Numeracy Needs Assessment

Concluded November 2023

Background

The decision to conduct this evaluation was driven by three major factors. First, through our continued partnership with MAPLE at Georgia State, we regularly receive updates on student achievement, including trends post-pandemic. When reviewing these results in early 2023, we found that growth in math national percentile ranking, particularly upper elementary and middle school, has progressed at a slower rate than expected. Next, the 2023-2024 school year was also a significant transition year with the new Georgia K-12 math standards being implemented. The last factor that influenced this evaluation was related to the changes in the Continuous Achievement policy.

Evaluation Questions

1) What proportion of students are participating in **Continuous Achievement** across zones and various populations?
2) How does performance in 8th grade Algebra I differ for students who are in **advanced, enhanced, and accelerated math** in 5th grade compared to students enrolled in grade level math in 5th grade?
3) Are 6th and 7th-grade **Continuous Achievement** students outperforming their on-level math peers?
4) What **numeracy instructional strategies** are used at the school and classroom level?
5) What is **teacher efficacy** around math instructional strategies?

Methodology and Data

Methodology

This evaluation was a three-part study. It included a quantitative study of the Continuous Achievement framework, a qualitative study of numeracy instructional strategies, and a qualitative study of teacher efficacy. Two teacher survey administrations were conducted in the spring of 2023. The Instructional Strategies Survey was sent to all K-12 math instructors in the district and had a 19% response rate. The Pulse Survey, a short survey to capture day-of math instruction, was sent to 1,200 teachers at the 21 schools selected for focus groups. The Pulse Survey had a response rate of 10%. Focus groups were conducted at 21 schools with individuals who were identified by principals as math instructional leaders. One elementary, middle, and high school was selected from each of the seven zones and were sampled to be representative of the district's race/ethnicity, economic status, and student performance. Instructional leaders included principals, assistant principals, math coaches, school improvement specialists, department chairs, professional learning community leaders, and grade-level teacher representatives. Findings reflect themes triangulated from the surveys and focus groups.

Data

Quantitative data to determine the impact of Continuous Achievement included two different data sets for the performance analyses. The first is the *cohort data*, which focuses on the cohort of students who were in 8th grade in the 2022-23 school year. It includes their demographic data, course enrollment, and test scores from 4th-8th grade. Most importantly, this data allows us to control for prior academic performance when looking for the impact of Continuous Achievement on Algebra I EOC and Milestone exam scores. The *snapshot data* focuses on students who were in 6th, 7th, and 8th grade in the 2022-23 school year. It includes their demographic data, course enrollment, and test scores for that school year.

Results

Continuous Achievement

- Participation in Continuous Achievement correlated with higher scores on grade-level Milestones exams, particularly for 6th and 7th-grade Milestones exams. However, findings suggest that enrollment in Continuous Achievement at the beginning of middle school may not lead to meaningfully higher scores on Algebra I End-of-Course (EOC) exams.
- In general, 7th and 6th grade students enrolled in Enhanced math courses demonstrated lower or comparable performance to those enrolled in Advanced courses. This suggests that the removal of Enhanced Math, as part of the changes to the Continuous Achievement Policy, is unlikely to have a negative impact on student performance.
- Students who took 5th-grade Accelerated math during the 2019-2020 school year scored, on average, 10 points higher on their 8th-grade Algebra I End-of-Course (EOC) exam compared to those who took on-level math in 5th grade. However, despite this advantage, the Accelerated students consistently achieved the proficient level on the EOC exam rather than reaching the distinguished level.
- Students in Zones 4-7 are 1.5 to 2 times more likely to be in a Continuous Achievement course than in Zones 1-3. This shows that access and participation in Continuous Achievement varies among zones.

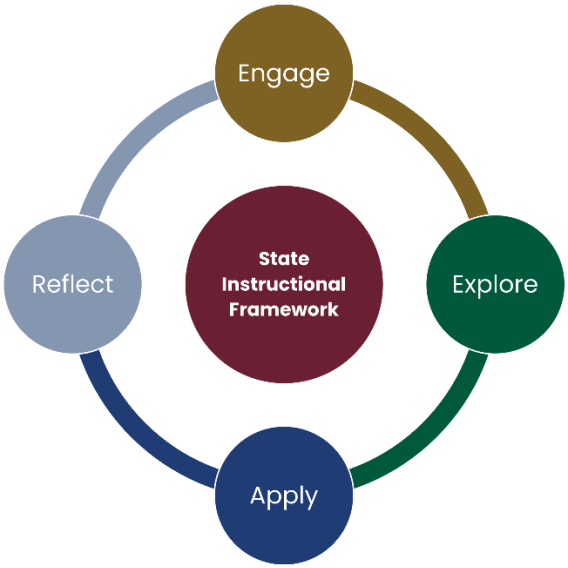
District Supports

- Coaches and administrators shared that their zone and district specialists have been responsive to problems that arise and regularly visit the school building.
- Despite 50-60% of teachers agreeing or strongly agreeing that the instructional learning plan and math hub materials are relevant, approximately 30% found that both resources don't have enough depth or explanation, and they feel unclear about how to integrate direct or guided instruction specifically with the state's Engage and Explore resources/activities.

Math Instruction in FCS

- Teachers and students at all levels are shifting their mindsets to become more comfortable with discourse and collaboration.
- Participants expressed a desire for increased resources to facilitate differentiation, catering to both remediation and enrichment needs. This encompasses materials aimed at supporting English speakers of other languages (ESOL), students with disabilities, and students performing below grade level. This includes, in part, the heightened focus on long, word-based problems and activities found in the new standards.
- Professional Learning Communities (PLCs) are spending considerable time rethinking and rearranging the lessons and materials from the district instructional plans and supplementing them where materials are missing.
- Teachers reported that a common issue among students is a lack of prerequisite knowledge because of the change in the order and units and certain topics not yet being covered due to the new Georgia math standards.

Figure 1



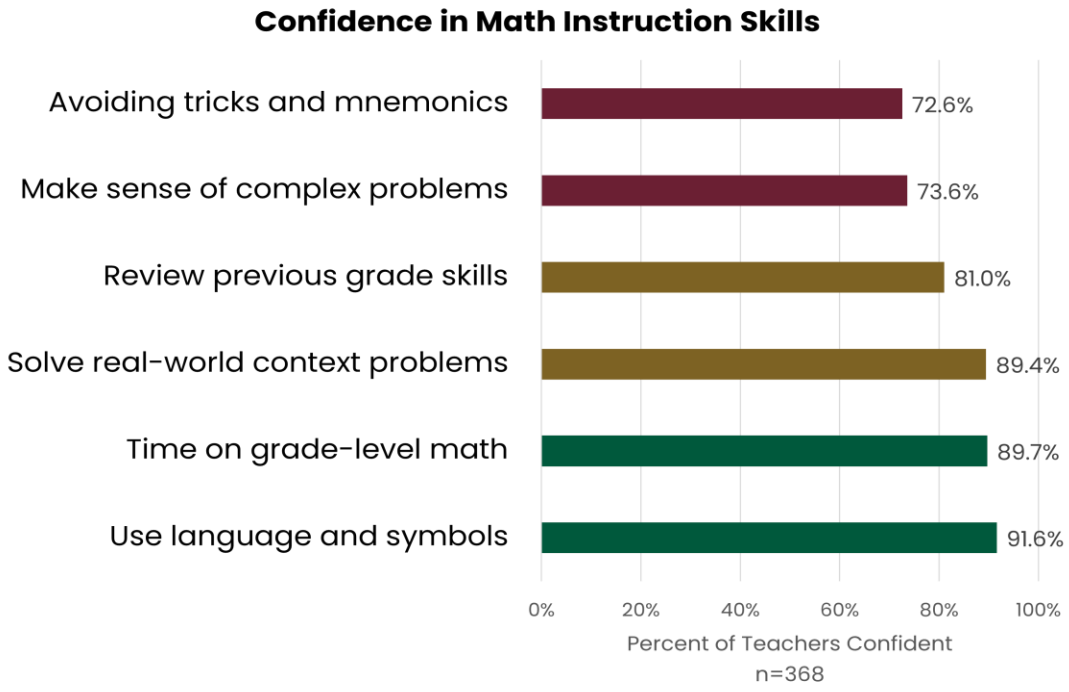
Teacher Efficacy

Teacher efficacy, as defined by Hoy, refers to teachers' confidence in their ability to promote students' learning. This information is derived from perceptions gathered from teachers and instructional leaders through evaluation surveys and focus groups.

As illustrated in Table 1, a considerable proportion of teachers indicated a confidence level of seven or higher on a 1-10 scale. Teachers demonstrated high confidence in their math instructional abilities, especially in employing mathematical language and concentrating on grade-level math content. However, teachers exhibited less confidence in certain areas, such as addressing gaps in students' knowledge, supporting students in persisting through complex problems and refraining from using teaching mnemonics.

Teachers and instructional leaders voiced a desire for an explanation of the philosophy of math instruction and concrete exemplars of instruction using the new state instructional frameworks (Figure 1).

Table 1



Limitations and Considerations

When reviewing the data gathered, it is crucial to consider the recent changes to the math standards by the state. This includes understanding issues with pacing and missing concepts and skills. Some of the areas for improvement in math instruction are not in direct control of the district. However, some changes can be made to help improve instruction for our students. It is also important to note that though Continuous Achievement correlates with higher scores, this does not help to determine if participation has led to growth or if scores are higher because higher-performing students are placed into Continuous Achievement.

Conclusion

In conclusion, while not all barriers mentioned fall directly under the control of the district, there are actionable steps the math department can take to address professional development needs and support teachers and instructional leaders:

- Providing opportunities for teachers to observe instructional strategies in action through in-person modeling and video demonstrations.
- Offering additional communication and training on research supporting the new instructional framework to enhance understanding of the "what and why" of math instruction.

Furthermore, several recommendations for professional development are already in progress for mid-year implementation:

- Collaborative professional development sessions led jointly by the Assessment and Math departments to unpack assessments and frameworks, ensuring teachers grasp the rigor of the standards.

- Curating AI resources to train teachers in utilizing AI for targeted differentiation.

For Continuous Achievement, the district should consider:

- Clearly defining what Tier 1 instruction looks like at different levels of math proficiency: On, Advanced, and Accelerated.
- Initiating a long-term study to investigate whether prolonged enrollment in higher-level math classes correlates with academic growth (i.e., changes in performance over time) rather than solely attributing higher scores to the selection of top-performing students for these classes.
- Refining the selection and screening processes to ensure schools have a clear understanding of criteria and qualifications for students in continuous achievement.
- Analyzing patterns of student identification across the district and within individual zones to prevent under-identification of eligible students.

Implementing these recommendations will bolster the district's efforts to support teacher development and enhance student achievement in mathematics.