Literature Synthesis for Winter 2021 Lesson Study

In this lesson study our research question was how we could cultivate students' confidence in math discussion and group work so that they are willing to share their thinking and support one another in our online math/science classroom. We had the equity goal of supporting students in building on each others' ideas in math discussions and trying to encourage all students to have their videos on during discussions. The core skills and content understanding goals that students would be exploring during this lesson are becoming familiar with the key vocabulary describing the parts of a circle: diameter, radius, area, circumference, and pi. With these goals in mind, we read several books and articles to help us develop a lesson plan that would achieve these objectives.

In the article "Get All Students to Speak Up," Goodwin mentions the phenomenon of the "vital few and trivial many." In terms of education, this is a trend in which a "small portion of students tend to account for a large portion of the discourse that occurs," (Goodwin, p. 82). One of the strategies that has been shown to help dismantle this unfair, oppressive pattern is having small group discussions prior to whole-class discussions. We built this into our lesson by creating moments of individual think-time and sharing with trusted partners before we asked students to share their ideas with the whole class. This strategy seemed to help three of the focus students feel confident sharing their ideas. We also chose to ask fewer, more thoughtful and open-ended questions in order to dismantle the idea that there is only one right way to find an answer to a question or explain a math problem.

In *Cultivating Genius*, Dr. Gholdy E. Muhammad presents a four-layered equity framework that provides all students with opportunities for personal, intellectual, and academic success. In this lesson, we are trying to use this four-layered system of equity to facilitate deeper learning and more engaged discussions. This lesson fostered Identity Development through opportunities for students to share their knowledge in a variety of ways to break down the stigma that you have to be a "math-person" to be "good" at math and the false narrative that there is always only one way to solve a math problem. The students worked on Skill Development and Intellectual Development by analyzing the parts of a circle, how those parts relate to the formulas mathematicians use to determine the area of a circle, and recognizing similarities and differences between the ways students think about these concepts. Students read the responses of their classmates and deciphered similarities and differences they found in the several strategies that were used in order to help develop their Criticality.

Cornelius Minor does an excellent job challenging the trope that teachers are superheroes in his engaging, functional, and entertaining book, *We Got This*. One of the recommendations he has is that in order to create a classroom environment where students feel safe to share their ideas, teachers must create a space where power is shared between teachers and students. We tried to do this in our online class by providing multiple opportunities for students to share their knowledge and lead discussions about mathematical concepts in a variety of ways. There were several rich

verbal discussions between students and many times in which written responses from students were shared with the entire class.

In *"Multiplication Is for White People": Raising Expectations for Other People's Children*, Lisa Delpit lays out key ideas and strategies for raising expectations for minority children, particularly Black youth. She urges educators to recognize the brilliance of children and teach them skills and relevant content to build on their strengths. Designing the lesson so that students led the discussion with facilitation from the teacher helped to achieve this goal. We were able to use diverse strategies to monitor and assess students' strengths and needs by what they were entering in their Desmos slides, what they were typing in the chat, and what they were speaking about in small group and whole class discussions. Several students examined their ideas about the relationship between a radius square and a circle, through a whole class discussion, showing they were using their prior knowledge to examine new information they were learning. This demonstrated a connection to their math/science classroom community as a safe and caring space in which they were encouraged to share their ideas.

Though it is a short article, LauraMarie Coleman's piece "Deeper Discussions in Math Add Up" had some helpful examples of personal experiences and research showing how discussions in math class that focus on different ways to think about a problem can be much richer and provide deeper learning than rote memorization of mathematical rules. By encouraging the mindset that we are all learning together and providing space for mathematical discussions in this lesson, we aimed to increase student learning, motivate students, support teachers' understanding and assessing of student thinking. This helps shift the mathematical authority from teacher and/or textbook to the community of our online classroom.

Dismantling the power structure of the teacher being the sole holder of knowledge and letting students lead discussions in math classes helps recognize the brilliance within children, helps them build on the prior knowledge they have, connects the students to their classroom community, and demands critical thinking for students to access skills they are developing. Moving forward, I will design my lessons so there are many opportunities for students to share their knowledge. I struggle with trying to get all students to join our classroom discussions, especially in online learning. Since this is a new experience for myself and the students, I want to approach the goal of having all students feel comfortable sharing their ideas in our class with grace and patience. Using strategies such as the ones we used in this lesson study will move us towards the goal of everyone feeling safe to share in our classroom, and it is unreasonable and unrealistic to expect every single student to feel comfortable in the online space since this is new to us and we are also in the middle of a very stressful pandemic. For the time being, I can connect with those students who do not yet feel comfortable sharing in front of their colleagues in other, less intimidating ways like one-on-one conversations, sending private messages in the chat, or through email.

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Coleman, L.M. (2020). Deeper Discussions in Math Add Up. *Educational Leadership,* p. 58-62.

Delpit, L. D. (2012). "*Multiplication is for white people": Raising expectations for other people's children*. The New press.

Goodwin, Bryan (2014). Get All Students to Speak Up. *Educational Leadership*, November 2014, 82-83.

Minor, C. (2019). *We Got This. Equity, Access, and the Quest to Be Who Our Students Need Us to Be*. Portsmouth, NH: Heinemann.

Muhammad, G. (2020). *Cultivating genius: An equity framework for culturally and historically responsive literacy*. Scholastic Incorporated.