

CIGNITION IMPLEMENTATION

OVERLAND TRAIL MIDDLE SCHOOL

Grades: 6 - 8

Program Length: 15 Months

Treatment Year: 2022-2024

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1.0 — Introduction

1.1 — Background

Brighton 27J Schools is a school district in Colorado that serves parts of Adams, Broomfield, and Weld counties, including the cities of Brighton, Commerce City, and Thornton. In the 2023-24 school year, the district served, the district served **23,108 students**.¹

As part of the District's Unified Improvement Plan, Brighton 27J partnered with Cognition to use our high-impact tutoring model to address math learning loss among middle school students. Overland Trail Middle School (OTMS) was the first school in the district to engage.

Program Overview: SY 2022-23

- **Launch and Duration:** Services began on **December 8, 2022**, and concluded on **May 11, 2023**.
- **Unique Schedule Consideration:** Brighton's four-day school week (Tuesday through Friday) necessitated modifying Cognition's recommended model of three 30-minute sessions per week. Instead, sessions were scheduled as **two 40-minute sessions per week**, held during the school's "Advanced Period" from **8:35 AM to 9:15 AM**.
- **Participants:** A total of **49 students** from **Sixth, Seventh, and Eighth grades** participated in the program.

Program Overview: SY 2023-24

- **Launch and Duration:** Services launched earlier in the school year on **September 7, 2023**, and ended on **May 10, 2024**.
- **Schedule:** The session schedule remained consistent, with **two 40-minute sessions per week** during the "Advanced Period."
- **Participants:** The program expanded to serve **154 Sixth, Seventh, and Eighth-grade students**.

¹ [District Profile - Colorado Department of Education \(accessed 01/03/2025\)](#)

1.2 — Program Design and Description

During the 2022-23 school year (SY), tutoring sessions were conducted online using Google Meet videoconferencing. In 2023-24, the program transitioned to **Zoom** for its sessions. Students accessed their sessions on **Chromebooks**, working with tutors through a collaborative digital platform embedded with hands-on activities and manipulatives. The curriculum, developed by Cognition, was aligned with the scope and sequence of Overland Trail's curriculum and focused on key grade-level standards.

Program Structure and Student Grouping

- **SY 2022-23:**
 - **49 students** were enrolled in 3 classes across 11 groups.
 - The average student-to-tutor ratio was **4.04:1**.

- **SY 2023-24:**
 - Tutoring expanded to **154 students** in 6 classes across 35 groups.
 - Four groups were assigned bilingual tutors to support **English Language Learners (ELL)**.
 - The average student-to-tutor ratio was **4.03:1**, with some groups containing up to 5 students.

Group Formation and Goals

School leaders used local student data to form homogeneous groups of four students, occasionally regrouping to enhance homogeneity. This grouping strategy aimed to create an environment conducive to **collaborative learning** with students from the same grade.

1.3 — Problem, Thesis, and Purpose

Implementing third-party school programs can pose significant challenges that may reduce their effectiveness. Third-party vendors often don't have insight into the local school leadership's vision and structure, making implementation difficult. As a result, vendors tend to present a "one-size-fits-all" program that overlooks how the tool integrates into and impacts the school day. Conversely, school leaders have limited time, and understanding the complexities of third-party programs is not part of their core responsibilities. These factors often lead to frustration among school leaders and diminished returns from tools designed to accelerate student learning.

At Cognition, we believe a learning partnership is the solution to this problem. This approach involves both parties engaging in ongoing meetings to answer relevant questions, examine current data, and adjust the program (without sacrificing its core tenets) based on what is learned. Furthermore, it is the responsibility of the vendor to lead this process by asking questions drawn from previous implementations and best practices to effectively integrate the program into the school day in a healthy way. Additionally, the vendor should provide ongoing data updates, highlighting key findings, and use that data, in collaboration with school leadership, to make real-time adjustments.

This paper aims to examine the two-year implementation of Cognition at Overland Trail Middle School and evaluate how Cognition's partnership with school leadership improved the program and enhanced student outcomes.

2.0 — Learning Partnership Practices

2.1 — Implementation

While district decision-makers generally understand the Cognition program and the reasons for partnering with us, local school leaders often struggle to catch up—usually during one of the busiest times of the year: preparing for the school year's launch. We believe it is our responsibility to hold clear and concise meetings as program design decisions are made. Effective program design is critical, as it can determine the success or failure of the implementation.

We endeavor to create tools and ask questions that embody the best practices of a High-Impact Tutoring program. These tools and questions not only inform and guide school leaders but also help them envision how to integrate Cognition's program effectively with their local school structure and culture. For example, [this tool](#) simplifies implementation into eight fundamental decisions.

2.2 — Launch

Schools often have varied technology setups, making launch day stressful for local leaders new to a service like Cognition. To reduce this stress, we provide “just-in-time” learning tools and scheduled pre-launch test sessions for technology administrators, teachers, and students. For instance, a tool designed for technology administrators can [be accessed here](#). A personalized tool for students using Clever to launch Cognition is also available [at this link](#).

2.3 — Ongoing Learning

All educators recognize the importance of formative assessments. Yet, we often **overlook opportunities** to integrate them into our programs. Cognition schedules consistent meetings with a designated school point of contact (POC) to evaluate the program's current state, monitor student progress, and recommend adjustments to improve outcomes. **Cognition takes full responsibility for preparing these meetings.** Our dedicated program managers compile current data—both aggregate and individual—**highlight key insights** and collaborate with the POC to make changes based on feedback.

Additionally, all local designees are given access to Cognition's data dashboard, which provides insights into their school or a subset of the school's sessions. This ensures that they do not have to rely solely on Cognition for updates or are **left entirely responsible** for managing program data.

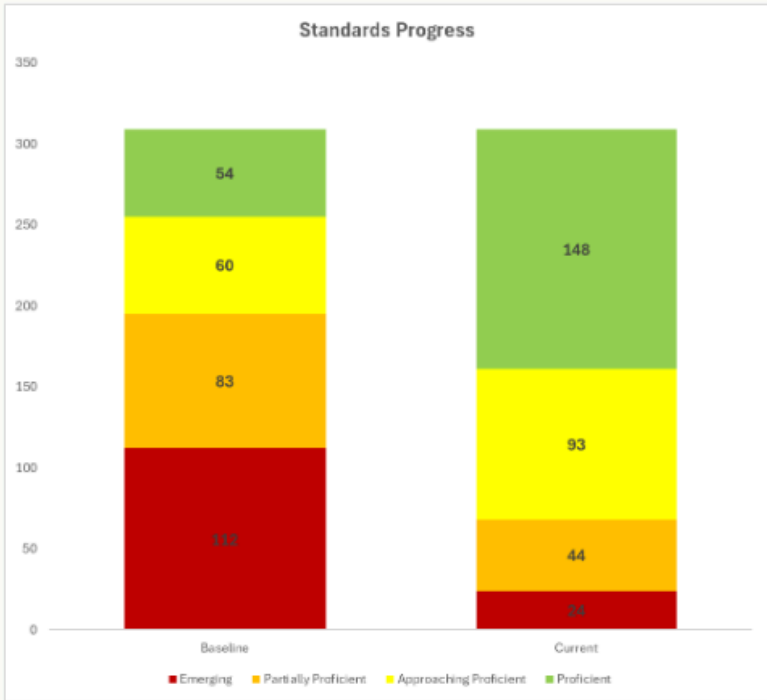
POCs are updated on student engagement and progress. Below are examples of aggregated data from actual POC meetings.

Attendance

| School Wide Attendance | |
|------------------------|-------|
| 92.1% | |
| Attendance By Class | |
| ELA-K | 94.5% |
| ELA-1st | 95.3% |
| ELA-2nd | 89.5% |
| ELA-3rd | 78.9% |
| ELA-4th | 86.0% |
| ELA-5th | 81.3% |
| Math-6th | 93.5% |
| Math-7th | 94.6% |
| Math-8th | 96.3% |

Standards Progress

| School Wide Standards Progress | |
|--------------------------------|--------|
| 84.7% | |
| Standards Progress By Class | |
| ELA-K | 266.7% |
| ELA-1st | 74.1% |
| ELA-2nd | 14.3% |
| ELA-3rd | 53.8% |
| ELA-4th | 113.5% |
| ELA-5th | 68.1% |
| Math-6th | 141.9% |
| Math-7th | 238.1% |
| Math-8th | 97.9% |



Months of Reading Growth

| School Wide Months of Reading Growth | |
|--------------------------------------|-----|
| 2.0 | |
| Reading Growth By Class | |
| ELA-K | 1.0 |
| ELA-1st | 0.6 |
| ELA-2nd | 3.8 |
| ELA-3rd | 2.8 |

2.4 — Overland Trail Practices

At Overland Trail, we followed a two-week meeting cadence, typically meeting with a single point of contact (POC) for 10-minute sessions. The POC communicated program updates to the teachers and relayed their feedback and questions. Having the same POC for both years fostered a strong and consistent learning relationship.

In contrast, some schools have allowed individual teachers to meet directly with Cognition staff to manage their students in the program.

3.0 — Data Analysis

Our data collection metrics fall into two categories: Engagement and Academic Progress. The metrics are detailed in Appendix A.

Engagement Metrics

Engagement metrics assess the program's overall health and the participation levels of individual students. We operate on the principle that students who are present and engaged are more likely to learn effectively. Conversely, students who are not present or engaged have a diminished ability to master the material. These metrics are essential for teachers, administrators, parents, and program managers to identify students and programs requiring intervention.

Academic Progress Metrics

Academic progress is measured by the student's ability to demonstrate mastery of the topic. Success is not solely determined by arriving at the correct answer. The tutors also evaluate the process used to derive that answer.

We measure engagement in four key areas:

1. Attendance
2. Participation
3. Student Feedback
4. Contact Hours

Based on our previous experience, we have established the following baseline metrics for healthy engagement, which correlate strongly with academic gains:

1. **Attendance** - 70%
2. **Participation** - 80%
3. **Student Feedback** - 90%
4. **Contact Hours** - 50
 - a. The contact hours baseline is drawn from [Design Principles for Accelerating Student Learning with High-Impact Tutoring](#), a meta-analysis from the Annenberg Institute at Brown University. However, this is often the most challenging metric due to limited student time and competing demands during the school day. Consequently, we frequently adjust our reporting standards to reflect

actual student averages. For this analysis, **we used 10 contact hours as the standard.**

Engagement Metrics Analysis: Overland Trail Middle School (OTMS)

In the 2022-23 school year, students at OTMS could attend a maximum of 33 sessions, equating to a potential maximum of 22 contact hours. **Due to attendance challenges, the actual maximum was 16 hours, with an average (mean) of 9.6 hours and a median of 10 hours.** Although the maximum, mean, and median were higher at OTMS in the 2023-24 school year, we maintained a consistent standard of 10 contact hours for comparison purposes to ensure an apples-to-apples analysis of student progress.

3.0.1 — Expected Academic Progress

Cognition’s Approach to Measuring Academic Growth

Cognition is not a testing company. Students are thoroughly assessed by their local and state school districts through standardized tests that measure individual and group achievement. While we have used summative assessments in the past, the items were not normed, and the testing environment often lacked the conditions necessary for accurate measurement or meaningful growth analysis.

However, measuring students’ academic growth is essential to any educational endeavor, including High-Impact/High-Dosage Tutoring programs. Without the ability to measure program participation’s impact on individual students and their cohorts, it is difficult to substantiate claims of “high impact.”

Transition to Formative Assessments

The two-year implementation at Overland Trail Middle School (OTMS) serves as a case study for our transition from informal pre- and post-assessments to formative assessments. These formative tools measure student progress and inform instruction.

We moved from multiple-choice items to constructed-response items scored using the rubric outlined in Section 2.3. This transition provided tutors with valuable insights into the following:

- Skills already mastered
- Misconceptions needing further instruction
- Student progress on individual standards

While more informative, this scoring approach is sensitive to initial conditions, complicating student-to-student comparisons. As a tutoring provider, we typically address standards that students have encountered before. This prior knowledge is assessed through an initial mastery check.

Insights from Overland Trail: Academic Year 2023-24

At OTMS in the 2023-24 academic year, **71.3% of students demonstrated some level of mastery** on the initial mastery check before instruction began. Notably:

- **17.3% of students** were classified as "Proficient," meaning they provided correct answers, showed the necessary work, and explained their thinking.

- **28.7% of students** scored "Emerging," indicating little to no prior mastery of the standard.

From an academic growth perspective, students with prior knowledge (Proficient or partially mastered) may demonstrate less measurable growth than those who began at the Emerging level. While all students aim for mastery, those starting with prior knowledge naturally show smaller gains, resulting in lower "Academic Growth" scores.

Defining Successful Academic Progress

To evaluate the "Impact" of High-Impact Tutoring, we defined successful academic progress as a student demonstrating at least **33% growth** across multiple standards. This equates to advancing at least one level on our Mastery Check rubric.

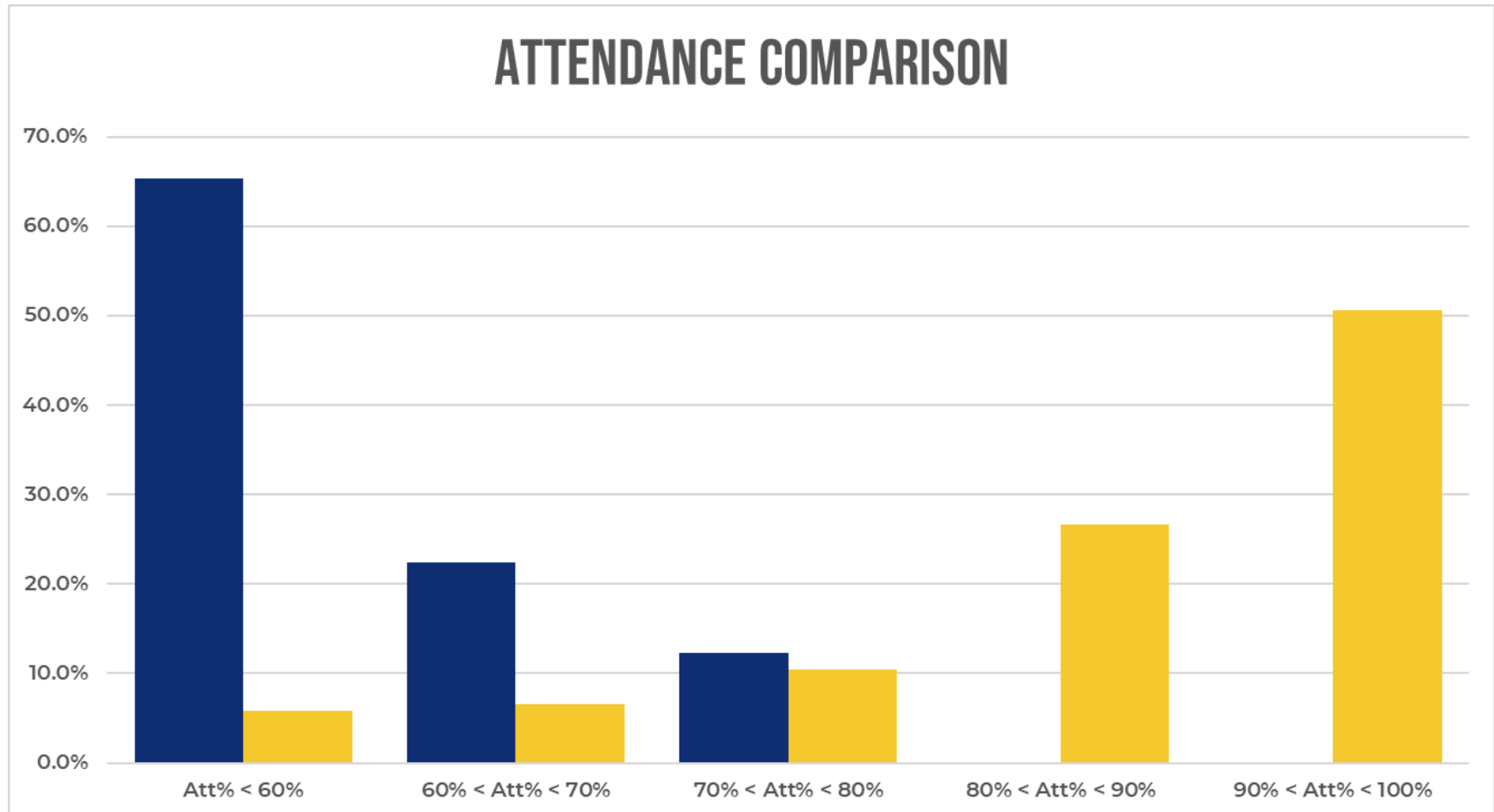
This benchmark ensures that the program captures meaningful growth while accommodating student starting point variations. By focusing on individual progress and using formative assessments, we better align our instructional practices with each student's unique learning needs.

3.1 — Student Participation Metrics

Our goal in comparing the student participation metrics from SY 2022-23 to SY 2023-24 at OTMS is to show how implementing learning partnership practices enhanced student participation. As we outlined above, increased engagement directly supports more effective learning.

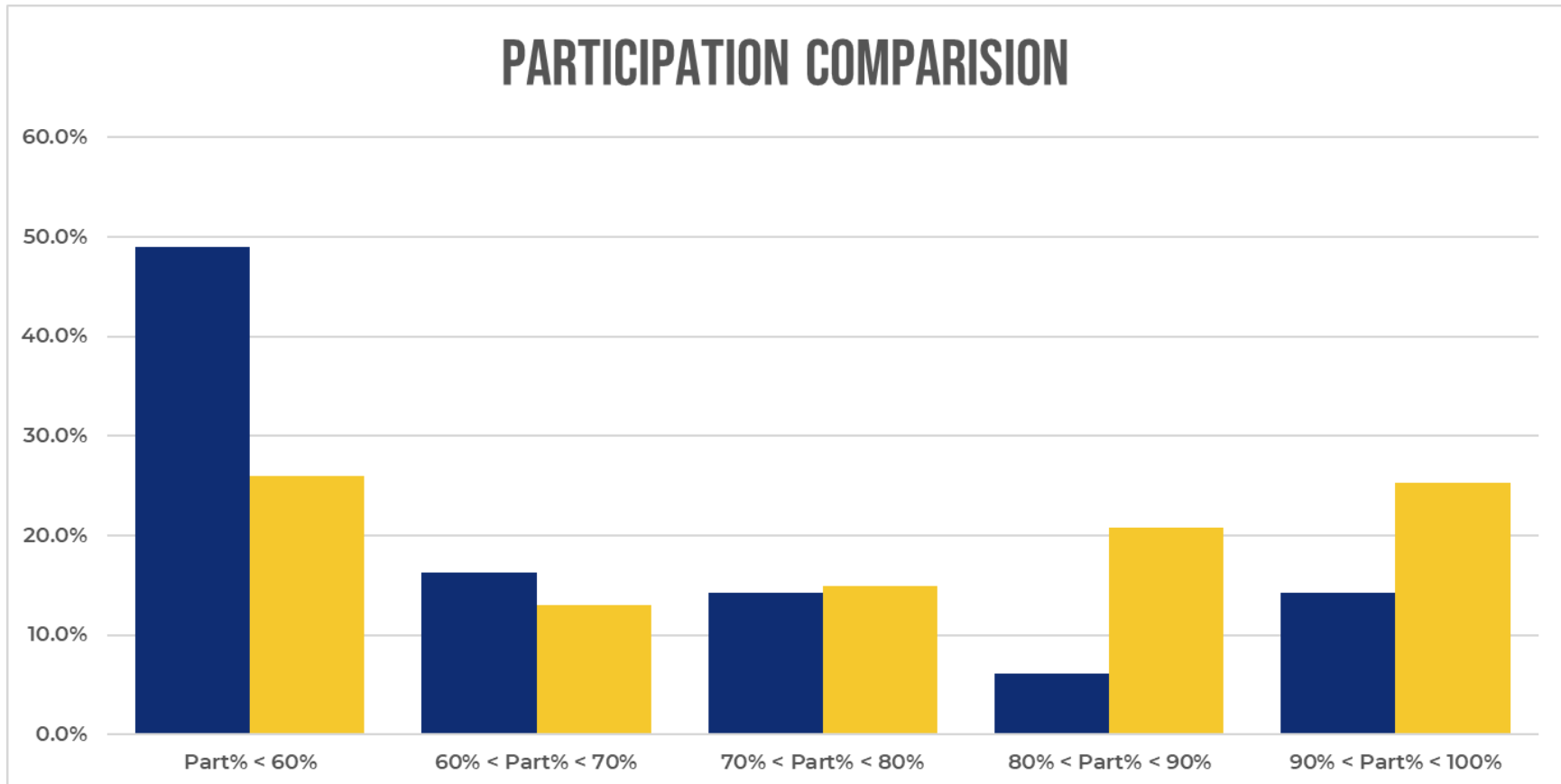
3.1.1 — Attendance

In SY 2022-23, most OTMS participants had an attendance rate below 60%, with only 12.2% meeting our 70% attendance goal. The average attendance that year was 52.5%. In contrast, **SY 2023-24 saw a significant improvement, with an average attendance of 85.0% and 87.7% of participants meeting the attendance goal.**



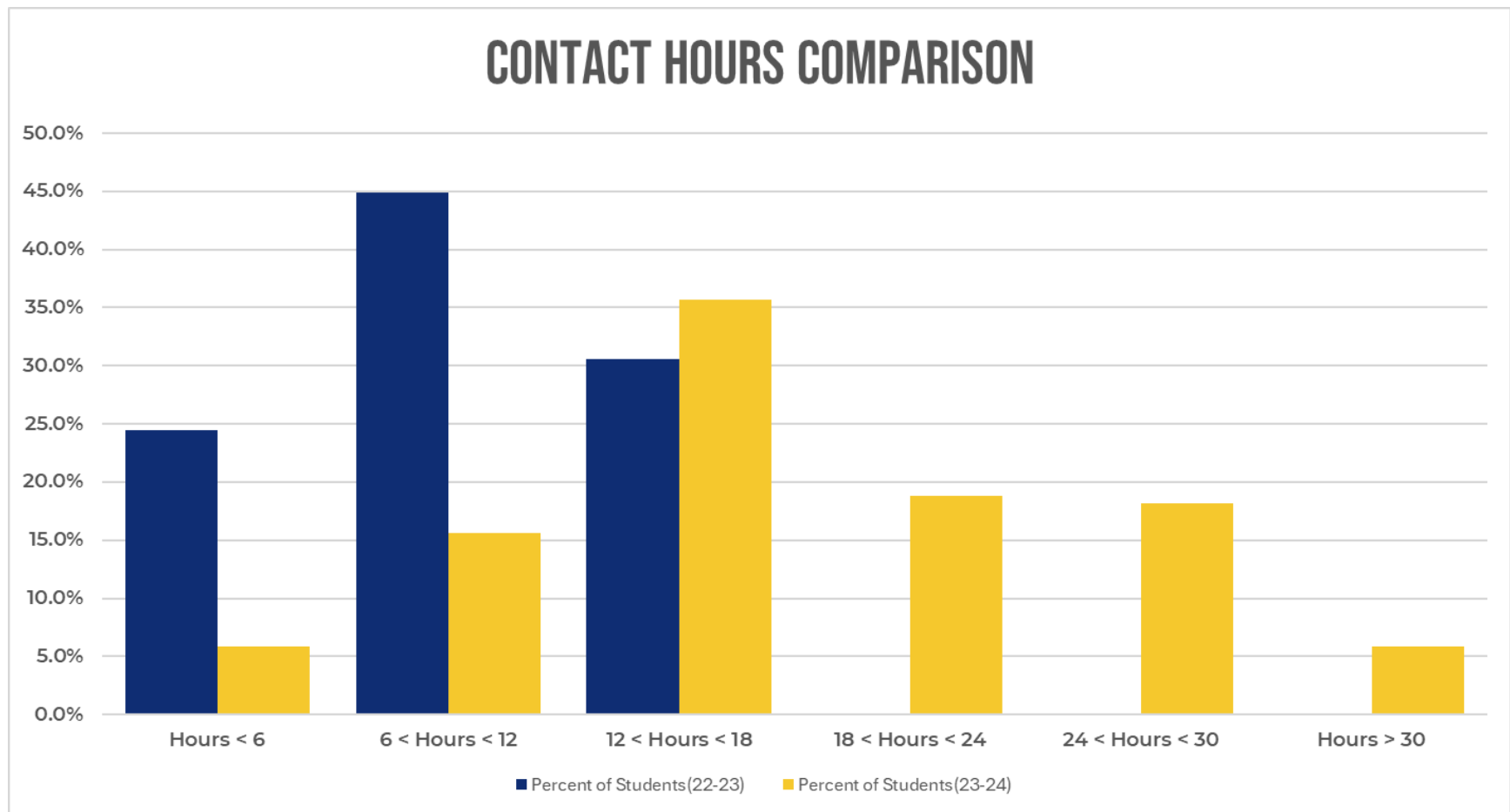
3.1.2 — Participation

In SY 2022-23, only 20.4% of OTMS Cignition students met the participation goal of 80%. **By SY 2023-24, this percentage more than doubled, with 46.1% of students meeting the goal. Aggregate participation also improved significantly, rising from 63.7% in SY 2022-23 to 74.6% in SY 2023-24.**



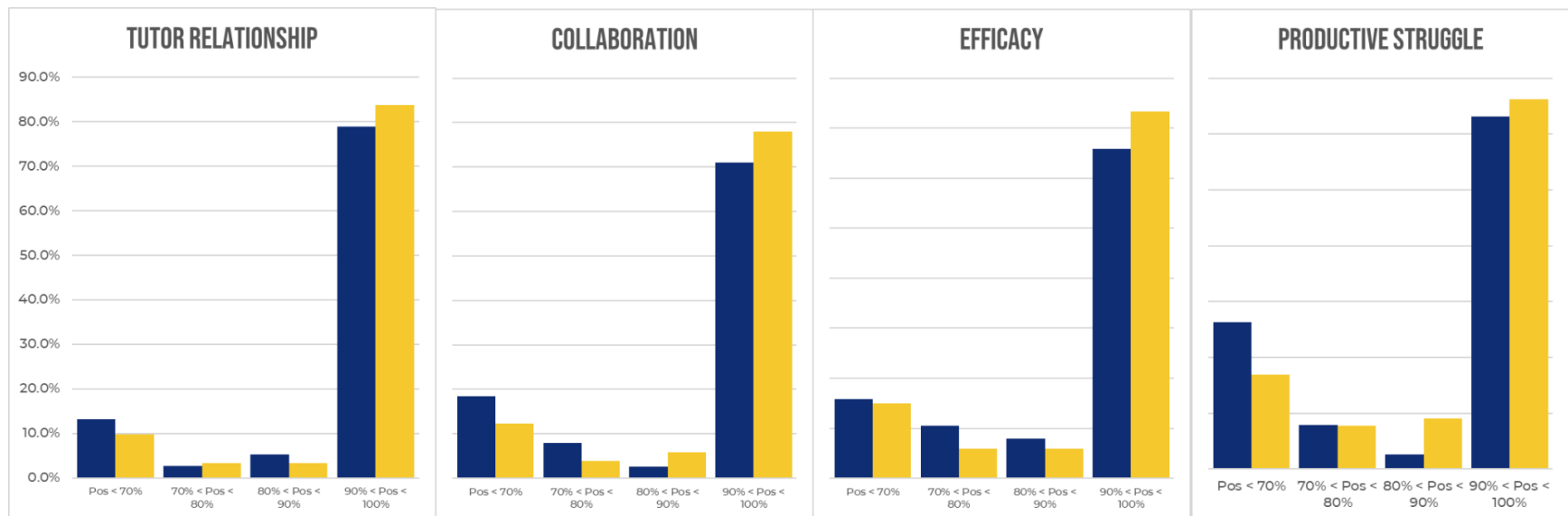
3.1.3 — Contact Hours

Although an agreement was finalized by late summer, the OTMS team took until December 8, 2022, to complete their due diligence and feel confident launching services. Consequently, the average student received 9.6 hours of tutoring in SY 2022-23. **The consistency of the POC and shared learning enabled a much earlier launch on September 7th, 2023, allowing students to receive an average of 18.4 hours of tutoring in SY 2023-24, an increase of nearly 100%.**



3.1.4 — Student Survey

Our goal for student survey results was to achieve an average of 90% positive responses (either “Strongly Agree” or “Somewhat Agree”) across the four survey questions. Positive responses increased in every category from SY 2022-23 to SY 2023-24, with **nearly 75% of students meeting the SY 2023-24 standard across all categories**. In the graphs below, SY 2022-23 is blue, while 2023-24 is gold.



3.2 — Student Progress Metrics

The fundamental question determining any educational program's value is, “**Does it work?**” While ongoing debate exists about the best methods for measuring student progress, our program used two distinct tools to address this question.

Measuring Standards Progress

One key metric we use is **Standards Progress**, assessed through embedded “mastery checks” within each lesson. Tutors directly observe student work to evaluate whether the student has mastered the standard, considering not only the accuracy of the answer but also the process used to derive it.

Scoring Scales: SY 2022-23 vs. SY 2023-24

- **SY 2022-23:**

The original scoring scale included three outcomes:

- **Complete Understanding (100%)**
- **Partial Understanding (50%)**
- **No Understanding (0%)**

- **SY 2023-24:**

To provide tutors with more nuanced feedback tools, the scoring scale was revised to four outcomes:

- **Proficient (100%)**
- **Approaching Proficient (66.7%)**
- **Partially Proficient (33.3%)**
- **Emerging (0%)**
- Additionally, a fifth category, **Not Assessed**, was introduced for sessions where mastery was not evaluated.

Baseline and Progress Measurement

Each student begins with a baseline mastery check to establish their initial knowledge of a standard. This baseline informs instructional focus and serves as a benchmark for measuring progress. Cognition's goal is for students to advance from their baseline assessment to **Proficient** during the sessions addressing a particular standard. Given this focus on mastery, students often work on a single standard across multiple sessions.

Student progress is measured as the difference between their highest mastery check score and their baseline mastery check score.

Comparing Scales Across School Years

To facilitate a comparison between SY 2022-23 and SY 2023-24, I will aggregate the middle outcomes from the revised scale (**Approaching Proficient** and **Partially Proficient**) to align with the **Partial Understanding** category from the earlier scale. Additionally, I will present the original scoring breakdown and discuss the overall progress scores for SY 2023-24.

3.2.1 — Standards Progress Score

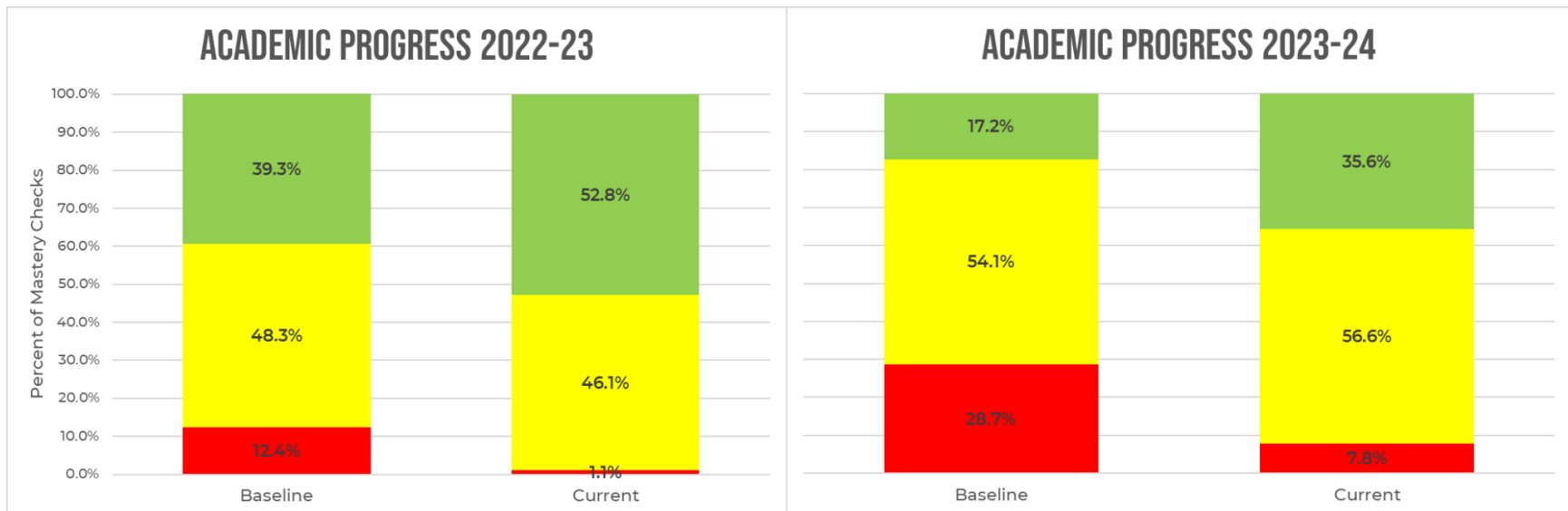
The graphic below illustrates the percentage of all mastery checks for OTMS students during both school years, represented using the SY 2022-23 scale.

- **Red** indicates the percentage of mastery checks marked “No Understanding.”
- **Yellow** represents “Partial Understanding.”
- **Green** signifies “Complete Understanding.”

For each section, the **left column** shows the baseline (initial mastery check), and the **right column** shows the current (final mastery check) for each standard.

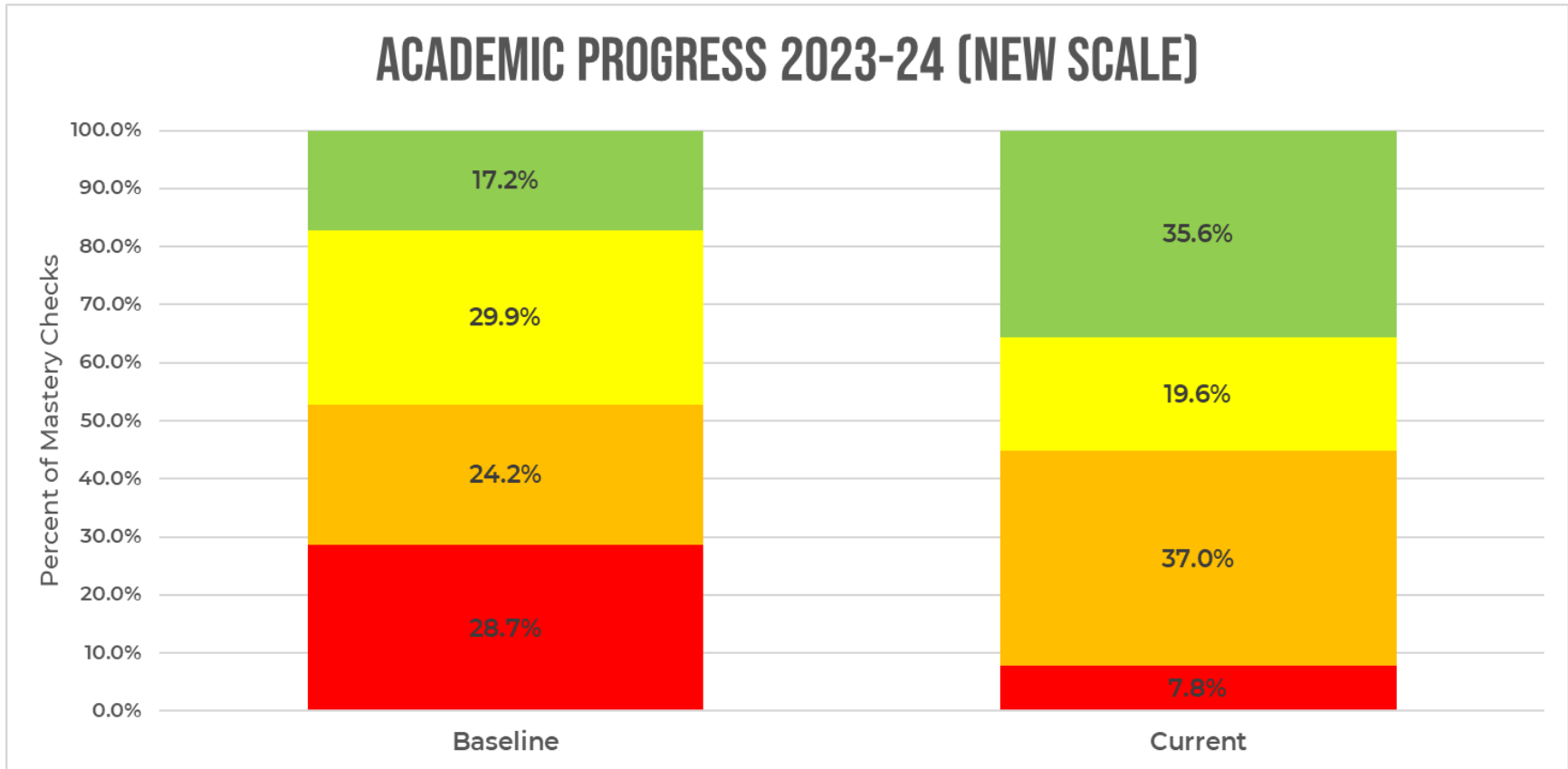
Using the 0%, 50%, and 100% scale:

- **SY 2022-23:** OTMS students demonstrated a **Standards Progress growth of 19.5%**.
- **SY 2023-24:** OTMS students achieved a significantly higher **Standards Progress growth of 44.3%**.



3.2.1.1 — Standards Progress Score of SY 2023-24 with Four-Point Scale

Using the actual four-point scale implemented by tutors in SY 2023-24, **OTMS students demonstrated a growth score of 34.8%.**

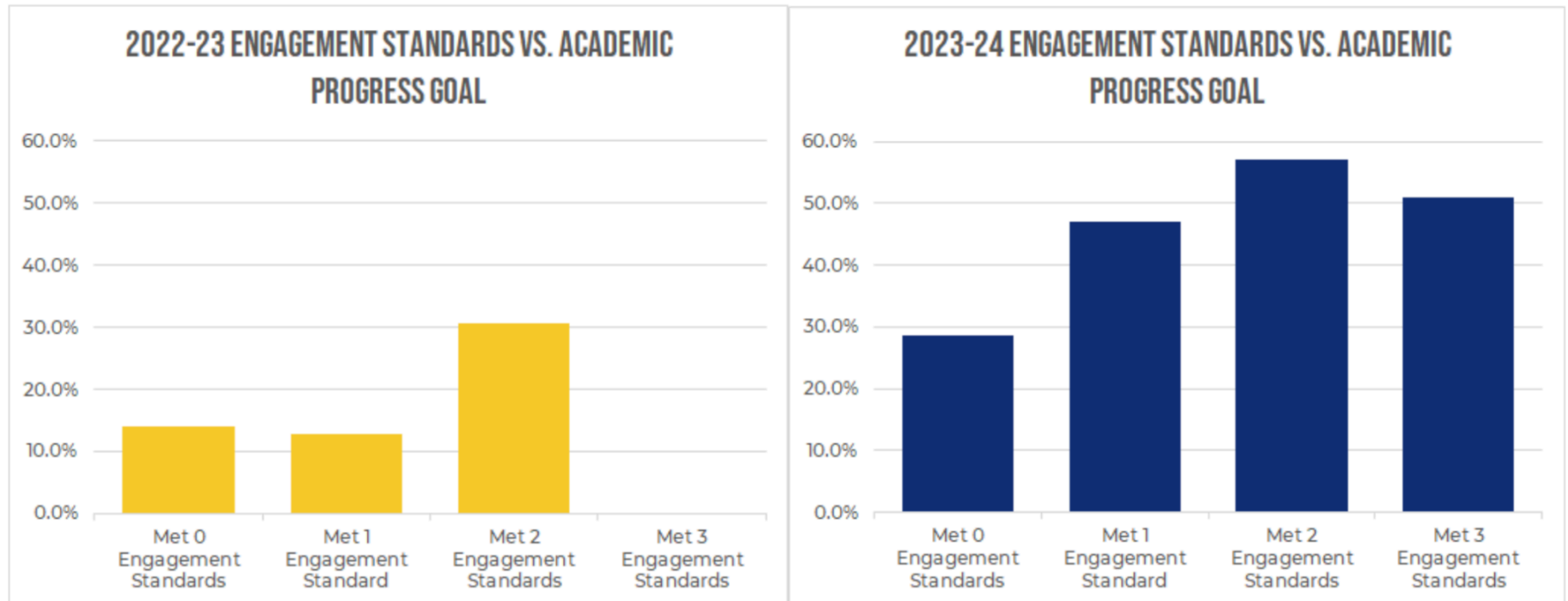


3.2.2.1 — Key Metrics vs. Percent of Students Reaching Growth Goal

While comparing students using the Standards Progress score presents challenges, we anticipate that students meeting all three key metrics—**70% attendance, 80% participation, and at least 10 contact hours**—would demonstrate more significant academic improvement than those meeting only a subset or none of the metrics.

The illustration below highlights the percentage of students who achieved the Standards Progress growth goal (33%), grouped by the number of key metrics they met.

- **SY 2022-23:** Only **18.4%** of students reached the growth goal.
- **SY 2023-24:** This percentage increased significantly to **52.6%** of participants.



We were surprised to find that a lower percentage of SY 2023-24 participants who met all three engagement criteria (70% attendance, 80% participation, and 10 contact hours) reached the academic progress goal (33% improvement) compared to those who met only two of the engagement criteria.

Upon reviewing the data for students who met all three engagement criteria but did not achieve the academic progress goal, an explanation emerged: their average baseline scores were nearly 2.5 times higher than those who met all three criteria and did reach the goal. As discussed earlier, these students had less room for growth with the formative assessment scoring tool.

² Our original standard was 50 contact hours, but the limitations addressed in the introduction limited us to 10 hours as a key metric.

4.0 — Findings Summary

Anders Erickson popularized the concept of Deliberate Practice, which is a “period of deliberate effort to improve performance in a specific domain.”³ This concept is equally applicable to organizations and programs. Data-driven decision-making on both sides of a partnership can significantly enhance student outcomes.

At Overland Trail Middle School, leadership thoughtfully leveraged feedback data from the first year of our partnership to improve the engagement metrics of their participants. As a result, students in SY 2023-24 attended sessions more consistently, were more engaged, and reported better experiences than SY 2022-23. **These improvements contributed to an approximate 100% increase in academic growth.**

While Cognition implemented programmatic changes based on the feedback from the scheduled meetings, the most critical role was providing up-to-date, actionable data to facilitate real-time adjustments. In Erickson’s terms, the hallmark of excellent performance is recognizing and responding to patterns. By applying these principles through our learning partnership practices, Overland Trail Middle School and Cognition collaboratively improved students' academic outcomes.

³ *The role of deliberate practice in the acquisition of expert performance.*

By Ericsson, K. Anders, Krampe, Ralf T., Tesch-Römer, Clemens
Psychological Review, Vol 100(3), Jul 1993, 363-406

Appendix A — Cognition Metrics

A.1 — Engagement Metrics

Student engagement was measured using four key indicators: attendance percentage, participation (as measured by the tutors at the end of each session,) contact hours, and a daily student survey.

Attendance

- Attendance percentage
 - Percent of scheduled sessions that a student attended
- On-time/late
 - Percent of scheduled sessions that a student arrived in the first 5 minutes
- Contact hours

- Total number of hours a student was in session with a Cognition tutor and their group.

Tutor Feedback

- Measured across three categories:
 - Persevered with Tasks
 - Listened Actively to Peers and Tutor
 - Participated in Discussions
- Measured on a five-point Likert scale daily by the tutor:
 - 0% of the session time
 - 25% of the session time
 - 50% of the session time
 - 75% of the session time
 - 100% of the session time
- Three category scores averaged for an overall “participation” score
- Tutor comments
 - Narrative of each day's session that records student progress and misconceptions

Student Feedback

- A survey was administered at the last minute of each session.
- **Measured on a four-point Likert scale:**
 - Strongly Agree
 - Somewhat Agree
 - Somewhat Disagree
 - Strongly Disagree
- Kindergarten through 4th-grade students had a descriptive emoji added to the scale for clarity.
- Measured across four categories:
 - My tutor talks to me about my work to help me understand my mistakes (Tutor Relationship)
 - I take turns, listen to, and work with others in my session (Collaborative Learning)

- Right now, I understand more of what we covered than when we started (Conceptual Understanding)
- I don't give up when the material is challenging (Productive Struggle/Growth Mindset)

A.2 — Academic Progress Metric

Student academic progress was measured through a series of mastery checks embedded in each lesson. These served multiple purposes. The initial check served as a baseline assessment. Subsequent mastery checks informed instruction. The highest subsequent check was used as the final measure of student mastery.

Standards Progress

- Measured by the tutor
- Mastery Check problems are embedded in the lessons.
 - Tutors assess students on the cadence dictated by the C&I instructional design.
- Direct observation of student mastery by the tutor
 - For math, tutors look for:
 - Correct answer
 - Students must show work required to get the correct answer
 - Students must explain their thinking
 - For ELA/Reading, tutors look for:
 - Correct answer
 - Students must show evidence from the text
 - Students must explain their thinking
- Measured with two different scales for the two school years
 - School Year 2022-23 Scale
 - No Understanding (0%)
 - Partial Understanding (50%)
 - Complete Understanding (100%)
 - School Year 2023-24 Scale
 - Emerging (0%)
 - Partially Proficient (33%)
 - Approaching Proficient (66%)
 - Proficient (100%)

- Cognition's goal is conceptual mastery for students.
 - Therefore, standards are generally addressed across multiple sessions.