<p align="center">Tracking Meaningful Student Data
Donald Thompson – Mathematics Teacher – Anacostia SHS</p>

Research Question - How does Mindprint Learning impact secondary math teachers' use of student data to prepare purposeful learning experiences that maximize student learning?

Rationale -This qualitative case study **results from investigations of** District of Columbia Public Schools (DCPS) math teachers **on** how cognitive skills impact academic success. The Cattell investment theory of capability is the theoretical foundation of this study, which states that cognitive skill is a 50 to 60 percent foundation of student achievement outcomes, which explains learning capacities across formats and environments and determines the most effective and efficient instructional delivery methods for a learner.

It is essential to make data-informed decisions to improve teaching and student outcomes. The case study will focus on eleven secondary math teachers and one instructional coach who use data trackers to improve teaching and learning. Accountability policies have led to increased teacher data use levels, teachers have begun to increase the extent to which students track and analyze data to improve teaching and learning.

In the current school settings, math teachers and instructional coaches meet bi-weekly as a PLC for data talk as accountability levels have increased. During these data talks, the guided questions for teachers focus on 1) what do we want our students to know? 2)How will they know they have learned it? 3) How will we respond when students do not learn? 4) How we extend the learning for students who are already proficient? And 5) Reflection. The guided questions unpack the standards-aligned, identify key teaching strategies, and evaluate students' proficiency levels who mastered the standard. Then used the data to plan intervention and extension strategies and evaluate how effective the teaching strategy used for the cycle to reflect on future instruction. The current data is helpful, and it is essential to make data-informed decisions to improve teaching and student outcomes. However, in the absence of cognitive data, teachers rely on guesswork and intuition when students do not perform or behave in optimal ways to prepare for instruction in the virtual and in-person environment.

Lastly, the Mindprint learning profile provides a comprehensive whole-child learner profile beyond the focus on students' past performance to include reliable data on students' variability in cognitive skills non-cognitive skills (i.e., self-control). The science of learning: using cognitive data to personalize instruction states that achievement data is not enough. They provide valuable insight into students' mastery, but they do not tell why a student struggles and what specific types of support they need.

Literature Review -

- Gómez-Veiga, I., Vila Chaves, J. O., Duque, G., & García Madruga, J. A. (2018). A new look to a classic issue: Reasoning and academic achievement at secondary school. *Frontiers in psychology*, *9*, 400.
- Leeson, P., Ciarrochi, J., & Heaven, P. C. (2008). Cognitive ability, personality, and academic performance in adolescence. *Personality and Individual Differences*, *45*(7), 630-635.
- Peng, P., & Kievit, R. A. (2020). The development of academic achievement and cognitive abilities: A bidirectional perspective. *Child Development Perspectives*, *14*(1), 15-20.

Instruments and Data Sources - The data **was** from a pre/post questionnaire, six weekly reflections aligned with the Mindprint Learning trainer's professional development. The weekly reflections of participants were collected from February and April 2021, focusing on the science of learning, complex reasoning, executive functions, memory, and efficiency bi-weekly PLCs facilitated by Mindprint. During the PLCs, Mindprint reviewed individual student strengths and

needs and recommended the whole class and individual strategies associated with the Mindprint student assessment. The students completed a one-hour assessment at the inception of the study to support the PLCs. The data analysis is a combination of quantitative (student profile analysis) and qualitative (teacher reflections) measures.

Data Analysis

A. Student Profile Analysis

Students' Mindprint performance is **consistent with other schools with a high percentage of FRL**

•Most students were struggling with executive functions. Weak executive functions can mask full capabilities.

•Most students with much stronger visual than verbal skills.

Since struggles are the norm, **teach to** your students' norm!

•Systematically address *executive function challenges*. If students cannot pay attention, they cannot learn (it is not something they can control).

•Present curriculum with more visuals: images, visual aids, graphic organizers. Content and standards do not change; presentation does!

Despite challenges, percent of **gifted learners** *is consistent with national norms.*

B. Selected Teacher Reflections

A new lens on learners

"The student's academic performance does not reflect the capabilities of - normal data points are one-dimensional. It does not identify the student's strengths and weaknesses. I prefer to do a MindPrint assessment at the beginning of the school year to plan for student instruction effectively."

Beneficial for everyone

"There is a need for teachers, students, and administrators to complete a MindPrint assessment as a reflection tool. All involved in the educational process need to be able to make decisions that support the typical student, and the talented and gifted."

Improving practice

"If we know how our students think and learn, we can tailor our instruction to them to create a more efficient learning environment."

"Beneficial in planning and where to focus attention when supporting specific students' needs. "

Not incremental work

"Thinking of methods we know already can only enhance what we need to know when we have a clear roadmap."

Recommendations:

DCPS should engage in a process that provides the beginning of the year Mindprint Assessment of students, especially in the transitions of children going from Kindergarten to 1st grade, elementary school to middle school, and from middle school to high school to support student learning and improve teaching strategies. Mindprint data provides an additional layer of insight to enable teachers to provide the most effective instructional support for each student. Cognitive ability is central to predicting academic outcomes and job performance and job type (Leeson & Heaven, 2008; Gómez-Veiga, I., Vila Chaves, J. O., Duque, G., & García Madruga, J. A. ,2018) to adequate track meaningful student data.

References

Gómez-Veiga, I., Vila Chaves, J. O., Duque, G., & García Madruga, J. A. (2018). A new look to a classic issue: Reasoning and academic achievement at secondary school. *Frontiers in psychology*, *9*, 400.

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