Ashley Martin
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Action Research Project
Course 320/520 and 330/530

STANDARDS BASED MATH INSTRUCTION IN UPPER ELEMENTARY

Abstract

Eureka Elementary, a district run school located in California, is home to approximately 275 students of diverse backgrounds, including an influx of newcomers from Latin America and the Middle East. With historically low test scores in math, the coach team conducted several observations, gathering data to determine the root causes for our unacceptable performance on state measures. From those observations, the data showed a disconnect in instruction between the intended standard for the lesson and the task students were completing. The research supports the need to develop teacher pedagogical content knowledge, understanding of the common core standards, including the shifts, and best practices for adult learning in impacting change. To build our teams pedagogical content knowledge in math, understanding of standards and the shift in common core, our coach team implemented a six week cycle of professional development cycle using best practices from adult learning theory. Data collected throughout the PD series were analyzed including researchers observation and meeting notes, teacher lesson plans, and end of cycle reflection survey showed that there was a shift in teacher's conceptual understanding of math and how those concepts build through the grades. Teachers reported that peer observations with structured debriefs, as well as,

opportunities to solve math problems in collaboration with peers and content specialist had the highest impact on their learning.

Context

I currently serve as the principal of Eureka Elementary, a full-service community, STEAM (Science, Technology, Engineering, Art, Math) academy with a focus on the environmental sciences. It is our hope that through this work, our school community will help create a green space in a historically polluted area and increase student and community knowledge about asthma, pollution, sustainable living, and obesity. Additionally, we hope that our students will become active participants in protecting our natural resources and lead their community in the same direction. Our mission is to provide high quality 21st century instruction in all content areas through project based and personalized learning. We also strive to maximize our existing resources and community partnerships, in order to serve every students' needs and ensure that they are college, career, and community ready.

Eureka has 272 students in grades TK-5; 43% of the student body are Latino, 39% are African American, 8% are White[1] and 4% are Asian. Also, 46% of our students are English Learners, of which 8% are newcomers, having only been in the country for less than 3 years. Additionally, 6% of our school population are students with disabilities and 98% qualify for free and reduced lunch services.

Eureka's teaching team is made up of 11 full-time classroom teachers (TK/K combo class, 1 kindergarten class, 2 first grade classes, 2 second grade classes, 2 third

[1] Please note that most of students coded as "White" in OUSDs demographic data are actually Yemeni Newcomers.

grade classes, 1 fourth grade class, a fourth/fifth grade combo class, and 1 fifth grade class). Of those 11 teachers, four have 0-2 years experience, two have 3-5 years experience, and five range from 10 years experience to 20+ years in the classroom. Additionally, all of the five teachers with 10+ years of experience have been at Hoover for the length of my tenure as principal.

As for instructional support staff, Eureka has two full time teachers on special assignment (TSA), otherwise known as instructional coaches. One TSA focuses on ELA and the other Science, Technology, Engineering, Art, and Math (STEAM). Each TSA has 15+ years of experience in education. Eureka's instructional coaches are tasked with supporting adult learning through individual coaching cycles for new teachers, attending bi-monthly grade level PLCs, and leading weekly professional development (PD) every Friday for 2 hours. The two instructional coaches and I make up the "coach team", which meets weekly. During the coach team meetings, we conduct classrooms observations focusing on standard-task alignment, calibration on feedback and ensuring fidelity to programs and systems. We also review data to determine supports for teacher collaboration and plan for upcoming PD. In addition, I hold individual meetings with each coach to provide feedback and guidance on their personalized action plan for the year.

At Eureka, we strive to have an effective distributive leadership model. Teacher leadership at our school is comprised of two team structures: one focused on instruction, the Instructional Leadership Team (ILT) and one focused on our school's culture and climate, the School Culture Team (SCT). The purpose of the ILT is to increase student achievement in all academic areas and the purpose of the SCT is to promote a safe

learning environment where students thrive social-emotionally and academically. Both teams are charged with representing the teacher community through collaborating with the administration to support the implementation of the school's annual priorities, using data to provide feedback on what is working and what is not in actualizing the school's mission and vision, and to develop their own teacher leadership skills. Both teams have three teachers leaders that participate and meet weekly for an hour and a half.

The K-5 instructional programs at our school for English language arts and science consists of a Balanced Literacy Framework that pulls from multiple curricula i.e. Systematic Instruction in Phonological Awareness, Phonics, and Sight Words (SIPPS), Words Their Way, Lucy Calkins' Reading and Writing Workshop and FOSS Science. For math instruction, we have traditionally used the district adopted program. Most recently, the district adopted Math Expressions with an additional resource called the Core Curriculum Guide. The Core Curricular Guide was created by a district wide teacher leadership task force. The guide modifies the Math Expressions lessons, and provides embedded performance tasks for assessments and pacing guides. However, this year our teaching staff and coaches decided to pilot the Eureka Math curriculum, formerly known as Engage NY. The reason for the pilot was because our teachers reported their dissatisfaction with the district adopted math curriculum and wanted a program that was "easier to follow".

Problem of Practice

Less than 10% of students at Hoover have reached proficient or advanced on the summative standards assessment, Smarter Balanced Assessment Consortium (SBAC) exam, in Math and English Language Arts (ELA) since its first implementation in April

of 2015. In spite of improving school culture and climate, implementing personalized learning programs to address student's unfinished learning, and providing professional development on district adopted instructional programs, we have not increased student outcomes on standardized state measures.

In February of 2017, the coach team attended the UnboundEd Standards Institute, a five day conference that is designed to build, improve, and sustain equitable instructional excellence in ELA, math, and leadership, in order to build our capacity to effectively coach teachers around understanding the common core learning standards and the shifts in ELA and math (UnboundED, 2018). This conference shaped the way our coach team thought about school wide instructional systems change and how to ensure our students receive high quality, rigorous instruction that is aligned to the shifts in the common core. From the conference, one of our key learnings in ELA was the importance choosing complex text and how to effectively use text dependent questions to increase the rigor of teaching grade level reading standards. For math, our key takeaway was the importance of giving students multiple opportunities to grapple with mathematical concepts in order to develop their conceptual understanding before being introduced to procedural solutions/algorithms. At our end of conference debrief, our team discussed how we may approach improving our school wide practice in these two areas. Reflecting on observations and coaching cycles with our teacher teams, the coaches expressed the need for developing teachers' understanding of the content and strengthening their ability to align tasks to common core learning standards. They also reflected on the fact that our teaching team has not received adequate school based training in these areas of practice.

At our ILT beginning of the year retreat for the 17-18 school year, the coach team and ILT sought out to define our collective focus for instruction over the next three years. The coaches, who attended the UnboundED Standards Institute, brought in their knowledge of the instructional core and importance of fully understanding the common core standards in relation with the shifts and content. In the retreat, the team also discussed the importance of instructional rigor and using data to drive instruction in order to support student mastery of grade level content. After a lengthy discussion and facilitative process, our team agreed that our school wide goal by 2020 is for every teacher to master the following four components of quality instruction:

- ⇒ Use data-driven instructional practices to achieve significant growth for ALL Hoover students.
- ⇒ Create vertical alignment through co-constructing a common vision and implementation around effective instructional practices for ALL students.
- ⇒ Deliver standards-based instruction in which the standards, objective and task are aligned.
- ⇒ Instructional rigor (students are doing the heavy lifting).
- ⇒ Facilitate collaborative learning (partner, group work, student-to-student discussions).

Next, our team was faced with the challenge of prioritizing each of these components into an action plan that would be implemented over a three year period.

To determine what to focus on first and build from our current areas of strength, data was collected through a school wide observational walkthrough with a focus on the components of quality instruction our team identified in our 2020 plan.

<u>September 2017 Observational Walkthrough Low Inference Data:</u>

- *5 of 11 classrooms has student friendly objectives aligned to grade level standards*
- *3 of 5 classrooms with standards based objectives are led by new teachers*
- *3 of 11 classrooms teachers were on pacing according to their instructional plans submitted at the beginning of the cycle.*
- *9 of 11 classrooms teachers were in front of the classroom doing direct instruction and holding the cognitive load.*

- *2 of 11 classrooms had students who were actively engaged in conversation with each other or reading and writing independently*
- *4 of 11 lessons aligned to grade level standards were implemented using adopted curriculum.*

After the first round of instructional walkthroughs, I decided to examine further why only 3 of 11 teachers were on pacing according to their instructional plans and the relationship this has to standards, objective, and task alignment through a second observational walkthrough.

<u>October 2017 Observational Walkthrough Low Inference Data:</u>

- *3 of 11 classrooms clearly had standards and objective alignment*
- *9 of 10 classrooms observed tasks were partially aligned (due to implementation lacking in rigor) to grade level standards*
- *5 of 10 tasks were math.*
- *1 of 10 task was science.*
- *2 of 10 task was reading comprehension.*
- *1 of 10 task was writing.*
- *1 of 10 task was reading foundational skills*
- *1 of 10 class was transitioning to preparation/enrichment period*

I brought data from both observational walkthroughs to the coach team to unpack their perspectives on why we are seeing low standards, objective, and task alignment across the school and off track pacing from a majority of teachers. I focused our conversation on math because in the second observation 5 out of 10 lessons observed were math and only 3 out of 11 had clear standards and objectives on the board, none of which were math, and we were in our first year of implementing a new curriculum. The coach team conversed about their experience in supporting teachers over the past two years at our school. The coaches both shared that they have watched teachers implementing math content incorrectly or communicating strategies in a confusing way. From here, we engaged in a conversation about how to most effectively address the

content misconceptions of the instructor, which led us into a lively discussion about the importance of pedagogical content knowledge. Coaches explained that most teachers know they need to differentiate to address students unfinished learning; however, due to a lack of content knowledge and general understanding of how the curriculum is organized, the instructional decisions they are making to modify the lesson plans has been largely ineffective. Based on analysis of school wide data, our students generally do not have procedural fluency[2], nor do they have a strong conceptual foundation. As a result, when teachers were implementing the EngageNY curriculum with fidelity, it was taking an average of 2 - 2 ½ hours to complete one lesson. The EngageNY lesson plans are designed so that the problem set increases in complexity and students are given 20 minutes to finishes as many problems as they can. For example, the first problem is Depth of Knowledge (DOK) level 1, where problem 10 is DOK 4. As a result, many of our students were only get through the first few problems due to their gaps in knowledge, which meant that they were not given access to questions with a higher level DOK, and thus not working on rigorous grade level content. This raised the dilemma that teachers needed to modify the lessons plans to provide students with access to grade level content, however, currently they did not have the content knowledge to make those strategic instructional decisions effectively. Recognizing that our students were not being given the opportunity to solve rigorous, standards based problems, our coach team named this equity issue and agreed we urgently need to address this for our school.

[2] Procedural fluency is defined by the National Council of Teachers in Mathematics as: the ability to apply procedures accurately, efficiently, and flexibly, to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognize when one strategy or procedure is more appropriate to apply than another.

Furthermore, we shared the observational walkthrough data with the ILT and opened space for a discussion on why team thinks there is a lack of standard based instruction happening across the school in math. After reviewing the notes from this conversation, three assumptions came to light. The first assumption was that teachers spend too much time on unaligned projects i.e. Paper Mache globes, decorating pumpkins for Halloween etc. The second assumption was that we have many students with TIER II and TIER III behavior challenges that are disrupting the learning environment and teachers can't get through their planned lessons. Third, the teachers named that they did not receive adequate training on the new curriculum they are teaching and wanted to learn how to effectively implement EngageNY. A veteran teacher referenced the Open Court program, where teachers attended a multiple day conference to learn how to effectively implement the program with fidelity, and made the argument that a similar opportunity for EngageNY would be helpful for our team.

To focus the conversation further, we shared last years' SBAC scores with the ILT. After analyzing the data, there was a reflection that even though behavior wasn't an issue in the 4th/5th grade classrooms in the 2016-2017 school year, the 4th and 5th grade students still did not meet or exceed standards on the math SBAC. This was a contradiction to their second assumption that behavior management was a barrier to getting through the curriculum. Unpacking this further, the coach team shared the dilemma they named around students having gaps in learning and as a result teachers needing to modify EngageNY lessons plans. They were also transparent that based on observations, in some cases teachers struggle with the content and making those instructional decisions effectively. The ILT recommended a PD cycle where teachers

were given the opportunity to unpack the EngageNY curriculum, specifically how it is designed to support standards based instruction, and how to best modify the lesson plans to provide both differentiation and access to rigorous grade level content, all while staying on pacing.

After the ILT meeting, our coach team felt strongly that we needed to focus our work on standards based instruction in math to address equitable access to rigorous grade level instruction. From here, the team discussed implications for our work ahead, specifically how can teacher professional development, collaboration and coaching support our goals around standards based instruction in math, more specifically increase standard, objective, task alignment and increase teacher pedagogical content knowledge in math. In order to focus our support and be strategic around implementation, our team decided to focus on teachers in grades 3rd - 5th, and in addition, our kinder teacher who teaches strictly math.

As a result of the observational walkthrough data, discussions grounded in data with instructional coaches and the instructional leadership team, the problem of practice for this action research is: 3rd – 5th grade teachers are not planning rigorous math lessons aligned to mastery of grade level standards.

Literature Review

Introduction

The Common Core Learning Standards (CCLS) were first introduced in 2009, when state leaders came together to standardize our national definition of proficiency for grade level learning targets. In doing so, they created for many states including

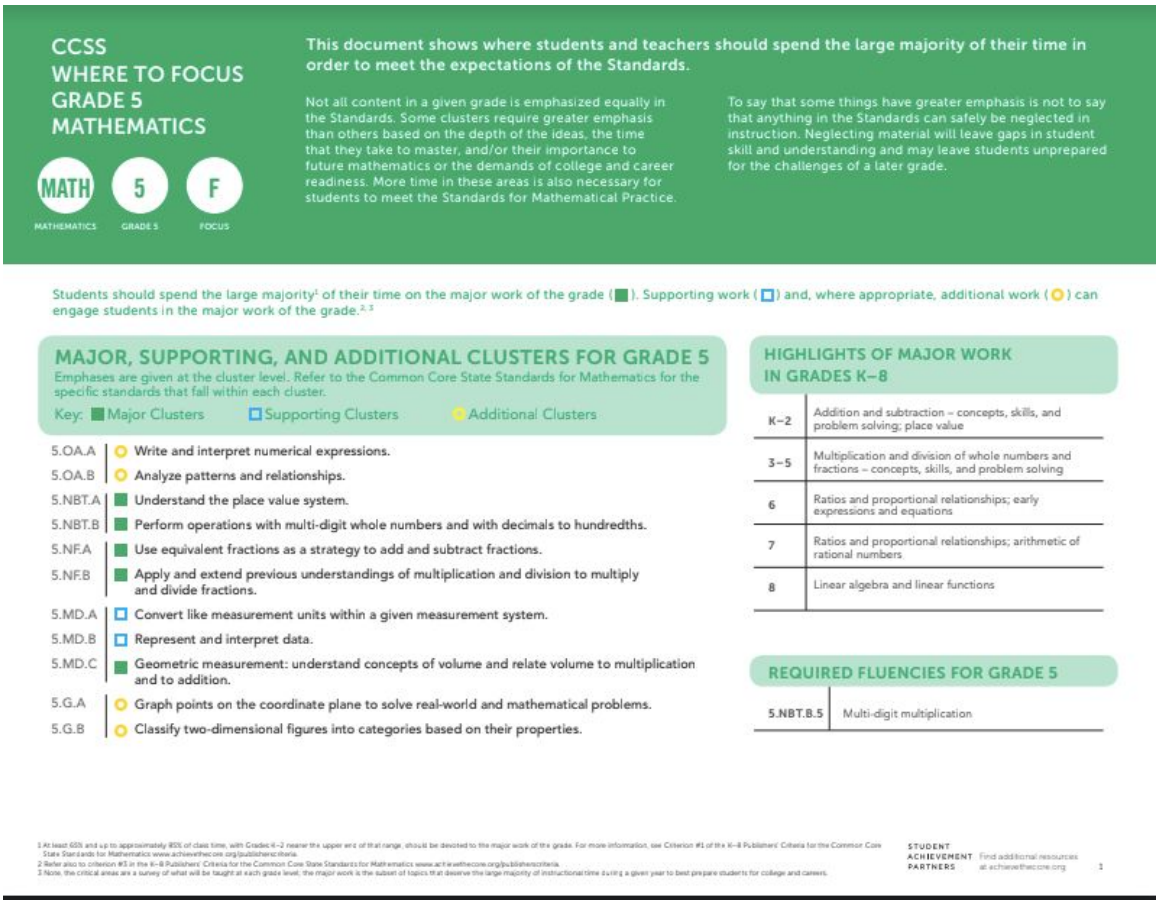
California, a more rigorous instructional framework that focused on college and career readiness (Common Core State Standards Initiative, 2017). The purpose of this literature review is to unpack the complex and challenging expectations of teachers given the new set of standards for student learning and how to best support teachers around increasing their understanding of the standards and deepen their pedagogical content knowledge.

Shifts in the Common Core

The three shifts in the Common Core Learning Standards for mathematics are Focus, Coherence, and Rigor (Common Core State Standards Initiative, 2017).

Focus is a shift in the new framework because the former standards covered a wide range of concepts in each grade, and the new standards push both teachers and students to deepen their understanding of a few core mathematical concepts and the dtime to develop strong procedural fluency (Alberti, 2012). Student Achievement Partners (SAP), a nonprofit organization dedicated to improving K-12 student achievement through evidence-based action, breaks down each grade level content standards into three categories: the major work of the grade, supporting work, and additional work (Student Achievement Partners, 2018). Exhibit 1.1 is an example of a planning tool created by SAP and identifies the major clusters, supporting cluster and additional clusters for each grade level. The SAP recommends that teachers use this document as a guide in supporting long term and short term planning.

Exhibit 1.1



CCSS
WHERE TO FOCUS
GRADE 5
MATHEMATICS

MATH (MATHEMATICS) 5 (GRADE 5) F (FOCUS)

This document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the Standards.

Not all content in a given grade is emphasized equally in the Standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the Standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Students should spend the large majority[1] of their time on the major work of the grade (■). Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade.[2, 3]

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 5

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters □ Supporting Clusters ○ Additional Clusters

5.OA.A	○	Write and interpret numerical expressions.
5.OA.B	○	Analyze patterns and relationships.
5.NBT.A	■	Understand the place value system.
5.NBT.B	■	Perform operations with multi-digit whole numbers and with decimals to hundredths.
5.NF.A	■	Use equivalent fractions as a strategy to add and subtract fractions.
5.NF.B	■	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
5.MD.A	□	Convert like measurement units within a given measurement system.
5.MD.B	□	Represent and interpret data.
5.MD.C	■	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
5.G.A	○	Graph points on the coordinate plane to solve real-world and mathematical problems.
5.G.B	○	Classify two-dimensional figures into categories based on their properties.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

REQUIRED FLUENCIES FOR GRADE 5

5.NBT.B.5	Multi-digit multiplication

1 At least 65% and up to approximately 85% of class time, with Grades K–2 nearer the upper end of that range, should be devoted to the major work of the grade. For more information, see Criterion #1 of the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publishercriteria.
2 Refer also to criterion #3 in the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publishercriteria.
3 Note, the critical areas are a survey of what will be taught at each grade level; the major work is the subset of topics that deserve the large majority of instructional time during a given year to best prepare students for college and careers.

STUDENT ACHIEVEMENT PARTNERS Find additional resources at achievethecore.org 1

Susan Alberti also identified the same major work of the grade for each cluster in grades K-8 as Student Achievement Partners. She argues that educators must narrow the scope of content in each grade and deepen the time and energy spent on those topics if they wish to implement the Common Core Learning Standards effectively (2012)

Coherence is the second shift and speaks to how mathematical concepts for college and career readiness build upon each other from year to year in K-12 education. Coherence is important for teachers to consider because mathematical concepts do not work in isolation, rather they are interconnected (SAP, 2018). Alberti argues that the most important connections in the standards are vertical: the link from one grade level to the

next, which allows students to progress to more complex concepts in math (2012). In her work, "Making the Shifts", she gives a prime example of the vertical progressions:

> "in 4th grade, students must "apply and extend previous understandings of multiplication to multiply a fraction by a whole number" (Standard 4.NF.4). This extends to 5th grade, when students are expected to build on that skill to "apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction" (Standard 5.NF.4)" (2012)

Since the CCLS is designed through this coherence model, it requires teachers to help students connect across concepts and utilize their foundational skills and prior knowledge to build new understandings. See Exhibit 1.3 below for a snapshot of how the mathematical concepts in K-8 build each year through the CCLS.

Exhibit 1.3

WHERE TO FOCUS
GRADES K–8
MATHEMATICS

An important subset of the major work in grades K–8 is the progression that leads toward middle school algebra.

K	1	2	3	4	5	6	7	8
Know number names and the count sequence Count to tell the number of objects Compare numbers Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from Work with numbers 11-19 to gain foundations for place value	Represent and solve problems involving addition and subtraction Understand and apply properties of operations and the relationship between addition and subtraction Add and subtract within 20 Work with addition and subtraction equations Extend the counting sequence Understand place value Use place value understanding and properties of operations to add and subtract Measure lengths indirectly and by iterating length units	Represent and solve problems involving addition and subtraction Add and subtract within 20 Understand place value Use place value understanding and properties of operations to add and subtract Measure and estimate lengths in standard units Relate addition and subtraction to length	Represent & solve problems involving multiplication and division Understand properties of multiplication and the relationship between multiplication and division Multiply & divide within 100 Solve problems involving the four operations, and identify & explain patterns in arithmetic Develop understanding of fractions as numbers Solve problems involving measurement and estimation of intervals of time, liquid volumes, & masses of objects Geometric measurement: understand concepts of area and relate area to multiplication and to addition	Use the four operations with whole numbers to solve problems Generalize place value understanding for multi-digit whole numbers Use place value understanding and properties of operations to perform multidigit arithmetic Extend understanding of fraction equivalence and ordering Build fractions from unit fractions by applying and extending previous understandings of operations Understand decimal notation for fractions, and compare decimal fractions	Understand the place value system Perform operations with multi-digit whole numbers and decimals to hundredths Use equivalent fractions as a strategy to add and subtract fractions Apply and extend previous understandings of multiplication and division to multiply and divide fractions Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition Graph points in the coordinate plane to solve real-world and mathematical problems*	Apply and extend previous understandings of multiplication and division to divide fractions by fractions Apply and extend previous understandings of numbers to the system of rational numbers Understand ratio concepts and use ratio reasoning to solve problems Apply and extend previous understandings of arithmetic to algebraic expressions Reason about and solve one-variable equations and inequalities Represent and analyze quantitative relationships between dependent and independent variables	Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers Analyze proportional relationships and use them to solve real-world and mathematical problems Use properties of operations to generate equivalent expressions Solve real-life and mathematical problems using numerical and algebraic expressions and equations	Work with radical and integer exponents Understand the connections between proportional relationships, lines, and linear equations** Analyze and solve linear equations and pairs of simultaneous linear equations Define, evaluate, and compare functions Use functions to model relationships between quantities

The third shift is rigor. Rigor in the CCLS is composed of three aspects: conceptual understanding, procedural skills and fluency, and application. According to Student Achievement Partners, its is important that a teacher builds student conceptual understanding of a topic before introducing algorithm. The argument is that if students have a strong conceptual understanding of the content, then when they use the algorithm to solve the problem, they will understand the math they are using vs. just going through the steps to find a solution. With that said, the common core shifts still require students to have accuracy and fluency. Choosing the most efficient way to solve the problem is a component of procedural fluency and thus, rigor. Lastly, if a student truly understandings a mathematical concept, then they should be able to apply that knowledge in multiple problems and scenarios. This is the last component of rigor.

Pedagogical Content Knowledge

Pedagogical Content Knowledge (PCK) is a combination of teachers' deep and thorough knowledge of content and using their knowledge of how students learn, and how curriculum and instruction can be crafted to teach students effectively (Louks-Horsley et al, 1996). When teacher have a strong PCK, they listen to students ideas and pose questions that move them further in their conceptual understanding. They also need to be prepared to help students overcome their difficulties and to unravel misconceptions.

In their article, "Investigating the Development of Prospective Mathematics Teachers' Pedagogical Content Knowledge of Generalising Number Patterns through School Practicum," Akkoc and Yesildere Imre name studies that focused on teachers'

conceptions of mathematical learning which found that teachers' knowledge of students' thinking has led to more effective teaching than simply their specific knowledge of content alone.

Consequently, Richard Askey summarizes Liping Ma's research that argues student understanding of content is largely dependent on teacher's substantive understanding of content in his article, "Knowing and Teaching Elementary Math (1999)." Askey argues that Elementary teachers in the United States largely do not have the same content knowledge of teachers in other countries like China because instruction in our K-12 system has historically focused on "developing a little skill on routine problems (p. 6). He also analyzes what Ma called Profound Understanding of Fundamental Mathematics (PUFM) and connects that the Chinese teachers in Ma's study developed PUFM, not through their own educational experience or isolated PDs, but through extensive planning and intentional study of the material they were to teach students over the course of their career.

Askey and Ma's claim that teacher content knowledge has a high impact on student learning outcomes differs from Akkoc and Imre's claim that teacher's knowledge of students thinking leads to greater outcomes; however, both agree that teacher pedagogical content knowledge is imperative to students' success in acquiring deep conceptual understanding of math.

Effective Professional Development and Adult Learning Theory

Linda Darling Hammond's defines effective professional development as: structured professional learning that results in changes in teacher practices and improvements in student learning outcomes (Darling-Hammond, Hyler, and Gardner, 2017). In her recent study for The Learning Policy Institute, *Effective Teacher Professional Development*, Darling-Hammond outlines seven features of effective teacher professional development:

1. *Content Focused*
2. *Incorporates Active Learning*
3. *Supports Collaboration*
4. *Uses Models of Effective Practice*
5. *Provides coaching and/or expert support*
6. *Offers opportunity for reflection and/or feedback*
7. *Is over a sustained period of time*

Generally, an effective teacher professional development incorporates a number of these components simultaneously, but does not need to contain all seven to impact student achievement and adult practice (Darling-Hammond et al, 2017).

Similar to Darling Hammond, in her article, "A Primer on Effective Professional Development" Laura Desimone identifies similar aspects to effective PD for teachers, and takes it a step further by identifying ways to measure the effectiveness of the PD. In her conceptual framework, Desimone argues that in order to determine the successfulness of professional development, we should test for three kinds of outcomes: Do teachers learn? Do they change their practices? And, most important, does student achievement increase as a result? She notes that in the past, evaluating professional was often through a satisfaction survey at the end of a workshop. Desimone suggests that instead, using observations, interviews, and surveys are the most common ways to measure the impact

that professional development had on teacher experiences, learning and instruction (Desimone, 2009).

Conclusion

As a result of the research conducted on the importance of teachers' understanding the shifts in the CCLS for math, the importance of both content knowledge and pedagogical content knowledge, and best practices for adult learning, the theory of action for this action research project is:

If the instructional coach team provides PD and coaching on standards based instruction in math by providing teachers structured time to learn content, plan upcoming lessons with a grade level partner and engage in peer observations and peer debriefs, then 100% of participating teachers will organize lesson plans for mastery of grade level standards as measured by lesson plans, teacher perception, and classroom walkthrough data by Coach Team.

Intervention and Data Collection Plan

Based on research on the shift in the common core for mathematics, the importance of pedagogical content knowledge and theories of how adults best learn, the STEAM coach and I designed an intervention plan that addressed all three elements. The goal of the intervention was for all teachers in grades 3rd - 5th and one strand of K-1[3], to plan rigorous math lessons aligned to mastery of grade level standards. Through the intervention plan, teachers in grade level teams would have an opportunity to unpack

[3] Our school is currently implementing phase 1 of our instructional redesign. In the new instructional program, there are three teachers to a circuit (Kinder, Kinder, 1st grade) and each specializes

grade level standards, co-plan standards aligned lessons, observe each other teach the lesson they co-planned, debrief observation with one another to provide feedback and have a discussion about instructional moves, and analyze student work to measure mastery of the standard and objective. Table 2.1 explains the professional development cycle plan, which spanned over two months, February - April, including 6 professional development sessions.

Table 2.1

Initial Intervention Action Plan Professional Development ARC						
	Component	**Activities**	**Sub-questions to be answered**	**Data to be Collected**	**Type of Data**	**Data Questions to be answered**
1.	SBAC Math Interim January	● Give SBAC Math Interim ● unpack assessment items to identify standards and ● Determine instructional next steps	How can unpacking questions from SBAC ICA build teachers understanding of standards mastery in math?	Teacher's analysis of grade level problems sets and identified next steps for instruction	Process: Teacher	How can a focused PD arc build teachers' understanding of standards based instruction and pedagogical content knowledge? Data: Feedback forms, lesson plans, walkthrough data, end of year survey data, audio recordings of PD and observations
2	PD Cycle	**<u>Part 1:</u>** ● Solve grade level rigorous math problem and unpack prerequisite skills and discuss mathematical concepts.	How can different Adult Learning approaches impact practice? (end of year survey data, feedback forms).	Feedback forms, weekly observations of aligned instruction ad debrief feedback, collection of lesson plans,	Impact: Low inference data from walkthroughs on standards, objective alignment. Process: providing	How can a focused PD arc build teachers' understanding of standards based instruction and pedagogical content knowledge?

		● Co-plan lessons with grade level partner **<u>Part 2</u>** (between PD sessions): ● Teach lesson-observation by peer observer ● Debrief observation and receive feedback from the peer observer **<u>Part 3:</u>** ● Analyzing exit slips from the lesson and determine next steps for instruction. ● Solve grade level rigorous math problem and unpack prerequisite skills and discuss mathematical concepts. ● Co-plan lesson with grade level partner *This cycle will be repeated twice throughout the intervention	How can opportunities for feedback and reflection from coaches and peers improve practice?	student exit tickets.	teachers time to co-plan and co-observe lessons will strengthen their PCK and instructional delivery. Process: Debrief Reflections - What worked in the peer observation, what didn't. Process: Feedback forms on perceived impact of PD cycle on individual practice	Data: Feedback forms, lesson plans, walkthrough data, end of year survey data, audio recordings of PD and observations.
3	End of cycle presentations	● Present to other PLC group their (teacher) takeaways/learnings from PD activities and shifts in their practice as a result.	How can a focused PD arc build teachers' understanding of standards based instruction and conceptual knowledge?	Recording of presentations and analysis of learnings.	Impact	How can a focused PD arc build teachers' understanding of standards based instruction and pedagogical content knowledge?

Before beginning the intervention, our teachers gave the SBAC Interim Comprehensive Assessment (ICA). The test is designed to assess all of the standards per grade level (3rd - 5th grade) and mirror the summative SBAC state exam. The teachers were previously trained on how to administer the exam standardized (which means in a formalized testing environment).

At the first PD of the intervention action plan, we had teachers unpack the test items from the math ICA and analyze student responses. The purpose of this activity was to build teacher knowledge of grade level standards and to engage the team in an initial discussion about key grade level concepts in math. The exam was approximately 30 questions. The questions ranged in DOK level and spanned across the claims i.e. Problem Solving and Modeling/Data Analytics, Concepts and Procedures, and Communicating Reasoning. In order to focus teachers analysis in the PD, we gave them the graphic organizer in Exhibit 2.2.

Exhibit 2.2

Math SBAC Analysis: FOCAL 5 Data Review

Choose a FOCAL 5: Which students did well and are on track to passing the SBAC?
Look at ALL the *EASY* questions for those students -What did they do well on? What did they struggle with? -How can you spiral/ review/ quickly teach to assure success on these for your students?
Look at a few of the Highest *MODERATE* questions for those students -What did they do well on? What did they struggle with? -How can you teach these/ make sure students can do well on them?
FOCUS: How/ when will you assure your focal 5 are meeting standards? What is your next step for your math teaching?
STANDARDS: Look at your upcoming unit, which standards are coming up? Choose 1 you will focus on for this PD cycle.

From there we had teachers share their learnings from the activity and discuss the implications for their work in the upcoming trimester.

The second part of the PD session was to launch the peer observation process. The STEAM coach introduced the peer observation framework and plan for

the PD series. Next, using a constructivist listening protocol called a "Dyad"[4], we had teachers share with each other using the following prompt:

> "Describe a time when you received observation and feedback that had a positive impact on your practice. Share what made the process helpful, what did the observer say or do that pushed your practice in a positive way?"

Then teams use the Oakland Unified School District's "5x8 Student Vital Actions Card" in Exhibit 2.3 that was developed by the math department to ground themselves in the practices that they wanted their peer to observe for.

Exhibit 2.3

5x8 Evidence-Gathering Card

Principle	Student Vital Actions
Logic connects sentences *Practices 1, 2, 3, 6*	Students ***say a second sentence*** (spontaneously or prompted by the teacher or another student) to explain their thinking and connect it to their first sentence.
Reasoning develops when students develop viable arguments *Practices 1, 2, 3, 6, 7, 8*	Students ***talk about each other's thinking*** (not just their own).
Students write explanations *Practices 1 - 8*	Students **write their mathematics**, and connect multiple representations of their thinking (e.g. pictures, diagrams, numbers, words, tables, graphs, expressions, etc.). Students revise their thinking, and their written work includes ***revised explanations*** and justifications.
Academic success depends on academic language *Practices 3, 6*	Students use ***general and discipline-specific academic language*** in their oral and written explanations and discussions (spontaneously and/or prompted by the teacher or other students.)
ELLs develop language through content	***English learners produce language*** that communicates ideas and reasoning, even when that language is imperfect. They take advantage of available language supports and resources: peer support, sentence frames, multiple choice oral responses, visual representation, graphic organizers, home language, cognates, etc.
A growth mindset matters	***Interview- Do students believe that they can learn to be good at math*** by learning more math, by working hard, and persevering to make sense of problems? Or do students think they cannot change how good at math they are?
Equity (The foundation for the above)	***Which students are participating?*** (e.g. boys more than girls, the same few students, ELL and special ed students?) Are they volunteering? Called on to do math? Talking about math in their group? Off task? **All students ask math questions.**

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The purpose of using this tool was to ground the observation in what the students were doing in order to lower teachers' affective filter around being observed by a colleague,

[4] Developed by School Reform Initiative a dyad consists of the following guidelines: equal time, listening without judgement or interpretation, confidentiality, speaker agrees to not talk poorly of the listener or a mutual colleague (the listener cannot truly listen if they are feeling attacked or defensive).

since this was their first time engaging in a process such as this. Each team was tasked with agreeing on one student vital action that they would observe each other's classes for, and they shared this with the rest of the group. At the end of the PD session, we did our closing circle ritual as a whole staff and teachers completed the PD feedback form shown in exhibit 2.4.

Exhibit 2.4

Name: _____ Date:

What worked for you today?	What questions or suggestions do you have?
What support would you like?	What are you left thinking about?

During the subsequent PD session, our teachers to engage in solving a complex math problem in groups. We chose to give the team a 5th grade task from Achieve the Core Coherence Map (2018), shown in Exhibit 2.5 below, because we wanted to get a gauge of the groups' mathematical content knowledge.

Exhibit 2.5

5.OA Video Game Scores

Alignments to Content Standards: 5.OA.A.2

Task

Eric is playing a video game. At a certain point in the game, he has 31500 points. Then the following events happen, in order:

- He earns 2450 additional points.
- He loses 3310 points.
- The game ends, and his score doubles.

a. Write an expression for the number of points Eric has at the end of the game. Do not evaluate the expression. The expression should keep track of what happens in each step listed above.

b. Eric's sister Leila plays the same game. When she is finished playing, her score is given by the expression

$$3(24500 + 3610) - 6780.$$

Describe a sequence of events that might have led to Leila earning this score.

The purpose of this component of the intervention plan was for the group to have an opportunity to unpack a rigorous math problem as a team and discuss the key mathematical concepts embedded in the task. We provided teachers with the following graphic organizer in exhibit 2.6 to help guide their discussion and process for solving the problem:

Exhibit 2.6

Analysis of Math Problem

Name: _____ Grade level:

Write the problem and show 2 ways students will solve it.	What is the grade level standard? What else does the standard call for?
What are the prerequisite skills/ standards?	What might students struggle with? What questions can you ask them to help them think it through?

After solving the problem and presenting their solutions to one another, the teachers read through the commentary provided by Achieve the Core (2018), shown below (Exhibit 2.7). Their discussion focused on unpacking the standard 5.OA.2, specifically identifying the mathematical skills and conceptual knowledge it is requiring of students.

Exhibit 2.7

IM Commentary

Standard 5.OA.2 asks students to "Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them." This task asks students to exercise both of these complementary skills, writing an expression in part (a) and interpreting a given expression in (b). The numbers given in the problem are deliberately large and "ugly" to discourage students from calculating Eric's and Leila's scores. The focus of this problem is not on numerical answers, but instead on building and interpreting expressions that could be entered in a calculator or

1

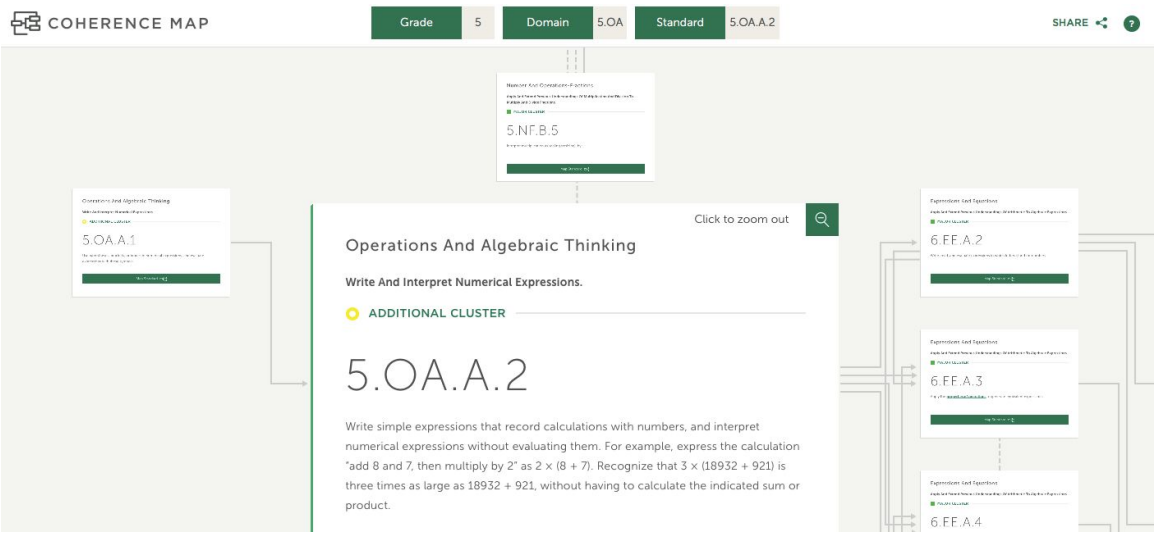
Illustrative Mathematics

communicated to another student unfamiliar with the context.

The STEAM coach then showed the team how to "map" the standards using the Achieve the Core "Coherence Map" online tool[5]. The teachers were given time to "map" the standard 5.OA.2 from the sample task. Exhibit 2. shows what the initial mapping process looks like for that standards using the coherence map.

[5] The purpose of this tool is to help teachers to: understand how the standards build student understanding by linking together concepts within and across grades, identify gaps in a student's knowledge by tracing a standard back through its logical prerequisites, and visualize and understand how supporting standards relate to the major work of the grade (SAP, 2018).

Exhibit 2.8



The next part of the PD session was for teachers to unpack the three shifts: focus, coherence and rigor in the common core state standards. The STEAM coach had teachers watch a 5 minute video that describes the three shifts and facilitated a discussion afterward.

Lastly, grade level teams received structured planning time with their grade level partner. Grade level teams were instructed to look at the Engage NY teacher's guide and choose an upcoming lesson to co-plan and teach during peer observations. Teams were given a planning template to guide them through the process. See exhibit 2.9.

Exhibit 2.9

Planning Math Lessons from Engage NY

Name:_____ Grade Level:____ (Module, Lesson): _____

Standard & Objective	**Teaching Sequence** Fluency- Daily practice of facts Hook—Posing and making sense of the first problem You Do—Independent/group productive struggle We Do—Sharing strategies and models to move learning forward; guided practice You Do—Apply and practice learning from "We Do" Debrief—Synthesize learning and reflect; ie. student presentations, turn and talk, class discussion. Exit Ticket- Assess what students understood
*Choose problems based on Coherence Map examples of mastery.	**Fluency Problem(s):** **Hook:** **You Do Problem:** **We Do Strategies/ Problems:** **You Do Problems:** **Debrief:** **Exit Ticket:**
Evidence of Student Understanding (What will you look for to measure their understanding?) **Possible Student Misconceptions** (What might students struggle with?)	

As the grade level teams planned the upcoming lesson that they were to observe each other teach, they were given the space to have discussions about which problems to choose for their problem set and to unpack the mathematical concepts that were required of students in the task. The STEAM coach rotated around the room providing thought partnership to the teams as they completed the activity.

After the second PD session, began the peer observations. The STEAM coach and the principal helped cover classes to ensure that each grade level team had the opportunity to observe each other teaching the lesson they co-planned[6].

[6] The K-1 design teacher paired with the STIP Sub, who was an aspiring teacher and would late become our new hire for the 1st -2nd grade personalized workshop teacher position for the 18-19 school year.

Next came the third PD session where teams engaged in a second round of solving a rigorous math problem in small groups, debriefed the first round of peer observations, and co-planned a second lesson that was to be observed again by their peer. During this PD session, teachers shared the need for more techniques to engage students in academic discussions in math and the need to understand better the mathematical models[7].

My original theory of action was this that teachers needed time to plan with their grade level partner with support from a coach to help their team when there was a lack of understanding with the content. Based on teacher feedback from the third PD session, instructional walkthroughs throughout the first half of the intervention, and peer observations and feedback sessions, the STEAM coach and I decided to shift the focus from co-planning and peer observations to unpacking conceptual strategies that carry throughout the grades and within the Engage NY Math curriculum. The shift in the original intervention plan was also supported by research of Magnusson et al (1999) in "Nature, Sources and development of pedagogical content knowledge" when they suggest that teachers "knowledge of ways to represent specific concepts or principles in order to facilitate student learning, as well as knowledge of the relative strength and weakness of particular representations. (p. 111)" is crucial to effectively teach the content.

A secondary shift at the mid-way point, per teacher request, was to also incorporate techniques for increasing student academic discussion about math. This was a result of focusing the peer observations on the Student Vital Actions, and groups sharing

[7] Examples of Engage NY mathematical models include: tape diagrams, number bonds, place value charts, rekenrek

overwhelmingly that students across the board need more support with producing academic talk on content.

As a result, Table 2.10 details the final PD arc that was implemented as the intervention action plan to address the problem of practice for the action research.

Table 2.10

Date	Outcome:
2/2- 4/20	3-5 teachers and K/1 teacher will examine, plan, teach, and assess math lessons based on student data and discuss with a partner the focus of peer observations based on teacher need.
2/2	Teachers will analyze ICA SBAC Math Data with this tool for analysis Teachers will choose one standard in the upcoming unit and decide on a next step in teaching that standard. Teachers will understand the PD arc for this cycle. Teachers will decide how they would like feedback and what they would like to focus on from SVAs.
2/9	Teachers will analyze a problem at their grade level and share their analysis with the group with this Problem Analysis Template. Teachers will use the Coherence Map to better understand their upcoming standard. Teachers will understand the three shifts in the common core standards: Focus, Coherence, and Rigor. Teachers will plan an upcoming lesson using EngageNY as a resource on this Lesson Plan template. Teachers will understand the purpose of peer observations and plan for peer observations.
3/2	Teachers will solve a math problem together and discuss the conceptual understanding necessary for solving the problem. Teachers will debrief the first round of peer observations. Teachers will plan an upcoming lesson using EngageNY as a resource on this Lesson Plan template.
3/16	Teachers will learn a strategy for small group learning by watching a video and discussing with a partner. Teachers will understand how number bonds build through the grades. Teachers will plan an upcoming lesson using EngageNY as a resource on this Lesson Plan template.
3/23	Teachers will learn a strategy for small group learning by watching a video and discussing with a partner. Teachers will continue to understand how Number Bonds build through the grades. Teachers will understand how Number Lines build through the grades. Teachers will plan an upcoming lesson using EngageNY as a resource on this Lesson Plan template.
4/20	Teachers will Understand how Place Value builds through the grades. PLCs will prepare for end of cycle presentations: What has your group been working on? What are your takeaways? What implications are there school-wide? What are next steps? Teachers will take a survey to reflect on their adult learning for the year.

Analysis and Findings

The overall research question for this action research was: How can a focused PD arc build teachers' understanding of standards based instruction and pedagogical content knowledge?

In analyzing the findings, I sought to understand what impact the six week professional development cycle had on developing teachers' pedagogical content knowledge in math. I also sought to learn the impact that deepening a teachers' pedagogical content knowledge in math had on increasing the effectiveness of the instructional decisions teachers make when planning. Lastly, I hoped to learn which adult learning technique works best for our team in order to continue growing their practice in the future.

Throughout the intervention, we did three instructional walkthroughs focused specifically on standard, objective, task alignment in math. The first walkthrough we conducted was with the Network Superintendent from the central office and the principal in late February. In this walkthrough, three out of 6 teachers had standard, objective, task alignment. A big trend we saw in the observations was that rigor was lacking due to teachers solving the problems for the students and the absence of student engagement opportunities with one another.

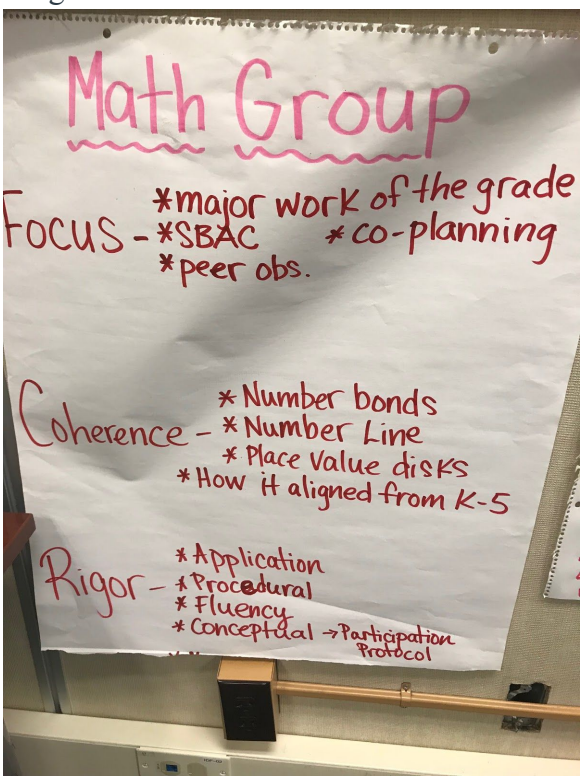
The second walkthrough, few weeks later in mid-March, was conducted by the network team of principals[8] and district level instructional coaches. All participants in the Math PLC (6 of 6) had standards, objective task alignment. In two of the six classes, the math content instruction was incorrect and the teacher was visibly confused by the lesson plan. This was one important data point that helped to initiate the shift of the intervention plan to spend more time on developing their pedagogical content knowledge through the Engage NY Mathematical models.

The third walkthrough was done by the coach team along with the Director for K-8 Math from central office. In this walkthrough, 5 out of 6 teachers had standard, objective, task alignment and the one teacher that did not demonstrate this was administering the end of module exam, so we didn't get to observe a lesson. The feedback that the Director of Math gave our team was there is a clear shift in math instruction at our school. Teachers were implementing standards aligned objectives and tasks and were engaging with students in a positive way. A continued area of growth is developing teachers pedagogical content knowledge so that they can push student thinking by asking strategic questions. In the observations, teachers struggled with addressing misconceptions or confusion students had because of the gaps in their own content knowledge. Additionally, she suggested that we focus future PD on engagement strategies, so that students have structured opportunities to grapple with mathematical concepts and hold the cognitive load in the classrooms.

[8] In our district, Principals are broken up into groups and attend bi-monthly PD. This includes instructional walkthroughs at school sites.

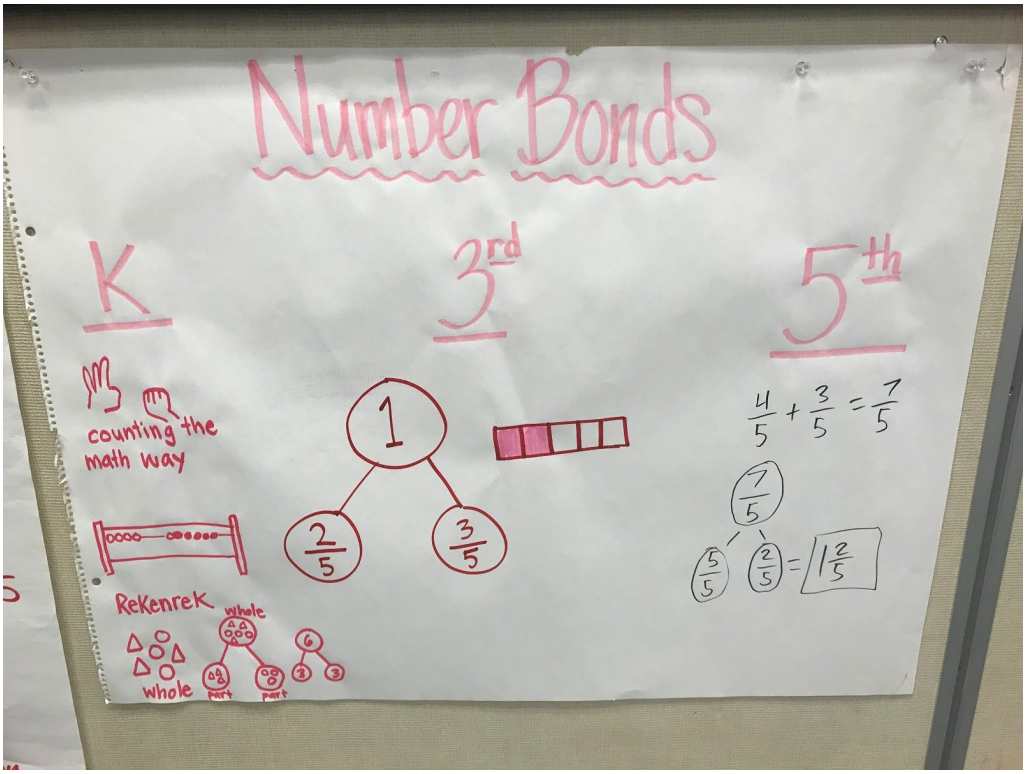
At the last PD of the intervention, which ended up being one of the last PDs of the school year, we had the PLC groups create a presentation of their learnings from the 6 session cycle to present to the other PLC group. During the presentation, teachers were able to clearly describe the shifts in common core and how we addressed them in our work during the PD cycle. Image 4.1 shows the poster the team created to share with the other group.

Image 4.1



Additionally, the math PLC group created a poster to explain how we unpacked the mathematical models the Engage NY program uses to build student conceptual knowledge. They shared how these models build through the grade. Image 4.2 is an example of the participants' presentation of number bonds:

Image 4.2



After presenting this section, one our most veteran teacher emphasized the importance of coherence of the standards and implementing math models with fidelity to support instructional alignment at the school and the impact on student learning. He said, “One of my biggest take-aways is that it is really important that we commit as a school team to using these strategies with fidelity if we want our students to really get a conceptual understanding of the math. We are really struggling in the upper grade to engage students in the curriculum because of the gaps they have in the foundational skills. I see the benefit of using the models and I hope we can really impact student achievement with an aligned program and implementation.”

Lastly, we administered an end of year survey to collect teacher perspective on the professional develop this school year. The survey was given to all 11 teachers and is shown in Exhibit 3.1.

Exhibit 3.1

EOY Adult Learning at Hoover~ Reflection

What worked well for your growth as a professional this year?

Your answer

Which activity below impacted your practice the most?

- [ ] Whole Group PD
- [ ] PLC (Math/ELA with coaches)
- [ ] Individual coaching
- [ ] Peer observations and feedback
- [ ] Collaboration
- [ ] Other: _____

My professional learning would have been even better if I had the opportunity to:

Your answer

SUBMIT

We gave the survey to the entire staff and these were the results:

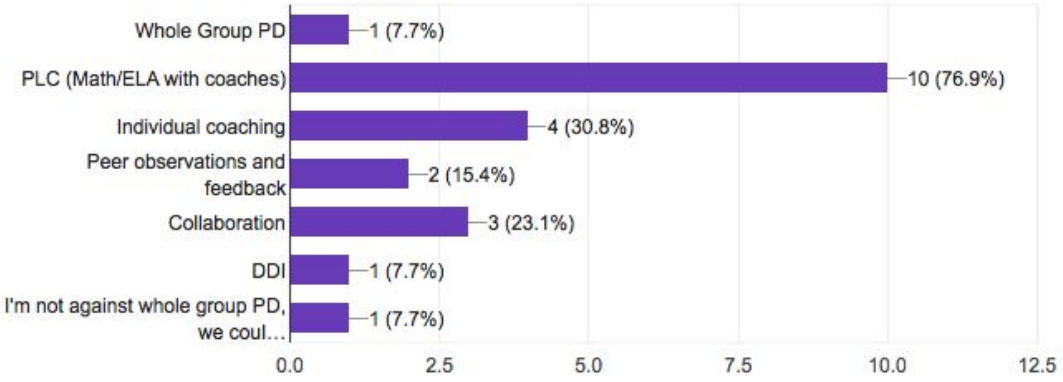
What worked well for your growth as a professional this year?

11 responses

- Working with my other colleagues to discuss Math alignment at Hoover.
- Direct instruction on Interactive Read Alouds from Gillian
- Lots of people coming to observe me, giving me specific feedback and ideas, information about what was and wasn't working, helping me figure out what to prioritize. Having opportunities to observe other teachers. Focusing on one subject area for several weeks was also helpful.
- Collaborating with teachers on our practices and seeing the trajectory of curriculum throughout the grades.
- Delving into the alignment piece of math and seeing how what we do in the classroom could impact other teachers.
- Time to work during PLC groups; Time to plan lessons
- It's my first year. So I really felt that all of it was very beneficial to me. I didn't do much collaboration. The PLC with Gillian was the most effective as well as the peer observations and feedback.
- Working closely with people in my design circuit
- Inquiry Groups - IRA and opportunites to align TK-5th, I liked hearing what the other inquiry group worked on. We also had a chance to look at Writing TK-5 and I felt like that alignment benefited my practice also.
- I liked the interactive read aloud PD cycle. Having time to go into depth in that content area, and make sure we were learning what we as teachers felt we wanted to get better at.
- looking at how math progressed across all grade levels, going over important concepts in math and which ones are the most important to focus on, peer observations, planning in the same space as other grade levels

Which activity below impacted your practice the most?

13 responses



My professional learning would have been even better if I had the opportunity to:

12 responses

- more grade peer pd time, to work awareness and alignment opportunities
- Observe more Math classes
- Go deeper on one thing e.g. student participation
- Individual coaching, peer observations and feedback.
- Co-plan more, especially long-term co-planning
- to do both groups somehow
- Peer observation and feedbacks, more time to collaborate on the same text with a grade level partner to plan the lesson and teach it at the same time (hard to do when we don't have a text set for this).
- I'm not sure what I need since I am first year. I I'll have a better grasp of what I need as I start.
- think about design needs (pacing, scope and sequence, etc) more during PLC/PD time
- Structure collaboration in a better way, focus on collaborating with PW so we could overlap ELA standards in the two components. I would have liked to observe other teachers teaching ELA or Science as well - especially in upper grades to get a sense of what practices I need to get the kids ready for.
- We really need PD on academic discussion and unit planning for everyone in the school. (GLAD would be great too). I think really prioritizing PD cycles over one-off random things. We only had one meaningful cycle, I'd love to have more. I think that the four missed PD for APTT is not necessarily worth it. T
- more choice about selecting PLCs instead of being assigned by grade level (people might need more support in certain areas), no math or science assessments were graded by everyone but writing assessments were (look at variety of assessments)

From this data set, teachers overwhelmingly across the school felt that the PLC focused groups over a period of time had impact on their practice. For the math PLC specifically, participants stated that working through with colleagues to discuss math instructional alignment and thinking about instruction school wide, not just in their own practice helped them to grow professionally. Additionally, the math PLC participants appreciated to the time to co-plan with their grade level partner and to be regularly observed by peers and coaches and receive feedback on what they can build on.

Conclusion

In our final coach team meeting, the team discussed the result of the PD reflection survey. We all agreed that teacher were very honest in their responses and that there has been a huge culture shift over the past two years around shared leadership at the school. Coaches stated that teachers feel comfortable providing leadership with constructive feedback, and are invested in the mission and vision of the school. From here, we decided to re-examine our weekly PD, coaching and teacher collaboration structure and developed a new framework in partnership with the ILT.

Exhibit 5.1

Hoover Adult Professional Learning Plan 2018-2019				
When: Friday	When: Friday	When: Bi-Monthly	When: Aligned to Cycles	Thurs. & Friday Minimum Days
Who: K/1, 1/2, 3/4, 4/5	Who:_STEAM, Math Studio, PW	Who:_STEAM, Math Studio, PW	Who: Individual based - each teacher getting one	Who: K-2 STEAM, PW, Math and 3-5
Grade Level PLC ● Weekly meeting with pod teachers ● Discussion about students: where they are academically (Data) ● Discussion about students: social emotionally (URFs) ● Determine who needs COST.	**Content PLC** What: ● Weekly meeting with content team: STEAM, Math, Personalized Workshop ● Discussion and learning about content standards How: ● Looking at student work samples across	**Collaboration** ● Bi-monthly Meeting with content team for Data Driven Instruction ● DDI: analyzing large scale data and deciding on next steps for students and teachers ○ Weekly quizzes ○ F&P	**Coaching** ● 1:1 teacher and coach choosing from Coaching Menu (see below) ○ Instructional feedback ○ Classroom hands-on learning ○ Lesson planning ○ DDI ○ Professional	**End of Cycle Planning** ● Cycle long term planning ● Aligning on pacing and curricular modifications ● Determine collaboration schedule with team and add dates to master calendar.

● Discussion about systems: how do we align our systems? ● Discussion about SEL lessons and systems. ● Promoting and planning family partnerships ● Deciding on field trips and discussing logistics for trips ● Plan for upcoming absences/subs ● Promoting partnerships with support staff around supporting students ● Determine Report Card Responsibility	grades to address learning gaps and align on expectations ○ exit tickets ○ writing samples ○ reading responses ● Discussion and learning about key instructional moves and strategies ● Reviewing weekly standards covered (pacing)	○ SRI ○ Math Mid-Module ○ Math End- of-Module ○ Writing On Demand Assessments ○ FOSS Assessment ○ SBAC ICA or IAB	Learning about a topic ○ Cycle of Inquiry ○ Support Peer observations ○ Support Lesson Study	
	● 1x/month PW and STEAM teacher from GL band review standards sharing.			

Exhibit 5.2

Hoover COACHING Menu of Options	
Purpose: To strengthen implementation of teaching strategies. **Observational Feedback Cycle** Link to Templates	● Initial Meeting: What will we work on and how? ● 4-6 Sessions: Coach observes lessons and debriefs together with teacher ● (Optional) Observe another teacher together and debrief ● Reflection Meeting: How did we work together? What are the next steps?
Purpose: To have a model of and practice teaching strategies. **Classroom Hands on Learning** Link to Templates	● Initial Meeting: What will we work on and how? ● 4-6 Sessions: Coach demo, Elbow teach, teacher teaches and gets feedback ● Reflection Meeting: How did we work together? What are the next steps?
Purpose: To hone in lesson planning skills.	● Initial Meeting: What will we work on and how? ● 4-6 Sessions: Teacher and coach meet to plan

Lesson Planning Link to Templates	lessons. ● (Optional) Coach observes and gives teacher feedback or teacher and coach co-teach. ● Reflection Meeting: How did we work together? What are the next steps?
Purpose: To strengthen making instructional decisions based on data.. **Data Driven Instruction** Link to Templates	● Initial Meeting: What will we work on and how? ● 4-6 Sessions: Analyze daily data together and plan instructional moves based on student needs. ● (Optional) Coach observes and gives teacher feedback or teacher and coach co-teach. ● Reflection Meeting: How did we work together? What are the next steps?
Purpose: To strengthen implementation of teaching strategies. **Professional Learning on a Topic** Link to Templates	● Initial Meeting: What will we work on and how? ● 4-6 Sessions: Learn about a topic of interest together and discuss implications for the classroom: choose a book, a series of articles, teaching videos, etc. ● Reflection Meeting: How did we work together? What are the next steps.
Purpose: To strengthen implementation of teaching strategies. **Cycle of Inquiry** Link to Templates	● Initial Meeting: What will we work on and how? ● 4-6 Sessions: Go through the cycle of Inquiry. ● Reflection Meeting: How did we work together? What are the next steps.

Our coach team also debriefed the peer observation protocol we implemented in the intervention plan for the math PLC. The teachers in the end of year survey also stated that they would have appreciated the opportunity to engage in this structure. One thing our team would change moving forward is ensuring that there is a coach present during the observation and debrief. A reflection that the STEAM Coach and I had was that teachers weren't critical enough, and there were missed opportunities to have deeper level debrief than what took place this first time around.

Our leadership team looks forward to continuing to promote teacher voice and choice to determine our PD plan, as well as, continue the adult learning structures that our team found were beneficial in growing their practice. i.e. peer observations and building teacher pedagogical content knowledge in math through collaborative problem solving and conversations around alignment.

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