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1. Lessons shown in video

Video clip 1 is lesson 2: 45 Layout Horizontal. Video clip 2 is Lesson 3: Golden Bead Addition

2. Promoting a positive environment

Creating a positive learning environment means to “understand students’ learning and social needs; providing students with access to an engaging and appropriate curriculum; and using innovative, motivating, differentiated teaching practices and instructional accommodations” (Salend, 2010, p. 278). The Montessori environment promotes a positive learning environment through the use of learning centers. Learning centers is a way to reach all types of learners by providing a variety of learning domains for students to develop their strengths and weaknesses. In my classroom, I have the following learning centers: practical life, art, sensorial, math, language, cultural subjects, and science. It is through these centers that students are actively engaged by exploring and repeating hands-on, concrete learning resources. All activities in the learning centers are mentally stimulating and challenging—which is an effective classroom management strategy. The variety and complexity of the learning resources available within each learning domain reaches out to all learning abilities, ranging from very simple to complex. In the first video clip, the two girls are working on the Forty-Five Layout (lesson 2). These two students are very good friends and love doing everything together. As they are socializing, they are completing the task at hand. The student that has not yet mastered this lesson, I provide prompts and lead-on questions to elicit the correct response (video clip1, time 1:55). Whereas, the student who have mastered this lesson is quick to generate a response (video clip 1, time 1:01). You also see that the students accessing the math materials located in the Math area of the classroom (video clip 1, time 2:05).

Showing respect and rapport

Students are challenged to engage in learning throughout the lesson. The students are cooperatively learning and authentically learning. The students are directing their learning, rather than being directed by me. In the first video clip, which is lesson 2, I demonstrate respect and rapport with students by acknowledging their responses to questions when asked. The student with the blue dress mentions that she can count to 100 (video clip 1, time 4:35). I responded to her need to demonstrate her ability by asking her count by tens (video clip 1, time 4:50) and then continues to count by hundreds. I then use a scaffolding strategy by “fading away” from the lesson and have the students complete certain parts of the task without my assistant (video clip 1, time 5:35). To acknowledge student answers, I use the talk moves of wait time, say more, and revoice (Chapin, O’Connor and Anderson, 2013). Students respond to the questions in different ways, some are quicker to respond, while others require longer wait time, or more leading questions for them to arrive at the correct response on their own. I asked one student to explain the organizational procedure of the units place value (video clip 1, time 1:00 – 2:20). I provide non-attributive feedback as a way to encourage their learning (video clip 1, time 0:12). In the second video clip (lesson 3), after guiding the first student with reading her four-digit number, the second student independently requested for a challenge by trying to read his own how to read the number (video clip2, time 1:08). I responded to the second student’s challenge and helped him to succeed in his challenge by providing him clues, hints, and leading questions to help him to arrive at the correct response (video clip 2, time 2:18).

3. Engaging students in learning

Students elicit their understanding of the learning targets by showing and explaining their thinking as they work with the manipulatives. The learning target for lesson 2 is for students to associate quantities with the cards from 1 to 9000. After

the student completed matching the hundreds quantity with the hundreds numeral cards, I have her check her work (video 1, time 6:05). She then excitedly exclaims that the thousands is the next place value that she is working on (video clip 1, time 6:18). At the end of the lesson, I asked the students to reflect on their learning (student voice video clip). In this video clip, the student is able to explain in her own words how 8000 is different than 9000. She said that if the two stacks of thousand cubes were 8000, then they would be the same height. But if one more thousand cube was to be added, it would be 9000 (student voice video clip, start - 0:21).

The learning target for lesson 3 is for the students to experience the addition operation of adding together different small quantities to form one larger quantity. I had the students read the small numeral card, which are the addends, in expanded form, and then in standard form (video clip 2, time 0:16 – 2:20). Response here show different levels of understand as one student fluidly reads the four-digit numeral cards, while the other student needed a lot more guidance. I then explained that addition is when you put two quantities together. The students then went on to put together the two quantities. I had them start with the units place and bring all the unit beads below the answer line. I had them count the unit beads and then find the corresponding large numeral card. In reflecting on these clips, I realized that I did not ask students why the learning targets were important, therefore in the future, it is a strategy that will need to be included in my lessons.

Developing mathematical concept

My instruction engages the students in developing the mathematical conceptual understanding of place value. In order to develop conceptual understanding place value order, I restated the procedural order of the layout to aid in memory (video clip 1, time 7:20). In order to develop understanding of counting by 10s, I prompted the student by giving them the first few multiples of 10, I had them try again. I then had the student explain how many ten bars makes 50 (student voice video 1:55).

In the Golden Bead addition, I first gathered all the unit beads together below the answer line, just like how it is done if it was written on paper, followed by the tens, hundreds and then thousands (video clip 2, time 2:45 – 3:35). The mathematical concept of addition means to put together two smaller numbers called addends, to get one larger number that is called the sum is demonstrated by the students (video clip 2, time 3:38 – end).

Link to prior knowledge and assets

Before being introduced to the decimal system, students have to know numeral and quantity 0 to 10, they have known their teens, and have been exposed to simple mathematical operations, such as addition and subtraction. Introduction to the decimal system begins with visual and tactile memory of what the Golden Beads feel and look like from each place value (preassessment in lesson 1 and 2). The students then associate the numeral with the quantity. In lesson 1, (video clip 1, time start – 0:30), I ask the students to verbally describe their work in progress. Their answer demonstrates their knowledge number symbol recognition, quantity, recognizing number patterns. In order to get students thinking more specifically about the numbers they worked with, I prompted them by asking what specific numbers they worked with (video clip 1, 0:07). In response, the student said, “eight” as she counts each unit bead. Later on in the lesson, the same student finished organizing the hundred squares, she counted by 100s, “100, 200, 300...900...and then 1000” (video clip 1, time 6:18). This is the third time these two students have done the 45 Layout (lesson 2). Therefore, their prior knowledge of place value elicited to the correct response of what place value to organize next is demonstrated (video clip 1, time 6:18).

4. Deepen student learning

In order to promote thinking and develop understanding of mathematical concepts, I gave students examples of the academic language they would use during the learning segments. To develop number sense and order, I ask open-ended questions. I ask one of the student, “How do you make 6000?” She demonstrated by counting out six thousand cubes. I then ask the other student, “What is after 6000?” The student responded with “7000” (video 1, time 9:00 – 9:40). In lesson 3, I continue to promote thinking and understanding of the mathematical concepts by asking students, “How many units did you get? How many tens did you get? And how many hundreds? And how many thousands?” The

students was able to read the numeral cards and tell me how much she has in each place value. She then was able to read the number in standard form. Phrasing of questions are careful, concise and clear, so that it sparks students' interests. This type of questioning is a way for students to dig deep and analyze their knowledge. When digging deep into the construction of knowledge, make I allow sufficient wait time to allow students to gather their thoughts.

Representations to support understanding

The Golden Beads and numeral cards broadens and deepens students' experiences with multi-digit numbers. Students names these numbers and compare them, visualizing their comparative size and location within the place value system. The layout of the Golden Beads in lesson 1, 2, and 3 is consistent throughout the instruction. In lessons 2 and 3, it has the same color coded scheme as lesson 3, which makes it easier for students to acquire a comprehensive understanding of the order and location of place value. In lesson 3, students perform four-digit addition on a place values chart. Using a place value chart supports students in performing four-digit operations, like addition and subtraction. They layout the first addend of Golden Beads in order, starting with the units beads and working their way to the thousands place value. They then place the corresponding numeral card below the quantity. Concrete representations of number (the Golden Beads) always comes before the abstraction representation of the number (the numeral cards). The second addend is then laid out in the same way as the first added, but below the first addend. Students are using the Golden Beads to perform four-digit column addition. I then stack the small numeral cards on top of each other and have them read the numbers of the two addends—this is way for students to verbally practice the language demand required for this lesson. The color coding of the place values allows students to visually see that they must perform the operation only within the designed place value. Depending on the ability of the student, I might have them practice reading the numbers in expanded form before reading it standard form. There are two sizes of numeral cards used in lesson 3. The smaller numeral cards are used to create addends. The larger numeral cards are used to represent to the sum. The reason for the two sizes is for students to visually see that when they take two smaller numbers (the addends) they get a larger number (the sum).

5. Analysis of teaching

My instruction supported individualized learning to meet a variety of learners in my class who may require different strategies and support. The environment layout of the classroom fosters a learner-centered approach in which the students are provided with multiple opportunities to develop understanding of the concepts. The students may choose to work together and engage in dialogue about what they know. In lesson 2, seems to need more practice with what it means to count by 10s. After demonstrating to them how to count by tens with the ten bars, they were able to do it successfully. I did realize that in the Golden Bead addition (lesson 3), I forgot to have the students check their answers. At the end of each of these lessons I should have ask the students figure out relationships between the lesson presented and its real life application.

Individualized and small group lesson presentations supports each learner who is academically and developmentally ready in understanding concepts presented in this lesson sequence. When I pair up students to do small group presentation, I have a tendency to work with students of mixed-abilities; there is usually one who has mastered the lesson and another who is progressing towards mastery. I acknowledge the different learning styles and abilities found in the classroom and applied that to all lesson presentations. For example, all three lesson plans are done on the floor to help students develop core strength and gross motor coordination; the students are actively moving materials to construct their learning to suit hyper active and kinesthetic learners, and using discourse and dialogue as a way to assess student's understanding of the content in a developmentally appropriate way. I think one way to improve is to incorporate more opportunities for whole group discussions.

In supporting students who struggles with math, I provide modeling of the language and opportunities for students to use the language. I give verbal and visual instructions to students about what they will be doing to learn the objective. I provide opportunities for them to practice the language demand of place values by having them use it regularly throughout the lesson.

I also support learning for students who are struggling with mathematics by giving them time to think (wait time) about the questions I ask. When students need extra guidance, I guide them to a peer to help them with their needs. One thing I can improve on is student self-assessment.

To support students who needs a greater challenge, I would extend the lesson. For lesson 1, I would have them roll dice, each die represents a place value, and have the student gather that amount. For lesson 2, I would have the student think of another way to display the 45 layout. For lesson 3, I would present to the students on how to regroup by exchanging the Golden Beads.

Changes for improvement

When students connect what they learn with the world, it makes learning more meaningful. I could have asked questions that connects the lesson to themselves: How many centimeters tall are you? Or, I could have asked questions that connects the lesson to the world: Where have you seen numbers like this? Vygotsky's socio-cultural theory believed that early learners, like my students, cannot separate personal and social experiences, and that they use language to develop skills and grasp new concepts as they speak to and listen to each other (Pressley & McCormick, 2007). Another way to make learning more meaningful is through small group, which I successfully demonstrated in my lessons. When students work in small groups, they are learning to work cooperatively to tackle complex tasks, engage in discourse and dialogue, and progress at their own pace (Knight, 2013).

I do not regularly deliver content specific math lesson to the whole-class because I feel that it is difficult to reach to all learners. However, Goldsmith (2013) suggests that whole-class discussions that promotes critical thinking provides opportunities for students to engage in meaningful conversation in which they learn from each other. Whole-class discussion also promotes student accountability and equity in student voice. Discussions can foster a psychologically safe learning environment for students in which they are free to express their thinking without feeling pressure to be "right" or "wrong," and promote peer-peer learning as students (Goldsmith, 2013). When students are welcomed to participate in academic conversations they become actively involved in the learning process. Specifically, questioning and discussion strategies can help cultivate a more engaging and motivating environment for students. According to Caram and Davis (2005), teachers who utilize effective questioning strategies are better able to engage their students than those who practice a more traditional "stand-and-deliver" style. However, simply asking the students questions will not boost engagement, teachers need to be able to ask deeper level questions if they hope to truly interest their students. Asking more open-ended, deeper level questions aligned to each learning target provide students with opportunities to think critically and develop problem solving strategies on their own, which, in turn, deepens their learning (Caram & Davis, 2005).

As a teacher of early learners, I need to improve with students' self-reflection—thinking about what they have to think about how well they understand a topic and where they might need more practice (Ellis, Denton, & Bond, 2013). This reflection practice is also known as metacognition—thinking about the learning process and progress. Self-talk is an important role in the metacognition process in which the student think about their thinking by talking out loud their thinking process. Flavell (1979) breaks down the cognitive processes into four major parts: metacognitive knowledge, metacognitive experiences, goals or tasks, and actions or strategies (p. 906). Metacognitive knowledge is defined as beliefs about what affects cognitive processes (Flavell, 1979, p. 907). Metacognitive experiences are explained as that moment before or after you think about something and you either feel like you understand or you feel like you don't understand. Goals or tasks "refer to the objectives of a cognitive enterprise" (Flavell, 1979, p. 907), and actions or strategies are the behaviors or thoughts to attain those objectives (p. 907). In order for reflection (and metacognition) to be effective, I must allow time for students to practice reflection either verbally or written, and teachers must also reflect on their instructional strategies.