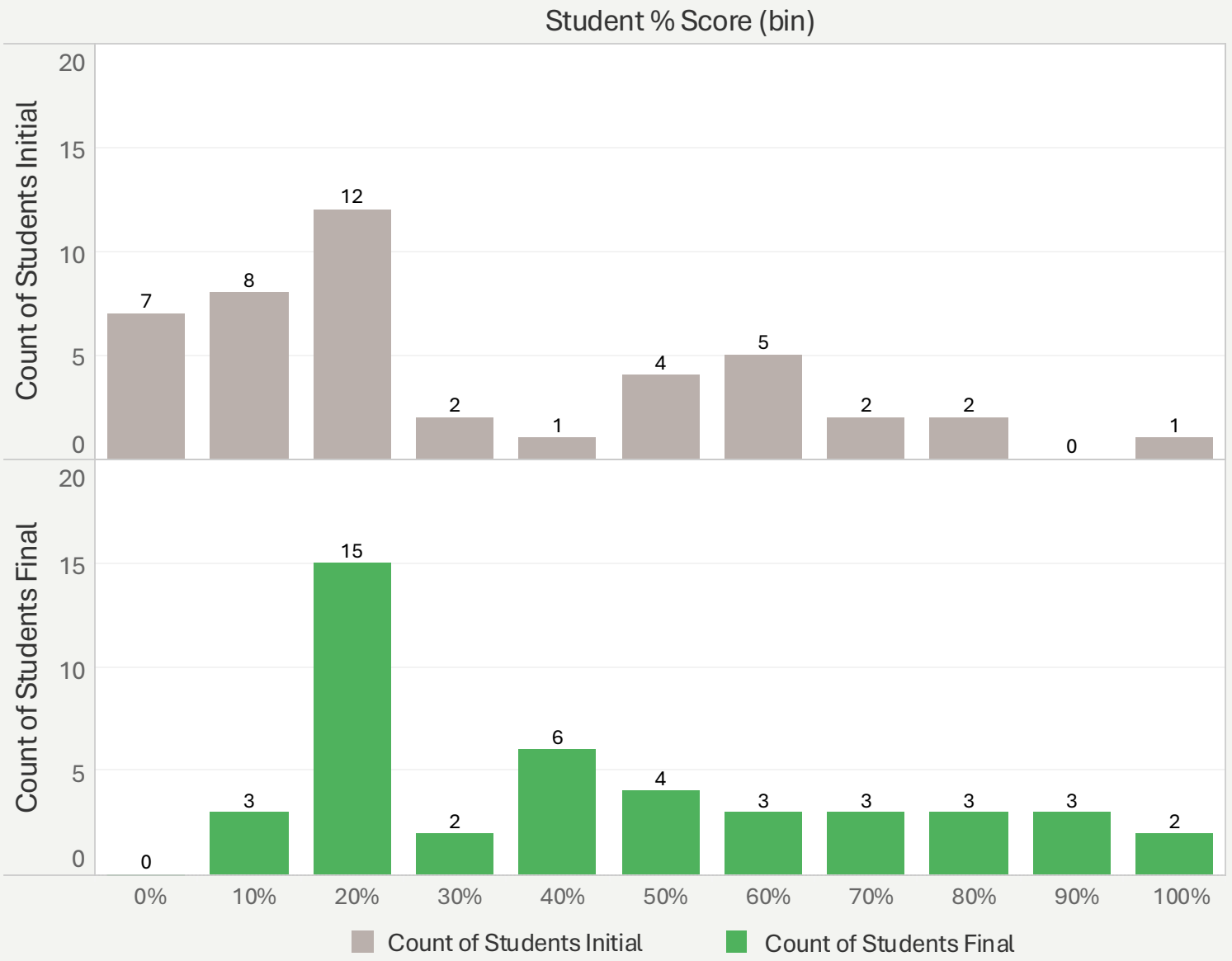
- Most students scored between 0–20%, with very few achieving above 70%.
- Scores were heavily concentrated in the 20% bin.

Final Evaluation:

- A **clear upward shift**, while many students still peaked at 20%, nearly half students scored $\geq 40\%$, and a few reached up to 100%,
- Final scores are **more evenly distributed across higher bins**, showing progress.

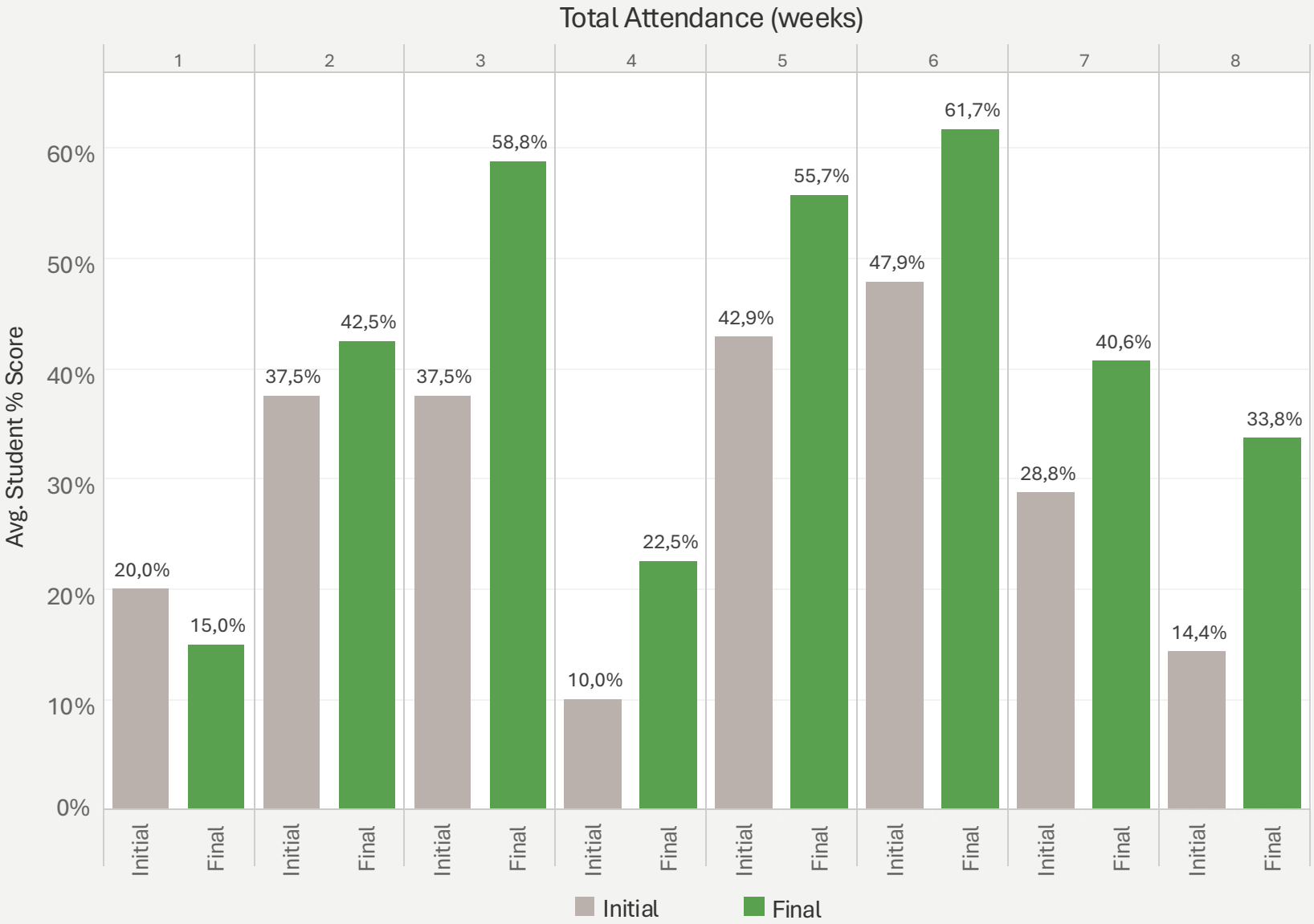
Evidence of Progress:

- Students scoring $\leq 10\%$ **dropped** from 15 to 3.
- Students scoring $\geq 70\%$ **increased** from 5 to 11.



Student Attendance Influence

*More weeks, better results? Impact of **attendance** on **performance***



General Observations

- Students who attended **more weeks** consistently **performed better** in the final evaluation.
- Students attending 6 weeks of attendance achieved the **highest average final scores** (61.7%).
- Low attendance ($\leq$ 2 weeks) resulted in **minimal or no improvement.**

Notable comparisons:

- **8-week** attendees: +19.4 percentage point improvement
- **6-week** attendees: +13.8 percentage point improvement
- **1-week** attendees: -5 percentage point change (decrease)

Site-level score growth

*Student performance across **different sites***

General Observations

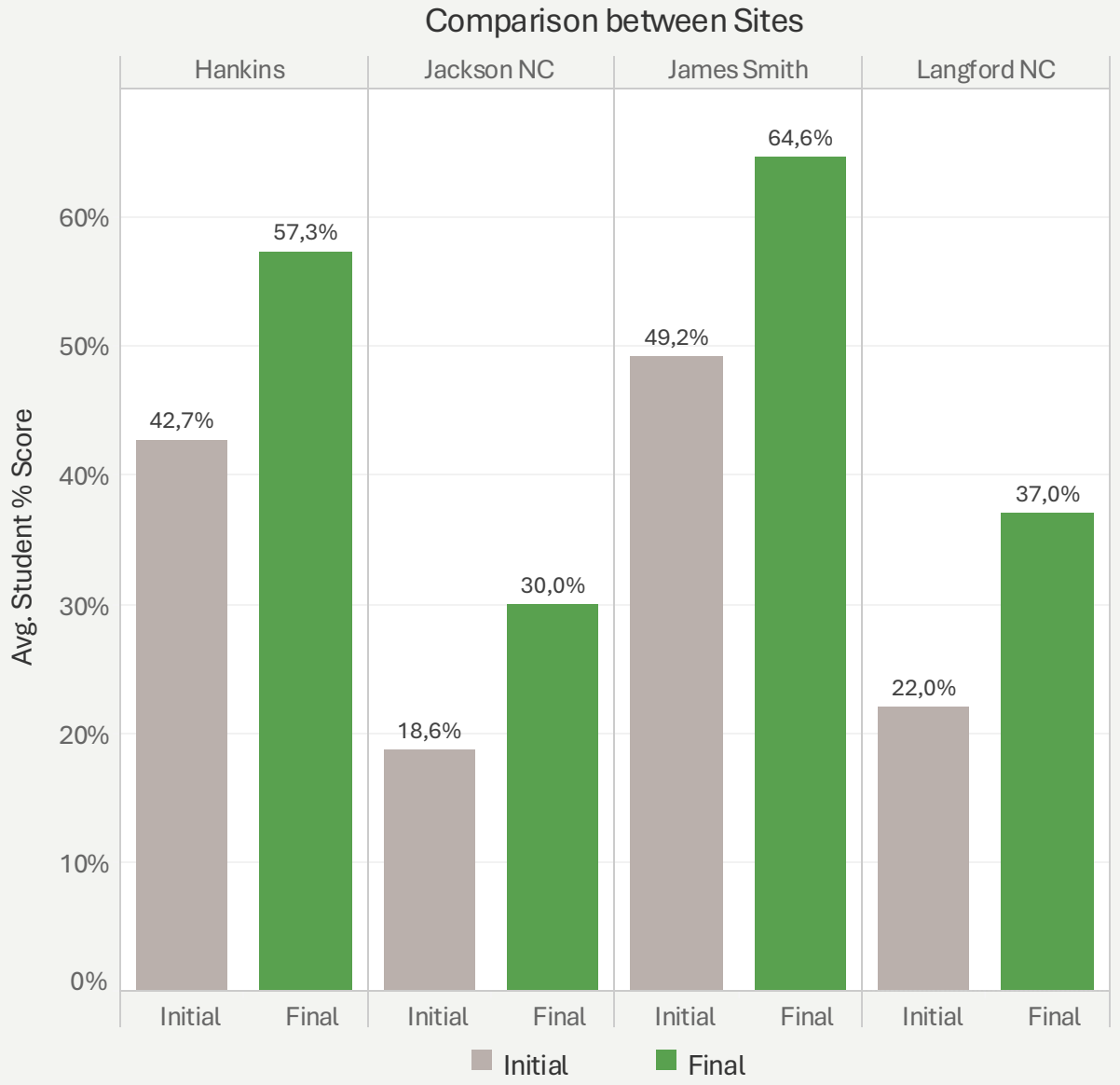
- **All four** sites showed **meaningful improvement** between initial and final evaluations.
- Hankins and Jackson NC showed **steady progress**, with relative gains of 34% and 61% respectively.
- James Smith had the **largest absolute gain** of +15.4 percentage points.
- Langford NC achieved the **highest relative improvement** at +68.2%, almost doubling its average score.

Percentage point change

Site	Evaluation Type: Fina
Hankins	14,5%
Jackson NC	11,4%
James Smith	15,4%
Langford NC	15,0%

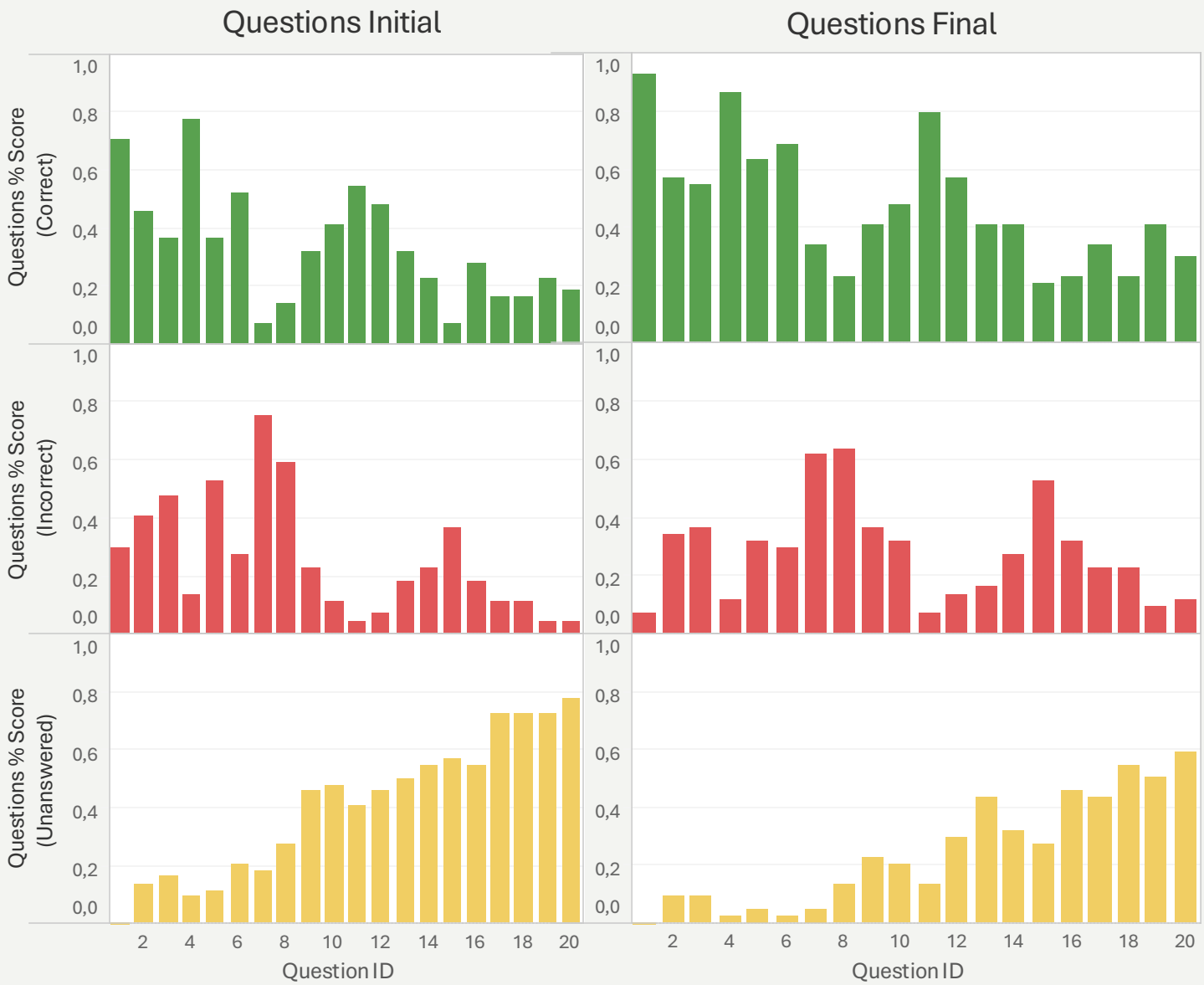
Score Improvement (% increase)

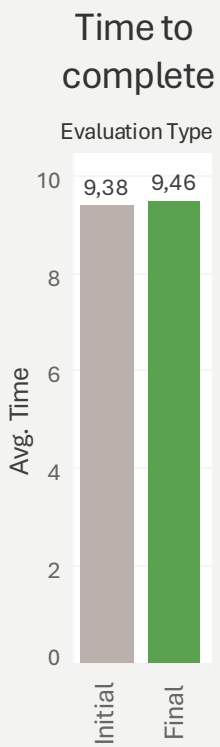
Site	Evaluation Type: Final
Hankins	34,0%
Jackson NC	61,0%
James Smith	31,4%
Langford NC	68,2%



Question-Level Performance

How was each question handled by students?





General Observations

- Most questions saw **higher correct** rates and **fewer incorrect** or **unanswered** responses in the final evaluation.
- The number of **skipped** questions **dropped significantly**, especially in the earlier part of the test.
- Final Questions (Q14-Q20) had the **highest unanswered rates**, likely because many students ran out of time.
- Challenging early questions (e.g., Q7, Q8, Q15) may have **slowed students down**, leaving less time for later questions.
- These patterns suggest **possible test fatigue or time management issues** during the assessment.

Question-Level Performance

*Looking at the **most notable questions***

Most correct

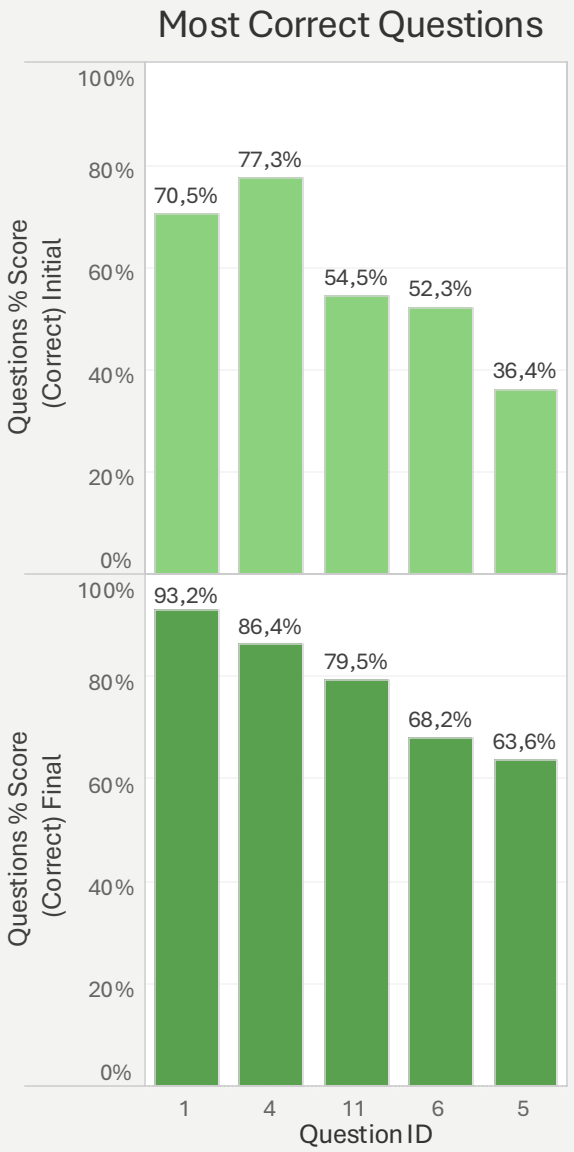
- **Q1,Q4 and Q11** had the highest correct response rates, showing strong overall understanding by students.

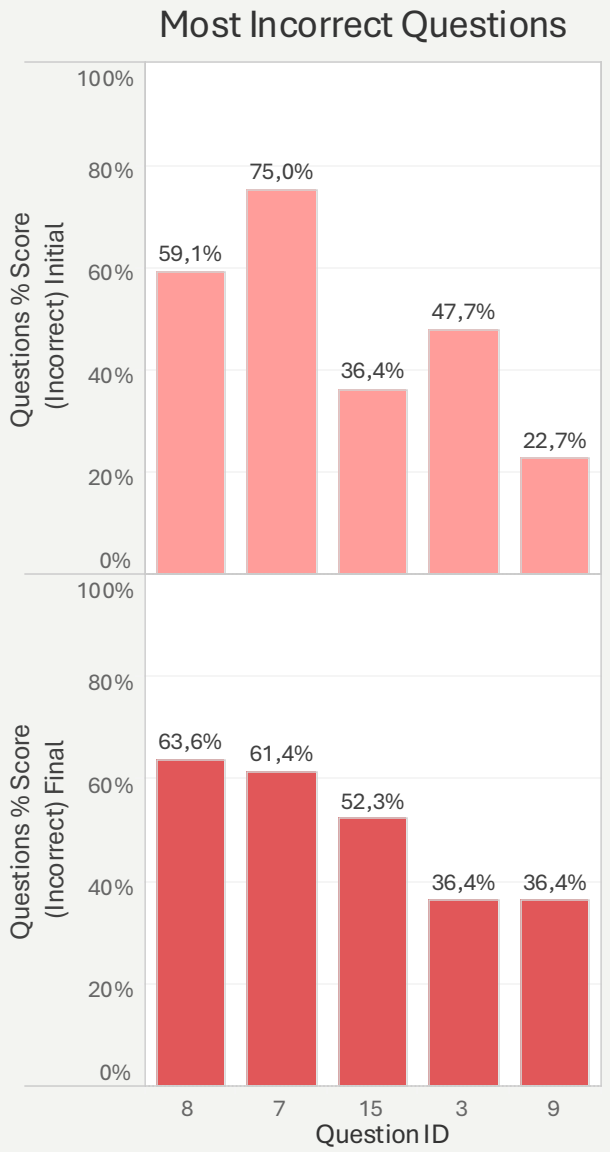
Most difficult

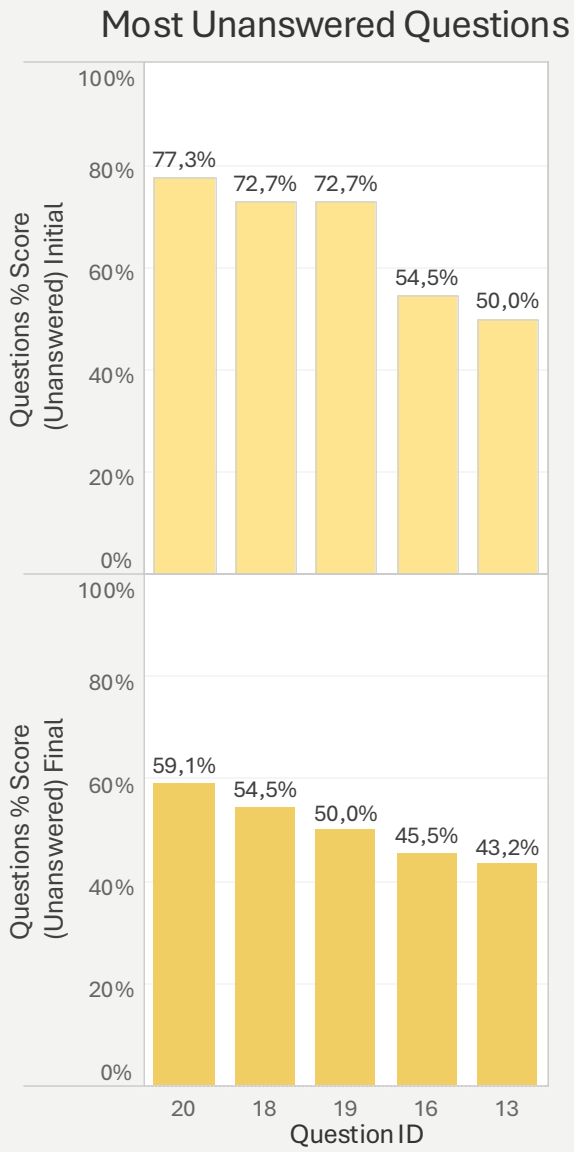
- **Q8,Q7 and Q15** showed consistently high incorrect rates, suggesting potential difficulty or confusion.

Most skipped

- **Q18 - Q20** had the highest skip rates for both tests (although rates improved on the final evaluation), indicating time constraints or test fatigue.

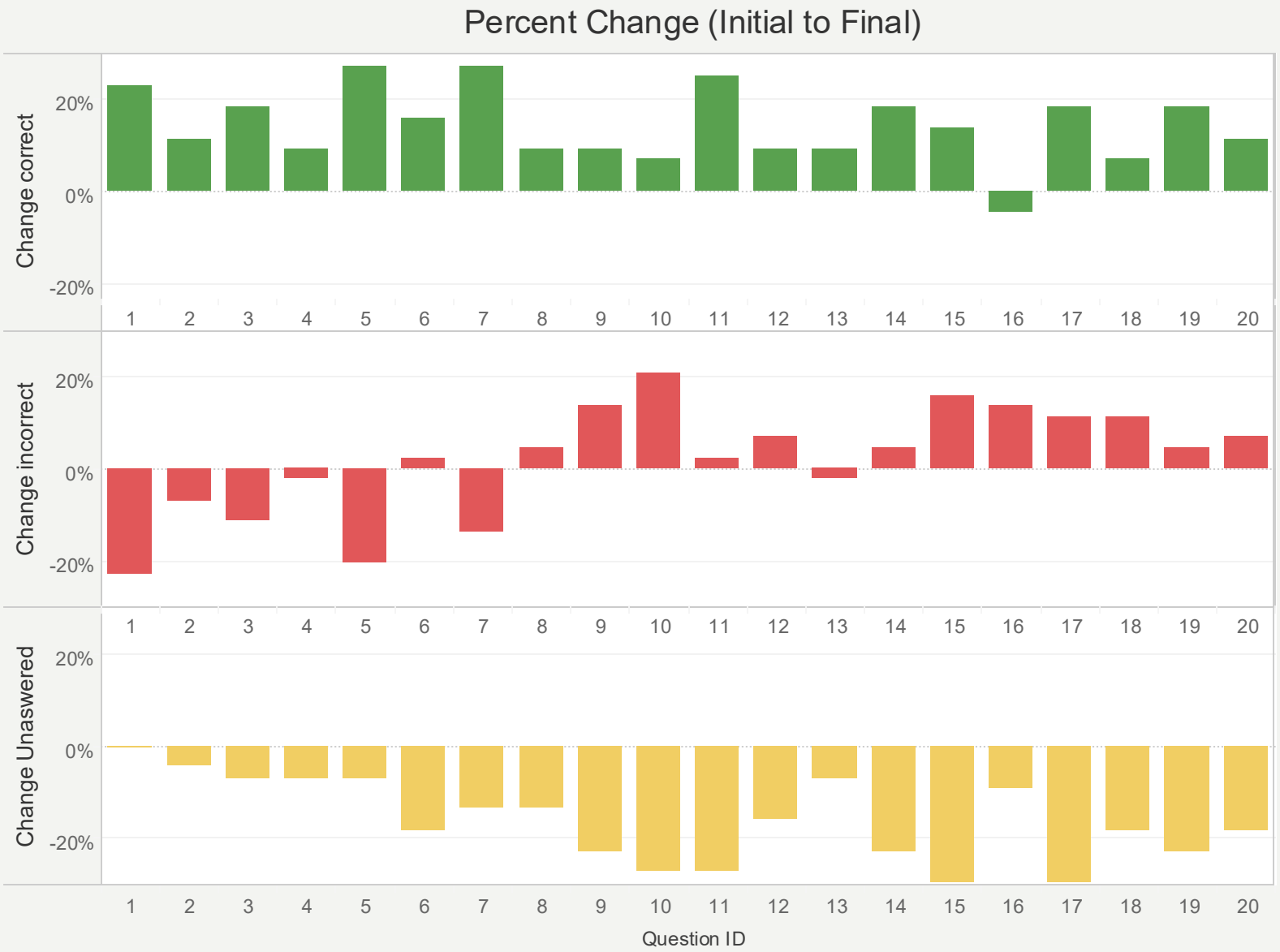






Question-Level Performance

How did each question response change between tests?



Specific Observations

- Q5 and Q7 showed the **highest gains in correct responses** (+27.3%), primarily converting previously incorrect answers.
- Q11 had the **most significant overall improvement**, with a +25% gain in correct responses and a -27.3% drop in unanswered ones, indicating a strong learning effect.
- Q16 was the **only question with a decline in correct responses** (-4.5%) despite more students attempting it, suggesting confusion or misunderstanding.
- Q10 saw a **large shift from unanswered to incorrect responses** (+20.5%), which may indicate guessing, or conceptual difficulty.
- Q15 and Q17 had the largest reduction in unanswered responses (-29.5%).